



# Non-Fungible Tokens and the Event Ticketing Industry in Portugal

João Nunes Rosado

Dissertation written under the supervision of Peter Rajsingh with the  
collaboration of industry expert André Pinho

Dissertation submitted in partial fulfilment of requirements for the MSc in  
Management with Specialization in Strategy and Entrepreneurship, at the  
Universidade Católica Portuguesa, June 2022.

## **Abstract**

**Title:** Non-Fungible Tokens and the Event Ticketing Industry in Portugal.

**Author:** João Nunes Rosado

The event ticketing industry has various points of failure along its value chain, both in the primary market and in the secondary market. The emergence of Non-Fungible Tokens has led to the search for new use cases that could create value for the industry. The objective of this dissertation is to understand the impact of NFTs on the event ticketing industry in Portugal, analyzing through scenario planning which are the different possible adoption scenarios given the different behaviors by industry stakeholders. The extant literature identifies general impacts of NFTs on the industry but does not specify factors influencing adoption, how it might be done, and specific impacts on the ticketing industry. With input from fourteen experts, it was possible to identify the most important aspects influencing adoption of NFTs in the industry. These include new sources of revenue, data collection and customer experience, and the way ticketing can become a tool that starts before the event and ends only after the event.

**Keywords:** NFTs, event ticketing industry, event organizers, ticketing, scenarios event ticketing, primary market, secondary market, utility, collectible

## Sumário

**Título:** Como é que os *Non-Fungible Tokens* irão impactar a Indústria de Bilheteira de Eventos em Portugal?

**Autor:** João Nunes Rosado

A indústria de bilheteira encontra-se com diferentes falhas ao longo da sua cadeia de valor, tanto no mercado primário como no mercado secundário. O surgimento dos *Non-Fungible Tokens* levou à procura por novos *use cases* que possibilitassem a criação de valor para a indústria. O objetivo desta dissertação é compreender o impacto dos NFTs na indústria de bilheteira em Portugal, analisando através de *scenario planning* quais os diferentes cenários de adoção possíveis atendendo aos comportamentos distintos pelos *stakeholders* da indústria. A presente literatura identifica os impactos generalistas dos NFTs na indústria, mas não concretiza os fatores que influenciam a sua adoção, como poderá ser feita e os impactos específicos que trará na indústria de bilheteira. Com o apoio de catorze *experts*, foi possível identificar os fatores que terão mais importância na adoção de NFTs na indústria, tais como, novas fontes de receita, *data collection* e experiência do participante, os cenários de adoção em Portugal e, a forma como a bilheteira e os bilhetes poderão passar a ser uma ferramenta que começa antes do evento e que termina apenas no pós evento.

**Palavras-chave:** NFTs, indústria de bilheteira de eventos, organizadores de eventos, bilheteira, cenários para bilheteira de eventos, mercado primário, mercado secundário, utilidade, colecionáveis

## **Acknowledgements**

Before anything else, I'd want to thank my supervisors Peter and André for the care, effort, and counsel they provided during the journey. They were crucial to the work.

I cannot forget to thank my closest friends and colleagues, as well as Raquel, for her patience, love, and support during all the most challenging times. This part of my academic path would not have been possible without the support of both my family and André Costa. A special thank you to you.

I conclude this academic path with teachings that I believe are important to position myself in the job market as a professional who seeks to feel challenged and who also seeks to challenge. Thank you to all the people who contributed to this journey.

# Table of Contents

<b>Abstract</b> .....	1
<b>Sumário</b> .....	2
<b>Acknowledgements</b> .....	3
<b>Table of Tables</b> .....	7
<b>Table of Figures</b> .....	8
<b>1. Introduction</b> .....	9
1.1. Problem Statement.....	9
1.2. Relevance.....	10
1.3. Research Questions.....	11
<b>2. Literature Review</b> .....	12
2.1. Ticketing Industry in a Nutshell .....	12
2.1.1. Definition and structure .....	12
2.1.2. Primary and Secondary Market .....	13
2.1.3. Event Ticketing Industry .....	15
2.1.4. Market Failures in Event Ticketing.....	16
2.2. Non-Fungible Tokens (NFTs) .....	16
2.3. NFTs in Event Ticketing .....	17
2.4. Scenario Planning .....	20
<b>3. Methodology</b> .....	22
3.1. Research Design .....	22
3.2. Data Collection .....	22
3.2.1. Primary Data Collection .....	22
3.2.2. Secondary Data Collection .....	24
<b>4. Findings and Discussion: Minting the Future of Event Ticketing</b> .....	25
4.1. Trends NFTs .....	25
4.1.1. User Experience.....	26

4.1.2. Legal Framework and Taxation.....	27
4.1.3. Sustainability .....	28
4.1.4. Education and Acceptance.....	29
4.2. Customer Profile.....	30
4.2.1. Geographic Location .....	30
4.2.2. Age .....	31
4.3. Level of Adoption.....	32
4.4. How NFTs are Working in the Industry.....	34
4.5. Impacts of NFTs in Event Ticketing .....	36
<b>5. Future Scenarios of the Industry .....</b>	<b>39</b>
5.1. Future Scenario “Positive” .....	42
5.2. Future Scenario “Neutral” .....	44
5.3. Future Scenario “Negative”.....	46
5.4. Scenario Overview .....	48
<b>6. Conclusion .....</b>	<b>50</b>
<b>References List.....</b>	<b>52</b>
<b>Appendices .....</b>	<b>61</b>
Appendix I. Summaries of Experts Interviews.....	61
Interview Expert 1: Paulo Amaral .....	61
Interview Expert 2: David Coutinho .....	62
Interview Expert 3: Nuno Lima da Luz.....	63
Interview Expert 4: João Leite.....	64
Interview Expert 5: Alberto Leanza .....	66
Interview Expert 6: Georg Muller .....	67
Interview Expert 7: Jorge Quintão.....	68
Interview Expert 8: Carlos Vicente .....	70
Interview Expert 9: Ben Broch.....	71

Interview Expert 10: David Garner .....	72
Interview Expert 11: Juliana Ribeiro .....	72
Interview Expert 12: Luís Freitas .....	74
Interview Expert 13: Ana Prata .....	75
Interview Expert 14: Pedro Cerdeira .....	75
Appendix II. Acquisition and Motivation Process .....	77
Acquisition .....	77
Motivations.....	77
Appendix III. NFTs Applied to Other Industries .....	78
Supply Chain .....	78
E-Commerce.....	78
Real Estate.....	78
Appendix IV. Trends in the Event Industry .....	79
Online ticketing will grow substantially.....	79
The problem of counterfeit tickets will be addressed.....	80
Focus on creating event experience.....	82
Use of apps for engagement with participants .....	82
Focus on data collection and personalization.....	83
Hybrid and sustainable events .....	83
Appendix V. Ranking of Impact Factors.....	84
Appendix VI. Definition of Scope.....	84
Appendix VII. Occurrence Probability Matrix.....	84

## **Table of Tables**

Table 1 - NFT Infrastructure (Cointelegraph Research, 2021) .....	25
Table 2 - Global NFTs Market Performance (NonFungible, 2022a) .....	25
Table 3 - The Twenty Nations with the Highest Search Traffic for the Term “NFTs” (Google Trends, 2022).....	30
Table 4 - Impacts in Event Ticketing Using NFTs.....	37
Table 5 - Description of the Stakeholders and Influencers in the Event Ticketing Industry .....	39
Table 6 - Summary of All Three Scenarios .....	41
Table 7 - Online Event Ticketing Market Growth 2021-2027 (Mordor Intelligence, 2021) .....	79
Table 8 - Ranking of Impact Factors in the Event Ticketing Industry .....	84



## Table of Figures

Figure 1 - Ticketing Industry (Courty, 2003).....	13
Figure 2 - Typology of Planned Events (Getz, 2008).....	15
Figure 3 - NFT based Ticket (Takyar, 2022).....	18
Figure 4 - Scenario Planning (Dean, 2019).....	21
Figure 5 - Expert Interview Participants.....	23
Figure 6 - The Number of Searches for "NFTs" and "Ukraine" Topics (Google Trends, 2022).....	26
Figure 7 - Lifetime Coachella Guest Festival Passes (Coachella, 2022).....	32
Figure 8 - TAM to NFTs .....	33
Figure 9 - European Countries' Experience with Fraud (European Commission, 2020). 80	
Figure 10 - Figure 10 - Monetary Fraud in European Countries (European Commission, 2020).....	81
Figure 11 - Internet use and online purchases (Eurostat, 2021) .....	81

# 1. Introduction

The event ticketing industry has ongoing concerns with fraud, counterfeiting, and secondary transactions (Waterson, 2016). Since it relies on distinct agents, NFTs (Non-Fungible Tokens) technology might break the dependency on third parties (Regner et al., 2019). The absence of information about event intermediaries diminishes confidence of the public participating in events (Waterson, 2016).

Despite efforts in recent years to legislate and ensure the better functioning of the ticketing industry, different problems are identified in the literature (Courty, 2019). The introduction of blockchain technology and new ticketing systems (Aventus Network, 2017) has increased event producers' involvement at major events, such as UEFA in 2020 (TheTicketingBusiness, 2021).

The first examples of Portuguese event promoters using NFTs have already appeared, as in the case of the Estoril Open in 2022 (Meios & Publicidade, 2022).

Despite these first tests and the emergence of new startups focused on NFT ticketing, adoption scenarios in the Portuguese industry, as well as its impacts on operation, legislation, and differentiation in companies, are unpredictable.

## 1.1. Problem Statement

Events have an important impact on today's society because of their social, cultural, and economic implications (Getz & Page, 2016). Tickets allow the public to enter an event. They are available in a variety of formats, from paper versions to digitally accessible codes on paper, integrated chips in contactless cards, or wristbands (Waterson, 2016).

There are two ways to purchase a ticket: on the primary or on the secondary market (Courty, 2003; Klein, 2010). The secondary market has become more sophisticated because of digitalization, causing problems for the primary market (Duffy et al., 2019). Digitalization has fueled technical advancements in ticket sales, such as bots to shift tickets from the primary to secondary market, directing customers to websites with prices that change and are vastly different from the initial cover or issue price. Through sales strategies such as paid advertising to elevate secondary ticket sites to the top of search engine ranking pages, secondary ticket companies are causing customer confusion (Duffy et al., 2019).

In Portugal, reselling tickets is prohibited (Centro Europeu do Consumidor, 2022). By prohibiting resales, fans who are unable to attend an event are prevented from selling their tickets to other fans. Transferring tickets at face value or less encourages the black market, where tickets are transferred at face value online and a supplementary transaction is made offline (Courty, 2019).

Despite various measures in different countries, as well as the introduction of new technologies and changes in the way tickets are sold at events, several authors argue that there are still many points to improve. While platforms and third parties perform well, the actual scenario is insufficient for the two most important stakeholders - the event organizer and the client - as evidenced by numerous complaints to consumer protection organizations (Courty, 2019; McMillan, 2020; Yates, 2017).

NFTs for ticketing increase a platform's transparency and reassure secondary buyers that they are purchasing a genuine ticket to an event (Takyar, 2022). Because each token has the digital signature of its owner, an asset can be readily traced back to its original issuer. The uniqueness and non-fungibility of NFTs reduces, if not fully eliminates, the problem of authentication and counterfeiting. Buyers can quickly track down the proprietors of the objects for sale, assuring valid transactions (Rehman et al., 2021).

## **1.2. Relevance**

The event ticketing industry in Portugal suffered considerably because of COVID-19. The number of live performance sessions was cut by 59.6%; 76.8% less tickets were sold; the number of attendees was down by 85.1%, and box office revenues were down by 80.1%, resulting in a loss of 100.4 million euros. In Portugal, event ticketing is estimated to generate €149 million in revenue in 2022, with a compound annual growth rate (CAGR 2022-2026) of 5.63%, resulting in a market volume of €186 million by 2026. By 2026, the number of users in the market is predicted to reach 2.3 million. Sport events is the market's largest sector, with a forecast market volume of €69 million in 2022 (Statista, 2022).

Portugal's favorable conditions for crypto and blockchain businesses have attracted NFT Startups. Portugal's regulatory framework allows for frictionless ICOs (Initial Coin Offerings) and adoption of the SAFT Framework (Standard Agreement of Future Tokens), among other factors (GrowIN Portugal, 2022). Cryptocurrencies are

taxable in Portugal if traded speculative, which requires users to register as a trader and pay taxes on capital gains; otherwise, they are declared non-taxable since they do not fall into any of the traditional asset categories (Galea, 2021).

In 2021, the NFT industry, which is just four years old, rapidly skyrocketed (Nadini et al., 2021). The total value of all NFT transactions globally increased by 21,350% from \$82.5 million in 2020 to more than \$17 billion in 2021 (Fortune, 2022). In 2021, there were 2.7 million unique active wallets (a proxy for users), with 49% of those users linked to NFT games. In terms of sales volume, OpenSea is the largest NFT marketplace (Caporal, 2022).

This dissertation aims to discuss the future possibilities of the ticketing industry in Portugal, analyzing how stakeholders might contribute to the adoption of NFTs. Since this topic is novel, there is no literature on NFTs in event ticketing. This dissertation examines how NFTs can be implemented in event ticketing industry in Portugal.

### **1.3. Research Questions**

Event ticketing can be improved by technological solutions. The influence of NFTs on the industry is the domain of this research, with the goal of analyzing operational, legal, and competitive effects that NFT adoption may have, and how they may transform the industry when implemented.

This Dissertation will answer two research questions:

**Research Question 1:** How will NFTs affect the event ticketing industry?

**Research Question 2:** What will the event ticketing industry look in 5 years, if NFTs are adopted?

## **2. Literature Review**

This chapter provides an overview of the ticketing industry, with a focus on the event ticketing segment. It covers the results of previous research on Non-Fungible Tokens applied to this segment.

### **2.1. Ticketing Industry in a Nutshell**

#### **2.1.1. Definition and structure**

Ticketing is a complex industry. There are few sectors where the goal is to sell nearly all the inventory (in this case, tickets) on the first day, with a perishable commodity that the consumer won't enjoy beyond the immediate experience (Waterson, 2018). Up to the mid-1990s, people used phone reservation systems or to a box office or shop to purchase tickets. Due of the tremendous demand, lines would form. Ticket resales take time, are seldom legal, are tightly regulated, and riddled with concerns about counterfeiting, fraud, and seat misrepresentation (Courty, 2019).

Tickets serve two purposes: they allow customers to purchase ahead of time and select a seat in the venue that they desire. Tickets cut down on transaction expenses that would otherwise be incurred if customers had to wait in line or send place keepers to obtain premium seats. Second, consumers have varying demands and tickets may enable the promoter to cater to a wider range of interests (Courty, 2003).

Ticketing consists of all activities that begin with the input of event strategies and end with the appearance of visitors / guests, in a quantity and quality, that is appropriate to ensure implementation of the object and its goal (Wibisono et al., 2020). Tickets include paper tickets, electronic tickets, machine-readable bar codes, credit or debit card admissions, or wearable technologies such as wristbands or other wearable items. All are options to enter in an event and in practice, tickets are the means of demonstrating one's right to attend an event (Waterson, 2016).

The notion of ticketing has evolved from a basic ticketless practice to a robust, multi-billion-dollar industry with numerous buyers and sellers in two different markets: primary ticketing and secondary ticketing (Klein, 2010). In Portugal, three companies stand out in the ticketing industry: Ticketline, Blueticket and Bilheteira Online. Some of the sales made continue to be held at physical points of sale such as the stores Fnac, Worten and El Corte Inglés.

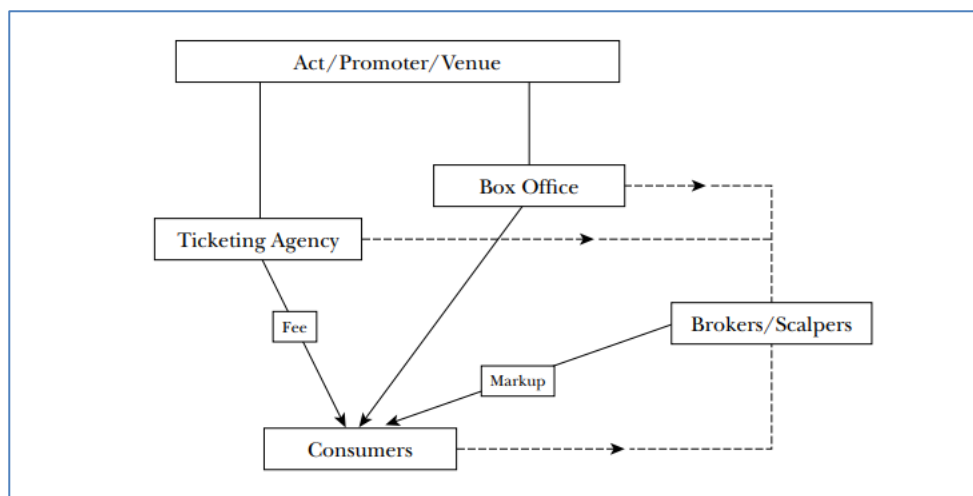
Ticketline is the largest and most renowned national company, with over 20 years of experience, specializing in integrated ticket sales solutions for any type of event. It has more than 540 points of sale, 460 rooms/spaces, access to online shopping 24 hours a day (Visit Lisboa, 2022). Blueticket is one of the most well-known ticketing companies in the industry. It sells around 3.5 million tickets every year for around 350 different events, with over a million annual website views (Blueticket, 2022). BOL is the newest platform with innovative and reliable functions in ticketing and culture, supported by the integrated provision of quality services (Bilheteira Online, 2022).

### 2.1.2. Primary and Secondary Market

A promoter will hire an artist, schedule a venue and negotiate a profit-sharing scheme with all parties involved. The promoter usually establishes the ticket price and decide when the "promotion and selling" of tickets will begin. The promoter (or the venue) will also deal with a ticketing company, such as Ticketline, to handle most tickets sold. Even though ticketing agencies impose additional fees on top of the base price, they often sell most tickets since they can reach a far broader audience than the box office. Tickets sold in this way are considered the primary market (Klein, 2010).

After a ticket has been sold in the primary market, it can be resold or secondarily sold in the secondary market. Ticket scalpers and ticket brokers are terms used to describe secondary ticket resellers. Scalpers are those who purchase tickets and then resell them at a higher price (Courty, 2003).

The structure of the market is depicted in Figure 1, below.



**Figure 1 - Ticketing Industry (Courty, 2003)**

The ticket scalping process normally begins with the purchase of tickets from the event's promoter, venue, or ticketing agency, usually in large quantities, and then waiting for the ticket supply to sell out. The secondary market for tickets is created when customers purchase tickets from a scalper, a secondary seller, rather than the venue or ticketing agency, the primary seller (Yang, 2004). The more popular an event, the more likely it is that tickets will be scalped at higher ticket prices. Ticket brokers, in contrast, are legitimate firms that purchase and sell tickets (Klein, 2010).

Ticket scalping is fueled in part by the prevalent practice of promoters selling tickets for less than face value. The possibility of ticket scarcity is raised if tickets are priced below what the average customer would pay for the ticket (Bell, 2006). When resources (event tickets) are rare – the "sold out" aspect – and valuable, the secondary market develops (Duffy et al., 2019).

As a result, what happens in the primary market has an impact on what happens in the secondary market. Pricing decisions will have an influence on the scope for resale transactions, as well as distributional measures that will affect the number of tickets migrating to the secondary market. The ability of venues to monitor and enforce admission restrictions will have a comparable impact on the desirability of secondary market ticket buyers (Rushton, 2016).

There are three types of buyers who use online secondary marketplaces (Waterson, 2016): traders who have purchased tickets for the sole purpose of reselling them; event goers who have purchased more tickets than they intend to use in order to sell some to offset the cost of the tickets they will use; and those who intended to utilize all of their tickets but were unable to do so due to unforeseen circumstances (Cui et al., 2014).

