



# INTEGRATING KLEROS ONTO PLATFORMS TOKENIZING REAL-WORLD ASSETS FOR FINANCING PURPOSES

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## Abstract

This research paper investigates how Kleros – a decentralized blockchain-based arbitration solution – can be integrated into platforms that offer tokenization of real-world assets for the financing of companies. The services currently offered by Kleros have the potential to be replicated in several fields, and new integrations are continuously being researched and developed. As the world moves into a token-based economy, and more companies and projects develop tokenization solutions, there will be a greater need for decentralized one stop-shop solutions that can be used as an answer to compliance, due diligence, technical expert opinions and dispute resolution needs.

Starting with an overview of what is tokenization of real-world assets and how it can be achieved, while presenting the main benefits but also its risks and challenges, the first part of this paper will focus on how this blockchain-powered process is being used to offer alternative financing to companies and how it is contributing to the reduction of the global trade finance gap. Defactor Labs<sup>1\*</sup> – a tokenization of real-world assets platform – was chosen as the main use case for this research paper, because of its recognition as an emergent player on the tokenization space and the growth potential it has shown, as well as because of its relevant partnerships with key players in the real-world asset market. The second part of this research paper focuses on decentralized justice and on the possible Kleros' integrations on tokenization of real-world assets platforms. A survey was also conducted throughout the length of the research fellowship, to gauge the community's interest and knowledge in this topic and its results and main conclusions will be presented at the end of this research paper.

The Author hopes that this research paper helps spread knowledge on tokenization of real-world assets and the possibilities it opens up for the financing of companies, especially small and medium companies, as well as how Kleros, as an always evolving decentralized solution, can help solve certain needs of tokenization platforms.

**Keywords:** Blockchain, Tokenization, Real-World Assets, Liquidity financing, SMEs, Decentralized Justice, Kleros

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<sup>1</sup> <https://defactorlabs.com/> (accessed 29th April 2023)

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# 1. Introduction

Ever since the conceptualization of blockchain in the Bitcoin White Paper<sup>2</sup> published in 2008, numerous use cases and applications of this technology have been developed. The launch of the Ethereum blockchain<sup>3</sup> in 2015 enabled developers to create a wide variety of decentralized apps (DApps), including those related to finance. This gave rise to the concept of Decentralized Finance (DeFi), which is normally opposed to Centralized Finance (CeFi), composed of the financial services offered by traditional companies and banks.

Blockchain technology, through the process of tokenization of real-world assets, has the potential to transform financial markets and the way companies achieve liquidity and get financed. However, a new paradigm does not come without its own challenges, nor is it exempt from legal disputes that may occur among the different players in the tokenization process, many times regarding technical questions that are difficult to understand by the mainstream actors of the legal ecosystem.

As this technology advances, new opportunities have opened up to manage and monetize valuable physical objects. Tokenization bridges these assets with their digital counterparts, thus eliminating the need for intermediaries and providing liquidity to otherwise illiquid and non-fractional markets. In recent years, different companies, banks and organizations have launched initiatives to tokenize real-world assets.

Tokenization of real-world assets is set to become one of the biggest trends of 2023 and beyond, and as more companies start building on this space, new solutions will be needed to be integrated into these platforms. Kleros, as one of the most well-established decentralized arbitration solutions, has the potential of being integrated into these platforms for different use cases, which will be explored in this research paper.

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<sup>2</sup> <https://bitcoin.org/bitcoin.pdf> (accessed 5th January 2023)

<sup>3</sup> <https://ethereum.org/en/> (accessed 29th April 2023)



## 2. Asset tokenization

In order to understand what tokenization is, it is necessary to have a basic idea of the underlying technology that allows for this process to be achieved. A distributed ledger technology (DLT) is “the technological infrastructure and protocols that allow simultaneous access, validation, and record updating across a networked database”<sup>4</sup>. Blockchain is a type of DLT and, in very simple terms, it can be defined as a distributed database that maintains a continuously growing list of ordered records (“blocks”), linked and secured through cryptography. Blockchain is the underlying technology of crypto-assets, allowing to register the transactions that are done on a given network.

According to the upcoming Market in Crypto-Assets (MiCA) regulation, a crypto-asset is a “digital representation of a value or of a right that is able to be transferred and stored electronically, using distributed ledger technology or similar technology”<sup>5</sup>. There are many types of crypto-assets, but the main division can be done between cryptocurrencies, also sometimes called payment tokens, and other types of tokens.

Cryptocurrencies are the digital assets native to a blockchain network, which can be traded, used as a medium of exchange and as a store of value, whereas tokens are digital assets that are built and used on top of a blockchain network to serve a specific function. There are many different types of tokens, with the possibility of new ones being created as technology advances. Particularly relevant to the tokenization of a real-world asset is the definition of non-fungible token (NFT). A fungible good is one that can be substituted interchangeably for another one (e.g. a dollar note is equivalent to other dollar notes, and a bitcoin is equivalent to another bitcoin). A non-fungible good is a unique one, that cannot be interchanged (e.g. a piece of art, like a painting, is a unique asset that cannot be substituted for another one). NFTs are “unique digital identifier[s] that cannot be copied, substituted, or subdivided, that [are] recorded in a blockchain”<sup>6</sup>, meaning its authenticity and ownership is recorded on a blockchain.

In the context of tokenization, which is “the process of digitally representing an existing real asset on a distributed ledger”<sup>7</sup>, we can define a token as a “representation of [the whole or fractions of an] asset or interest that has been tokenized on an existing cryptocurrency's blockchain”<sup>8</sup>. It can involve the “digital representation of real assets on distributed ledgers or the issuance of traditional asset classes in tokenised form”<sup>9</sup> and therefore be divided into two main types, depending on whether the assets exist

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<sup>4</sup> Distributed Ledger Technology (DLT): Definition and How It Works (investopedia.com) (accessed 5th January 2023)

<sup>5</sup> [https://www.europarl.europa.eu/doceo/document/A-9-2022-0052-AM-002-002\\_EN.pdf](https://www.europarl.europa.eu/doceo/document/A-9-2022-0052-AM-002-002_EN.pdf) (accessed 29th April 2023)

<sup>6</sup> NFT Definition & Meaning - Merriam-Webster (accessed 29th April 2023)

<sup>7</sup> Hileman, Garrick and Rauchs, Michel, “2017 Global Blockchain Benchmarking Study”, available at SSRN: <https://ssrn.com/abstract=3040224> (accessed 6th January 2023)

<sup>8</sup> What Are Crypto Tokens, and How Do They Work? (investopedia.com) (accessed 12th January 2023)

<sup>9</sup> <https://www.oecd.org/finance/The-Tokenisation-of-Assets-and-Potential-Implications-for-Financial-Markets.pdf> (accessed 5th February 2023)



on-chain or off-chain, which refers to the existence of the tokens on a blockchain or other DLT, or existing solely in the real world.

Any asset that has real-world value, meaning it has “intrinsic value due to its substance and physical properties”<sup>10</sup> and that can be traded for that value, both tangible and intangible, can theoretically be transformed into a token<sup>11</sup>, which can then be traded on a secondary market such as a cryptocurrency exchange<sup>12</sup> or platform. Tangible assets have physical forms and hold a specific monetary value, like real estate and land, commodities like gold and other precious metals, oil, energy and carbon credits, art like paintings and sculptures, factory equipment, a company's inventory or stock, receivables like invoices or tradeable valuable goods like whiskey. Intangible assets, on the other hand, are assets that do not exist in physical form, such as voting rights, ownership rights, patents and IP licenses.

Another important distinction is between real assets, normally associated with tangible assets, and financial assets such as stocks and bonds don't have a physical form but represent value to the entity that owns them and can quickly be converted into cash. In this research paper, the Author will focus on tangible real assets and how their tokenization allows for alternative financing of companies, since gaining access to short-term capital poses a significant challenge for many businesses around the world, especially those with smaller or informal structures, and operating in unstable economies. The term that will be used to describe these assets will be real-world assets (RWAs).

## 2.1. Process of asset tokenization

The process of asset tokenization is composed of several steps but there's no unified nor definitive checklist that needs to be complied with, as it all depends on various factors, such as the type of token that is being tokenized, the objective of the tokenization, the platform that is used and the jurisdictions where the asset and the investors are located. In this chapter, the most relevant milestones in the tokenization process will be presented and briefly explained.

### 2.1.1. Due diligence and auditing of the asset to tokenize

The first step of asset tokenization is choosing what asset will be tokenized. This asset needs to pass through an auditing process, in order to verify its status, value and other identifying characteristics. The auditing process can be done through the tokenization platform itself, or through specialized third-party services, which can analyze the viability of tokenizing the asset.

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<sup>10</sup> <https://www.investopedia.com/terms/r/realasset.asp> (accessed 7th May 2023)

<sup>11</sup> <https://www.forbes.com/sites/rachelwolfson/2018/10/03/a-first-for-manhattan-30m-real-estate-property-tokenized-with-blockchain/#6a61a5ea4895> (accessed 9th May 2023)

<sup>12</sup> E.g. Binance <https://www.binance.com/en>, Coinbase <https://www.coinbase.com/> (accessed 7th May 2023)



### 2.1.2. Choosing the best-suited type of token

Secondly, it's important to choose the type of token that better suits the chosen asset and the tokenization purposes. Security tokens can digitally represent traditional securities, like stocks or bonds. NFTs tend to be the most effective and efficient solution for tokenizing tangible real assets, because of their ability of capturing the uniqueness of each asset. A NFT can represent a work of art, like a physical painting or sculpture<sup>13</sup>, a piece of land or real estate<sup>14</sup>, trading cards<sup>15</sup>, and many other types of goods. There is still no token standard for RWAs, although there are several initiatives by standardization associations for tokenization of certain asset classes like receivables. Also, there are many different blockchains to choose from, with Ethereum, Solana<sup>16</sup> and Polygon<sup>17</sup> being the most popular ones for launching NFTs<sup>18</sup>.