Some of the largest European companies operating in the field of ticket resales are: StubHub, Ticketmaster Entertainment and Viagogo (Brandessence, 2021). Viagogo and StubHub are in the Portuguese market also. In addition to these two businesses, SeatWish and Billetto exist.

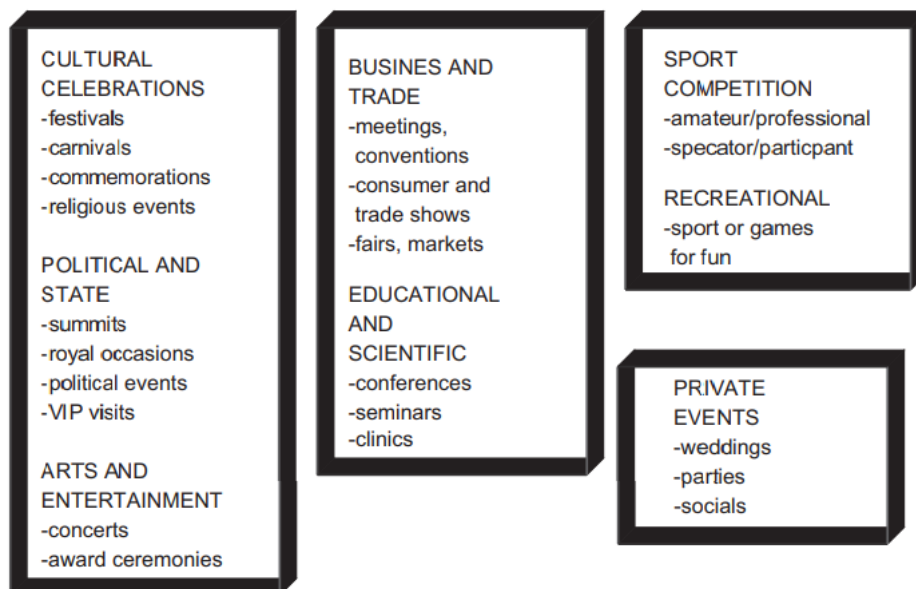
In Portugal, reselling show tickets for a price greater than the event promoter's set price is considered a crime of economic speculation (art. -Law No. 20/2008 of April 21)

and is punishable by imprisonment from 6 months to 3 years, and a fine of not less than 100 days (Centro Europeu do Consumidor, 2022).

Although various governments are contemplating full bans on ticket resale for profit, several economists are skeptical of absolute resale restrictions, claiming that countries will lose the value and advantages of having a secondary market (Courty, 2019).

### 2.1.3. Event Ticketing Industry

There are five basic types of events, each with distinct purposes and programs. Some are intended for public celebration, while others are for competition, amusement, entertainment, business, or socialization (Getz, 2008).



**Figure 2 - Typology of Planned Events (Getz, 2008)**

Most individuals attend events with family or friends which can pose at least two challenges for ticketing. First, how do they enable individuals to purchase tickets for others even if they don't know who their group's members are? The second is allowing someone to buy tickets on behalf of others, such as children, who want to attend an event (Waterson, 2018). Event tickets are frequently transferrable, which is required for valid resale activity, in contrast to other ticketed goods such as airline travel (Leslie & Sorensen, 2014). Sports and most of the arts often have an influence over venues, whereas music promoters (except for festivals, for the time being) are more reliant on rules made by venue owners (Waterson, 2016).



The music events category dominates event ticketing business with music-related events including concerts, festivals, musicals, music shows, and operas. Online ticketing has gained popularity owing to its convenience and flexibility. Service providers are building user-friendly mobile interfaces, speeding up ticket purchases (Mordor Intelligence, 2021). E-tickets are digital versions of paper tickets that operate as a contract between the ticketing company and the service provider, giving customers security, affordability, and convenience. Online ticket purchases don't need employee assistance. E-tickets promote a cleaner future by reducing carbon emissions and paper waste (Zamer, 2018).

#### **2.1.4. Market Failures in Event Ticketing**

Consumers and the economy benefit from a well-functioning secondary ticket market. First, it allows customers acquiring tickets in advance to resale them. Second, those who missed the initial sale can buy tickets. This category includes tourists and impulsive individuals. Depending on the event's popularity, customers may pay more. Third, customers and sellers demand the service. Not everyone wants to be first in line for tickets (virtually). As tickets start to expire, they'll be offered at a discount, enabling individuals who couldn't otherwise attend to do so (Waterson, 2016).

A secondary ticket market also has disadvantages. Organizers lose pricing control. In the secondary market, the seller sets the price and buyers may reject "excessive" pricing. Some sellers try to recuperate the ticket's cost, while others maximize profits. This undermines efforts to make live entertainment accessible to the public via ticket prices (Waterson, 2016).

When purchasing tickets in secondary markets, consumers must trust third parties, running the danger of obtaining fraudulent or invalid tickets which are counterfeits or may be revoked (Regner et al., 2019). The resale market also limits event organizers' ability to get to know their clients. Once a ticket is sold, the organizer doesn't know who bought it. This limits the organizer's capacity to develop consumer connections that might benefit both sides which may be a primary objective for the artist, sport, cultural event, or organization (Waterson, 2016).

#### **2.2. Non-Fungible Tokens (NFTs)**

NFTs, are digital assets that represent physical or digital creative work or intellectual property, such as music, digital art, games, gifs, video clips, and more. The

term "non-fungible" refers to the fact that each token cannot be exchanged for another, making it a unique entity representing a singular distinct item (Rehman et al., 2021). It is especially useful for tokenizing individual assets, which is not possible with fungible tokens because they cannot digitally reflect uniqueness (Regner et al., 2019). NFTs were designed with one goal in mind: to represent ownership of digital or physical things.

The first application of blockchain technology was in 2009, when Bitcoin was introduced as a peer-to-peer digital currency (Nakamoto, 2009). Aside from this first implementation and the use case of cryptocurrencies, a larger variety of uses has evolved. Developers and organizations may utilize smart contracts to construct financial apps that leverage cryptocurrencies and other types of tokens for things like decentralized financing (DeFi), crowdfunding, decentralized marketplaces, data storage, and more (Buterin, 2014).

Smart contracts, a term created by Nick Szabo in 1994, enable parties that do not know or trust each other to safely conclude transactions. They are typically irreversible and unmodifiable once deployed since they are trustless, autonomous, decentralized, and transparent. The use of smart contracts in an agreement or transaction can reduce - or possibly eliminate - the need for intermediaries and contract enforcement (Cryptopedia Staff, 2021; Glaser, 2017; Szabo, 1994).

Any tangible or nonphysical item may now be converted into a digital token by utilizing the benefits of blockchain. Asset tokenization is a way to represent a blockchain system. In early 2021, NFTs were one of the most widely used implementations of blockchain technology, gaining international attention (Mojtaba et al., 2021).

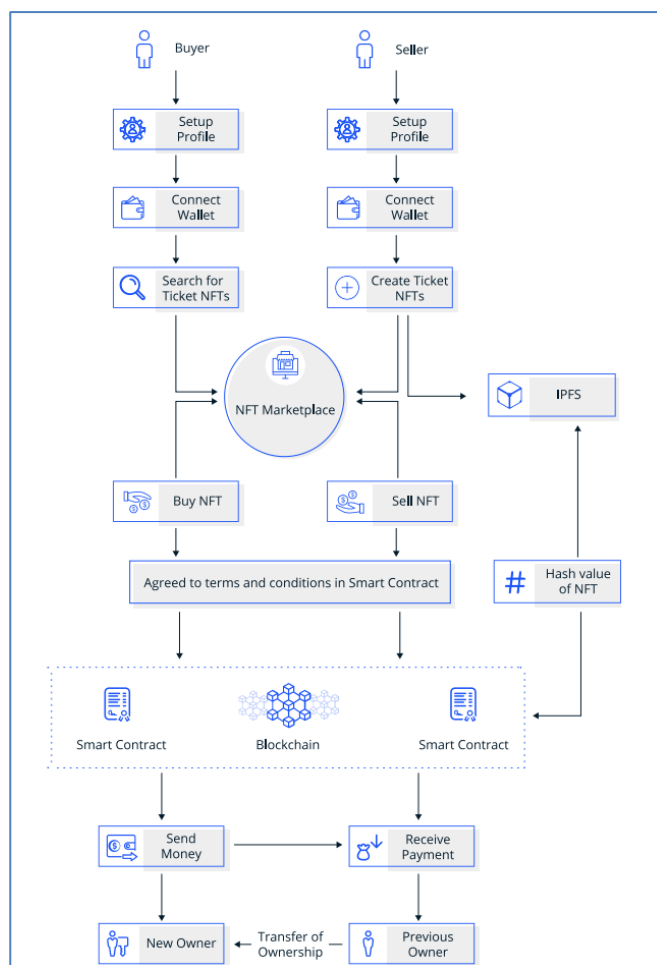
NFTs are classified as collectibles, gaming, art, metaverse, sports, and utility. Art and collectibles were the most profitable category in 2021 (Cointelegraph Research, 2021). However, there is a huge untapped NFT market that needs grow beyond digital collectibles to provide additional value for fans and partners, the utility NFT market. This time around will be about narrative and the value added. Especially if the NFT providers and creators maintain the user at the core of their initiatives (Arnon, 2022).

### **2.3. NFTs in Event Ticketing**

NFT tickets act as entrance credentials for the events. These assets may be sold, bringing in additional revenue for both the community and event organizers. Attendees

will be able to access both the in-person and virtual experiences using the NFT tokenized tickets. Event organizers may continue to collect royalties once the event is ended using everlasting digital assets (bitsCrunch, 2022).

Event organizers can use their preferred blockchain platform to mint<sup>1</sup> the needed quantity of NFT tickets in the ticketing system. They can program the NFTs to establish a sale price or have an auction where people can bid on tickets. Customers then buy NFT tickets and save them in their digital wallets, which they may access via their mobile devices (Takyar, 2022).



**Figure 3 - NFT based Ticket (Takyar, 2022)**

The buyer purchases an NFT-based ticket and pays the ticketing company the ticketing fee. A smart contract governs when the money is received, and how an NFT ticket is delivered to the buyer from the ticketing database. The ticketing firm asks for the

<sup>1</sup>“Minting is the process of taking a digital asset and converting the digital file into a digital asset stored on the blockchain. Making it officially a commodity that can be bought and sold” (Hayden, 2022).

ticket to be uploaded to IPFS<sup>2</sup>. IPFS calculates the hash, and tickets are saved in the database (Takyar, 2022).

NFT tickets are prepared and posted to the NFT marketplace that has been requested. NFT tickets can also be resold on the NFT marketplace by ticket owners. A smart contract is used to store the ticket. When a customer purchases a ticket, the smart contract is triggered, and payment is automatically transmitted to the seller. Tickets can be kept as NFTs in crypto wallets and transferred from one user to another, through apps, and to secondary markets. The transfer of NFTs is recorded immutably on the blockchain, from the first sale to any later resale, making it very easy to check the legitimacy of a ticket and study the history of its owners (Coinclarified, 2021; Takyar, 2022).

The literature shows the following broad advantages of NFTs: they avoid fake tickets and scams; blockchain gives ticket holders and organizers a single data source; all parties may confirm an NFT's validity while going from initial sale to resale; organizers may make NFTs non-transferable to avoid reselling (Regner et al., 2019; Takyar, 2022; Wend, 2019).

They entail faster and possibly cheaper production: an NFT may be sold in less a minute; selling and minting NFTs in the future can be cheaper than the prior ticketing system; customers and organizers may validate each ticket on the network and track ownership by buying an unforgeable ticket at a cheaper cost (Regner et al., 2019; Takyar, 2022; Wend, 2019).

The earnings are limitless: Because programmable NFTs may contain rules for merch, content, resales, and royalty splits, the organizer can analyze revenue sharing percentage ranges for long term resales or new content on secondary marketplaces and get payments knowing they are immutable (bitsCrunch, 2022; Takyar, 2022).

They are a source of new revenue: NFT-based tickets are programmable money, creating unlimited earning opportunities; organizers may develop art-like tickets that convey the story of an event and give benefits and incentives to attendees; customers may sell tickets for upcoming events they can't attend and rare old tickets; these NFTs create

---

<sup>2</sup> IPFS is a peer-to-peer file sharing system that allows users to host and receive material in a decentralized way. This implies that user-operators have access to a subset of the whole data, resulting in a robust file storage and sharing system (IPFS, 2022; ONE37pm, 2022).

communities and income streams based on membership (Regner et al., 2019; bitsCrunch, 2022; Takyar, 2022).

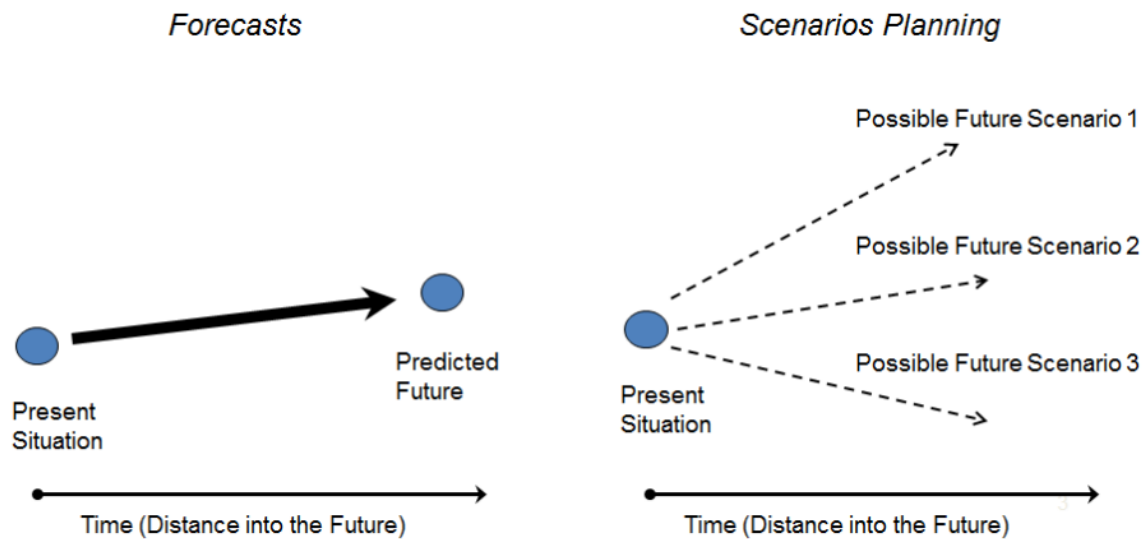
The main obstacle in incorporating NFTs into an event is simply a lack of consumer awareness and acceptance. This will take a while for individuals to feel comfortable incorporating this technology into their daily routines because it is still early technology (TPG, 2022). Another issue is lack of a suitable cryptocurrency wallet. A user must have a crypto wallet that is compatible with the blockchain on which the NFT was created to receive it. This implies that each organization must develop its own system which can be a problem for smaller events at this point (Virtual Edge, 2022).

When employing NFTs, event organizers must ensure that the proper NFT is assigned to the relevant event, manage the logistics of issuing and redeeming NFTs, and care for any possible security threats. Event organizers must also verify that any applicable legislation governing the usage of NFTs are followed.

#### **2.4. Scenario Planning**

Scenarios are a self-contained vision of what the future may be - not a prediction, but one potential future outcome (Porter, 1985). Scenario planning is a kind of strategic planning that may be used to investigate potential future scenarios and growth routes, often over a medium-term horizon (Schoemaker, 1995), including information about various development routes leading to that future state, which may serve as a foundation for action (Parson et al., 2007; Porter, 1985).

Strategic management processes benefit from the use of scenario-based planning, which offers a robust methodological framework for accounting for uncertainty, volatility, and complexity (Schwenker & Wulf, 2013a). Its objective is not to accurately forecast the future, but to develop alternative future scenarios (Figure 4 - Scenario Planning) to increase policymakers' and business leaders' awareness of emerging potential trends, key factors, and players capable of causing significant shifts in existing conditions, and previously unknown opportunities and threats associated with each anticipated future condition (Grant, 2003).



**Figure 4 - Scenario Planning** (Dean, 2019)

A standard scenario planning method begins with the sketching of conceivable futures based on assumptions about the likely development of current variables and situations (Kosow and Gaßner, 2008; Schwenker and Wulf, 2013).

Starting with scope, during this stage the scenario planning team establishes the extent of the activity, the topic scope, the key stakeholders, the timeline, and the geographic dispersion of scenarios (Center for Strategy and Scenario Planning, 2022; Schwenker & Wulf, 2013). Second, they gather data and information on the existing condition and all the elements that may affect future development. They consult relevant governance and strategy documents, academic sources, scientific publications and reports, and newspapers, as well as interviews, conferences, or conversations with experts and stakeholder groups (Center for Strategy and Scenario Planning, 2022; Schwenker & Wulf, 2013a).

Third, the trend and uncertainty analysis part explores and assesses major trends and uncertainties. The goal is to arrange essential Perception Analysis findings into secondary components, trends, and key uncertainties. Unknown critical uncertainties affect a company's future success. The last part is creating scenarios based on trends and significant stakeholders (Schwenker & Wulf, 2013a).

## **3. Methodology**

### **3.1. Research Design**

From a managerial standpoint, the academic literature on NFTs in event ticketing is limited, given that the technology is still in its early stage and under development. Therefore, it is challenging to create reliable estimates about event ticketing in Portugal. This allows for the formation of new knowledge and the collection of viewpoints on the topic. After performing a literature review that detailed the most recent advancements in the industry and its key stakeholders, the analysis part explored insights and future trends regarding NFTs and their impact on the event ticketing industry.

RQ1 shows how NFTs may affect the event ticketing industry by examining qualitative findings from industry experts and secondary sources. RQ2 focuses on the evolution of the market once NFTs have taken full effect. Expert evaluations and relevant secondary data, such as industry reports, scenario analysis, and analyses of other industries that are also implementing NFTs, led the findings.

### **3.2. Data Collection**

#### **3.2.1. Primary Data Collection**

Most of the analysis was developed based on the results of semi-structured interviews with NFTs experts. To ensure a comprehensive perspective on the topic and to prevent a biased study, a variety of specialists with varying roles and types of industry stakeholders were picked. On the list of interviewees were ticketing companies, event promoters, NFT developers, Web3 attorneys, Web3 industry experts, and Web3 industry investors.

Semi-structured interviews were used to assess the interviewee's industry knowledge, attitudes, perceptions, and predictions (Rowley, 2012). This sub-category promotes an open interview setting and allows participants to choose relevant and relevant content. The exploratory approach led to different opinions (Britten, 1995). Experts in the field of event ticketing were asked to select the factors that would have the most impact on the implementation of an NFT ticketing solution for event organizers.

The qualitative interviews were meaningful for both research questions. An overview of each interview is included in the appendix.

Interview ID	Name	Role	Company	Reason to Interview
1	Paulo Amaral	Teacher	Católica Lisbon School of Business and Economics	Experience in Blockchain companies, having worked with the implementation of cashless technology with Portuguese companies in the past. Gives classes on Blockchain applicability at Católica-Lisbon.
2	David Coutinho	Co-Founder & CEO	GamifyYou	Gamification startup, being the first to use NFTs in major Portuguese events (Estoril Open).
3	Nuno Lima da Luz	Principal Associate	Cuatrecasas	Responsible for large companies working on Web3 in Portugal (such as RealFevr), with high knowledge of the law applicable to Web3 and experience in legal frameworks.
4	João Leite	Head of Research	Polkastarter	Deep knowledge about Web3 startups with focus on due diligence, tokenomics, NFTs and challenges in building solutions in this environment.
5	Alberto Leanza	Co-Founder	Wicket Ticketing	NFT ticketing company in Italy that uses White Label technology.
6	Georg Muller	Founder	B.A.M Ticketing	NFT ticketing company in Vienna that does not use any tokens, only FIAT money.
7	Jorge Quintão	Executive Director	Blueticket	Responsible for one of the biggest ticketing companies in Portugal, working with the biggest events in
8	Carlos Vicente	Freelance Consultant	-	Experience in ticketing in companies such as Rock in Rio, UEFA and StubHub. Worked as Ticketing Manager on Blockchain implementation at Euro 2020.
9	Ben Broch	Senior Product Manager	YellowHeart	One of the most advanced startups in creating NFT Ticketing and NFT Music, working directly with product development and customers.
10	David Garner	Chief Information Officer	Centaurify	NFT Ticketing startup based in Estonia. They created their own token for implementing the solution in events.
11	Juliana Ribeiro	Ticketing Manager	Rock In Rio	Responsible for ticketing solutions for one of the biggest festivals in the world. Works with teams both in Portugal and Brazil.
12	Luís Freitas	Software Engineer & Product Leader	Mintbase	Responsible for the development of Mintbase, one of the companies that facilitates the use and creation of NFTs with NEAR technology. High knowledge in the application of NFTs in businesses in Portugal.
13	Ana Prata	Partner	Last2Ticket	Event management through different approaches: ticketing, software, analytics, having worked with different large-scale events.
14	Pedro Cerdeira	Managing Director	Business Plug	Investor and entrepreneur with different projects in the Web3 area, working with Business Angels in Portugal and teaching at Católica-Lisbon.