### 2.1.3. Choosing a suitable jurisdiction to conduct the tokenization

Before issuing the token, it's extremely important to understand the existing legislation and regulations on asset ownership and token issuance and distribution, in the different countries where the token will be launched and where investors will be targeted. If the token offering is directed towards retail investors and qualifies as a security, most jurisdictions will require some form of prospectus or white paper to be presented and approved by the competent financial authority of that country<sup>19</sup>.

### 2.1.4. Creation and emission of the token

Tokenization platforms, businesses that offer "tokenization as a service", are becoming more popular as one-stop shops for businesses to tokenize their assets. Nowadays, there are many platforms to choose from, like Brickken<sup>20</sup> and Polymath<sup>21</sup>, with each one offering different features. These platforms are normally able to take care of the technical requirements for tokenization, as well as issuing and

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<sup>13</sup><https://www.wsj.com/video/series/on-the-news/nft-artist-beeples-first-physical-sculpture-fetches-about-289-million/D9F5DA81-173C-4C79-B3D2-EF9E1FA76B29> (accessed 9th May 2023)

<sup>14</sup> <https://nfts.wtf/the-first-ever-physical-real-estate-property-is-being-auctioned-as-an-nft/> (accessed 9th May 2023)

<sup>15</sup> <https://td35.net/pages/what-are-phygicards> (accessed 9th May 2023)

<sup>16</sup> <https://solana.com/> (accessed 29th April 2023)

<sup>17</sup> <https://polygon.technology/> (accessed 29th April 2023)

<sup>18</sup> NFT Charts: Transactions, Users and Trading Volumes (theblock.co) (accessed 6th March 2023)

<sup>19</sup> The Virtual Asset and Initial Token Offering Services Act 2021 from Mauritius has white paper requirements for issuers of tokens, available at <https://www.fscmauritius.org/media/119928/the-virtual-asset-and-initial-token-offering-services-act-no-xxi-of-20.pdf> (accessed 9th May 2023)

<sup>20</sup> <https://www.brickken.com/> (accessed 29th April 2023)

<sup>21</sup> <https://polymath.network/> (accessed 29th April 2023)



distributing the tokens, and sometimes also facilitating trading between investors, through their own secondary market. The cost of tokenizing an asset also varies, depending upon the type of asset to be tokenized and the chosen features of the tokens.

### 2.1.5. Linking the tokens to the RWA

Linking the off-chain asset with its digital representation is the most challenging step of this tokenization process. There are several models<sup>22</sup> that can be adopted, depending under which law the tokenization is taking place, the tokenized asset and the rights that the token holders will have. If the token itself is planned to be a legal claim, then the right is directly linked to the token. In order to transfer this legal claim, the token itself has to be transferred to another person and whoever is the owner is also the creditor of that claim. If the ownership of the real-world asset is to be encapsulated in its digital representation, setting up a trustee structure or special purpose vehicle (SPV), that legally owns the asset, might be necessary in certain jurisdictions. There are limitations derived from civil and commercial legislation that can regulate transfer of ownership of real estate, as well as from contractual requirements needed to validate that transfer. For example, some jurisdictions require that, for real estate to be sold, that the contract is done through an authenticated document that needs a notary stamp to be valid.

The linking between the RWA and the token is done through smart contracts, which are programs stored on a blockchain that run when predetermined conditions are met. The smart contract produces and manages the desired number of tokens and, if it includes an oracle, which is a data feed that fetches data from different off-chain sources into smart contracts (e.g. a database of flights that departed a certain airport can be an off-chain source for a smart contract of a plane ticket NFT), it can get information about the state of the RWA and also be programmed to act in the case that something happens to it.

The Liechtenstein Token and TT Service Provider Act<sup>23</sup> is one of the few regulations in the world that has addressed the disconnect between physical objects and their digital token representation, stating that the transfer of the token equates to the transfer of the right embodied in the token, provided that transfer is lawful and contractually permissible. This Act also contemplates the existence of physical validators<sup>24</sup>, who need to obtain a registration in order to be able to legally verify the authenticity and the safekeeping of the real-world asset.

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<sup>22</sup> Tokenize The World - Stadler Völkel Rechtsanwälte (svlaw.at) (accessed 6th March 2023)

<sup>23</sup> <https://www.regierung.li/files/medienarchiv/950-6-01-09-2021-en.pdf> (accessed 5th March 2023)

<sup>24</sup> <https://www.lcx.com/lcx-gains-regulatory-approval-as-a-physical-validator-to-enable-tokenization-of-assets/> (accessed 5th March 2023)





### 2.1.6. Ensuring proper management of the asset

Proper asset and custody management is an extremely important step, as the asset should constantly be monitored. In principle, the asset's owner should surrender the item to a verified third party to ensure its safety and authenticity. In some cases where storage is not possible, as with real estate, a vault may hold key documents related to the asset. A smart contract captures the parties' agreement and once its conditions are fulfilled, the tokens can be issued and delivered to the investors.

These tokens can be made available for trading in the tokenization platform itself or be admitted to trading in centralized or decentralized exchanges. Depending on the business model that is used, the token owners can receive dividends or interest payments, stake the token in a platform, meaning locking the token in a vault for a certain amount of time in order to get some future reward, or invest it in different investment protocols.

## 2.2. Using tokenization of real-world assets to finance companies

During 2021 and 2022, with the total value locked (TVL) in DeFi protocols greatly decreasing<sup>25</sup>, the return yields, meaning the amount an investment earns during a certain period of time, on these types of investments were cut back, mainly because of the reduction of on-chain activity and the overall negative sentiment of traditional finance and crypto markets. A new source of stabler yields, based on real-world assets, has been emerging, and investors' interest on them has been growing, in both sides of the financial world<sup>26</sup>: several Traditional Finance (TradFi) institutions are studying how to tokenize real-world assets and more DeFi protocols have been creating lending pools based on RWAs.

### 2.2.1. The real-world assets market

The total global value of real-world assets is estimated at \$256 trillion<sup>27</sup>, and a large part of the world's wealth is locked in illiquid assets. Tokenization can bridge traditional and decentralized finance and monetize on the market values of RWAs, such as gold's \$13 trillion<sup>28</sup>, real estate's \$390 trillion<sup>29</sup>, and invoices' \$500 billion<sup>30</sup>. Unlocking this value can allow for more sustainable and reliable DeFi yields, without the volatility that characterizes the crypto market. The base average yield per protocol varies from around 3% to 16%, with the possibility of being even

<sup>25</sup>DefiLlama - DeFi Dashboard (accessed 10th March 2023)

<sup>26</sup><https://www.forbes.com/sites/leeorshimron/2023/03/16/tokenized-real-world-assets-are-bringing-new-yield-opportunities-to-defi/?sh=304784a85c74> (accessed 29th April 2023)

<sup>27</sup>We Need to Expand Access to \$256 Trillion in Real-World Assets (futurism.com) (accessed 10th March 2023)

<sup>28</sup>Market Cap of Gold (precious metal) (companiesmarketcap.com) (accessed 10th March 2023)

<sup>29</sup>Real Estate Market Size, Trends and Global Forecast To 2032 (thebusinessresearchcompany.com) (accessed 10th March 2023)

<sup>30</sup>Invoice Markets Use Case | 2Tokens.org (accessed 15th March 2023)



higher in case rewards are paid in other DeFi tokens<sup>31</sup>.

At the end of 2022, the tokenized real-world assets market had a locked gross value of \$193 million<sup>32</sup>. This value is predicted to reach \$16 trillion by the year 2030<sup>33</sup>, which constitutes a growth of more than 50.000%, meaning that this market could reach 10% of the global GDP by the end of this decade.

In the beginning of 2023, out of the top 10 lending protocols, were lending tokenized real-world assets, namely Centrifuge Protocol, TrueFi, Maple Finance and Goldfinch<sup>34</sup>. MakerDAO, another important actor in the DeFi space, also generated 57% of its total revenue from real-world assets<sup>35</sup> and accumulated over \$600 million in real-world asset collateral during 2022<sup>36</sup>. The 7 largest RWA credit protocols have had a historical loan value of \$4.2 billion, with active loans currently stand at \$456 million, offering an average annual percentage rate (APR) of 12.63%<sup>37</sup>.

Some of these protocols focus on providing liquidity to emerging economies and in helping small and medium companies (SMEs) get liquidity. Almost all of GoldFinch's<sup>38</sup> end-borrowers are located in growing economies, like the Philippines, Nigeria, Kenya and Mexico<sup>39</sup> and Defactor Labs has been mainly focusing on the Latin American and European markets<sup>40</sup>.

### 2.2.2. The trade finance gap

Micro, small and medium-sized enterprises (MSMEs) "account for 90% of businesses, 60 to 70% of employment and 50% of GDP worldwide"<sup>41</sup>. These companies are the foundation of numerous economies across the globe, generating employment opportunities and providing essential resources to

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<sup>31</sup> (1) Ignas | DeFi Research on Twitter: "1/ The Real-World Asset revolution in #DeFi is already here — but many aren't paying enough attention yet. Here's the current state of RWAs to help you catch the wave 🌊" / Twitter (accessed 5th February 2023)

<sup>32</sup> Tokenizing Real-World Assets: What You Need To Know (polkastarter.com) (accessed 12th February 2023)

<sup>33</sup> on-chain-asset-tokenization.pdf (bcg.com) (accessed 10th March 2023)

<sup>34</sup> Four RWA lending protocols rank among top 10 lending apps with largest collected interest (cryptoslate.com) (accessed 12th February 2023)

<sup>35</sup> Four RWA lending protocols rank among top 10 lending apps with largest collected interest (cryptoslate.com) (accessed 12th February 2023)

<sup>36</sup> Maker on Twitter: "The Maker Protocol accumulates over \$600 million in real-world asset collateral. Clearly, 2022 was a vital year for flourishing the TradFi & DeFi connection. These are the most noteworthy RWA milestones you should be aware of: ↓ <https://t.co/XgQrI1i9L>" / Twitter (accessed 13th February 2023)

<sup>37</sup> RWA.xyz (@rwa\_xyz) / Twitter (accessed 16th March 2023)

<sup>38</sup> <https://goldfinch.finance/> (accessed 29th April 2023)

<sup>39</sup> Emerging market opportunities. Goldfinch has issued \$100M in loans to... | by Goldfinch Foundation | goldfinch\_fi | Medium (accessed 2nd January 2023)

<sup>40</sup> Customer Spotlight: Fivana and the growth of SME invoice financing in Latin America | by Defactor [Official] | Medium (accessed 2nd January 2023)

<sup>41</sup> <https://www.un.org/en/observances/micro-small-medium-businesses-day#:~:text=MSMEs%20account%20for%2090%25%20of,and%20groups%20in%20vulnerable%20situations> (accessed 29th December 2022)



families, as well as being instrumental in propelling innovation and progress within their respective communities. One of the biggest barriers for the growth of these companies is the difficult access to financing, especially those operating in weaker economies, particularly when it comes to securing short-term cash flow. Almost half of all formal micro, small and medium enterprises in emerging countries have unmet financing needs estimated at \$5.2 trillion every year<sup>42</sup>, a number that is only expected to keep growing and which does not account for informal structures, which have even more difficulty in accessing financing."

Traditional finance is not always the best solution to finance small and medium-sized companies. Banks and other TradFi institutions face several limitations in their ability to provide financing to smaller companies due to the growing constraints of the finance industry. These providers typically focus on established businesses with a proven track record of revenue and profitability, which can be a significant barrier for new or emerging businesses seeking financing. Additionally, they often offer a limited range of lending solutions, such as term loans or lines of credit, which may not meet the needs of all types of businesses.

Moreover, traditional finance providers typically have strict underwriting criteria, such as a minimum credit score or collateral requirements, which can make it challenging for small and medium-sized enterprises to qualify for financing. Many SMEs have limited credit histories or may not even have the financial knowledge and technical resources to elaborate the financial statements needed to demonstrate their ability to repay loans, which can limit their ability to negotiate favorable credit terms. This also makes it difficult for banks to properly assess the financial health of SMEs, which may be considered riskier given their small size and lack of a proven credit track record. As a result, lenders may be more cautious about lending to SMEs, offering higher interest rates or stricter loan terms. Another major drawback of traditional finance is its slow approval process, which can be problematic for businesses that need quick access to financing or to cover unforeseen expenses. Geographic limitations are also a significant issue, as traditional providers may only operate in certain regions, which limits access to financing for businesses located in emerging countries or other areas where traditional providers do not operate.

All of these factors make it challenging for SMEs to obtain the financing they need to grow their businesses and succeed in today's increasingly competitive market, making them more dependent on informal lenders, which can lead to the exploitation of families and create marginalized and poorer communities. Considering these problems, SMEs have started to explore alternative financing methods, including those powered by blockchain technology, which can help them overcome some of the mentioned challenges and access financing in

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<sup>42</sup> World Bank SME Finance: Development news, research, data | World Bank (accessed 29th December 2022)



innovative and efficient ways. Tokenization platforms allow SMEs to monetize their assets, which can be used as collateral to obtain loans, and facilitate peer-to-peer lending without intermediaries. By utilizing these alternative financing options, SMEs can overcome some of the challenges associated with obtaining traditional financing, which can ultimately help them grow and expand their business.

### **2.2.3. Benefits of tokenization of real-world assets for financing purposes**

Although the concept of fractionalization, which is the division of an asset into smaller parts, that can then be purchased by multiple investors, has already existed in TradFi for a long time, mostly through Real Estate Investment Trusts (REITs) and Exchange Traded Funds (ETFs), it has several limitations and normally only focuses on assets like real estate or equity. Tokenization of RWAs allows access to other markets like receivables, and using blockchain technology allows SMEs to tokenize their own assets, leveraging them in order to obtain financing.

#### **2.2.3.1. Better access to liquidity**

First off, tokenization increases the available liquidity in the market, as it allows for fractionalization of the asset. Traditional illiquid assets, such as real estate or fine art, can be turned liquid through tokenization and traded on a secondary market, offering greater liquidity to the companies that own those assets as well as investors. It also allows for companies to monetize their own assets, such as stock and inventories that are stored in their warehouses, or invoices that are issued daily. The crypto market is also generally seen as highly volatile, with some tokens losing all their value quite rapidly. An asset-backed token is tied to its real-world value, therefore not suffering the fluctuations associated with most cryptocurrencies.

#### **2.2.3.2. Democratization of investments**

By reducing barriers to investment, such investments become more accessible to a wider range of people. The tokenization of assets that are part of a company's balance sheet means that those assets can be used to achieve liquidity that would not be available through traditional financing methods. This also leads to increased accessibility, as it creates new investment opportunities for investors who cannot afford high-value assets, creating greater financial inclusion and allowing a bigger pool of investors to participate in the financing of companies.

#### **2.2.3.3. Access to a global market**

In addition, tokens can be exchanged globally and virtually, in digital exchanges, at any time, 365/24/7, increasing market efficiency and optimizing the lending process, although an always open crypto market



can also have its disadvantages<sup>43</sup> If the RWA generates income, the profits can be split amongst the token holders, based on how many tokens they own, creating new income sources for investors to then spend into their own communities.

#### **2.2.3.4. Faster access to funding**

Since blockchain technology allows for the removal of intermediaries, transactions are much faster than in traditional finance and administrative fees and bureaucratic proceedings are reduced. Unlike traditional lending mechanisms, there is no need to involve a bank or depository, as the tokenization platform is normally issuing the tokens directly to the investors, and these hold the tokens in their own wallets. Besides, the use of smart contracts allows for the automation of token trading, compliance checks, settlement and clearance, document verification and dividend payments.

#### **2.2.3.5. Increased transparency**

The use of a public blockchain allows for anyone to view the entire history of activities performed over a certain asset, as well as its associated chain of ownership. By default, all data stored on a blockchain is immutable, meaning asset information and transaction records are verified and data cannot be easily manipulated. NFTs can act as a digital record of authenticity and provenance on the blockchain and might even have embedded on them a digital certificate of authenticity of the asset.

#### **2.2.3.6. Enhanced security**

Blockchain, as a distributed and decentralized registry, means it is theoretically more secure than traditional databases, regarding the risk of loss and exploitation of the information stored on the network. Being distributed means that each full node on the network has a copy of the database and decentralized that there is no single point of failure since it has no centralized entity controlling it. New entries to the database are only possible with the consent of the majority of the participants in the system, which can be achieved through various consensus mechanisms.

### **2.2.4. Main challenges and risks of tokenization of real-world assets**

Tokenization of RWAs as a financing mechanism does not come without its own challenges, which tokenization companies should take into account before starting the process but also throughout its stages.

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<sup>43</sup> <https://www.theblock.co/post/147579/is-the-24-7-crypto-market-good-or-bad-for-traders-experts-disagree> (accessed 9th May 2023)



#### **2.2.4.1. Connection between the off-chain asset and its on-chain token**

Besides the general security concerns that any online platform has to take into account, like being subjected to hacks and exploits, a blockchain-based project should ensure that the smart contracts that govern it are well coded, as well as guarantee that they are regularly audited. Tokenization projects also have their own unique technical challenges, such as ensuring that there is consistency between the off-chain real-world assets and their on-chain counterparts. Although an asset-backed token will have a more stable value than other types of token, it can still de-peg from the off-chain asset value. Another unique challenge is the possibility of the RWA being destroyed, damaged or stolen. The token can continue trading at a certain value that is mismatched with the RWA's value, if the smart contract is not prepared to handle those situations or does not have an oracle or data feed to get information on the status of the tokenized asset.

#### **2.2.4.2. Liquidity and valuation risks**

While tokenization can increase the liquidity of assets, it is important to note that the tokens themselves may not always be liquid, which can make it difficult for investors to sell their tokens at the time they want to, therefore exposing them to liquidity risk. Determining the value of tokenized assets can also be difficult, as there may be limited data or market precedents to go on, which could lead to a higher valuation risk for investors, who may not be able to accurately gauge the true value of the tokens they are buying.

#### **2.2.4.3. Legal and regulatory risks**

Tokenization projects are normally managed in a decentralized manner, with global teams working remotely, while being targeted to investors worldwide, making it nearly impossible to comply with all the existing regulations worldwide, as well as tax and accounting requirements. Investors are many times unprotected against fraud or scam situations, since there are no clear regulatory frameworks for the issuance of certain types of tokens. This can create regulatory uncertainty for companies that wish to issue tokens backed by real-world assets, as well as causing a lack of confidence and trust by investors. The absence of regulation of certain aspects of the tokenization process can also lead to a lack of accountability of the company founders and decision-makers in case there is a legal issue where it's necessary to hold the company or some individuals accountable.