**Figure 5 - Expert Interview Participants**



### **3.2.2. Secondary Data Collection**

To consolidate the present state of knowledge on the current developments within the event ticketing industry in Portugal and the influence of NFTs as well as existing research dealing with the future of the industry, a review of academic concepts was conducted through the literature. To address RQ1 about the overall topic of whether NFTs disrupt the Portuguese event ticketing industry, secondary data in the form of academic literature, scientific papers, and industry projections were used.

## 4. Findings and Discussion: Minting the Future of Event Ticketing

### 4.1. Trends NFTs

Ethereum is the most important blockchain when it comes to NFT transactions, accounting for 78% of the whole market (NonFungible, 2022a). Numerous layer-one blockchains support NFT protocols through their native programming specifications. Ethereum is a popular platform for NFTs since its ecosystem and liquidity are the biggest. However, Ethereum's blockchain has high transaction costs, which inhibits user growth and creates a bottleneck for micro priced NFTs (Cointelegraph Research, 2021). There is a trend for ticketing startups towards the adoption of layer 1 blockchains with greater speed and lower costs or layer 2 blockchains that are built with the security of the Ethereum ecosystem, such as Polygon, but with increasing transaction speed and decreasing transaction costs (Expert 5; Expert 6; Expert 12).

NFT Infrastructure	
Layer 1	
Layer 2	
Minting	
Storage	
Data Intelligence	
Portfolio Management	
Other	

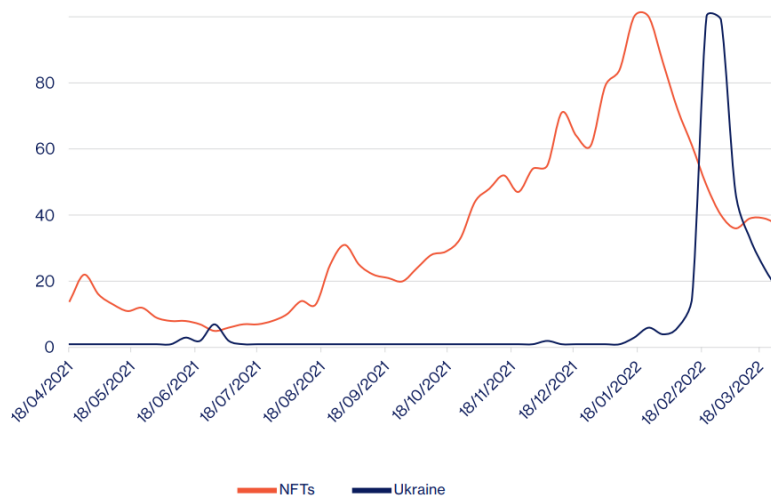
**Table 1 - NFT Infrastructure** (Cointelegraph Research, 2021)

	2019	2020	2021
<b>Number of Sales</b>	1,619,516	1,415,638	27,414,477
<b>Buyers</b>	44,324	75,144	2,301,544
<b>Sellers</b>	25,036	31,774	1,197,796
<b>Active Wallets</b>	55,330	89,061	2,574,302
<b>Average Price</b>	\$15.17	\$49.18	\$807.52

**Table 2 - Global NFTs Market Performance** (NonFungible, 2022a)

In the last 3 years the NFTs market has increased in activity and size, however, in Portugal there is still no specific data on the number of wallets, sales and values practiced (Expert 1; Expert 4; Expert 12).

Google Trends shows that NFT searches spiked in 2021 and peaked in 2022. Since then, search volume for the subject has decreased steadily and looks to be settling around October 2021 search volume. This decline is due to two factors: Interest declined by the end of 2021 due to media saturation and investor losses in NFTs. The Ukraine crisis moved focus from a new sort of digital assets to a challenging political struggle (NonFungible, 2022a). Figure 6 illustrates the connection between the Ukraine crisis and NFT searches.



**Figure 6 - The Number of Searches for "NFTs" and "Ukraine" Topics (Google Trends, 2022)**

Despite the decrease in the volume of NFTs transactions in 2022, it is possible to verify a decrease in speculative transactions (NonFungible, 2022a), and the disappearance of projects that sought a quick and speculative return (Expert 4).

#### 4.1.1. User Experience

Acquiring an NFT is a difficult process that may scare crypto newcomers (Expert 1). The operation is more difficult and expensive than it seems (Expert 3). Thus, ensuring everyone's user experience is simple and practical is a priority. Mostly for the older, less tech-savvy Portuguese (Expert 14).

Buying an NFT involves four stages. The first step is to purchase cryptocurrency, that is part of the NFT infrastructure, Ethereum, Polkadot, Solana, Near, or Polygon. After buying cryptocurrency, users need a wallet (Metamask) to store and transfer it. In a third phase, is necessary to choose the marketplace where the NFT will be purchased or sold, such as Opeansea or Mintbase. The last stage is to buy or make an offer (NonFungible, 2022a). An NFT's mint process doesn't require Opensea, but it does need the project's platform (Expert 9).

It is critical to minimize the number of clicks required between picking an NFT online and completing the transaction. The user experience should be as effortless as feasible. However, this is not the case with NFTs. There is no approach that has succeeded in striking a balance between maintaining an existing user experience and keeping the advantages of decentralization (NonFungible, 2022a). Thus, the development of solutions that provide a better user experience will be a critical factor in the adoption of NFTs (Expert 1, Expert 4, Expert 8, Expert 11, Expert 12). In the next years, there is a need to develop infrastructures that enable an easier process of purchasing crypto, moving it to a wallet, purchasing NFTs with that wallet, and then accessing, displaying, and creating use cases for NFTs that enhance both the sharing of NFT with others and its day-to-day usage (Expert 4, Expert 8, Expert 12, Expert 14).

#### **4.1.2. Legal Framework and Taxation**

The legal framework governing NFTs varies from country to country. There is no clear law regarding the underlying assets of NFTs (NonFungible, 2022a). Portugal's NFT market is growing compared to countries with stronger fiscal frameworks, like Germany. Portuguese tax legislation says nothing about taxing NFT revenue (GrowIN, 2021).

However, for organizations that begin using NFTs and derive revenue from NFTs in their activities, it will be vital to comprehend Portugal's specific legal structure. Companies and other legal organizations in Portugal are taxed on their income under the Corporate Income Tax (CIT), while individuals are taxed on their income under the Personal Income Tax (PIT). The taxes of income obtained from digital tokens received by investee companies (i.e., corporations and other legal entities apart from individual taxpayers) raises no questions: all revenue should be included in the entity's taxable profit and subjected to CIT (Rogério Fernandes Ferreira & Associados, 2022).

In the event ticketing industry, reselling tickets at a price greater than the price set by the event organizer is a crime of economic speculation in Portugal (Centro Europeu do Consumidor, 2022). Consequently, the ticket may only be resold at the price established by the promoter. Thus, legislative modification or new judicial interpretation of the regulation may be viable options (Expert 3) for a more favorable secondary market. In the absence of a modification that favors the secondary market, ticketing solutions will be necessary in which the event organizer establishes a maximum price for resale or a period from which tickets may be resold at a specified price (Expert 3, Expert 6). In the European Union, ticket resale is limited to a maximum of 5x the ticket price (Expert 3). However, after the event, the "digital memory" can be sold without price limitation, given that it is a collectible.

Clearly, the legal structure and taxes are crucial areas to clarify and specify. In the future, there should be a regulatory regime, as well as a more concentrated position and a public strategy on these issues (Expert 1, Expert 3, Expert 4). Financial and digital literacy will increase the use of these technologies (Expert 12, Expert 13). Alternately, if there is no desire to develop its own regulatory regime, create a regulatory framework, concentrate on the rules governing behavior, and permit a new legal basis. The legal framework for ticketing is an important factor, however, the current state does not disable the benefits and impacts of the solution (Expert 3, Expert 4).

#### **4.1.3. Sustainability**

NFTs themselves have no environmental effect, but how they are minted may. An NFT requires at least 35 kWh<sup>1</sup> of electricity to mint, and the whole process creates roughly 20 kilograms of CO<sub>2</sub> when using Ethereum, despite its gradual transition from the energy-intensive proof-of-work consensus method to proof-of-stake (Forkast, 2022). The proof-of-stake approach consumes less energy than the proof-of-work method because it requires less processing power. In contrast to miners engaging in a proof-of-work blockchain, validators in a proof-of-stake blockchain are required to stake, or pledge not to trade or sell, their cryptocurrency holdings. Adding a staking requirement for blockchain validators is a strategy to guarantee the security of the blockchain without demanding excessive energy consumption from network users (Ethereum, 2022).

One of the concerns for event organizers and artists is the use of more environmentally friendly solutions, so many ticketing startups are opting for other

blockchains (Expert 5, Expert 10). Tezos transactions were 35,000 times more energy efficient than Ethereum's in 2021. This is like powering an American home for a day with one Ethereum transaction. However, a Tezos transaction took 0.0016 kWh, or even less than 10 minutes to power an Apple Tablet (Cointelegraph Research, 2021).

The NEAR Protocol is also one of the most recent Distributed Ledger Technologies competing with Ethereum, being the solution used by Seatlab, as well as, considered one of the most recent technologies for the creation of NFTs that is safe, efficient and with low transaction costs (Expert 10, Expert 12). The findings indicate that the current carbon footprint of the NEAR Protocol is 174 tons of CO<sub>2</sub> per year. Therefore, NEAR Protocol is almost 200,000 times more carbon efficient than Bitcoin, mostly because to its use of PoS rather than PoW. The NEAR Protocol, introduced in 2020, is a third generation blockchain based on PoS that performs 1,000 transactions per second while operating significantly more efficiently than PoW networks and is carbon neutral as of February 2021 (Near, 2021).

In part because of this, Proof of Stake-based blockchains are gaining popularity as a basis for new blockchain initiatives. First, because transaction costs are cheaper, and second, because their energy usage is lower than Ethereum's. It will be important for event organizers to choose a ticketing solution that is sustainable.

#### **4.1.4. Education and Acceptance**

Large-brand advertising and credit card use to buy NFTs boosted active wallets in 2021. With so many entrants, the NFT community must continue to reduce cryptocurrency dangers (NonFungible, 2022a). As technology and industry develop, new infrastructures and economic models allow user-beneficial solutions. This increased value and use cases allow for user onboarding and education. It's important to give conditions and incentives that correspond with this paradigm, as well as innovative tactics to promote education and new users (Expert 1, Expert 7, Expert 11, Expert 14).

Increasing the number of programmers and Web3-affiliated persons fosters innovation and creativity. Developing training-content platforms like Web3 University and LearnWeb3 is crucial. Web3 University provides free training on developing NFTs for multiple platforms. It develops community bonds by giving tasks and pathways (Web3 University, 2022). It collaborates with Buildspace, a community of developers

who learn Web3 by doing. LearnWeb3 provides four free learning routes for users. These examples explain Web3 easily.

Usefulness, usability, and security (Lee, 2018) may increase public acceptance rates. Large companies, the government, and the media may promote these positions (Expert 2, Expert 4, Expert 7, Expert 8).

## 4.2. Customer Profile

### 4.2.1. Geographic Location

Geographically, even though European countries do not rank among the top 9 countries doing research on NFTs, Portugal is well-positioned at both the global and European levels (Table 3) being one of the countries conducting the most research on the subject (Google Trends, 2022).

	Country	Interest Score
01	Singapore	100
02	Hong Kong	96
03	China	81
04	Taiwan	56
05	Philippines	55
06	Canada	54
07	United Arab Emirates	54
08	New Zealand	53
09	Australia	53
10	Lebanon	52
11	Venezuela	51
12	United States	49
13	South Korea	48
14	Nigeria	46
15	United Kingdom	40
16	Netherlands	39
17	Georgia	38
18	Switzerland	38
19	Israel	37
20	Portugal	37

**Table 3 - The Twenty Nations with the Highest Search Traffic for the Term “NFTs” (Google Trends, 2022)**

Braga, Vila Real, Lisbon, Évora, and Faro were the Portuguese cities that searched NFTs the most from May 2021 to May 2022. Lisbon is the world's and Europe's second-most-eventful city (Turismo de Portugal, 2022). Thus, it is important to consider Lisbon's strategic interest in launching events of an innovative nature. For example, the Non-Fungible Conference (The Portugal News, 2022) or what Mintbase did in November 2021 to bring to the city of Lisbon the usefulness of NFTs for spaces such as restaurants: Mintbase partnered with Lisbon's greatest restaurants, bars, and stores to offer NFTs offline. NFTs could be redeemed for various objects (Nogueira, 2021).

These are critical factors, according to the experts interviewed: developing a value proposition for society to adopt in their everyday lives and onboarding diverse service providers (Expert 4, Expert 14). Society will perceive value whenever a feasible and safe solution is established, and network effects can be created (Expert 1, Expert 11, Expert 12). The creation of use cases that integrate with people's daily lives, regardless of their age and geographic location, will be important for the organization of events. Connecting with different vendors and integrating NFT technology will make the experience simpler and easier to use (Expert 11).

#### **4.2.2. Age**

Most NFT enthusiasts are between the ages of 18 and 24 comprised of Generation Z, born after 1995 (Colormatics, 2021; Ensari, 2017). Then there are the 25-34 years old, Generation Y, those born between the early 1980s and 1995, who grew up in a prosperous and technologically savvy time (Cilliers, 2017; Colormatics, 2021). In Portugal, there are about 780,000 young people between the ages of 18 and 24 and 1,114,060 between 25 and 34 years (Pordata, 2020).

The younger demographic in Portugal, who grew up in tandem with the rise of new technologies, has a lower resistance towards using and experimenting with many of emerging technologies (Expert 1, Expert 12).

Coachella, according to Sam Schoonover – Innovative Lead, is a festival and experience that values creativity, which is why they created NFTs with collections of festival images and sounds, posters, and distinctive Coachella keys that came with lifetime passes and on-site experiences ranging from front-of-house views to lifetime luxe camping accommodations at the festival (Graham, 2022). The objective was to expose Coachella attendees to new technologies and NFT attendees to Coachella. NFTs will play



a significant role in Coachella's marketing and fan interaction tactics (Vargas, 2022). The importance of fostering community and the focus on creating a value proposition through a unique participant experience reinforces the benefits of NFTs and how event organizers can take advantage of the technology (Expert 7, Expert 8, Expert 11).



**Figure 7 - Lifetime Coachella Guest Festival Passes (Coachella, 2022)**

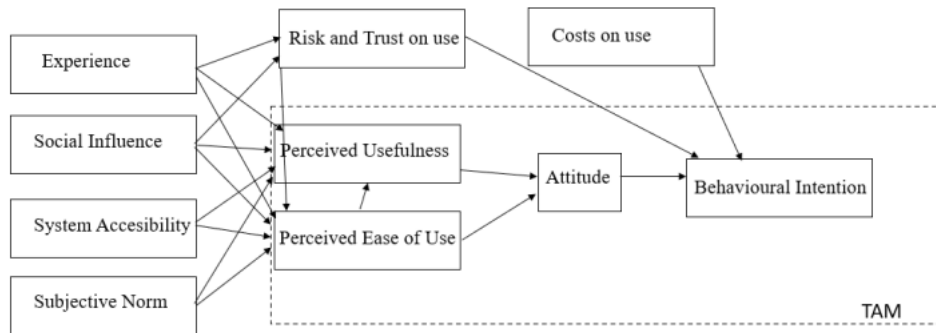
The benefit of post-event and the creation of digital memory is an important step for event organizers to understand tests they can do on their events, without the need to start with ticketing. It is a way of understanding the consumer's profile, verifying adherence, and studying these results (Expert 2, Expert 5, Expert 6). Attached it is possible to verify the purchase process and the buyer's profile (Appendix II).

### **4.3. Level of Adoption**

NFT resurgences have historically been associated with the general bitcoin market cycle. The recent comeback of NFTs is a result of the bull market in 2021. This is anticipated as bitcoin investors seek out further possibilities with their increasing buying power (Cointelegraph Research, 2021). Collectibles and art sales have the highest association with overall NFT sales, showing their dominance. DeFi and utility NFTs have the lowest correlation across all categories, indicating that these categories may be developing their own market (NonFungible, 2022b). The utility NFTs industry is still very new and has enormous development potential, being by far the most diverse and well spread across projects (NonFungible, 2022a).

In Portugal, there is still a lack of true understanding of the subject and the relevant technologies. While NFTs are a great tool for attracting new users, users must be educated

on blockchain and crypto technologies (Expert 1, Expert 4). The Technology Acceptance Model is the primary way for measuring individual adoption of a technology (Nevi, 2022).



**Figure 8 - TAM to NFTs**

The factors that may influence the acceptance of NFTs are namely: cost of use, risk and trust in their use and the consumer's attitude towards their use (perceived usefulness and perceived ease of use). Experience with technology (generic digital education), social influence (produced by third parties, media, and society), accessibility to use an NFT (user experience), and subjective norms (use by third parties who influence through direct contacts) are some of the elements that impact these factors for usage. These many elements will impact how the user perceives risk, security, and usability, and subsequently, whether they will use NFTs (Nevi, 2022).

There are a variety of news stories in the media nowadays that cast doubt on the security of technology and discourage the adoption of NFTs by large corporations unwilling to risk their reputations (Expert 4, Expert 5, Expert 6). Thus, according to the questioned experts, there is a definite need to develop a more mature user experience that facilitates an easier adoption scenario, as well as to provide enterprises with assistance and high-quality infrastructures. At the same time, Portugal will need inspiration from international success stories to increase adoption rates (Expert 7, Expert 8, Expert 11). In the appendix (Appendix II), there are several examples of the use of NFTs in various industries around the globe.

Among some of the applications from other industries that can be replicated in the event ticketing industry are the use of digital twins to replicate goods, such as a paper ticket; the use of IoT to enhance the analyzed data and the way it is interpreted; and the development of one's own artificial intelligence for the analysis of each transaction.

Converting tangible objects to NFT format. For instance, guitars and balls from concerts and games might be used. Fractionating a single asset to increase its liquidity or permit a split purchase, such as a collection or a ticket. Place information in smart contracts that can be communicated to various parties throughout the event's value chain, including suppliers and sponsors.

#### **4.4. How NFTs are Working in the Industry**

According to expert Carlos Vicente, UEFA's implementation of a blockchain-based mobile ticketing system for stadium access during EURO 2020 was one of the most significant testing and use cases for the use of blockchain technology and might be a precursor to the acceptance of NFT-ticketing (Expert 6, Expert 8). This was made possible by UEFA's collaboration with SecuTix Solutions to distribute close to one million mobile tickets through its UEFA EURO 2020 Mobile Tickets app, which utilizes blockchain technology (TheTicketingBusiness, 2021).

One of the strongest use cases was the presentation of data analysis and processing capabilities. The app reports directly when the ticket is registered at the stadium entrance, allowing UEFA to know precisely how many spectators were entering each entry of the outside perimeter and how many tickets each officer was activating in real time (TheTicketingBusiness, 2021).