Each jurisdiction regulates the issuance of tokens differently, with some classifying almost all tokens as securities, therefore subjecting them to the regulation of securities laws, while some don't even have clear definitions on the different types of crypto tokens. In other jurisdictions, token



issuance is heavily regulated, with tokenization companies having to obtain licenses with the national regulatory entities, as crypto-asset service providers, whereas in others there are no specific laws enacted for companies providing these types of services. Also, the primary focus on regulation worldwide has been on CeFi, whereas DeFi services tend to be left out of the current regulatory scope, at least in this first phase of crypto regulatory initiatives. NFTs are tricky to regulate, as their legal classification will always depend on the particular asset that was tokenized. For example, the Commodity Futures Trading Commission (CFTC) has stated<sup>44</sup> that renewable energy credits are commodities as defined by the US Commodity Exchange Act, but some other assets have not yet been explicitly analyzed.

Since we are dealing with real-world assets that are already subject to specific national and international laws, another relevant concern relates to the compliance with property rights, ownership and custodianship, which can be affected by court decisions or restitution of ownership, forced transfers, and expropriation orders. Tokenization projects should also comply with international compliance requirements, such as those related to KYC and KYB requirements, anti-money laundering and terrorism financing.

The mainstream use of tokenized assets can also prompt regulators to enact legislation specific to these types of assets. A possible solution for the development of a token-based economy is the creation of sandbox and pilot regulatory regimes, to test out the best regulatory approaches, and allow startups and companies to participate in the regulation of the ecosystem. One such example is the DLT Pilot Regime<sup>45</sup>, which provides a legal sandbox for the trading and settlement of transactions of crypto-assets qualifying as financial instruments within the meaning of the MiFID II Directive<sup>46</sup>.

#### **2.2.4.4. Jurisdiction and dispute resolution questions**

The decentralized nature of tokenization also raises the question of which jurisdiction is competent to solve legal issues that may arise. This is particularly challenging when it comes to certain aspects of the law that are not traditionally harmonized and that vary widely from jurisdiction to jurisdiction, such as intellectual property rights. There are also challenges related to cross-border transactions, as since there is no centralized payment system, it's difficult to ensure that these transactions comply with international regulations dealing with payment services.

Like with any other business transaction between two parties, there is

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<sup>44</sup> <https://www.jonesday.com/en/insights/2021/04/nfts-key-us-legal-considerations-for-an-emerging-asset-class> (accessed 12th February 2023)

<sup>45</sup> EUR-Lex - 32022R0858 - EN - EUR-Lex (europa.eu) (accessed 13th February 2023)

<sup>46</sup> EUR-Lex - 02014L0065-20230323 - EN - EUR-Lex (europa.eu) (accessed 13th February 2023)



potential for disputes to also arise out of the negotiation of asset-backed tokens. Traditional courts and its actors might not be able to understand the more technical aspects of these disputes, having to resort to expert opinions. As new disputes related to Web3 and blockchain start appearing, specialized courts and arbitral centers will need to be created, requiring some lawyers and arbitrators to become specialized on these matters.

#### **2.2.4.5. Lack of token standardization and blockchain's interoperability**

New token standards, especially those based on Ethereum, are regularly being created, as the blockchain industry and its applications evolve. For example, ERC-1400, the Security Token Standard, is programmed to enforce predetermined legal and regulatory conditions that are relevant to securities across various jurisdictions. Token standards enable the automation of compliance processes, making it easier to adhere to applicable regulations as well as complying with due diligence and other requirements. They also allow for easier and faster dividend and yield distribution to investors.

As there is no standardized global invoice format and most invoices are still in paper format, the process of verifying them is a tedious and slow one, complicating its digitization process and subsequent tokenization. Manual payments are also subject to human error and can lead to double spending issues, in case they are offered as collateral to multiple parties. Institutions like the 2Tokens Foundation<sup>47</sup>, which Defactor Labs has partnered with on their tokenized invoices use case, and the International Token Standardization Association<sup>48</sup> are developing and studying standards for different asset-backed tokens.

Another concern for tokenization projects, especially as more actors start operating in the market, is the need for their platforms to be interoperable, in order to be able to communicate with liquidity providers and pools, as well as with asset originator services.

#### **2.2.4.6. Slow adoption**

Mass adoption of tokenization of real-world assets is going to take years to fully come into fruition, and it will require efforts and cooperation from several actors in the ecosystem. It is estimated that tokenization will have a level of "very high" mass adoption in the range of 3 to 6 years<sup>49</sup>, as a critical technology enabler that will create new business and monetization opportunities. The mainstream use of tokenized securities, for example powered by traditional financial institutions' initiatives and regulatory sandboxes, can possibly raise awareness for the benefits of tokenization of

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<sup>47</sup> 2Tokens.org | Roadmap Token Finance | Tokenization (accessed 16th February 2023)

<sup>48</sup> International Token Standardization Association (itsa.global) (accessed 16th February 2023)

<sup>49</sup> Emerging Technologies on the 2023 Gartner Impact Radar (accessed 5th of March 2023)





other assets.

#### **2.2.4.7. Lack of market readiness**

The immaturity of the tokenization market, the lack of regulation and monitoring mechanisms, paired with a general lack of knowledge of blockchain and its potential benefits, can hinder the development of tokenization solutions. One of the biggest challenges for the growth of tokenization platforms is the lack of interest of investors to participate in the provision of alternative liquidity to companies. There needs to be sufficient demand from SMEs to tokenize their assets, but also enough participation from investors in the alternative financing solutions market, in order for them to become viable alternatives to traditional financing. Market readiness is a key condition for the development of a token-based economy, which requires efforts from the more prominent actors of the tokenization ecosystem to promote educational initiatives, not only on blockchain, but also on financial literacy. Empowering SMEs with this knowledge can help their management make informed decisions of which financing solutions to choose from. The mainstream adoption of alternative financing methods can generate a shift in the mindset of TradFi actors that are reluctant to enter the blockchain ecosystem and incentivize them to explore the offering of new technology-based solutions.

#### **2.2.4.8. Lack of technical and financial knowledge**

Blockchain technology, and its practical applications, are still relatively unknown by the general population and normally associated only with cryptocurrencies and not with the hundreds of practical applications it has over several industries. Most blockchain-based applications are also only catered to crypto natives, discouraging retail traditional investors to use these platforms. In theory, investing in an asset-based token should not be more difficult than investing in a traditional security.

There are several initiatives aiming to promote the potential of tokenization. One such example is "Tokenize Europe 2025"<sup>50</sup>, co-managed by the European Commission and the Association of German Banks, with the participation of over 20 member organizations. It aims to promote tokenization in the European Union and project the region as one of the front-runners on the development and regulation of this space. As part of this initiative, Roland Berger ran a survey<sup>51</sup> on tokenization and identified three issues that are holding the European Union back:

- 1) A lack of relevance in daily business, as tokenization rarely appears on the top management agenda of traditional companies;

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<sup>50</sup><https://www.santander.com/content/dam/santander-com/es/documentos/notas-de-prensa/2023/01/np-2023-01-19-informe-tokenise-europe.pdf> (accessed 21st February 2023)

<sup>51</sup> Should Europe develop into a token economy? | Roland Berger (accessed 21st February 2023)



- 2) Culture and traditions, as European companies, institutions and citizens tend to be risk-averse and more conservative than some other regions of the globe;
- 3) Lack of financial and technological literacy, as there is still a general lack of awareness of blockchain technology and its practical applications.

Startups, as entities more used to testing new use cases and equipped with the necessary knowledge and technological infrastructure, can collaborate and partner with incumbents such as SMEs, in order to advise them on the benefits of tokenization. It's important to note that each country can have its own specific challenges regarding the adoption of tokenization, with those that are more technology advanced having bigger chances of accepting the mainstream adoption of tokenization of real-world assets.

### 2.2.5. Defactor Labs Use Case

Defactor Labs<sup>52</sup>, launched in 2021, is a startup with the mission of disrupting the financial sector through blockchain technology and bridging TradFi with DeFi, as it allows traditional companies to access liquidity through tokenization of real-world assets. As one of the first platforms to bring RWAs into blockchain, this startup has attracted extensive media attention and coverage, quickly becoming one of the most important actors in this space. Namely, it was recently identified in Binance's Industry Map<sup>53</sup>, in the subcategory of Trade Finance RWAs.

As its name indicates, Defactor Labs brings the concept of "factoring" into "DeFi". Invoice factoring is a form of financing where a company sells their outstanding invoices to a third-party like a factoring company, in exchange for immediate cash, in order to meet its short-term liquidity needs and it is sometimes used by SMEs as an alternative to traditional bank loans. However, this financing solution does not come without its own risks and challenges, some of which blockchain can be able to solve. Working with a factoring company to collect invoices means that SMEs may lose some degree of control over that process, as well as possibly disrupting customer relationships, by introducing a third-party into the relationship<sup>54</sup>, which will generally also be responsible for all communication regarding the invoice collection with the company's customers.