According to specialists in the area and NFT-ticketing competitors, GET Protocol is one of the most developed White-Label solutions for NFT-ticketing, enabling it to be seen as a ticket solution capable of handling events such as Rock in Rio Portugal (Expert 5). Since 2016, GET Protocol has started distributing on-chain event tickets to the public. They have evolved their strategy regularly to achieve a market fit with the broader (non-crypto) audience and the desires and interests of event organizers throughout the globe. They have issued more than one million tickets worldwide and iterated on a ticketing system that provides several advantages to its consumers. From scalping protection to direct communication and fan benefits (GET Protocol, 2022). The value proposition of the GET Protocol is thus centered on four core areas: maximizing the primary sale, developing income streams on the secondary market, producing digital collectibles using NFTs, and managing data for engagement and marketing.

Wicket Events, an Italian ticketing company, also utilizes the GET Protocol technology to develop its own NFT-ticketing solution, currently with more focusing on

the music market, which it believes has the greatest use case due to the community it has engaged (and the digital memories it can create) as well as the issues with the various points of sale in the primary and secondary market. Given the challenge of reaching the market with event organizers, the solution aims to be a white label and collaborate with ticketing companies to deliver NFT-ticketing solutions to organizations already established in the market for events, concerts, and festivals (Expert 5). The solution focuses on the experience it can give and the benefits that come with it, such as the ability to communicate with fans and keep them engaged before and after the event by sending airdrops and always knowing who the ticket holder is (Wicket Events, 2022).

YellowHeart is a ticketing startup that aims to compete in the ticketing industry by creating Music NFTs and NFT Ticketing. They choose Polygon since it had the lowest gas fee at the time of construction, but NEAR may be a better choice now (Expert 5, Expert 9, Expert 12). With the security of NFTs being connected with the blockchain, enabling royalties for artists and event organizers, and the potential of establishing memberships unique via the collectibles they give after each event, the solution intends to provide huge advantages to the US market (YellowHeart, 2022).

B.A.M Ticketing is an Austrian ticketing startup. Larger events get the greatest immediate benefit from blockchain technology, but often have lengthy implementation and sales processes related to contracts and exclusivity agreements, which are maintained by sponsorships to the event organizers (Expert 6, Expert 10). This is one of the difficulties of penetrating bigger events, since there are sometimes obstacles to entrance and protections for incumbent rivals, because of established cost structures and relationships. The startup takes a different approach, having developed its own blockchain that operates centrally to reduce the cost and speed of each transaction (Expert 6). Even compared to Polygon, the solution permits 2150 transactions per second, making it better. The value proposition then emphasizes earning more on each transaction, absorbing secondary market earnings, and eliminating scalpers and bots. Provide fans with NFT tickets that serve as permanent memories and proof of attendance. Enhance engagement with NFT collectibles; Collect information about current and former ticket holders. Smart contracts should be used to enforce all ticketing rules (B.A.M Ticketing, 2022).

Seatlab is a U.S.-based startup that utilizes the NEAR Protocol blockchain to build its own token in response to the need for low-cost transactional solutions that can satisfy the demands of event organizers. Through its own marketplace for ticket resale, Seatlab aims to provide a ticketing solution that adds value to the end customer. The solution focuses on personalizing ticket features via the use of next-generation, programmable event tickets, which enable event organizers to define royalty splits for every ticket resale on the secondary market. Set price limitations to limit resale pricing and make tickets non-transferable or non-resaleable to remove them altogether from the secondary market. In addition, they concentrate on the data supplied by the solution, including dashboards that let the event organizer know how many tickets were sold in each market (main and secondary) and to whom (Seatlab, 2022). Given the collected data information, it is possible to offer prizes for the most faithful fans and establish engagement mechanisms with them, as well as to personalize each NFT, for instance, by adding a Deep Fake of the event artist to thank the participant (Expert 8).

The solutions now available on the market are still in the “product-market fit” phase, where they are attempting to comprehend the use cases and primary clients. Most of the current testing include Web3 events, or the usage of NFTs in an engagement perspective via collectibles or with POAPs (Expert 4), like with Coachella and what Rock in Rio Brazil is contemplating introducing, for instance (Expert 11). Even yet, it is understandable that there is a strong emphasis on finding cost-effective solutions that allow event organizers to avoid incurring additional expenses and, in some cases, even save money (Expert 7, Expert 8). The objective will be to design a system that reduces costs and translates to a user-friendly experience for the participants (Expert 12, Expert 13); however, there is currently no clear strategy about whether it will be possible to onboard users without crypto (Expert 12). The most common options are the development of the token with a blockchain reliant on the ticketing company or the adoption of fast and sustainable blockchains, such as Polygon or NEAR Protocol, in replacement of Ethereum.

#### **4.5. Impacts of NFTs in Event Ticketing**

The many implications that NFTs may have on the industry may be categorized into three distinct phases: before the event, during the event, and after the event, following the attached (Appendix III) event ticketing industry trends.

Before the Event	During the Event	After Event
<b>Primary Market Maximization:</b> using smart contracts to connect ticket information and price regulations, enabling limitless versions of tickets with discounts and dynamic pricing.	<b>Gamification:</b> for instance, using tokens to gamify the participant's experience with the right to airdrops as a type of award at the end of the event.	<b>NFT Collectibles:</b> creation of digital memories after the event, with the possibility of airdrops: unique moments, ticket design, among others.
<b>Revenue in the Secondary Market:</b> define royalty splits, price limitations to limit resale pricing and make tickets non-transferable or non-resaleable.	<b>Real Time Data:</b> understanding when tickets are activated, in which areas, as well as enabling the integration of mechanisms for collecting information and mapping the participant's path through AI.	<b>POAP:</b> it is possible after using the ticket to generate an NFT proving that the user was at the event (it may or may not be transferable).
<b>Communication and Marketing:</b> it is feasible to trace the ticket and personalize the ticket, allowing for articulation with influencer marketing and creating the opportunity for upselling and cross-selling.	<b>Experience Tokenization:</b> integration of partners (sponsors, vendors, among others) into the event experience through sales tokenization (similar to cashless).	<b>Personalization and Targeted Marketing:</b> through collectibles and POAPs it is possible to continue to communicate with users and send special conditions (those who attended the last events receive a discount or a VIP ticket).
<b>Elimination of Illegal Resale and Control of Scams:</b> through blockchain technology, it's feasible to ensure no sales outside the network and decrease the likelihood of scams with the user able to confirm the ticket on the blockchain.	<b>Safety:</b> using blockchain, it's feasible to detect bogus tickets and track their origin.	<b>Revenue After Event:</b> through the deployment of collectibles, artists and event organizers may be compensated with royalties.
<b>Data Analytics:</b> Integration of all transactions in the primary and secondary markets, allowing for improved decision-making and comprehension of each transaction's general analytics.	<b>Engagement and Personalization:</b> possibility of unique moments for NFT holders and interaction with participants (those who have been to past events, who have NFTs from artists who are at the event, among others).	<b>Community:</b> Participant identification and communication channels for community management (unique sales and engagement opportunities)

**Table 4 - Impacts in Event Ticketing Using NFTs**

The usage of NFTs may have varying effects on the industry, therefore event organizers may apply the solution from a variety of viewpoints. Consequently, it is essential to comprehend the variables that potentially lead to the implementation of NFTs in the Event Ticketing industry, which, according to interviews with industry experts, may be categorized into eight key elements: sales; competitive advantage; customer preference; customer experience; customer satisfaction; customer engagement; data collection; and new revenue streams.

Respondents were asked when establishing an NFT-ticketing solution, which three elements (in no order) would be most significant to event organizers, attached is the table with all the answers (Appendix IV). In this approach, it was feasible to confirm the presence of a response pattern regarding the most influential element: New Revenue Streams, with 50% of respondents (ticketing companies and event organizers) identifying

it as the most influential component. In second and third position, respectively, were Customer Experience and Data Collection. Given their qualities, NFTs have the potential to help event organizers overcome many of the challenges they now face, including the secondary market, the lack of participant information, and the need to seek new alternatives and solutions to enhance the participant experience.

Customer Preference was not picked by any of the interviewees, which may be explained by the fact that most event organizers would acquire this solution in the future, and this may have had an impact. This rationale may also be applied to the two remaining elements with less votes: Competitive Advantage and Customer Satisfaction. Given the topic discussed throughout the interview (the future of NFTs in the industry), there may have been a bias in the responses, given that respondents who predict the more widespread adoption (or not) of this solution may not see the value of short-term adoption, but rather the possibility that it will become a more prevalent option in the industry in the future, not sustained competitive advantages or consumer preference.

Given the novelty of this topic and the fact that it is relatively new to the industry, these elements may evolve over time and with more accurate and mature solutions, as more use cases and new features are introduced. The secondary market, the inability of event organizers to obtain real information on who will be attending the event, and the improvement of the participant experience, considering the newly created contact points: before the event, during the event, and after the event, will be the primary focus of the implementation of NFTs in the event ticketing industry.

Impacts may vary based on the kind and scale of the event. Several experts highlighted that the sort of event (sports, festival, concert, theater, etc.) might affect event organizers' adherence to it and usage of NFTs, as well as the variety of impacts. For music and sporting events, the increased connection with idols increases the utility of collectibles, for instance. Likewise, the scale of the event will influence the sort of benefits sought. A festival, for instance, will evaluate the effectiveness and safety of secondary market control, but a smaller event will focus on the participant experience and collect more data to learn how to enhance it. In this way, it is possible to understand that using NFT ticketing, the meaning of ticketing will gain a much broader relevance in the different phases of the event, being important to explore this global approach in the understanding of the event industry.

## 5. Future Scenarios of the Industry

The second research question aims to answer the question “What will the event ticketing industry look in 5 years, if NFTs are adopted?”. To illustrate how the industry may possibly change in the future, three scenarios were developed, and the three most plausible outcomes were identified.

For the construction of these scenarios, the Scenario Planning framework was used. The definition of the scope of the analysis is attached (Appendix V). The scenarios are divided into positive, neutral, and negative categories. The terminologies allude to the outcomes of these future scenarios, i.e., whether the future of event ticketing uses and implements NFTs. To begin, the probabilities of occurrence for all three scenarios are equal at 33,3%. These probabilities of occurrence are updated at the conclusion of this chapter based on the expert interviews and individual evaluations.

The scenarios are based on the predominantly proactive or reactive stakeholders’ collective behavior and are separated into primary, secondary, and influencer groups. Primary stakeholders are the agents of industry transformation, while secondary stakeholders normally respond reactively. Influencers have an impact on how stakeholders embrace a change. The distinction between primary and secondary stakeholders, as well as influencers, was developed based on the interview findings.

Stakeholders Groups	Role	Description
Event Organizer	Primary Stakeholder	Event organization companies (Everything is New, Música no Coração, and others).
Ticketing Companies & Related Services	Primary Stakeholder	Ticketing companies and solutions (GET Protocol, Blueticket, Last2Ticket, Ticketline, others).
Performers	Primary Stakeholder	Artists, performers and event headliner (poster).
Participants	Secondary Stakeholder	Festival-goers, event attendees, fans and supporters.
Sponsors	Secondary Stakeholder	Brand activations, partners, communication companies, larger companies.
Vendors	Secondary Stakeholder	Food, drink, gifts and merchandise inside the venue.

Influencers	Role	Description
Government Entities	Influencer	Local/national politics, national NFTs and Crypto laws, international NFTs and Crypto treaties.
Media	Influencer	Media and awareness, PR, social networks.
Public Opinion	Influencer	General public perception of technology, education and use cases.
Technology	Influencer	Concerning: transaction cost, security and user experience.

**Table 5 – Description of the Stakeholders and Influencers in the Event Ticketing Industry**



The scenarios will then be constructed depending on the behaviors taken by various agents and their speed in adopting and implementing NFTs at their business. Table 6 presents the scenarios. The individual scenarios are further explained in the subsequent chapters.

Stakeholders / Influencers	Role	Behaviour	Positive Scenario	Behaviour	Neutral Scenario	Behaviour	Negative Scenario
<b>Event Organizer</b>	Primary Stakeholder	Proactive	Use of NFTs as an alternative to ticketing in larger events; Specific community events full use of NFT-ticketing; Some events without using NFT-ticketing.	Proactive	POAP and collectibles, as well as tokenization of gamification apps are the most recurrent; possibility of use as an alternative for smaller events or even full use.	Reactive	Collectibles and POAP may exist at some events. NFT-ticketing for Web3 events only.
<b>Ticketing Companies &amp; Related Services</b>	Primary Stakeholder	Proactive	Synergies between startups and ticketing companies to share resources and capabilities. Different approaches and positions but high responsiveness. Use of white-label for some events.	Proactive	The positioning of ticketing startups will vary as a seller or provider. There is some conflict between different companies.	Reactive	Ticketing startups will focus on niche events and creating collections for event organizers. There is no resource sharing with ticketing companies.
<b>Performers</b>	Primary Stakeholder	Proactive	Helps in creating utility for NFTs at events, through the creation of specific content and projects for the event community.	Reactive	Performers will have a protocol dependent stance that they have with event organizers. In some cases they will be able to participate in collections, but only more niche performers will enter in the utility space.	Reactive	Collectibles are seen as an extra marketing strategy or form of monetization. There is not much involvement.
<b>Participants</b>	Secondary Stakeholder	Reactive	Very different adoption profiles: generalized population already with interest and knowledge, however, there are participants who prefer more traditional purchase mechanisms.	Reactive	Lighter adoption, still being in a more initial and primordial phase of adoption. Groups more educated and eager to use it, due to the collective effort of the industry.	Reactive	Early adopters and the rest of the population with little knowledge and understanding of the technology. Poorly instructed use.
<b>Sponsors</b>	Secondary Stakeholder	Proactive	Help in reducing implementation costs and risk, creating value through the launch of collections and utility for events.	Reactive	Participation in prizes and gamification through tokens, with the possibility of supporting initiatives with greater impact.	Reactive	Reluctant to support initiatives with NFTs and only participates depending on how attractive the project is from a financial point of view.
<b>Vendors</b>	Secondary Stakeholder	Reactive	Acceptance of cryptocurrencies and support in launching initiatives with NFTs through utility.	Reactive	Support for the use of tokens, but with more restrictions on the payment method.	Reactive	It does not participate in the industry with NFTs and maintains its current stance.
<b>Government Entities</b>	Influencer	Reactive	Creation supported by the remaining stakeholders in a legal framework suitable for use in the industry.	Reactive	Without creating special conditions and following international policies.	Reactive	Application of specific tax regimes for the use of NFTs collectibles.
<b>Media</b>	Influencer	Proactive	Active participation and looking to bring new use cases with impact.	Reactive	Reproduction of news linked to some less positive uses and little talk about benefits.	Reactive	News against the industry and linked to scandals.
<b>Public Opinion</b>	Influencer	Proactive	Positive, with some understanding of safety and usage.	Reactive	Initial, little educated yet. However, there is more discussion and good use cases.	Reactive	Weak expression and association with feelings of insecurity and difficulty in use.
<b>Technology</b>	Influencer	Proactive	Many developments in user experience and infrastructure simplification. Low usage & implementation costs.	Proactive	It seeks to create more infrastructure and simplify usage.	Reactive	Technological investment was not made for ticketing, it is still complex in use.

**Table 6 – Summary of All Three Scenarios**

## 5.1. Future Scenario “Positive”

Together, event organizers and ticketing companies accelerate the introduction of NFTs in Portugal. This situation is driven by the capacity of event organizers and ticketing companies to collaborate, gaining the backing of artists to produce industry value. Thus, the three major stakeholders will initiate discussion and strive to develop innovative ideas, based on test project and in collaboration with other organizations (sponsors). Simultaneously, there is an active engagement of the media in the healthy discussion on solutions, as well as the exposure of outstanding global cases, carried out by the adequate work on the technical side of the ecosystem to ease the processes for widespread population acceptance. Due to the simplicity and utility of the solutions, the public has a favorable perception of the usage of this new technology in numerous fields of activity.

Through the introduction of more international use cases and the search for solutions, event organizers will test different solutions and integrations of NFT-ticketing in events, not only from the standpoint of employing NFTs as a marketing tool, but also in terms of their usefulness as a ticketing tool. Thus, work will be conducted on the usage of NFTs as the only ticketing option for bigger events with a younger target demographic. However, for general events and audiences that are not highly segmented, it will be possible to buy the ticket as either an e-ticket or an NFT. The difference will turn upon the ticket’s functionality, allowing for more resale prospects, creating collectables, and offering additional advantages via the assistance of partners and sellers on-site.

Ticketing companies will investigate the best methods to apply the solutions for each event with the help of sponsors who will attempt to cover the expenses of tokenizing the participant’s experience and including advantages with prizes and gamification. These companies will collaborate with startups to digitalize the process and build the necessary infrastructure. Consequently, startups will collaborate directly with ticketing companies to use white-label technology or sell directly to event organizers. However, it will be more common to see smaller events working with startups and larger events, due to exclusivity agreements with artists, using startups as a white label for larger ticketing companies.

Participants will follow the projects chosen by their favorite performers. Consequently, the adoption of this technology by the participants will also rely on the mix of usefulness and rewards used by the performers. The addition of music samples, deep fakes, and customized messages, as well as the utility of opt-in meet-and-greets or even tickets to future events, are

methods to bring additional advantages to events and encourage more attendees to purchase NFT tickets.

The potential of tokenizing the experience will increase the participation of sponsors and merchants. Sponsors will fund a portion of the installation expenses via sponsorships and the creation of special campaigns, enabling bigger events to adopt the technology at a higher rate. For instance, sponsors may create and participate in limited editions of NFTs while placing their own branding. A ticket to a bigger event grants access to a sponsor's VIP stand. Gamification combined with tokenization can give marginal utility to sponsors and their relationship with events. In this manner, the active involvement of sponsors will also enable the addition of value and use cases to NFTs, hence facilitating broader acceptance and engagement by users.

Educating consumers via media articles facilitates the dissemination of accurate information and the introduction of further projects. Government organizations will not take an active role; instead, with the assistance of other stakeholders, they will establish a legal framework that facilitates the use of technology and stimulates innovation. Given the media's support and the simplification of its use through the improvement of technological infrastructures, such as wallets and the way to buy crypto, marketplaces and the way to share NFTs, as well as the creation of new integration methods that do not require such complex private and public keys (such as NEAR), and low transaction costs, the public will view the technology favorably.

Web3 academies, events, and more use cases for adjacent sectors will be developed by Web3 enterprises to facilitate the education and transfer of users on a big scale. To begin utilizing and accepting crypto, the procedure of purchasing cryptocurrency, registering in wallets, and using it in daily activities with various partners will be streamlined. The regulatory structure will facilitate straightforward comprehension of the legislation. Thus, consumers who acquire NFT tickets will be able to resell their tickets anytime they like, save digital memories, and take advantage of the utility provided by event organizers via the digitization they provide. The application of metaverse and augmented reality improves the distribution of Non-Fungible Tokens.

Therefore, the positive scenario will include the usage of NFTs as an alternative for major events, with the option of traditional tickets still available, but with the opportunity to acquire tickets in NFT format. At the same time, event organizers will fully implement NFT-

ticketing as a single solution for smaller events. However, it will depend on the kind of event: there are communities who will not use NFT-ticketing since the marginal advantages of the solution are not readily apparent to the event organizer, as well as the education requirements of this audience. This situation is also a consequence of the favorable feedback gathered from the usage of NFTs in an international setting by large events such as Coachella and UEFA.

## **5.2. Future Scenario “Neutral”**

Event organizers and ticketing companies explore the possibility of employing NFTs to digitize the user experience at events, even though the technology has not been embraced by most of the population and public opinion is inactive in its defense and promotion. The endeavor is centered on the exploration of solutions inside the event that correspond to a utility viewpoint, with a focus on the participant’s experience and the prospect of post-event marketing. However, for larger events with major sponsors, testing will be conducted based on worldwide applicability. With the backing of their sponsors, some event organizers may try alternate ticketing methods in this manner. However, smaller events may seek to speed digitalization and the establishment of new income’ streams in collaboration with ticketing startups seeking to penetrate specialized markets and particular communities.