Blockchain technology allows for the removal of intermediaries and automates the factoring process, giving full control to SMEs. Digitizing the factoring process through blockchain makes it transparent and can enhance customers' confidence, as all parties involved in the financing process can easily access this data. The use

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<sup>52</sup> Defactor | Connecting Capital (accessed 22nd February 2023)

<sup>53</sup> Industry Map – Mar 2023 (binance.com) (accessed 25th March 2023)

<sup>54</sup> <https://www.corcentric.com/blog/top-5-risks-of-invoice-factoring-and-how-to-minimize-them/> (accessed 9th May 2023)



of encryption methods also makes sensitive data only available to the relevant actors, giving SMEs full control over their private data. As a tamper-proof and highly secure technology, blockchain-based solutions allow for real-time tracking of the payment status on a determined tokenized invoice. Also, factoring is normally a more expensive solution than traditional bank loans, because of the multiple fees a factoring company charges, which can be too high for SMEs to support, and using blockchain for this process can make this solution cheaper. Defactor Labs connects asset originators (AOs), businesses such as invoice factoring providers that aggregate assets, with liquidity providers (LPs) who provide the capital that AOs use to finance assets. After passing KYC and AML checks, LPs get access to a dashboard where they are able to assign their capital to various liquidity pools, each one with a different risk profile.

Defactor Labs' business model consists of charging a fee for connecting these two entities through their platform, and currently works with businesses involved in supply chain finance with three real-world asset classes, with more use cases being studied and developed:

- 1) Receivables
- 2) Inventory Finance
- 3) Trade finance

Any asset originator can make an application to the Defactor Labs platform. The onboarding process for these entities consists of two stages<sup>55</sup>:

- 1) Corporate Level Assessment
- 2) Risk Assessment

The first stage consists of the submission of key legal documents, like articles of association of the company, list of shareholders and copies of identification documents, for which Defactor Labs relies on third-parties specialized in KYC/AML solutions, as well as liveness, identity, residency and corporate checks. Defactor Labs has developed its own risk assessment process, resorting to external credit partners for certain steps. By requesting certain data points to AOs, such as the number of years in operation and number of debtors to be funded, Defactor Labs is able to produce an internal risk score for each asset originator. This score allows Defactor Labs to do a balanced allocation of the available assets across the different liquidity pools.

In case the application of the asset originator is successful, the real-world assets are uploaded into Defactor Labs' platform, which will serve as collateral for the transaction and are then tokenized and held until repayments to the loan are made. These assets are assessed and assigned to one of four risk profiles: Prime+,

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<sup>55</sup> AO/LP onboarding - Defactor (accessed 20th February 2023)



Prime, Prime- and SubPrime. External reviews of this risk process are conducted to corroborate its robustness and in order to improve according to the current market conditions.

In order to access the Defactor Labs platform, asset originators need to purchase its native token \$FACTR. These tokens are locked in a smart contract for the funding term and asset originators can be required to pay a fee for each term. As long as these fees are lower than the ones required by traditional banking financing mechanisms, these types of platforms can be an alternative to smaller companies.

The platform's dashboard allows SMEs to access DeFi liquidity and investors to get real-time insight into the underlying assets being funded. It also allows for the authentication and onboarding of real-world assets, exchanges between fiat and crypto, and connection to liquidity pools. In the crypto ecosystem, and more specifically the RWA sector, it is important that the different stakeholders collaborate between them, in order to discuss the challenges they are facing and joining forces to solve them. Such examples include the collaboration of Defactor Labs' partnership<sup>56</sup> with Centrifuge, in order to jointly work on enhanced onboarding processes for new asset originators that are seeking to obtain liquidity from Centrifuge's liquidity pools focused on real-world assets, such as invoices, real estate and royalties. The team behind Defactor Labs had also collaborated with MakerDAO in the past<sup>57</sup>, through ConsolFreight, a SaaS freight and fintech provider focused on enabling digital transformation and creating a network of international trade actors. By tokenizing real-world assets into NFTs and collateralizing them to fund international trading operations, it provided SMEs and freight forwarders the ability to access DeFi liquidity through Defactor Labs.

The interest in using these types of platforms seems to be growing. Throughout 2022, Defactor Labs onboarded four new clients, and facilitated a total of \$24,640,955 in transactions through their platform. Investors have also demonstrated interest in purchasing the tokens associated with these projects. \$FACTR, the token that powers the Defactor Labs ecosystem is, as of March 2023, listed in several crypto exchanges, reaching millions of users<sup>58</sup>.

We have seen how tokenization of real-world assets can be conducted, and how companies can use platforms such as Defactor to tokenize some of their assets and achieve alternative forms of financing. The second part of this paper will look into possible integrations of Kleros into tokenization of RWAs platforms, and explore what types of solutions it could provide.

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<sup>56</sup> Defactor is delighted to announce a partnership with Centrifuge | by Defactor [Official] | Medium (accessed 15th February 2023)

<sup>57</sup> ConsolFreight taps into Maker's Vault - Updates / Integrations - The Maker Forum (makerdao.com) (accessed 5th February 2023)

<sup>58</sup> <https://blog.defactor.com/factr-now-listed-on-mexc-global-providing-access-to-6-million-active-users-74f60720e905> (accessed 10th March 2023)



### 3. Introduction to Kleros

Decentralized justice is a broad term that refers to the use of blockchain technology during a dispute resolution process, from crowdsourcing jurors to solving the dispute itself. Usually also referred to as smart contract arbitration, it is an evolving concept, which will probably in the near future encompass several forms of decentralized dispute resolution. Currently, to be considered as a decentralized dispute resolution, a platform needs to comply with three conditions: "to be built as a decentralized autonomous organization ("DAO") on blockchain technology, to be based on a mechanism design using crypto-economic incentives, and generate a perception of fairness."<sup>59</sup>

There are already a few platforms offering decentralized justice services, with Kleros arguably being the most developed and widely used one. These platforms can be defined as "a form of "digital courts" supported by blockchain technology whose purpose is the settlement of disputes by crowdsourcing jurors under economic incentives to provide fair rulings"<sup>60</sup>. The procedure in these platforms is encoded in a smart contract, which guarantees legal certainty to economic transactions.

Kleros, commonly known as the "justice protocol", uses crowdsourcing and game theory to provide fast, transparent, and affordable arbitration for several types of disputes. In theory, the model used by Kleros can be replicated to solve of all kinds. It uses smart contracts on the Ethereum blockchain to manage the dispute resolution process. When a dispute is submitted to Kleros, a panel of jurors is selected through a combination of randomness and the staked amount that a juror has of Kleros' native token, PNK. Any holder of the PNK token can become a juror in Kleros, with each court having a minimum PNK staking requirement. When a dispute is submitted to each one of the courts, Kleros randomly selects a panel of a determined number of jurors staking in that specific court, the jurors review the evidence presented by both parties and vote on the outcome of the dispute, and then a decision is reached and the dispute is updated on the Kleros court, then allowing the possibility of appeal in case the losing party is not satisfied with the decision. . Jurors risk losing a percentage of their stake if they vote in the minority and earn PNK if they decide in the majority.

Parties are able to submit an agreement to Kleros' platform. The payer deposits the amount of this agreement into an escrow account in ETH, if it's on the Ethereum network or xDAI, if it's in the Gnosis chain network. In advance, both parties have to pay costs associated with a potential dispute, with the losing one ultimately paying the arbitration costs. The other will receive the funds that were established in the agreement and the reimbursement of the costs that it had paid in advance.

By using a decentralized network of jurors, Kleros can provide faster and more affordable arbitration, with decisions typically being reached in a matter of days, rather than months

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<sup>59</sup> When Online Dispute Resolution Meets Blockchain: The Birth of Decentralized Justice · Stanford Journal of Blockchain Law & Policy (pubpub.org) (accessed 10th February 2023)

<sup>60</sup> Blockchain Disputes ADR: Is Kleros a Fair Dispute Resolution System? (accessed 10th February 2023)



or years. Each dispute can take around 7 to 15 days to be solved, with an approximate cost of 20 to 200 dollars<sup>61</sup>. There are currently 800 jurors, distributed into 12 specialized courts, each one for a specific matter, and as of March of 2023, Kleros has already solved more than 1500 disputes<sup>62</sup>.

Kleros represents a significant development in the use of blockchain technology for dispute resolution, offering a fast, affordable and transparent arbitration solution, and it has a number of tested applications, including e-commerce platforms, insurance providers, and blockchain-based marketplaces. Kleros is also used by other blockchain projects as a decentralized oracle service, providing reliable data for smart contracts. Decentralized justice platforms can often resolve disputes more quickly than traditional courts, as they do not have to contend with the same level of bureaucracy and backlogs. Decentralized justice platforms can easily operate across national borders, making them well-suited for resolving disputes involving parties from different countries. While decentralized justice platforms have numerous benefits compared to traditional justice, it is important to carefully consider the risks and limitations of these solutions before deciding whether they are the right approach for a particular dispute. However, some of the most common criticisms of decentralized justice systems seem to arise when they are analyzed as if they were traditional judicial courts or even as Smart Contract arbitration mechanisms. This section will look at some of the most common criticisms and debunk them, before analyzing how can Kleros be integrated into tokenization of RWAs' platforms.

### 3.1.1. Limited scope and adoption

One common criticism is that since decentralized justice solutions rely on pre-programmed rules and procedures (which can be argued is also the case for traditional legal systems), that they may not be appropriate for all types of disputes, with the most common example being given of extremely complex disputes, with lots of evidence. Another related criticism is that decentralized justice solutions do not offer the same level of nuance and flexibility as traditional methods of dispute resolution. This criticism possibly comes from a confusion between decentralized justice and the possibility of smart contract's solving some simple disputes.

However, what is not noted sometimes is that these solutions can be appropriate for specific types of disputes, namely related to RWAs, which will be analyzed in a further chapter.