Consequently, event organizers prioritize the experience of the participant and the collection of data during the event through gamification systems using tokens, which may convert into simple experiences employing tokens such as Bepro. Bepro is a marketplace and technology that links developers with operators or anybody seeking to construct open-source development repositories (bepro, 2022).

Tokenization permits the participation of sponsors and the incorporation of new users. Thus, it is conceivable to begin the creation of tiny experiences using blockchain technology and the introduction of ticketing solutions in part in NFT format. At the ending of each event, through the collection of data in the applications used, users will be able to collect their NFT as proof of attendance, allowing the event organizer to continue communicating with the participant and to obtain new sources of revenue on the secondary market, thereby enabling the event organizer to obtain some of the benefits associated with the use of NFTs. However, other event organizers may want to be nimbler in testing and implementing the technology, particularly those that do not have exclusivity agreements and can incorporate new ticketing alternatives. Consequently, the industry will be divided if significant event organizers do not adapt rapidly.

There will be ticketing startups that sell tickets solely to smaller event organizers and ticketing startups that want to collaborate with major ticketing organizations as their NFT ticketing and blockchain partners. How they want to position themselves in the market will determine their approach. To be able to compete with existing rivals who are well-established and have strong relationships, startups will need to acquire ticketing expertise.

It will take longer for performers to fully shift to NFTs. Their posture will be more reactive, depending on their connection with the event organizer and the parties with whom they have contracts. For larger events with a greater association with tokenization and post-event NFTs, there will be partnerships and the launch of marketing collections associated with the event; however, the greatest utility and participation of performers will be associated with events whose communities are already more engaged. In Portugal, however, distribution and collaboration for such efforts will not be the norm. Nevertheless, foreign artists will have created excellent use cases, as is starting to be seen in the United States.

Due to the technical complexities related with the establishment of wallets and the usage of various cryptocurrencies, international cases will make it more difficult to onboard new users. Due to the more reactive nature of the value chain related to events, there will be no big use cases in Portugal, which will discourage the adoption of these solutions by general participants.

Sponsors and vendors of the event will take a more passive attitude, neither aiming to cover all expenses nor to accelerate the adoption of NFT-ticketing. Sponsors may sometimes want to participate with the tokenization of an experience, but only from a public relations standpoint and not to offer additional value. For events with bigger audiences and event organizer effort, there may be more adherence to the release of collectibles and usefulness related to sponsors. Moreover, the type of relationship will have to come from a more active stance from event organizers and not from their sponsors.

Due to the influencers' more reactive stance, there is less support for technological advancement, which slows the onboarding of new users. On the side of government entities, there will be engagement with businesses; however, owing to its reactive approach, it will not seek the development of unique regimes; instead, it will strictly follow to international law and globally accepted regimes, aiming to achieve best practices. On the media side, there will be some noise linked with the negative aspects of cryptocurrencies and the usage of NFTs, focusing on collections with limited use and ignoring worldwide examples from other sectors.

The general public's view is negatively impacted by the lack of disclosure owing to the hurdles posed by the fear of danger and the perceived difficulty of usage.

Despite technology advancements and organizations' attempts to simplify infrastructure, there is still public opposition to widespread adoption, necessitating increased efforts in education and the establishment of use cases in areas where the population works more often.

Furthermore, it can be argued that niche events that leverage NFTs as a solution will exist in the future, as they already do now. In bigger events, however, a Proof of Attendance Protocol and gamification systems with tokens will be used, allowing for post-event communication with participants who were there and assuring an engaging experience for the participant. There may be organizations who enable the use of NFT-ticketing as an alternative at certain large events, but it will not be widespread due to the nature of the audiences at these major events. There will continue to be events that, depending on their nature, do not utilize NFT technology.

### **5.3. Future Scenario “Negative”**

The primary drivers are the lack of a clear adoption position on the part of ticketing companies and event organizers, despite continued efforts by ticketing startups to come closer. However, due to the lack of incentives, support, and mass acceptance, most of these solutions lose their track record and are not used, since the population and businesses have a negative perception of NFTs as “unnecessary” and “trendy.” This results in the collapse of a number of these startups, leaving only those focused on supporting the introduction of collections and NFTs as proof of attendance with event organizers. The lack of broad support is attributable to the fact that Portugal is a tiny market with a population that has a low buying power and education levels for e-commerce and other digital solutions that are below the European average.

Event organizers, due to implementation costs and agreements made with ticketing companies that do not seek NFT-ticketing solutions due to lack of support and pressure, end up not making a clear investment in this area. Leaving NFTs for more common use cases, such as collectibles and POAP. To launch these projects, companies just explore alternative income sources and the application of agreements with artists and sponsors. Some event organizers, more closely associated with Web3 for branding purposes, continue to employ NFT-ticketing because they believe in its potential, despite the implementation expenses.

Large ticketing organizations in Portugal maintain “business as usual,” without attempting to integrate NFT-ticketing solutions due to Portugal’s lack of mass users. Thus, companies concentrate on major events and do not work with ticketing startups. Consequently, ticketing startups lose momentum since they can only deal with niche events. For such result, there is less investment in this area, as prior investments did not provide a large return. Nonetheless, there are still excellent foreign examples that have not yet reached Portugal. The implementation of NFT-ticketing is slow, like cashless and digitalized buying procedures.

National musicians do not actively promote this sort of technology since their intended audience does not utilize it. Publishers and artists’ agencies continue to see NFTs as a specialized practice. Some communities introduce collectibles with the intention of generating revenue via collectors. As a result of the solution’s expense and lack of immediate value, artists do not amplify and use the utility that can be provided.

Participants are not now seeking this sort of solution due to their primary focus on the remaining digitalization and event organizers’ experience. This form of technology is avoided by sponsors because of its negative connotation among the public and the absence of media backing. Since there are few use cases in these industries, companies aim to avoid generating possible difficulties when introducing new solutions by focusing on what they currently do effectively. Sponsors only consider the usage of NFTs at events as a potential source of additional income and a viable form of public relations when there is a solid strategy in place for their execution.

The use of NFTs in secondary sectors and the development of use cases for mundane transactions do not exist in Portugal due to a lack of funding for these types of initiatives. Therefore, event vendors use no NFT-related technologies.

Due to their more neutral approach, the remaining influencers limit the pace of innovation in this industry in Portugal. The technology is used in other industries with more financial resources, and in Portugal, the emphasis is on B2B solutions, avoiding the B2C market owing to its limited expression and diffusion. Due to poor expression and the exploitation of companies to generate rapid profits with collectible NFTs, the media conveys negative news that, from an interest and education standpoint, devalues public perception. Given the limited technology advancements for B2C, public opinion regards NFTs as difficult and unsafe. Due to the abuse of NFTs and their inapplicability in Portugal, the government attempts to restrict



the use of technology via the imposition of additional taxes to reduce negative usage by businesses.

In this way, there could be a disincentive of the use of NFTs. POAP will only be used at niche events, whereas NFTs will relate to collectibles and post-event marketing; they will function as “digital memories” rather than as a utility. There will be events, such as for Web3 communities, where NFT-ticketing may be used, but it will not be widely adopted due to the fact that there are still several issues that need to be resolved: population education, use of more specific cases and larger scale in Portugal, better user experience when buying, simplification of technology and standardization of options, and greater sponsorship support to cover implementation costs in events.

#### **5.4. Scenario Overview**

In all these three scenarios, the usage of non-fungible tokens (NFTs) by event organizers is defined, with the goal of exploring multiple possibilities based on the response and actions of stakeholders. Changing the behavior of one stakeholder impacts the behavior of other stakeholders and either encourages or discourages the usage of NFTs in an industry. Given the interactions with the various specialists, it is feasible to deduce that there are an increasing number of use cases of NFTs in this market that want to test the applicability hypotheses of various features in the pre-event, event, and post-event phases. Investment and the risk that will be carried by many stakeholders are two elements that influence the industry’s growth potential. In Portugal, the introduction of NFT-ticketing might be accelerated by the increased participation of the primary stakeholders, facilitated through a technology advance. Despite this, there is still apprehension on the part of the major Portuguese players over tests that lack substantial international validation.

Taking into consideration the optimism of the tech providers and the reluctance of the event organizers and Portuguese ticketing companies, it is necessary to assess the probabilities of the occurrence of each scenario. There is still a tendency to believe that the general implementation of NFT-ticketing will take longer than 5 years due to a lack of understanding of the technology’s potential at major international events.

Given the worldwide trends in foreign markets, the present use cases in various sectors, and the tendency toward improvement and convenience of the adoption and onboarding of new users in the Web3 world, the positive scenario has a 30% chance of occurring. Nevertheless, given the unwillingness of Portuguese players to adopt NFT as the only ticketing method for

major events, the neutral scenario has a 60% chance of occurring during the next five years according to an expert (Expert 14) and according to appendix VII. Thus, the negative scenario in which the use of NFT-ticketing and the use of NFTs and tokenization of the experience of event participants does not occur in most events, with only the use of NFTs from a collectible perspective and in more niche events as a ticketing solution, has a 10% chance of occurring, given the growing belief that NFTs will influence the industry within five years (Expert 14).

Nevertheless, given the novelty of this topic, it is important to verify that the probability of occurrence between the scenarios might change rapidly based on the influence of worldwide use cases and the success or failure of key international events. It is believed that the issue of who will accept this new technology first and if it will be effective will be one of the most crucial variables in its deployment.

The purpose of constructing these scenarios was to assess action and adopt innovative solutions. Due to smaller resources of event organizers, the Portuguese sector is now waiting for worldwide outcomes. Given that there is agreement that improved technology would be beneficial for the sector, it is vital for various stakeholders to consider their approach. The issue will be whether NFT application in an industry can be anticipated or whether it will only be done when the populace accepts it more widely. It is essential to comprehend if the stakeholders would seek responsibility for the acceptance, or whether they will be a result.

## 6. Conclusion

This research sought to comprehend the impact that the NFT disruptor may have on the event ticketing industry by analyzing factors that would influence event organizers and the advantages of the application of NFTs in this sector. In this way, the impact that NFTs will have on the event ticketing industry in Portugal over the next five years was examined through the creation of adoption and implementation scenarios, as well as the main challenges associated with each stakeholder and the consequences of their active reactions. The scenario with the highest probability of occurring in Portugal is the neutral scenario, with a probability of 60%, due to the influences of the differing perspectives of the experts interviewed: while some are certain that it will be the industry standard, others are uncertain as to whether it will be implemented in a 5-year timeframe.

Important implications for both academic and management domains were discussed in this study. Examining this industry in Portugal, there was no relevant literature on its technological developments. In addition, it addresses the impacts and challenges of implementing NFTs in the industry from the perspective of many stakeholders and it includes knowledge and research on NFTs, aiming to contribute to the NFT literature.

Nonetheless, there are a number of limitations pertaining to this Dissertation. In the first instance, the interviewed experts are part of a large stakeholder group in the Portuguese market, which, on the one hand, gives them greater capacity to invest in technology, but on the other hand, they have greater aversion to risk and fear losing their reputations if they implement a solution that has not been fully validated by the international market. Consequently, the scenarios mainly evaluate the viewpoint of bigger enterprises in this industry, providing fewer perspectives of smaller event organizers and ticketing companies.

In addition, the current study does not assess the influence of technology based on the kind of event or its size, which might be a subject for future research - understanding the impact of NFTs taking into consideration the type of event/audience-target and its size. Given the paucity of research on this issue, the current study does not assess the quantitative effects on the industry. However, it does provide insights on many of the drivers and serves as a foundation for future research.

Additionally, the current research does not incorporate a customer (participant) viewpoint since there is no literature on the subject. Therefore, it will be important to address

this viewpoint in future study and determine what factors may promote or reduce this technology's adoption through TAM. On the other hand, it is vital to do future study on the influence of the implementation of NFTs in businesses comprising the event ticketing value chain, such as vendors. In addition to investigating the possible models and applications of engagement and gamification systems inside events using tokens.

Consequently, it is hoped that this Dissertation will serve as a framework for further work on solving problems with new technologies such as NFTs in the event ticketing industry nationally.

## References List

- Arnon, B. (2022, March 4). *Utility Is the Future of NFTs*. <https://cryptonews.com/exclusives/utility-future-of-nfts.htm>
- Aventus Network. (2017). *The Event Ticketing Industry is Broken and in Need of Disruption*. <https://medium.com/aventus/the-event-ticketing-industry-is-broken-and-in-need-of-disruption-a60781c3c699>
- B.A.M Ticketing. (2022). *NFT Ticketing and Collectibles*. <https://www.bam.fan/nft-ticketing-and-nft-collectibles/>
- Bell, J. (n.d.). *Loyola Consumer Law Review Ticket Scalping: Same Old Problem with a Brand New Twist Recommended Citation*. 18. Retrieved April 10, 2022, from <http://lawcommons.luc.edu/lclr/vol18/iss4/3>
- bepro. (2022). *Bepro.network | Web 3.0 codebase protocol*. <https://www.bepro.network/>
- Biaett, V., & Richards, G. (2020). Event experiences: measurement and meaning. *Https://Doi.Org/10.1080/19407963.2020.1820146*, 12(3), 277–292. <https://doi.org/10.1080/19407963.2020.1820146>
- Bilheteira Online. (2022). *BOL - Quem Somos*. <https://www.bol.pt/Projecto/QuemSomos>
- bitsCrunch. (n.d.). *NFT tickets: How are the event management and ticketing industry embracing this trend?* Retrieved April 16, 2022, from <https://bitcrunch.com/blogs/nft-tickets>
- Bizzabo. (2022). *What Is Event Experience? Everything You Need To Know*. <https://www.bizzabo.com/blog/what-is-event-experience-everything-you-need-to-know>
- Blueticket. (n.d.). *Blueticket - Quem Somos?* Retrieved April 10, 2022, from <http://palaciodabolsa.byblueticket.pt/content/docs/empresaPT.pdf>
- Brandessence. (2021). *Secondary Ticket Market By Product Type, By Application & Industry Size By 2027 | Report Analysis 2021-2027*. [https://brandessenceresearch.com/technology-and-media/secondary-ticket-market?MND\\_Priyanka](https://brandessenceresearch.com/technology-and-media/secondary-ticket-market?MND_Priyanka)
- Brenner, M. (2022). *The Biggest Event Trends for 2022*. <https://marketinginsidergroup.com/event-marketing/biggest-event-trends/>

- Britten, N. (1995). Qualitative interviews in medical research. *BMJ (Clinical Research Ed.)*, 311(6999), 251. <https://doi.org/10.1136/BMJ.311.6999.251>
- Buterin, V. (2014). *A NEXT GENERATION SMART CONTRACT & DECENTRALIZED APPLICATION PLATFORM*.
- Center for Strategy and Scenario Planning. (2022). *Our Scenario Approach | Center for Strategy and Scenario Planning*. <https://www.scenarioplanning.eu/our-scenario-approach>
- Centro Europeu do Consumidor. (n.d.). *Compra de Bilhetes para Espetáculos*. Retrieved April 10, 2022, from <https://cec.consumidor.pt/topicos/comercio-eletronico/compras-na-internet/previna-se-antes-de-comprar/compra-de-bilhetes-para-espetaculos.aspx>
- Cilliers, E. J. (2017). THE CHALLENGE OF TEACHING GENERATION Z. *PEOPLE: International Journal of Social Sciences*, 3(1), 188–198. <https://doi.org/10.20319/PIJSS.2017.31.188198>
- Coachella. (2022). *Key to the VIP Compound*. <https://nft.coachella.com/nfts/542604126323301038>
- Coinclarified. (2021). *NFT's and Ticketing*. <https://www.coinclarified.com/p/nfts-and-ticketing/>
- CoinGecko. (2022). *Survey Report NFT*. <https://twitter.com/coingecko/status/1509075551168114688>
- Cointelegraph Research. (2021). *Nonfungible Tokens: A New Frontier*. <https://docsend.com/view/yfq9898d9ixz73qt>
- Colormatics. (2021, December). *NFT Audience Insights: Who Buys NFTs and Why?* <https://www.colormatics.com/article/nft-audience-insights-whos-buying-nfts-and-why/>
- Courty, P. (2003). Some Economics of Ticket Resale. *Journal of Economic Perspectives*, 17(2), 85–97.
- Courty, P. (2019). Ticket resale, bots, and the fair price ticketing curse. In *University of Victoria*. <http://web.uvic.ca/~pcourty/FPT1005.pdf>

- Cryptopedia Staff. (2021). *Real World Examples of Smart Contracts | Gemini*.  
<https://www.gemini.com/cryptopedia/smart-contract-examples-smart-contract-use-cases#section-introduction-what-are-smart-contracts>
- Cui, Y., Duenyas, I., & Şahin, Ö. (2014). Should Event Organizers Prevent Resale of Tickets? *Management Science*, 60(9), 2160–2179. <https://doi.org/10.1287/MNSC.2013.1862>
- Dean, M. (2019). *Scenario Planning: A Literature Review*.  
<https://doi.org/10.13140/RG.2.2.12629.24802>
- Duffy, K., Reid, E., & Finch, J. (2019). Sold out? Reconfiguring consumer demand through the secondary digital ticket market. *Https://Doi.Org/10.1080/10253866.2019.1684270*, 23(2), 174–194. <https://doi.org/10.1080/10253866.2019.1684270>
- Ensari, M. S. (2017). A study on the differences of entrepreneurship potential among generations. *Pressacademia*, 4(1), 52–62.  
<https://doi.org/10.17261/PRESSACADEMIA.2017.370>
- Ethereum. (2022). *Proof-of-stake (PoS)*. <https://ethereum.org/en/developers/docs/consensus-mechanisms/pos/>
- European Commission. (2020). *SURVEY ON “SCAMS AND FRAUD EXPERIENCED BY CONSUMERS” Final Report*.
- Eurostat. (2021). *File:Internet use and online purchases, 2021 (% of individuals aged 16 to 74).png - Statistics Explained*. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Internet\\_use\\_and\\_online\\_purchases,\\_2021\\_\(%25\\_of\\_individuals\\_aged\\_16\\_to\\_74\).png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Internet_use_and_online_purchases,_2021_(%25_of_individuals_aged_16_to_74).png)
- Floor. (2022). *Top 8 events industry trends to look out for in 2022*. <https://floor.bz/blog/events-industry-trends-to-look-out/>
- Forkast. (2022). *State of the NFT Market In partnership with CryptoSlam Q1 2022*.
- Galea, J. (2021, December). *Portugal - The Most Crypto-Friendly Nation in Europe*.  
<https://jeangalea.com/portugal-crypto-bitcoin/>
- Gamifyou. (2022). *About us - Gamifyou*. <https://gamifyou.com/about-us/>

- GET Protocol. (2022). *An open invitation for free NFT ticketing services*. <https://www.get-protocol.io/content/an-open-invitation-for-free-nft-ticketing-services>
- Getz, D. (2008). Event tourism: Definition, evolution, and research. *Tourism Management*, 29(3), 403–428. <https://doi.org/10.1016/J.TOURMAN.2007.07.017>
- Glaser, F. (2017). Pervasive decentralisation of digital infrastructures: A framework for blockchain enabled system and use case analysis. *Proceedings of the Annual Hawaii International Conference on System Sciences, 2017-January*, 1543–1552. <https://doi.org/10.24251/HICSS.2017.186>
- Google Trends. (2022). *NFTs, Ukraine*. <https://trends.google.com/trends/explore?geo=PT&q=NFTs,Ukraine>
- Graham, L. (2022). *What Is Coachella's Target Market?* <https://www.lowendtheoryclub.com/what-is-coachellas-target-market/>
- Grant, R. M. (2003). Strategic planning in a turbulent environment: Evidence from the oil majors. *Strategic Management Journal*, 24(6), 491–517. <https://doi.org/10.1002/SMJ.314>
- Grienitz, V., Hausicke, M., & Schmidt, A. M. (2014). Scenario development without probabilities — focusing on the most important scenario. *European Journal of Futures Research*, 2(1), 1–13. <https://doi.org/10.1007/S40309-013-0027-0/FIGURES/7>
- GrowIN. (2021). *GrowIN Portugal & Utrust Join Hands to Enable Crypto Payments*. <https://www.growinportugal.com/growin-portugal-ustrust-join-hands-to-enable-crypto-payments/>
- GrowIN Portugal. (2022). *Why is Portugal Such a Friendly Place for NFT Companies? | GrowIN Portugal*. <https://www.growinportugal.com/why-is-portugal-such-a-friendly-place-for-nft-companies/>
- Hayden, M. (2022, February 17). *What Does it Mean to Mint an NFT? | Canstar*. <https://www.canstar.com.au/cryptocurrency/mint-nft/>
- Hopin. (2022). *2022 Event Trends Report: The Show Goes On*. <https://hopin.com/blog/2022-event-trends>



- IPFS. (2022). *What is IPFS? | IPFS Docs*. <https://docs.ipfs.io/concepts/what-is-ipfs/#decentralization>
- Klein, Z. (2010). Who's the Boss? The Need for Regulation of the Ticketing Industry. *Brooklyn Journal of Corporate, Financial & Commercial Law*, 5(1). <https://brooklynworks.brooklaw.edu/bjcfcl/vol5/iss1/8>
- Lee, W. (2018). Understanding Consumer Acceptance of Fintech Service : An Extension of the TAM Model to Understand Bitcoin. *Journal of Business and Management*, 20(7), 34–37. [https://d1wqtxts1xzle7.cloudfront.net/56980210/F2007023437-with-cover-page-v2.pdf?Expires=1652040743&Signature=FI9NbbsPCzHd6iZxeYQe0z4Ge3SIRx1G-y5~Vgra3ZsJCevDRkh-ma8RE3I3DdqdupJ5EIjHeZUnO94EAgKCQOKZFa1zlfYCzh7QnuEoBeOHppUd5adv3Qqo-tbbAilWkroQap7p~dobXAXt0xewkpm-gL8ydMvYJQSU-W9JKuu6ALfaAmexgixM3Z3VWXMKI1s9zEXewJl0xdkZYQ0XrQzgX5N2vOhhQvEhxghIxcPozurXpxNjQNubFsvgIEfDw0-aBeuPjeViM8HQDiCmYg333F4j1~d~GFomb75PqTYmyRJkf06VXbR6MGhREO2tdogbmV~cF6f7FV0Gzxnv2A\\_\\_&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA](https://d1wqtxts1xzle7.cloudfront.net/56980210/F2007023437-with-cover-page-v2.pdf?Expires=1652040743&Signature=FI9NbbsPCzHd6iZxeYQe0z4Ge3SIRx1G-y5~Vgra3ZsJCevDRkh-ma8RE3I3DdqdupJ5EIjHeZUnO94EAgKCQOKZFa1zlfYCzh7QnuEoBeOHppUd5adv3Qqo-tbbAilWkroQap7p~dobXAXt0xewkpm-gL8ydMvYJQSU-W9JKuu6ALfaAmexgixM3Z3VWXMKI1s9zEXewJl0xdkZYQ0XrQzgX5N2vOhhQvEhxghIxcPozurXpxNjQNubFsvgIEfDw0-aBeuPjeViM8HQDiCmYg333F4j1~d~GFomb75PqTYmyRJkf06VXbR6MGhREO2tdogbmV~cF6f7FV0Gzxnv2A__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA)
- Leslie, P., & Sorensen, A. (2014). Resale and Rent-Seeking: An Application to Ticket Markets. *Review of Economic Studies*.
- Lopes, A. (2022). *Há cada vez mais burlas com revenda de bilhetes*. <https://echoboomer.pt/ha-cada-vez-mais-burlas-com-revenda-de-bilhetes/>
- marketsN. (2022). *marketsN*. <https://marketsn.com/technology.html>
- McMillan, C. (2020). *Secondary ticketing: the problem and possible solutions, explained*. <https://inews.co.uk/culture/music/secondary-ticketing-problems-solutions-31525>
- Meios & Publicidade. (2022). *Millennium Estoril Open com NFT e bilhética digital - Meios & Publicidade - Meios & Publicidade*. <https://www.meiosepublicidade.pt/2022/03/millennium-estoril-open-com-nft-e-bilhetica-digital/>
- Mojtaba, S., Bamakan, H., Nezhadsistani, N., Bodaghi, O., & Qu, Q. (2021). *A Decentralized Framework for Patents and Intellectual Property as NFT in Blockchain Networks*. <https://doi.org/10.21203/rs.3.rs-951089/v1>

- Mordor Intelligence. (2021). *Global Online Event Ticketing Market Size | 2022-27 | Industry Analysis*. <https://www.mordorintelligence.com/industry-reports/global-online-event-ticketing-market-industry>
- Nakamoto, S. (2009). *Bitcoin: A Peer-to-Peer Electronic Cash System*. [www.bitcoin.org](http://www.bitcoin.org)
- Nevi, G. (2022). *NFT-Non-Fungible Tokens how react the consumers? An exploratory analysis for a future integrated acceptance model*.
- Nogueira, R. (2021). *Accepting NFTs here: bringing NFTs to real life in the streets of Lisbon | by Regina Nogueira | Mintbase*. <https://blog.mintbase.io/accepting-nfts-here-bringing-nfts-to-real-life-in-the-streets-of-lisbon-2de5e0892062>
- NonFungible. (2022a). *Yearly NFT Market Report 2021*.
- NonFungible. (2022b, April). *Market Report Q1 2022*. Quarterly NFT Market Report Q1 - 2022. <https://nonfungible.com/news/corporate/nft-market-report-q1-2022>
- ONE37pm. (n.d.). *What is IPFS?* Retrieved April 16, 2022, from <https://www.one37pm.com/nft/what-is-ipfs>
- Our Scenario Approach | Center for Strategy and Scenario Planning*. (n.d.). Retrieved April 23, 2022, from <https://www.scenarioplanning.eu/our-scenario-approach>
- Parson, E., Burkett, V., Fisher-Vanden, K., Keith, D., Mearns, L., Pitcher, H., Rosenzweig, C., & Webster, M. (2007). *Global-Change Scenarios: Their Development and Use*.
- Pordata. (2020). *PORDATA - População residente, média anual: total e por grupo etário*. <https://www.pordata.pt/Portugal/Popula%C3%A7%C3%A3o+residente++m%C3%A9dia+anual+total+e+por+grupo+et%C3%A1rio-10>
- Porter, M. (1985). *The Competitive Advantage: Creating and Sustaining Superior Performance*. <https://www.hbs.edu/faculty/Pages/item.aspx?num=193>
- Regner, F., Schweizer, A., & Urbach, N. (2019). NFTs in Practice-Non-Fungible Tokens as Core Component of a Blockchain-based Event Ticketing Application. *Fortieth International Conference on Information Systems*, 1.

- Rehman, W., Hijab e Zainab, Imran, J., & Bawany, N. Z. (2021). NFTS: Applications and challenges. *2021 22nd International Arab Conference on Information Technology, ACIT 2021*. <https://doi.org/10.1109/ACIT53391.2021.9677260>
- ReportLinker. (2022). *Online Event Ticketing Market - Growth, Trends, COVID-19*. <https://www.globenewswire.com/news-release/2022/03/18/2405895/0/en/Online-Event-Ticketing-Market-Growth-Trends-COVID-19-Impact-and-Forecasts-2022-2027.html>
- Rogério Fernandes Ferreira & Associados. (2022). *THE TAXATION OF INCOME FROM DIGITAL TOKENS (CRYPTOCURRENCIES, NFTS, ETC.) IN PORTUGAL*.
- Rowley, J. (2012). Conducting research interviews. *Management Research Review*, 35(3–4), 260–271. <https://doi.org/10.1108/01409171211210154/FULL/XML>
- Rushton, M. (2016). Touts out? The Waterson review on secondary ticketing. <https://doi.org/10.1080/09548963.2016.1217588>, 25(4), 287–290. <https://doi.org/10.1080/09548963.2016.1217588>
- Schoemaker, P. J. H. (1995). *Scenario Planning: A Tool for Strategic Thinking*. 36(2). <http://mitsmr.com/1nJI6Qi>
- Schwenker, B., & Wulf, T. (2013a). *Scenario - Based Strategic Planning*. Springer Gabler.
- Schwenker, B., & Wulf, T. (2013b). *Scenario-based Strategic Planning: Developing Strategies in an Uncertain World*. <https://doi.org/10.1007/978-3-658-02875-6>
- Seatlab. (2022). *SeatlabNFT*. <https://www.seatlabnft.com/>
- Statista. (n.d.-a). *Event Tickets - Portugal | Statista Market Forecast*. Retrieved April 10, 2022, from <https://www.statista.com/outlook/dmo/eservices/event-tickets/portugal?currency=EUR>
- Statista. (n.d.-b). *Event Tickets - Worldwide | Statista Market Forecast*. Retrieved April 10, 2022, from <https://www.statista.com/outlook/dmo/eservices/event-tickets/worldwide#methodology>
- Szabo, N. (1994). *Smart Contracts*. [https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOT\\_winterschool2006/szabo.best.vwh.net/smart.contracts.html](https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOT_winterschool2006/szabo.best.vwh.net/smart.contracts.html)

- Takyar, A. (2022). *How can NFT Ticketing disrupt the ticketing industry?*  
<https://www.leewayhertz.com/how-nft-ticketing-works/>
- TechCrunch. (2022). *Propy launches NFT platform in the US, allowing real-world property to be bought as an NFT | TechCrunch.* [https://techcrunch.com/2022/01/27/propy-launches-nft-platform-in-the-us-allowing-real-world-property-to-be-bought-as-an-nft/?guccounter=1&guce\\_referrer=aHR0cHM6Ly93d3cuZ29vZ2xiLmNvbS8&guce\\_referrer\\_sig=AQAAAJwb60TfWm68m50TddGgi1ESJYrhMk-TMun1ve3J7LeJJ3oH7XVA33qZnL92OzdIgxIwAGl9G\\_y0WogU\\_dLnNZLFJm8ubc6DnJuG5aCVG1CMZgIjJDU5YG4LFjcB9ezCbcPtUxvmU--dENLkVfwGGblbgZk\\_pSHPjh-x8B\\_\\_iJwBf](https://techcrunch.com/2022/01/27/propy-launches-nft-platform-in-the-us-allowing-real-world-property-to-be-bought-as-an-nft/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xiLmNvbS8&guce_referrer_sig=AQAAAJwb60TfWm68m50TddGgi1ESJYrhMk-TMun1ve3J7LeJJ3oH7XVA33qZnL92OzdIgxIwAGl9G_y0WogU_dLnNZLFJm8ubc6DnJuG5aCVG1CMZgIjJDU5YG4LFjcB9ezCbcPtUxvmU--dENLkVfwGGblbgZk_pSHPjh-x8B__iJwBf)
- The Portugal News. (2022). *Lisbon in the Center of the Blockchain Universe - The Portugal News.* <https://www.theportugalnews.com/news/2022-04-18/lisbon-in-the-center-of-the-blockchain-universe/66453>
- TheTicketingBusiness. (2021, August 3). *Case Study: UEFA Euro 2020 & the role of mobile blockchain ticketing.* <https://www.theticketingbusiness.com/2021/08/03/case-study-uefa-euro-2020-the-role-of-mobile-blockchain-ticketing/>
- TPG. (2022). *Mind Blown! How NFTs Will Disrupt Events - TPG Trade Show + Event Marketing.* <https://www.tpgliveevents.com/blog/mind-blown-how-nfts-will-disrupt-events/>
- Turismo de Portugal. (2022). *Portugal entra no top 10 dos destinos mundiais para a Organização de Congressos e Eventos.*  
<http://www.turismodeportugal.pt/pt/Noticias/Paginas/portugal-no-top-10-dos-destinos-mundiais-para-organizacao-congressos-eventos.aspx>
- Vargas, C. (2022). *Coachella 2022 NFTs: What they are and how to get a free one .*  
<https://www.pe.com/2022/04/12/coachella-2022-nfts-what-they-are-and-how-to-get-a-free-one/>
- Virtual Edge. (2022, March). *How NFTs create new opportunities in the Event Industry.*  
<https://www.virtualedge.org/how-nfts-create-new-opportunities-in-the-event-industry/>
- Visit Lisboa. (n.d.). *Ticket Line | Visit Lisboa.* Retrieved April 10, 2022, from  
<https://www.visitlisboa.com/pt-pt/locais/ticket-line>

- Waterson, M. (2016). *Independent Review of Consumer Protection Measures concerning Online Secondary Ticketing Facilities*.  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/525885/ind-16-7-independent-review-online-secondary-ticketing-facilities.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/525885/ind-16-7-independent-review-online-secondary-ticketing-facilities.pdf)
- Waterson, M. (2018). Ticketing as if consumers mattered. *Warwick Economics Research Papers*.  
[https://warwick.ac.uk/fac/soc/economics/staff/mjwaterson/twerp\\_1177\\_waterson.pdf](https://warwick.ac.uk/fac/soc/economics/staff/mjwaterson/twerp_1177_waterson.pdf)
- Web3 University. (2022). *How to Build Your First NFT*.  
<https://www.web3.university/tracks/build-your-first-nft>
- Wend, C. (2019). *How can NFTs solve common problems with event ticketing - NonFungible.com*. <https://nonfungible.com/news/utility/fixing-event-ticketing-with-nft>
- Wibisono, Y. P., Primasari, C. H., & Kurniawan, S. R. S. (2020). Analysis of Event Marketing, Registration, and Ticketing Digitalization. *Jurnal Teknik Informatika Dan Sistem Informasi*, 6(1), 2443–2229. <https://doi.org/10.28932/JUTISI.V6I1.2199>
- Wicket Events. (2022). *WICKET — Digital ticketing*. <https://www.wicketevents.com/en/>
- Yang, J. (2004). A Whole Different Ball Game: Ticket Scalping Legislation and Behavioral Economics? *Vanderbilt Journal of Entertainment & Technology Law*, 7(1).  
<https://scholarship.law.vanderbilt.edu/jetlaw/vol7/iss1/5>
- Yates, S. (2017). *The great ticket mark-up - how fans are paying through the nose*.  
[https://www.nzherald.co.nz/entertainment/the-great-ticket-mark-up-how-fans-are-paying-through-the-nose/WC57QWIII6O5YQR6PME7ZUU6EE/?c\\_id=1501119&objectid=11833817](https://www.nzherald.co.nz/entertainment/the-great-ticket-mark-up-how-fans-are-paying-through-the-nose/WC57QWIII6O5YQR6PME7ZUU6EE/?c_id=1501119&objectid=11833817)
- YellowHeart. (2022). *About YellowHeart*. <https://yh.io/about/>

# Appendices

## Appendix I. Summaries of Experts Interviews

### Interview Expert 1: Paulo Amaral

In Portugal, acceptance of NFTs is quite low, with a concentration on youth adoption. The primary impediments to adoption arise from a variety of factors. People must get used to utilizing Wallets, and this experience must be simplified. Providers of NFT must clearly articulate the value proposition connected with the project. In addition to the presence of the legislation, security and infrastructure are also required to ensure safety.

In the next five years, the adoption of NFTs will be influenced by network and community impacts. Adoption will be easier in communities with heroes, such as those in music and sports. The greatest difficulty will be locating the appropriate community to begin these projects. There are a growing number of small groups where it is simple to adopt technology if the appropriate motivation is provided.

NFTs will be a source of additional income, quick to grow in value, and simple to monetize. It is essential to comprehend the idea of monetization in information economy, in which marginal costs are zero.

Given the enormous number of use cases, NFTs will significantly disrupt the ticketing industry; however, the impact in Portugal will depend on the rate of adoption. However, it is just a question of time.

This issue of time relies on the regulatory component, which will be crucial. In addition, the participation of many stakeholders and the event's value chain contribute to the formation of an ecosystem. The market must be prepared for this transition to take place. The legislative framework, the security framework, and the media may be obstacles for NFTs in the sector.

## **Interview Expert 2: David Coutinho**

The GamifYou goal is to introduce NFTs to the gamification area, as was done with the Estoril Open. Transform points into tokens to enable their use as an investment product. Before ticketing, there is a concept of establishing an ecosystem and connections between various major stakeholders.

Even if the experience with the Estoril Open did not include tickets, it was a significant step towards the use of NFT technology. It is a simpler approach to begin the process and educate individuals and businesses how to utilize it.

In other countries, large-scale events have previously been subjected to several testing, but not in Portugal. The case study was worthy of replication. There is a market, it functions, and it influences revenue. It provides a positive experience for users and places the innovative companies in the lead.

In the next five years, there will be a clear emphasis on distinct digital memories, and there may be several applications in music and sports. There will be a big market for collectors if it is feasible to prove attendance at an event. Memory will always be the participant's optimal use case. For the organizer, there are a number of considerations, but in Portugal, the introduction of extra revenue streams is a must.

Festivals and sports will be the best opportunities for NFTs. They are locations that appeal to passion. They are separated by both time and place. Tickets are obvious.

There is still work to be done. For a bulk solution, it is tough and not straightforward for someone to demonstrate their NFT. There must be supporting infrastructure. Sharing and distribution must provide an excellent user experience. The metaverse may provide an alternative.

Additionally, adoption in other sectors is limited. It is important to observe the local ecosystem. Standardizing technology is still difficult, and it is vital to simplify the consumer journey.

### **Interview Expert 3: Nuno Lima da Luz**

The main use would be to serve as a ticket, in this perspective it will only be possible to transmit in the functionality if it is for face value. There is a legal limitation, however, there can only be a secondary market if there is no profit with the resale. It is not possible to still have different prices for the same token.

There has to be an interpretation that NFTs may be out in the legal framework. There may be features that come out over the scope. Legislative amendment or judicial interpretation of the rule. For example, setting maximums by event organizers or even placing margins "maximum 5x the value of a ticket".

It's still very early, things only start to have more impact on the consumer experience or more linked to widespread adoption when it becomes a settled point. There is still a lot of illiteracy. Within the potential, there are still many steps to be taken before it is possible to provide an experience and make it useful. Not to be just for tech savvy. There is a long way to go in time for full adoption: 5 to 10 years to go. From a point of view for people who are already established, it's complicated. Mass adoption can be complex. It is necessary for the state to take an active stance and the state has to implement technology at the service of the population. It is still too early to have such widespread acceptance of these matters.

Legal point of view on the part of the government: what can be done will have to have its own regulatory regime (there are no longer legal frameworks for technology adoption) but at least there will be a more concentrated position and a public strategy on these issues. Open the state to society in these materials. Financial and digital literacy so that these technologies are more adopted. Alternatively: create a regulatory framework, focus on laws to support these laws.

NFTs may work as an alternative to normal ticketing. The target can be reduced, but it can be a good way to get used to the theme. There may be a core of people who already know what it is and instead of buying a regular ticket, buy an NFT ticket with unique benefits. The holder of the discount may have an incentive system that allows adoption. Promote acceptance. An alternative and not a replacement. If the interest is to have an access category where the objective is a select group, but if the objective is to go to Rui Veloso, there may be a weaker adhesion.



What can cut the legs: there can be a discrediting of the industry, but there can be such a scandal that a company that creates a sense of danger or discomfort that can have a negative impact on the population.

#### **Interview Expert 4: João Leite**

The NFTs industry is still in its development. People in Portugal are establishing collections, but there is no genuine utilitarian use. Despite being an excellent vehicle for onboarding new Web3 users, care must be made to educate them once they have been onboarded.

Portugal is still in a "casino" period in which technology and its usage are subject to speculation. There is a strong desire to gain money quickly via initiatives that provide little genuine benefit.