As these solutions are still in their early stages of development, as it may be difficult to find enough parties who are willing to test and use these solutions, they have not yet achieved widespread adoption, which can actually reinforce the idea

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<sup>61</sup> Cómo funciona la empresa cripto fundada por un argentino que resuelve conflictos del mundo real - LA NACION (accessed 27th February 2023)

<sup>62</sup> Homepage | Kleros (accessed 1st March 2023)



that they are not able to solve varied types of disputes. These types of platforms can also be quite complex and difficult to understand, particularly for those who are not familiar with technology and some terms related to the Web3 ecosystem, making it more difficult for parties and potential jurors to use these solutions effectively.

### 3.1.2. Lack of expertise of the jurors

It is also argued that, since jurors on these platforms are pseudonymous and don't normally need to pass through any type of KYC nor qualification checks, that they may be lacking in expertise of the legal and technical aspects involved and are therefore not qualified to solve disputes. As opposed to traditional legal mechanisms, these decisions will also typically be decided through the analysis of very scarce information and submitted proof, with no possibility for oral submissions nor questioning of witnesses and even the involved parties. Critics see this as a disadvantage, but what they might not fully understand is that this process is not necessary for binary-choice types of courts, as most Kleros sub-courts are. Since the arbitration process is fully digital and automated, critics argue that this can make the decision process less personal and effective at building trust and understanding between the parties but the contrary can also be true, as the impersonal nature of the dispute resolution process can make it more effective at building trust. It can be argued that decentralized justice is able to ensure trustlessness<sup>63</sup>, meaning that no one needs to rely on the honesty or "good word" of a stranger in order for the dispute resolution process to work.

### 3.1.3. Lack of legal recognition and enforcement

Because decentralized justice platforms may not be recognized as legal authorities in the same way that traditional courts and even some arbitral centers are, it may be more difficult for parties to enforce the decisions through traditional legal mechanisms. However, at least one of Kleros' decision has been enforced in an ordinary court<sup>64</sup>. In 2020, two parties celebrated a rental agreement with an arbitral clause that instructed the arbitrator to use Kleros for the substance part of the award. When the tenant failed to pay the rent and a dispute arose, the arbitrator submitted the procedural order onto the Kleros protocol, which delivered a decision in favor of the landlord. This arbitral award was then presented to a Mexican court, which recognized it and ordered its enforcement, issuing a notice for the award-debtor to resist its enforcement. And although he did not<sup>65</sup>, this case still brought global recognition to Kleros as it was the first time an arbitral award that used a decentralized dispute resolution tool was recognized in an ordinary court.

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<sup>63</sup> <https://thebitcoinmanual.com/btc-culture/glossary/dont-trust-verify/> (accessed 17th May 2023)

<sup>64</sup> How to Enforce Blockchain Dispute Resolution in Court? The Kleros Case in Mexico (accessed 16th February 2023)

<sup>65</sup> <https://arbitrationblog.kluwerarbitration.com/2022/03/04/arbitration-tech-toolbox-is-a-mexican-court-decision-the-first-stone-to-bridging-the-blockchain-arbitral-order-with-national-legal-orders/> (accessed 17th May 2023)



## 3.2. Proposed Kleros' integrations on tokenization of real-world assets platforms

Kleros has been designed to be able to handle a wide range of disputes, with the possibility of new courts being created according to necessity. A court focused on real-world assets has not yet been created, but this doesn't mean that the already existing solutions powered by Kleros cannot be integrated into tokenization platforms.

### 3.2.1. As a due diligence and compliance tool

One of the biggest challenges related to tokenization of assets is the auditing of the off-chain asset, and the verification of its characteristics and value, as well as constant monitoring of its status. Kleros can be used as a solution to perform all types of due diligence and compliance checks as well as risk and credit assessments to corroborate its robustness and trustworthiness.

A video and/or the key documentation of the real-world asset can be submitted onto the Kleros platform, in order for the jurors to vote on the validity of the asset and if the information on-chain is correct and up-to-date with its off-chain information. This process could work similarly to Proof of Humanity's registration and vouching mechanism<sup>66</sup>. The registration of an asset could be done through the filling of a form with key information about the asset, a picture and a video. The jurors assigned to a specialized real-world assets court could then vote on the validity of the asset. If this is challenged, or if there is incorrect information, a dispute can be created in the Kleros court, similar to what happens when a Proof of Humanity profile is challenged. Evidence can be provided by the asset originator, and the juror's decision can be appealed in case the entity that submits the asset does not agree with the decision.

Kleros can also be used as a due diligence and KYB (know your business) tool to onboard asset originators and liquidity providers onto tokenization platforms. The onboarding process will depend on each platform, as there are no uniformized requirements for registration of asset originators. The power of the Kleros community, composed of its jurors, can also be leveraged to perform risk assessments, and vote on the reputation of the asset originators.

### 3.2.2. As a data curation tool

Kleros can be used for the decentralized curation of real-world assets, to ensure there is no mismatch between the off-chain asset and its on-chain representation. Anyone can submit tokens that represent RWAs to a community-vetted curated registry, which is secured by a Kleros court. The jurors can vote and assess on the

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<sup>66</sup> Proof of Humanity Tutorial (Register & Vouch) - Kleros (gitbook.io) (accessed 1st March 2023)





quality of the compliance and risk assessments that were done.

This solution is already available as Kleros Curate<sup>67</sup>, an in-house product of Kleros, used to create open curated registries. Each curated list has an acceptance policy and field set for each list entry. After a user submits an item in Kleros Curate, anyone can challenge that submission, with the dispute going to Kleros Court for its jurors to decide. If the submission is not challenged, it gets added to the list. As proposed by Marvin Coleby, in the research conducted for the Kleros/MakerDAO fellowship<sup>68</sup>, a Kleros court for asset listing and claims could be created, whose listing rules and procedures could be adapted from recognized arbitral centers around the world.

A curated list of verified real-world assets could be easily created, where real-world assets would be added if they complied with the necessary due diligence requirements and could be classified by the community through the use of badges. These can be used to classify the type of token that was used in the tokenization process, the degree of authenticity of NFTs, if a risk and compliance assessment was properly done to the asset, or the status on the auditing of the smart contracts governing it, amongst other things.

With the rise of scams and rug pulls on blockchain-based projects, investors are sometimes afraid of connecting their wallets to certain websites and investing in these projects. For tokenization platforms, it is necessary to ensure that they possess a good level of reputation. A curated list of tokenization platforms, where each one of them would have a rating according to their compliance with certain conditions, such as partnerships with well-known liquidity pool providers, token listing in centralized and decentralized exchanges, existence of customer support, the team's expertise, and other relevant markers, can help these companies achieve the necessary level of trust, as well as warning against the bad actors in this space, in case they don't comply with these requirements. There are already certain websites<sup>69</sup> that allow anyone to vote on the reputation of a certain token and the project behind it, and Kleros Curate could operate in the same logic. Similarly, a curated list of liquidity pools, with real-time data of the total value locked, the number of tokenized assets, and the origin of the liquidity, can also be an interesting application of Kleros Curate.

### 3.2.3. As a link with real-world courts

Real-world assets are regulated by existing contracts, laws and regulations, as well as being subjected to court decisions of courts. In case those assets are tokenized, there needs to be a mechanism in place to adapt the on-chain token to

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<sup>67</sup> Kleros · Curate (accessed 25th February 2023)

<sup>68</sup> [ter\\_kleros/README - Roadmap.md at main · obsidianventures/ter\\_kleros · GitHub](#) (accessed 1st March 2023)

<sup>69</sup> [Is This Coin A Scam](#) (accessed 3rd March 2023)



the situation of the off-chain asset. The Kleros court on real-world assets could communicate with ordinary courts, and in case a judgment has been passed on a certain asset, in theory trigger the smart contract managing the asset, for example modifying the token's price to reflect a decrease in value of the RWA.

Lawyers can also present Kleros' arbitration rulings as expert opinions in traditional courts, at a much lower cost than traditional technical opinions, to help clarify questions related with the use of blockchain and smart contracts, token listing, tokenization of RWAs, amongst other technical questions, and help judges in making a more informed decision.

### 3.2.4. As an arbitrator and dispute resolver

Kleros' Dispute Resolver<sup>70</sup> can be integrated into tokenization of real-world platforms to solve various types of disputes. In order to do so, there are 5 main steps that need to be followed<sup>71</sup>:

- 1) Determining the conditions for escalation and enforcement - before escalating a dispute to Kleros, criteria needs to be established for when an escalation is allowed and the requirements for enforcing Kleros rulings.
- 2) Writing a dispute policy - a comprehensive dispute policy that provides jurors with the necessary information to resolve disputes should be created. The policy should serve as a reference document for jurors and consider the evidence provided and Kleros Court policies.
- 3) Determining the court parameters - the appropriate court for arbitration and the number of jurors involved in the initial round of arbitration should be decided.
- 4) Integrating the platform with the newly created court - an already-existing smart contract can be integrated with Kleros Court or through a Recognition of Jurisdiction integration. And even if this integration is not done, ad-hoc disputes can be created directly in Kleros Court.
- 5) Communicating the integration with the users - the tokenization platform must inform its users about the involvement of Kleros in the dispute resolution process. The dispute policy must be publicly available, clarifying the escalation and enforcement criteria, and providing instructions for submitting evidence and raising appeals if applicable.

Kleros can be used as an impartial dispute resolution platform for some of the most common disputes that can occur in any business relationship between two or more parties, as well as for more specific and unique disputes to blockchain-based projects. For some types of disputes, jurors could be required to present experience and knowledge on legal and financial matters, for example

<sup>70</sup> Dispute Resolver (kleros.io) (accessed 5th March 2023)

<sup>71</sup> <https://docs.kleros.io/integrations/types-of-integrations/1.-dispute-resolution-integration-plan> (accessed 11th May 2023)



by presenting on-chain certifications and interaction with DeFi protocols and RWAs liquidity pools, in case they would like to preserve their anonymity, or by presenting educational diplomas or proved experience in the legal and financial fields, such as on corporate or securities law.

The most common disputes related to tokenization of RWAs will be presented in this chapter and whether Kleros could be capable of solving these types of disputes or not.

#### **3.2.4.1. Breach of contract**

There are multiple interactions between the different actors of the tokenization process, including asset originators, liquidity providers, investors and any third-party service used by the tokenization platform. Multiple types of disputes can occur between them, like for example token listing disputes or yields not being properly distributed to the liquidity providers. Kleros can be contractually designated as the competent dispute resolution mechanism through a clause like this one: "Any dispute, controversy or claim concerning the interpretation, the validity, effectiveness, performance of or non-compliance with this contract, shall be determined by jurors constituted under the Kleros Protocol developed by Coopérative Kleros".

#### **3.2.4.2. Ownership and custodianship disputes**

Another potential source of disputes is the issue of ownership as there may be questions about who has control over the tokens and/or the underlying asset. Depending on what is established in the smart contract and the tokenization model that is chosen, as well as the jurisdiction governing the tokenization, owning the token does not necessarily confer ownership of the underlying asset's rights that the token represents. A dispute could arise between multiple parties who claim ownership of the same token or the underlying asset, in case the company owning them becomes insolvent or dissolves, or there can be a need to legally clarify an asset originators' right to use the asset as a collateral. A smart contract can legally appoint a custodian for the asset or bind a trusted third-party as a fiduciary to act in case something happens to the tokenized asset and perform real-world actions, such as moving the asset to a secure location, as well as ensuring that the asset is properly identified and that the documents documenting its validity and status are always up-to-date.

#### **3.2.4.3. Intellectual property disputes**

Intellectual property rights over a token or NFT can also be disputed, as they can represent assets that are subject to protection by patents and IP rights. The rights to use and commercialize the asset are not necessarily guaranteed when a token representing that asset is acquired. For example,



purchasing a NFT representing a real-world asset does not mean that its owner can print it, reproduce it in another form, display it in public, or commercialize it. The extent to which rights are transferred from the NFT's creator to the buyer will depend on the terms and conditions stipulated in the smart contract or in another agreement. The most recent court case related to the commercialization of IP-protected assets in the form of NFTs was the MetaBirkin case<sup>72</sup>, where an NFT creator was sued by Hermès and the court decided that he was liable for trademark infringement, trademark dilution and cybersquatting.

#### **3.2.4.4. Indemnity insurance and liquidity mismatching between on-chain and off-chain assets**

Kleros is already used as an independent claim arbitrator by several DeFi insurance projects<sup>73</sup>, ensuring fair and transparent decisions. This model can be replicated into insurance over real-world assets that are used as collateral for lending purposes. Accurately valuing real-world assets is difficult, which will then have an effect on the collateralization ratio, the value of the collateral relative to the loan amount. A potential dispute that is unique to tokenization is a mismatch or de-peg between the off-chain asset and its on-chain representation. A real-world asset can get damaged or destroyed, suffer interruptions (e.g. tokenized energy grid), lose value over time (e.g. machinery that is subject to wear and tear), or even get stolen from a vault or warehouse. If the token is not coded to be dynamic in price and tied to the fluctuation of the value of the RWA, there will be a mismatch between the on-chain value and the real-world value of the asset.

#### **3.2.4.5. Asset fraud and misrepresentation**

Another common dispute that can occur and that is kind of unique to tokenized assets is asset fraud or misrepresentation. A borrower might use a fake or forged real-world asset or may claim to own an asset that it's not owned by them, which can be another source of dispute. The US Securities Exchange Commission (SEC) has exposed several initial coin offerings (ICOs) that were reportedly backed by real-world assets, which was found not to be true, as the companies had not bought those physical assets.

In an investigation conducted by the SEC against REcoin Group Foundation et al.<sup>74</sup>, this company, promoted as the first cryptocurrency in the world to be backed by real estate, was found not to own any real estate, and Diamond Reserve Club had not purchased any diamonds nor identified any storage location for those RWAs. Similarly, in the case of SEC v. Natural

<sup>72</sup> Judgment – #145 in *Hermès International v. Rothschild* (S.D.N.Y., 1:22-cv-00384) – CourtListener.com (accessed 20th February 2023)

<sup>73</sup> Welcome to Decentralized Insurance - Kleros & Unslashed Finance unite. (accessed 12th January 2023)

<sup>74</sup> REcoin Group Foundation, et al. (Release No. LR-24081; Mar. 26, 2018) (sec.gov) (accessed 16th March 2023)



Diamonds et al.<sup>75</sup>, a group of companies, including a cryptocurrency business, were offering unregistered securities that were purportedly backed by diamonds, but their operation was found to be a Ponzi scheme. By using the Kleros Curate solution mentioned above, these cases of fraud related to tokenization of RWAs could be mitigated.

#### **3.2.4.6. Hacks and exploits**

Technical issues can also lead to disputes, as a smart contract can be exploited or hacked and funds stored in it can be stolen. Some of these cases have been brought to traditional courts: a user of a NFT marketplace brought a complaint to court<sup>76</sup>, claiming that a Bored Ape NFT he owned was listed for sale without his consent, thanks to a bug on the platform, and ended up being sold for a below market price. In a UK High Court case<sup>77</sup>, where a NFT marketplace user alleged that someone stole two NFTs from them, this court ruled that NFTs are considered property and thus victims of NFT theft can now have their stolen assets frozen through court injunctions in the UK. It is expected that more cases like these will be brought to courts, although they are the types of disputes are probably the harder ones to solve out of the presented list, both by traditional courts as well as decentralized justice platforms, as in some cases there might be no way to recover the exploited funds nor can a court order for a smart contract to be backtracked to its original state. In these cases, Kleros' rulings are better used as expert opinions to be presented in court, regarding more technical questions.

#### **3.2.4.7. Jurisdiction questions**

The globalized nature of the issuance and negotiation of asset-backed tokens raises several jurisdictional questions, leading to uncertainty of which court has jurisdiction to solve these disputes, as the parties are probably located in different countries and the tokenized asset could be in another jurisdiction. The inclusion of an exclusive jurisdiction or arbitration clause in the token purchase agreement can clarify this issue, as well as a clause appointing Kleros as a dispute resolution mechanism. However, it will always depend on the RWA that is being tokenized, as some jurisdictions might restrict ownership of the asset or oblige that a dispute regarding that asset is solved through a determined dispute resolution system and not allow for alternative dispute resolution mechanisms to be used.

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<sup>75</sup> Natural Diamonds Investment Co., Eagle Financial Diamond Group Inc A/K/A Diamante Atelier, Argyle Coin, LLC, Jose Angel Aman, Harold Seigel, and Jonathan H. Seigel, et al. (Release No. LR-24473; May 21, 2019) (sec.gov) (accessed 16th March 2023)

<sup>76</sup>McKimmy v. OpenSea 4:2022cv00545 | US District Court for the Southern District of Texas | Justia (accessed 16th March 2023)

<sup>77</sup> data.pdf (nationalarchives.gov.uk) (accessed 16th March 2023)



## 4. Survey Results

During the duration of this research, an anonymous survey, built with Google Forms and titled "Disputes related to Tokenization of Real-World Assets (RWAs)", was shared in several social media channels as well as with some participants of the 8th Edition of the Web Summit, that took place in November of 2022 in Lisbon, Portugal.

For tokenization of real-world assets to be a reliable option for small and medium companies, the mechanism behind it and a basic understanding of blockchain technology needs to be common knowledge. Also, for decentralized justice platforms' like Kleros to be integrated into tokenization platforms, a notion of how blockchain-powered justice can work and some of its practical applications also needs to be known to the participants in the Web3 ecosystem.

The survey was composed of 11 questions in total, with 8 required ones and the remaining questions as optional. This form had the main objective of gauging the interest in these topics, of understanding how many people, both in the Web3 ecosystem and beyond it, were aware of what tokenization of real-world assets is, what are its current challenges, what is decentralized justice and if it is capable of solving disputes arising out of tokenization. At the time, the Author was planning to focus mostly on the dispute resolution potential of Kleros for tokenization of real-world assets and most questions are related to that section of this research paper, which is normally what most people associate with Kleros, although as this research paper has shown, numerous other integrations are possible. A total of 68 answers were collected, and the results will be presented in a combination of graphs, pie charts and text analysis.

**Question 1** (optional) - *Do you know any tokenization of real-world assets projects/startups? If yes, which ones?* This question was accompanied with a quick explanation of what tokenization of RWAs was.

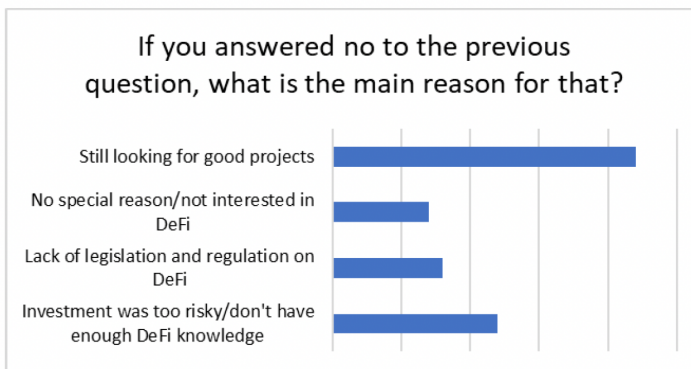
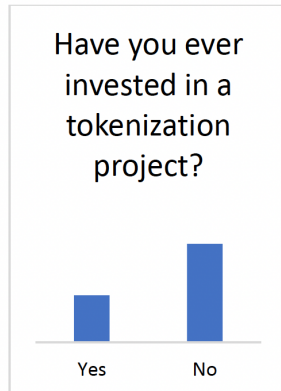
Despite being an optional question, a total of 49 answers were recorded and out of these, 30 respondents specifically named one or more tokenization projects, mostly related to fintech, real estate and art, with 6 respondents stating that they knew or had heard of a tokenization project but could not name them or could only name the field in which tokenization was taking place. The remaining answers specifically stated that they did not know of any tokenization projects.