Education will be the central key to sustainability. A financial incentive is required for education to exist. As part of teaching, it is necessary to demonstrate that there is application and that it is not only a new technique to earn money, but that there is additional value, making it viable to monetize. Use cases are essential as a result. Display all situations where an NFT may be used and how it can be utilized. Demonstrate that it is not only a picture, but that it serves a purpose. It may symbolize a ticket, an identification, or an insurance policy.

The trick will be to produce greater use via an increase in use cases, which will generate education and need improved infrastructure in the future. concentrating on this last component. Additional wallets and infrastructure are required to enable their usage.

The manner in which the technology will be used in Portugal will be the subject of debate. There must be initiative and discussion about the matter. There is a need for interest signs. In addition, huge corporations lack investment because they are fearful. Bitcoin's adoption took several years, but NFTs will be used far more quickly. Already known, blockchain is now simpler.

For new use cases to arise, financial and fiscal incentives must be created. The fiscal aspect is still quite "obscure," and there is a great deal of passivity. In five years, NFTs will represent most of all cryptocurrencies. NFTs make it simple to convert individuals to cryptocurrency. Instagram and Twitter facilitate additional growth. Integrations of NFTs into apps that everyone now utilizes will cause the digital universe to erupt. It is just a matter of time until widespread distribution occurs.

There are certain use cases that are more evident than others. Collectibles are simple to comprehend since people have been collecting for centuries. NFTs provide digital with authenticity. In addition to many use cases and trade possibilities, gaming alters the economics of games. The value placed on games is very different. The sharing economy will increase the number of young people who use NFTs.

Always, there must be a link to the actual world. It must be acknowledged by the controlling institutions. There needs to be trust and mechanisms in the real world that ensure that there is added value in an NFT.

For events it is an excellent case study. It is possible to collect. Say where someone has been and have proof of it. Users can prove that someone was and that generates value. Additionally, it creates chances for marketing. Knowing where an individual went offers a use case that enables direct connection with that individual. However, it may bring privacy concerns that have not yet been discussed.

Simultaneously, gamification for events. Create token-based incentive programs inside the platforms itself, and then distribute NFTs as a reward (a digital medal). Not to mention the counterfeiting of the market that comes to an end.

The largest factors influencing the deployment of NFTs are the largest organizations. The government must provide the financial and safety circumstances necessary for individuals to think critically and engage in novel experiences.

The media provide information and education; they might be a means of diffusion; nevertheless, it cannot be assumed that this is where the most value would be created. Large corporations, despite their aversion to interfering with what works, are the ones with the most economic power, they are the ones who can experiment and make errors, and they will have the opportunity to teach the populace if they have a strong trust foundation.

Lastly, the major events. Users may begin testing with basic and smaller use cases. Utilize POAPs currently in use at all Web3 conferences. After attending an event, users get an NFT confirming their attendance, enabling them to create a collection. There are several illustrative cases.

### **Interview Expert 5: Alberto Leanza**

Wicket was founded in 2020 in response to the dilemma of not being able to find sold-out tickets. When searching the secondary market, they were aware of the associated issues. The answer looked to be blockchain. Wicket's solution is based on GET Protocol, the most mature solution available on the market. After speaking with several events, they realized that the music sector confronts the greatest challenges and may have the most use cases.

There are exclusive agreements and sponsorships for tickets at festivals and large events, making it tough for new players to join. It is a crowded market. The challenge faced by the organization is that organizers do not know who their participants are, since the information is held by the major ticketing corporations. The greatest value offer is the direct contact formed with the participant, as well as the opportunity to generate new income streams.

The solution employs NFT technology. Participants who attend the event receive a digital collectible (digital memory). The organizer will have access to who will make the NFT claim, as well as any further information associated with them, such as access to pre-sales or special merchandise.

Wicket portrays itself as a ticketing startup, competing with market-established ticketing businesses. However, they noticed that this presents a dilemma. They lack the expertise to compete with the ticket sales in terms of connections with event organizers, therefore the simplest solution is to sell to the ticketing firm under a white label. Long-term industry leaders, however, will be those that can combine connections with event organizers and technology. Selling technology to small and medium-sized events is simple. There is already a need, and they have no trouble seeking new answers. However, a network side exists for major events. That must establish a connection with a reliable companion.

The value proposition of NFT tickets is so substantial that there are several angles from which to pitch the solution, including marketing, analytics, revenue, and the blockchain itself. It's a wonderful use case for community building. Votes may be cast to choose the performers, decorations, and theme for the next year. It is a method for increasing engagement and involvement among each participant. It is a technique to acquire more experience and a stronger sense of "being an ambassador." The fundamental value proposition will always be to enhance sales, data gathering, and participation.

In 5 years, the adoption of NFTs will clearly increase. Nowadays, it's still a buzz word that people are discovering the use case. In five years, however, all events will be based on NFT technology or will use NFTs in some capacity. It may serve as a form of participation (Fun Token) for events. But in 5 years, there will undoubtedly be more use cases and it will be something usual and typical.

The most essential stakeholder will be the artist who provides fan-interactive material. They are the ones with the fans, and they are the only ones who can convince people to connect with and utilize the products they create. In addition, investors will play a crucial role in making funds accessible for the creation of projects and market competition. Finally, the big players in the industry that can force the use of NFTs.

### **Interview Expert 6: Georg Muller**

NFT-Ticketing has not yet been implemented on the European market. Nonetheless, the major ticketing corporations in the United States have already begun working with the technology and are developing plans for a larger-scale application. Despite this, the sales and implementation period is lengthy. Finding the appropriate team to approach event organizers is difficult. Simultaneously, small events gain most from the advantages of digitizing procedures and the capacity to get more information inexpensively.

More and more event organizers are utilizing collectibles to commemorate the finest moments of their events, but there are currently no compelling use cases for tickets. Until now, the best example comes from UEFA.

The current goal is to provide ticketing services to ticketing businesses. Long-term, the intention is to collaborate directly with event organizers. The strongest and most comprehensive value proposition will always be to eliminate the current ticketing firms as the intermediary. They currently do not utilize tokens. It is FIAT currency. They use techniques for verification of authority and proof of security. They want simplification and did not wish to use crypto. Costs for event organizers might vary: a setup fee, a maintenance fee, and a tiny profit margin on each transaction.

Educating the populace about the advantages of technology is the primary obstacle. More use cases are required across the value chain. In addition to waiting for market speculation to diminish so that only real users are interested in the technology.

Due to Portuguese law, it is impossible to leave sales margins "decentralized." The event organizer must impose a maximum selling amount. In the European Union, for instance, the maximum quantity for sale is up to five times the original price. All this information can currently be simply included into smart contracts.

Event administration will center on attendance verification. It is the optimal use case. Moreover, for places where reselling is permitted (such as the United Kingdom), the value is considerably larger since it avoids these issues. Simultaneously, it is possible to interact with fans, so creating a larger community; for sporting events, this is a wonderful method to increase attendance: for instance, when a participant offers his ticket to someone who uses it, he gets a reward. In this manner, the event's attendance goal is always met.

There is a distinction between the advantages of technology for small events and those for medium or big events. Increasing revenue is a must for medium and large-scale events but gaining experience and gathering data represents the greatest value offer. The value proposition for small events is built on the gathering and handling of data, as well as the experience they can deliver, allowing for the progressive expansion of their participant base.

In five years, according to Mark Cuban, every ticket will be an NFT Ticket. There's utility and there's the collectible.

### **Interview Expert 7: Jorge Quintão**

Portuguese market still seems like early adopters. For Portuguese reality, it is necessary to comprehend foreign practices (festivals and other events). The Portuguese general culture tends to be open, but decision-making is not quite the same. The event organizers will choose the entry time. Brands will have a significant impact on the interaction between tickets and the co-creation of unique moments (immediate and future value). Blueticket and InnoWave collaborated. The promoters must be engaged, and then you must go out to the customers (18 to 25 is OK), but the elderly are the difficulty.

Blueticket is frantically attempting to comprehend what it is offering. Understand brand engagement and use cases. Formal interactions indicate that no one now has this vision. The exercise is the speed of implementation (from the US and UK, they are the ones who sell, they are used to paying). People spend more, which increases their interest in the area. Everyone gains greater wealth. The danger of loss is bigger; therefore Portugal must comprehend the

major markets and attempt to adopt their standards. Engage the masses, brands, and great awareness, and try to achieve the same.

Due to the market's immaturity, it will be essential to invest without a return guarantee (associate positively, brands can and should invest, as they will instantly get the customers' view that they are ahead of the curve and investing in something that makes sense). There must be a criterion for this. A separate distinguishing aspect. Several objects and use cases will serve as communication and opportunity accelerators.

The promoters of the event are the ones who determine who will purchase. Ticketing firms are responsible for implementing new technology and new drivers. Promoters will be able to enable additional upselling and use cases; but they may lack the knowledge to do so due to their insecure organizational structures. Ticketing, however, will achieve ultimate acceptance. Their concentration is on event production and artist management. When attempting to upsell when purchasing Blueticket, you may be advised to purchase a VIP ticket to add an additional pack, which conveys a different feeling.

Cashless was a bad application of an internationally popular technology. The event organizers did not understand how to utilize the technology and made several errors. There may be a scenario in which cashless is paired with NFTs. By holding a certain NFT, someone can spend a specific sum or own a specific quantity of tokens. Brands are excellent drivers and want to adopt technological trends and practices as quickly as feasible. They have a limited budget yet a passion for technology. There are fewer opportunities to take risks and there is greater inertia due to the short portfolio and restricted market that prevent players from adopting such technology. They prefer to adopt only reliable and assured options. They cannot incur a loss.

The market for 5-year tickets is very complicated in Portugal. Because it predicts a worldwide adoption and then considers how long it will take to reach Portugal. However, the use case will always include tracking and phone usage. Everything that has large data and enables for customization will appeal to the client. The initiative would include listening to younger generations and worldwide practices. The target audience of each event is also crucial for the right implementation of technology for the events. However, there are still no actual examples. Portugal will invest in technology only once worldwide success stories have been established. However, there is great promise.

## **Interview Expert 8: Carlos Vicente**

Extensive knowledge of entertainment and sporting events. He has experience as a promoter, as a vendor, and in tickets (both in the primary and secondary markets).

Two sorts of ticket vendors: portals (Tickeline, Blueticket, numerous tickets for sale, less and fewer physical points of sale, and now everything is online) and white label sellers (Rock in Rio with Seetickets, keep their commission and only give a fee to the software company that makes it). The only organizational strength of the secondary market in Portugal is street sales. Prior to the pandemic, internet sales were not prevalent.

Event promoters are promoters who arrange and host events. There are several festivals. Whose artists are associated with it. Promoter may have tickets in different locations. New agreements: there is a sponsorship advance. Essentially, exclusivity already exists. If the event does not have a sponsor (there might be many contracts) and there is a commission for the promoter, then can charge the consumer (they can receive it in several places). The promoter chooses based on the terms he stipulates. It may be white labeled to internalize ticket sales, and they have exclusive access.

UEFA already sells tickets using Blockchain technology. The individual only sees the document when he approaches the door. UEFA is already selling tickets with tokens in NFT format.

Unless a software firm has an exceptional team for events, it is impossible to penetrate the market. Promoters seek assurance that their cash register will not malfunction during the event. Working at an event has unique challenges. Difficulties: accessible software, the need of reading this program, and the cost of everything. After taking over online ticket sales, customers won't even realize it's an NFT; instead, they'll get a QR code and be unaware. The amount of population has no effect on anything other than the price. It is difficult to be secure and reliable. Companies will need to be persuaded of the importance of security, since it will be a significant concern. The unique code will be of utmost importance, and the secondary market must be persuaded that it works and is incredibly trustworthy. But it will be the first thing.

Bots acquired 40% of tickets in the European Union, which cannot be attacked and must be secure. Price will undoubtedly be crucial. The promoter will attempt to determine the cost. Source of revenue always (and not as cost). Implementation taking the event and its context into consideration (ephemeral state of an event).

Unique NFT experience: a personal interview with each artist. It might be a Deep Fake expressing gratitude to the participant. NFTs are ideal for ticketing since they are unique and tamper-proof. Unforgettable NFT provides access to the event (it has utility, and it has collectionable). Experience beyond the occasion. The event begins when the ticket is purchased, and fan involvement might occur before entering the venue or after the event. Whoever receives a ticket has a high likelihood of being monitored for traffic control (and there are no crazy prices). Individual and ticket tracking. Knowing who is going will generate fan interest. The forgery would equal zero. Users may own a comparable NFT, but it would never pass. The infrastructure may be encrypted using NFT to generate a QR code that is only usable with Bluetooth on the day in question.

There will be big international events doing this (UEFA with SecuTix) and then yes there will be 100% use in events in Portugal.

### **Interview Expert 9: Ben Broch**

The majority of YellowHeart's use cases and market validation began with massive Web3 events. They have already been doing pilots in Las Vegas with large event organizers for more than three events every week. Some tickets granted access to VIP zones, some to food and drink, and yet others to particular sections and performances. Participants may collect their tickets after each event and sell them on sites such as OpenSea. In addition, after scanning certain tickets, an NFT that grants access to food and beverages in voucher form is dropped. At the conclusion of the event, people may also engage with fans through push notifications by sending a "thank you NFT."

YellowHeart is a startup that works with event organizers to sell tickets. They use Polygon as a technology since ETH's high expenses and gas fees would have deemed its usage and ticketing unfeasible. Polygon is secure and a part of the ETH ecosystem. Blockchain security is essential. However, they made their choice more than a year and a half ago, and new technologies that are quicker and safer have since emerged.

To win major events, sponsorships are the main challenge. There are already players in the United States that are evaluating the technology and finalizing contracts. After the contracts expire, the structure and organization of events will face a radical transformation. For YellowHeart, the factor that will have the most influence on event organizers will be the customer experience and the competitive advantage they gain over others.



In five years, the use of NFTs will be commonplace for small events, but not for major events due to limitations with sponsors.

#### **Interview Expert 10: David Garner**

Centaurify is attempting to build its own token to ensure security and speed in the NFT trading ecosystem. The objective will be to create a ticketing system that eliminates the middlemen and brings fans and artists closer via improved engagement capabilities. In contrast to Bitcoin, the solution is centralized. The ecosystem is closed, but they feel it is the best way to provide value to its partners. The primary benefit of having their own coin is that they can expand with a more reliable token.

GET Protocol is the most sophisticated solution, and they have been working on White-Label tickets to compete in a hybrid manner on the market. The greatest difficulty is guaranteeing blockchain security, which enables an efficient experience for all parties involved. Therefore, it is essential to comprehend how to guarantee a seamless experience for stakeholders and partners.

The greatest effect of the solution will be to establish new income streams, enhance customer engagement, and boost sales.

In five years, NFTs will either be completely standardized on the market, serving as the standard solution for events, or they will serve just as a marketing and post-event collecting tool. All events will employ NFTs meant to have a Proof of Attendance, although the ticketing portion will vary greatly. It relies on the adoption of these solutions by artists and companies to offer additional value for people seeking these solutions.

#### **Interview Expert 11: Juliana Ribeiro**

Rock in Rio in Portugal utilizes a white-label, but has a very high penetration at points of sale (FNAC), having agreements with 10 to 12 companies (not only in Portugal, but globally) and integrating with all of them. The white-label integration is free for participants when they purchase a ticket, but there are expenses associated with the other partners, and the amount is negotiated annually. The reason they choose a white-label is that it is a location where they can collect all of their marketing and communication data, since it has a vast database (the same does not happen with other ticketing companies). The concept of establishing its own channel aligns with their perspective in Brazil.

In Brazil, they collaborate with an exclusive supplier, who also supports the event, but the exclusivity is in sales, and they retain the data of the attendees. In Brazil, discussions are already on to include NFTs in the edition, although the situation in Portugal is rather different. They will execute it with artists and partners in Brazil. They will approach with collectibles and collector life experience. However, they are still seeking a robust and ready-made solution for ticketing. Collectibles are the entry point to experiencing tickets. Certainly, they will experiment with tickets in the future, with a team dedicated to this topic.

They think Rock in Rio should be implemented in five years, but this will rely on the people and the advancement of the technology. If there is already awareness, if there are existing use cases, and if the infrastructure for festivals is already in place. This solution makes great sense for small events, but festivals need additional infrastructure and use cases. However, it can work as an alternative. In order to accelerate the acceptance process, festivals and bigger events must conduct effective market testing. The most important factor will be the usability and ability to implement in events. Rock in Rio will test the technology when it is ready.

Ticketing companies are essential to the use and implementation of the technology. It is just a question of fitting the technology to their current ticketing system. However, suppliers and vendors must be familiar with the technology for major events.

The pricing cannot be on the promoter's side; it must be on the sponsors' and brands' sides if they want to create use cases. Ticketing companies using NFTs must have well-crafted use cases and applicable solutions.

While NFT ticketing may function quite well in Brazil, it may be more complicated in Portugal. In Brazil, it is reasonable to assume that NFT tickets will be implemented in two to three years, however in Portugal, it will take longer. To be quick, all stakeholders must be unified and working toward the same goal.

The advantages of NFT tickets will always be the creation of new income channels, data collecting, and audience engagement.

## **Interview Expert 12: Luís Freitas**

The acceptance level of NFTs in Portugal is close to zero. In November, Mintbase conducted a use case with restaurants to take NFTs as payment and entry access, which needed a significant amount of work and instruction. In Portugal, there is still a widespread fear of cryptocurrencies and blockchain technology, which remains a buzzword. Consequently, it is essential to simplify the points of interaction. For instance, incorporating credit card payment for the purchase of NFTs enables interaction with the blockchain without the need of a token.

NEAR already addresses usability, making the creation of a digital wallet more simple. NEAR is a user bank that is straightforward and user-friendly. It is necessary to create a solution and an interface that is simple, as happened with the IP of the computer and the simplification was to give a link.

The future of NFTs in five years may be seen from either a pessimistic or an optimistic standpoint. According to the pessimistic viewpoint, the decentralization of services fails badly due to a lack of incentives. Blockchain is a method for recreating the previous and current "state." Blockchain permits the replication of the state on several computers, hence enabling decentralization. However, if tokens lose their use, there will be no motivation for anybody to participate in blockchain.

From an optimistic standpoint, decentralization makes sense. It is to democratize information access. Democratizes access to everything digital. They are machines that may be controlled by anybody, and the construction is open to everyone. Using NFTs for tickets eliminates fraud. It is impossible to conduct fraud. All transactions are now public, allowing event organizers and even artists to employ smart contracts for monetization and value generation. If in the first four years of NFTs there is already this much disruption and social networks like Twitter and Instagram use NFTs, the following five years will be much more disruptive. In five years, NFT tickets will be a viable solution.

Startups are the greatest innovators; they will test concepts and develop pilots with corporations to ensure that everything runs well, and they will seek to produce new use cases. Large corporations will be required to test innovations and produce value for the society in this manner. The government is responsible for regulating and supporting the link between startups and major corporations to test and develop innovative ideas. Proof of Attendance will be a method for ensuring that everyone who attends an event is registered and will enable marketing synergies.

### **Interview Expert 13: Ana Prata**

Last2Ticket is an event management firm that operates in a disaggregated manner to accommodate the variety of the event industry. The objective of the disaggregated view of events is to define what events are. Events are something unique and unrepeatable. Everything that makes the event unrepeatable increases its value.

In five years, it will be simple for the worldwide events industry to use NFTs. Creating a link between the secondary market and the event organizer, as well as a collectable (unique and non-replicable) value for the ticket. It will make great sense from a mass standpoint, given the high demand and limited supply.

However, there is a significant investment impasse in Portugal. There are events that attract elderly audiences in show venues. On the part of event organizers and ticketing businesses, there is a disagreement about whether or not investments should be made. The issue is the variety of objectives and how to develop a solution that encompasses all of them. There is a cultural viewpoint that must be understood so that marketable solutions may be developed.

In Portugal, they will be required to participate in events with a youthful and often foreign audience in five years. They are the audience that appreciates experience and uniqueness. There is a significant human element, since there are individuals in the events industry who are not early users of technology.

The usage of NFTs by the general public may be aided by marketing-focused corporations and artists who can convince individuals to make an attempt to learn something. It is vital to establish a desire and financial incentives for individuals to learn and comprehend something new.

### **Interview Expert 14: Pedro Cerdeira**

The use of NFTs from a marketing perspective is dependent on companies and artists. They are the most influential in promoting the usage and generation of additional value in NFTs. Large use cases cannot be created by the event organizer alone, hence it is necessary to include these stakeholders.

NFT ticketing turns out to be a source of truth for both event organizers and attendees. It may show to event organizers that several individuals purchased tickets on the primary market, secondary market, and even activated them on the day of the event. It enables more regulation between companies and a higher capacity to interpret new data.

Additionally, it is possible to build value retroactively. No longer is this a relationship that has terminated, as it was before. Those that attended the event may continue to provide value and use cases. There is a stronger link with the communities when it is known who has attended the events. With the various entities, it is feasible to upsell and cross-sell more rapidly and directly. It is an excellent source of truth and revenue.

By tokenizing the connection and the event, it is feasible to provide higher liquidity, permit returns, and enable more interactions with individuals due to the digital nature of the tokenization. It is possible to airdrop tokens into a person's wallet. There are other use cases that are currently being investigated and considered. By having an NFT, for instance, companies may cross-promote with other partners, allowing them to engage more people and drive purchases inside the event itself. Customer experience, customer engagement, and the development of new revenue channels are the aspects with the most effect and influence on NFT ticketing. The response would remain the same regardless of the size of the event.

There are technical limitations that may limit the acceptance and generalization of the offer; nonetheless, the event organizer and the artist determine the usage and maturity of the offer. They will be able to generate new kinds of adoption within the target population. Adoption in Portugal will rely on the rate of implementation on global stages of significance. If the Super Bowl introduces NFT ticketing, for example, everyone will want to use it. Therefore, only one brand is required to do this test. However, it is a question of time.

Event organizers are primarily responsible for pressuring ticketing providers, businesses, and other stakeholders to adopt. If an event organizer wishes to employ NFT ticketing, they may begin searching for solutions immediately; the next step is to locate partners who are prepared to take the risk. In the next two to three years, this will occur often. This year's major events are returning; therefore, it is time to begin seeking other options.

The optimistic scenario has a 30% chance of occurring, given that there is always an alternative, even for the Web3 people. However, it will not be the sole answer for popular items, but rather an alternative. The neutral scenario would say it has a 60% chance of happening. It is a definite scenario as to how it will occur. Most of the ideas are sensible and are starting to be recognized in an international context. The negative scenario believes has only a 10% probability of occurring. Things had to deteriorate, which do not think will occur. Portugal will witness new use cases in the next two years. Contracts that will be executed with an increased incorporation of technology. It's a matter of time.

## **Appendix II. Acquisition and Motivation Process**

### **Acquisition**

According to a CoinGecko survey, more than 40% of NFT buyers started before the summer of 2021, indicating their resilience in the face of market swings and new innovations. Only 12% of NFT buyers had never bought crypto before, which may be connected to the difficulties of purchasing an NFT. NFTs are often acquired via secondary market transactions or direct minting. Most acquisitions seem to be active (e.g., minting, purchasing), as opposed to passive (e.g., airdropped, gifting) (CoinGecko, 2022).

### **Motivations**

The main motivations given by Cointelegraph Research and CoinGecko for the use of NFTs, at this stage, are primarily related to the potential for financial gains through "flip & gain", that is, to buy as cheaply as possible and sell at a profit. However, it should be noted that there is a percentage close to 30% in both studies, which reflects that the reason is related to the usefulness that the NFT can bring, as well as the benefits associated with long-term utility (CoinGecko, 2022; Cointelegraph Research, 2021).

Three main buyer profiles exist nowadays. NFT flippers want to hear about the next big idea first. A flipper tries to buy limited items to resale them for profit. NFT flippers buy low and sell high. They will always be the first to get a highly sought NFT and resale it for a profit. This buyer profile causes inflation and speculative bubbles for profit. Collectors want a valuable historical artifact. This NFT purchaser enjoys everything cool, innovative, or intriguing. This buyer seeks the "digital memory" associated with a purchase, the artistic component, or even the utility that the item may provide. Early Adopters, like to collectors today, acquired NFTs to financially support artists and works of art they admired. Additionally, they may be seen as tech-savvy or even as geeks. Today, more emphasis is placed on the project's utility and staying ahead of emerging trends.

A combination of collectors and early adopters might be advantageous for the event ticketing industry, as it permits the formation of tiny groups interested in new technology and supporting of new trends and their favorite performers. Concerts, sporting events, and festivals, activities that appeal to the formation of a hero and where there may be a better connection with community and "digital memories," as well as the utility that can be provided by event organizers as a value proposition (Expert 1, Expert 2, Expert 8).

## **Appendix III. NFTs Applied to Other Industries**

### **Supply Chain**

In a supply chain, NFTs may be utilized to digitally represent a physical object. The combination of this representation's trustless provenance and immutable product data with Internet of Things (IoT) technology produces a digital twin model. This is becoming useful in supply chains involving several countries and individuals. Profit margins in the supply chain business rely heavily on the absence of mistrust and the efficacy of interactions between parties. MarketsN from KoineArth52 is a platform that enables organizations to digitize and attach immutable data in the form of NFTs to documents and products (Cointelegraph Research, 2021).

MarketsN employs a permissioned/private blockchain to create business groups on-demand. When external verification of transaction information inside a group is required, marketsN records validated transactions on a public blockchain. MarketsN enables the use of IoT data created by the movement of items in the supply chain to measure supply chain performance. IoT's rise strengthens the intersection of blockchain, data, and algorithmic judgments (marketsN, 2022).

Learnings: Use of digital twins to replicate goods; use of IoT to boost the analyzed data and the way they are interpreted through the development of own AI for the analysis of each transaction.

### **E-Commerce**

NFTs with digital capability may be used to symbolize or supplement e-commerce products. This includes authenticity verification, provenance, and loyalty benefits. This not only reduces fraud, but also creates new possibilities for customer interaction. In this category, luxury items, limited edition items, commodities, and collaboration products are prevalent. By translating real-world goods into physically backed NFTs, 4K enables anybody to keep physical assets on-chain (Cointelegraph Research, 2021).

Learnings: Converting physical items to an NFT format. For example, guitars and balls that were used in concerts and games can be applied.

### **Real Estate**

The procedure of selling real estate via financial institutions is tedious and complicated. This is largely owing to the prevalence of deed fraud and the resulting need for additional

security measures. NFTs provide immutable ownership evidence with built-in provenance and near-instant transferability resolution. This technology may speed the sale of real estate, bring liquidity, and lessen the likelihood of deed fraud (Cointelegraph Research, 2021).

Propy is the most advanced NFT Real Estate solution working in the US market. In Portugal, Unlockit is preparing the future of real estate. Propy asserts that the record of the purchase is stored on an immutable blockchain and that it offers access to the legal papers attesting to ownership. This minimizes expenses for purchasers and expedites the acquisition process by allowing them to purchase a home in a matter of minutes (TechCrunch, 2022).

Learnings: Fractionating a single asset to provide greater liquidity or enabling a split purchase. Place information in smart contracts that can be transmitted to different stakeholders within the value chain.

### Appendix IV. Trends in the Event Industry

#### Online ticketing will grow substantially

Due to the expansion of smartphones and mobile devices, the perceived convenience and adaptability of online ticketing has increased in popularity. Service providers are developing appealing and user-friendly mobile interfaces, resulting in simpler and quicker ticket purchase (ReportLinker, 2022). Major ticketing providers are emphasizing mobile apps and user-friendly websites to promote fast and simple ticket sales. These apps provide clients with access to a variety of event-related details, including ticket prices, seating maps, and other pertinent data.

The Online Event Ticketing Market was worth USD 28.49 billion in 2021 and is projected to reach USD 94.92 billion by 2027, expanding at a CAGR of 7.52 % from 2022 to 2027 (Mordor Intelligence, 2021).

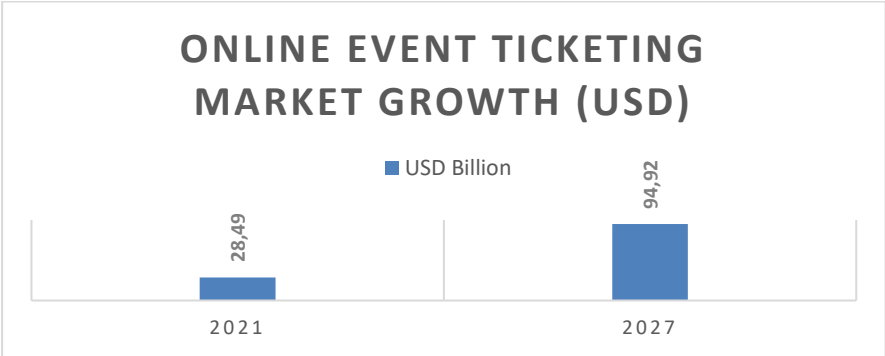


Table 7 - Online Event Ticketing Market Growth 2021-2027 (Mordor Intelligence, 2021)

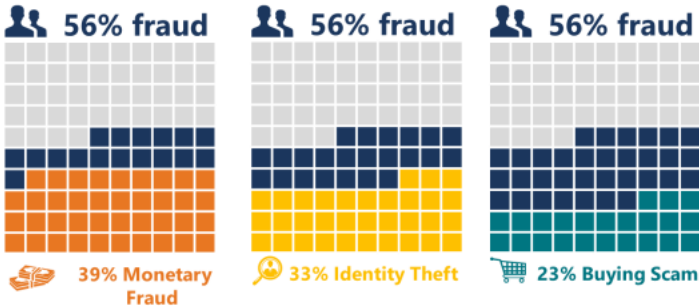


The market growth indicates the possibility of converting people to online purchasing. In Portugal, the adoption of online ticketing is hindered by the population's age and level of education. Cashless in Portugal took a long time to be embraced, necessitating multiple foreign use cases before moving forward, as well as a great deal of pushback from the populace and poor use practices by event organizers. The telephone will be at the core of innovation, since it is something that most people will use daily. As a result, tickets will increasingly rely on online solutions and industry digitalization (Expert 7).

**The problem of counterfeit tickets will be addressed**

Event organizers are concerned about counterfeit tickets, frauds, and issues with the secondary market (Expert 11). The market for event tickets is plagued by counterfeit and duplicate tickets as well as excessive secondary ticket prices (Statista, 2021b). In Portugal, complaints increased by 90 % in the Portal da Queixa in the first quarter of 2022, due to the lack of ticket control on platforms such as Olx and Facebook groups (Lopes, 2022).

Scams and fraud may expose victims and their loved ones to severe psychological, financial, and physical damage. Moreover, scams and fraud may undermine consumer trust, reduce consumer spending, and thus have a substantial impact on economic development and job creation. 39% of the 56% of Europeans who have encountered fraud are victims of monetary fraud, which results significant issues with ticketing (European Commission, 2020).



**Figure 9 - European Countries' Experience with Fraud (European Commision, 2020)**

Countries with a lower overall frequency of scams and fraud also tend to have a relatively low e-commerce intensity (See Figure 11). Even if Portuguese legislation protects the presence of a problematic secondary market, like it does in countries such as the United States and the United Kingdom, there is a chance that with the subsequent education and digitization of the ticket sales, fraud issues may become more prevalent. The emergence of legislation and solutions, such as UEFA in 2020, are increasingly recurrent in major events. The use of QR

codes and solutions such as 3cket or Last2Ticket are more frequent for information control and event management.

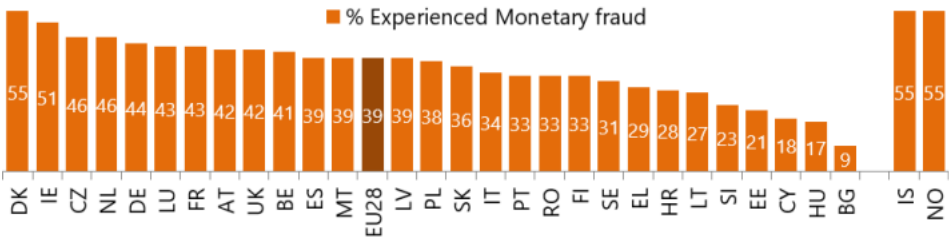


Figure 10 - Figure 10 - Monetary Fraud in European Countries (European Commission, 2020)

**Internet use and online purchases, 2021**  
(% of individuals aged 16 to 74)

	Proportion of individuals who:	
	Used internet within the last 12 months	Purchased online within the last 12 months
EU (*)	90	66
Belgium	94	75
Bulgaria	78	33
Czechia	90	75
Denmark	99	91
Germany	92	76
Estonia	92	70
Ireland	99	87
Greece	79	54
Spain	94	67
France	93	76
Croatia	82	57
Italy (†)	81	44
Cyprus	91	54
Latvia	92	62
Lithuania	88	60
Luxembourg	99	81
Hungary	89	66
Malta	88	65
Netherlands	95	89
Austria	93	63
Poland	87	61
Portugal	83	52
Romania	88	38
Slovenia	90	72
Slovakia	90	75
Finland	97	79
Sweden	97	87
Iceland	100	85
Norway	100	92
Switzerland	98	83
Montenegro	83	26
North Macedonia (‡)	84	34
Serbia	84	45
Turkey	82	40
Bosnia and Herzegovina	77	30
Kosovo (‡) (†)	97	46

(\*) estimates  
 (†) 2020  
 (‡) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.  
 Source: Eurostat (online data codes: isoc\_ci\_ifp\_iu and isoc\_ec\_ib20)



Figure 11 - Internet use and online purchases (Eurostat, 2021)

### **Focus on creating event experience**

Experiences are important to events yet evaluating and contextualizing the significance of event experiences remains a significant difficulty for the event management industry (Biaett & Richards, 2020). Events are distinct experiences in space and time. The competitive advantage of event organizers is their ability to generate unique moments that allow for the formation of memories (Expert 13).

Event experience is how attendees perceive and interact with the event, including, but not limited to, how participants feel about registration and tickets; event content; entertainment and food; engagement opportunities; artists; vendors, partners, and exhibitors. Every stage of the event planning procedure, from concept to implementation to assessment, now requires the creation of meaningful experiences (Bizzabo, 2022). Event organizers must understand how to provide attendees with distinct and relevant event experiences. The event experience is strongly dependent on the way interactional moments with the attendees are designed.

### **Use of apps for engagement with participants**

In 2022, the success of an event will be determined by genuine interaction and data collection to verify its significance (Hopin, 2022). An event app may be used to provide event information to promote communication with other participants before and during the event. Having a direct route to the participants through an app is a practical method for delivering information to those who need it. When it comes to fostering connections, these applications may be used to add contacts and "friends" on the event floor who can be reached later for more networking via the app or other platforms (Floor, 2022).

Through the usage of their own apps, event organizers' access to participant information is a great means of communicating with attendees. Millennium Estoril Open used Gamifyou, a powerful cloud-based gamification platform with extensive customization options (Gamifyou, 2022), to test digital ticketing in cooperation with Blueticket and the application of NFTs as a method of rewarding app users (Expert 2, Expert 7). They have given over 100,000 points, of which 62% were turned into vouchers and 75% were converted into prizes. They had 1,310 downloads, almost 2,000 completed surveys, an average of ten actions per user, and rewarded 4 NFTs.

The use of tokens to produce incentives and gamify the user experience is a method for creating a new experience and interacting with the participant. It is feasible to integrate the value chain by awarding points for a series of activities, such as interacting with sponsors and

attending performances. It is essential to include additional stakeholders to generate new use cases, enhance the user experience, and design a unique journey. For Gamifyou, giving the NFT as a reward to the most active participants generates a memory of the event that may subsequently be shared, and even creates NFTs that are awarded to the participants with the best moments (Expert 2).

### **Focus on data collection and personalization**

Data gathering and analytics may assist event organizers in meeting the continuously shifting expectations of consumers. Real-time data gathering will be the primary method for bridging the gap between the current state of events and their desired state (Floor, 2022). There is a need for event organizers to collect more information and get to know their attendees, given that when they do not internalize ticketing due to GDPR protections, they are often unable to perform or have knowledge about who the attendee is (Expert 11).

Post-event, event organizers may generate individualized follow-ups and more targeted advertising and tailored marketing communications by using data obtained about event attendees' activity. Personalization enables attendees to be happier with the event's quality and to make better judgments: knowing which artists to hire, what sort of sponsors to have, and what the consequences of actions are, therefore optimizing costs and maximizing long-term outcomes (Expert 5, Expert 6).

### **Hybrid and sustainable events**

Hybrid events include both virtual and physical components. The virtual event concept has provided organizations and attendees with several advantages, including worldwide audience reach, decreased event costs and duration, and user activity monitoring, among others. Hybrid event solutions enable event registration and check-in for participants, premium video streaming, live polling, Q&As, data analytics, and lead tracking capabilities to quickly measure event participation and return on investment (Floor, 2022).

Given the shifting customer preferences, sustainable events have become fashionable. There are other prospects, including the use of digital ticketing systems, the replacement of plastic bottles and silverware with biodegradable alternatives, the use of seasonal, local ingredients in catering, and the donation of surplus food to local organizations. As customers demand that brands create more sustainable practices, they will also anticipate that events will be organized to have a low environmental effect (Brenner, 2022).

## Appendix V. Ranking of Impact Factors

Factors	Most Relevant						Rank
Sales	X			X			4°
Competitive Advantage			X				6°
Customer Preference							8°
Customer Experience		X	X		X	X	2°
Customer Satisfaction			X				6°
Customer Engagement		X				X	4°
Data Collection	X			X	X		3°
New Revenue Channels	X	X		X	X	X	1°

**Table 8 - Ranking of Impact Factors in the Event Ticketing Industry**

## Appendix VI. Definition of Scope

Goal of Scenario Project: Develop scenarios for Event Ticketing Industry in Portugal for the next 5 years considering the use of NFTs as a Disruptor.

Strategic Level of Analysis: The level of analysis will be for the industry, looking to specify for events such as: concerts, festivals, and sports.

Participants (Expert 8): Primary Stakeholders: Event Organizer, Ticketing Companies, Performers. Secondary Stakeholders: Participants, Sponsors, Vendors. Influencers: Government Entities, Media, Public Opinion, Technology

Time Horizon: 5 years. A five-year timeframe from the present. That is sufficient time for significant external events to occur, but not so extensive that the persons participating in the scenario creation process cannot adapt (Schwenker & Wulf, 2013b).

## Appendix VII. Probability of Scenarios

The study of the probability of occurring of the various scenarios was based on an understanding and analysis of the literature, the Portuguese context via the insights of the experts, as well as technological development and maturity taking into consideration the inputs provided by the experts in the field.

The comprehension of the Portuguese context translates into a need for more international use cases, as well as the ongoing growth of this context, was one of the

determining variables for the likelihood weighting that held the most weight. Expert 14 also presented an overview of the topic, validating and assigning a value of 60% probability for the neutral scenario, 30% probability for the positive scenario, and 10% probability for the negative scenario. The literature encourages conversation about the ticketing industry and enables comprehension of the many present market failures, as well as the immediate advantages that NFTs might provide. Through interviews with multiple experts (Expert 5, Expert 6, Expert 9, Expert 10) developing ticketing solutions, it was possible to validate new perspectives and comprehend the factors that would have the greatest influence and impact, demonstrating a great applicability for the Portuguese industry in the use of NFTs, as the interviews with experts 2, 7, 8, and 11 demonstrated.

Despite the use of probabilities, when performing scenario planning, it can be considered by authors as subjective (Grienitz et al., 2014), the applicability of probability aims to demonstrate the existence of a greater tendency of the different experts with an optimism regarding the use of NFTs, at 5 years, in the event ticketing industry in Portuguese, always taking as a starting point the international context and the best practices in the different sectors.