**Questions 2** (required) **and 3** (optional) - *Have you ever invested in a tokenization project? E.g. Tokenized real estate, fractionalized NFTs, art, invoices, etc... If you answered no to the previous question, what is the main reason for that?*

Despite the diversity of tokenization projects our respondents were able to identify, only around one-third (32.3%) of our sample actually has invested in such projects, with almost half (47.8%) of the people that have not performed any tokenization investment stating

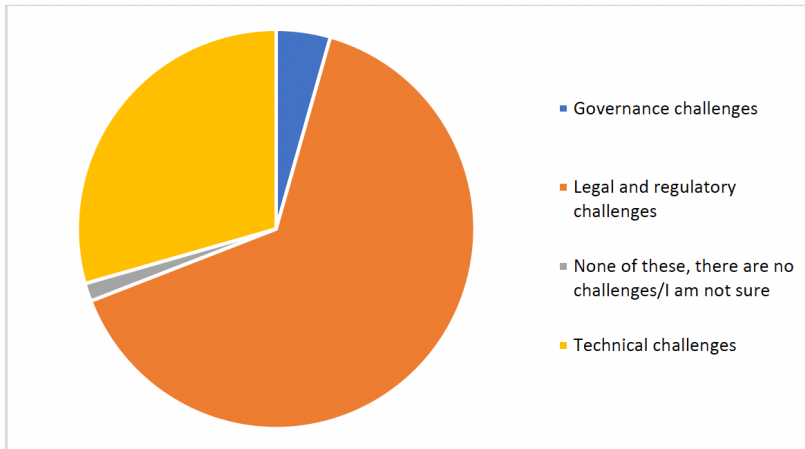


that this decision stems from the fact that they are still searching for good opportunities or ideas that could spark their interest.



However, and with greater connection to the purpose of this research paper, 17.3% of respondents that have not yet invested in tokenization projects state that this decision is mainly derived from the lack of actual legislation and regulation on DeFi. But are these legal ramifications and framework an important blocking point for the progression and normalization of tokenization projects? In order to find out just how relevant this driver could be, we asked our survey respondents to choose the most relevant challenges for tokenization.

**Question 4** (required) - *What do you believe are the biggest challenges related to tokenization?* This question allowed for more than one answer.



These results clearly demonstrate that legal and regulatory challenges are the most common concern of our sample, and one of the areas where the DeFi actors should look to collaborate with regulators, in order to further enhance its expansion and potentially increase the level of existing investment. The second most popular answer was related to technical challenges, which was not further defined in this survey, but can be indicative of either the lack of knowledge of most investors to use DeFi protocols - meaning they might have interpreted this option as their own blocking points of accessing tokenization platforms - , or as the risk of accessing DeFi solutions because of the security risks and the still nascent state of smart contract auditing services.

**Question 5** (required) - *What do you believe are the potential disputes related to tokenization?* This question allowed for more than one answer from the presented options, as well as an open-ended answer.

When analyzing the potential disputes that arose from our sample reflecting on the tokenization landscape, the most common choices from the presented options - all with more than 30 answers registered - were:

- potential issues with jurisdiction and the court that would be competent and suitable to address such dispute;
- changes to laws and regulations that could make smart contracts illegal;
- possible issues with verification off-chain of the RWA or its destruction and damage.

As discussed in this research paper, Kleros' proposed integrations could help with these issues. Jurisdictional disputes could benefit from an expert/community-based opinion, where a Kleros decision could complement the offering of traditional courts, sustaining a more robust and competent approach to such technical subjects and disputes. The proposed Kleros real-time compliance RWA court can also be used to get information from any laws and regulations that make changes to smart contracts, therefore adapting





the token value or emission accordingly and it can also be used to perform due diligence and asset auditing procedures.

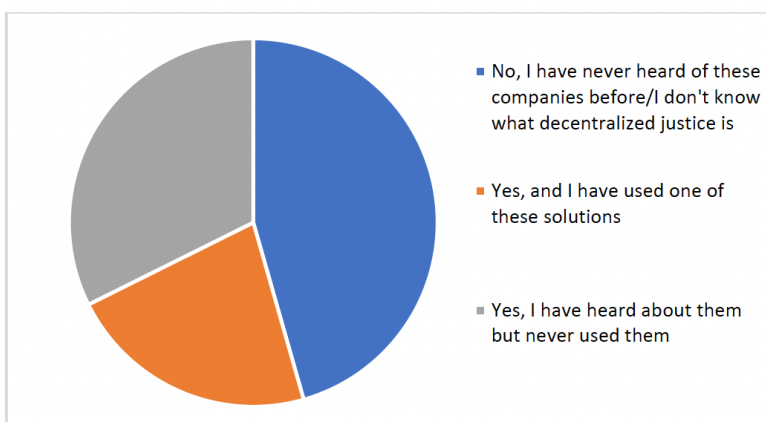
Also chosen as potential disputes, with more than 25 answers, were:

- disputes over ownership of the RWA and/or its digital representation, which can be solved by a Kleros court focused on real-world asset disputes;
- smart contract bugs and errors/differences between natural language and coded language. A group of Kleros jurors with proven experience in coding and auditing smart contracts, as well as one composed of lawyers with legal and coding experience, could be jointly used to produce an expert technical and legal opinion that could be presented in an ordinary court.

This question received three open-ended answers, namely referring to a centralization risk on tokenization platforms, which introduce a single point of failure, possible securities laws violations, and issues with the people/team behind the project.

**Question 6** (required) – *Are you familiar with decentralized courts (e.g. Kleros, Aragon Court, Jur) providing decentralized justice?*

More than half (54.4%) of our respondents have heard of decentralized justice services, but only around a fifth (22%) have actually used at least one of these solutions. Nevertheless, the fact that over 40% of our sample has not heard of these companies or is unaware of what decentralized justice entails, implies that in order for solutions like Kleros to actually have a significant impact in addressing the previously identified legal disputes, they will need to continue to grow awareness of the existing solutions, ensuring that a large portion of the community that identified legal and regulatory challenges as well as potential disputes around tokenization can look towards decentralized justice as an effective complement towards the mitigation of their concerns.

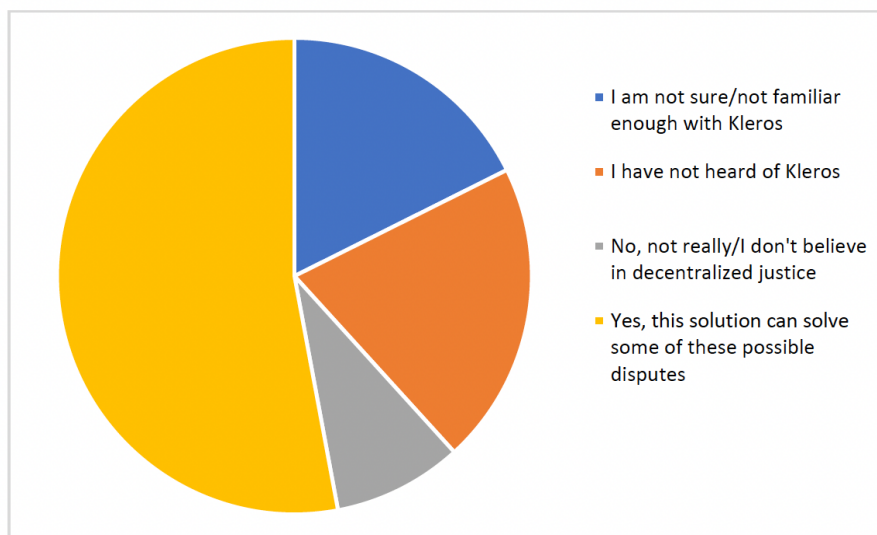




However, the question remains, within the people that actually know the concept and some of the solutions within the decentralized justice field, do they recognize their potential value towards the resolution of the aforementioned disputes? To answer this question, we took Kleros as an example.

**Question 7** (required) - *Do you believe Kleros could solve some of the mentioned disputes arising out of tokenization of RWAs?* This question was accompanied with a quick explanation of how Kleros worked.

After providing a brief description of Kleros and its services, more than half of our sample (53%) showed belief that such solution could potentially answer some of the disputes arising from tokenization projects. This means that beyond the initial sample portion that has already used decentralized justice services, part of the respondents that have never used such a solution still recognize its value to address the disputes initially identified on the survey.



Nevertheless, and in line with our previous statement, 21% of our respondents have not heard of Kleros and its solutions. This again addresses the need for further awareness raising activities by such platforms, in order to progress population knowledge regarding decentralized justice and its solutions.

**Question 8** (required) - *Do you foresee any challenges related to Kleros being used as a dispute resolution system for these disputes?* This question allowed for more than one answer from the presented options, as well as an open-ended answer.

Apart from awareness raising efforts that Kleros and decentralized justice platforms have to ensure, as the adoption rate becomes higher and as more decisions are enforced and recognized by ordinary courts, the reputation of these services will be able to



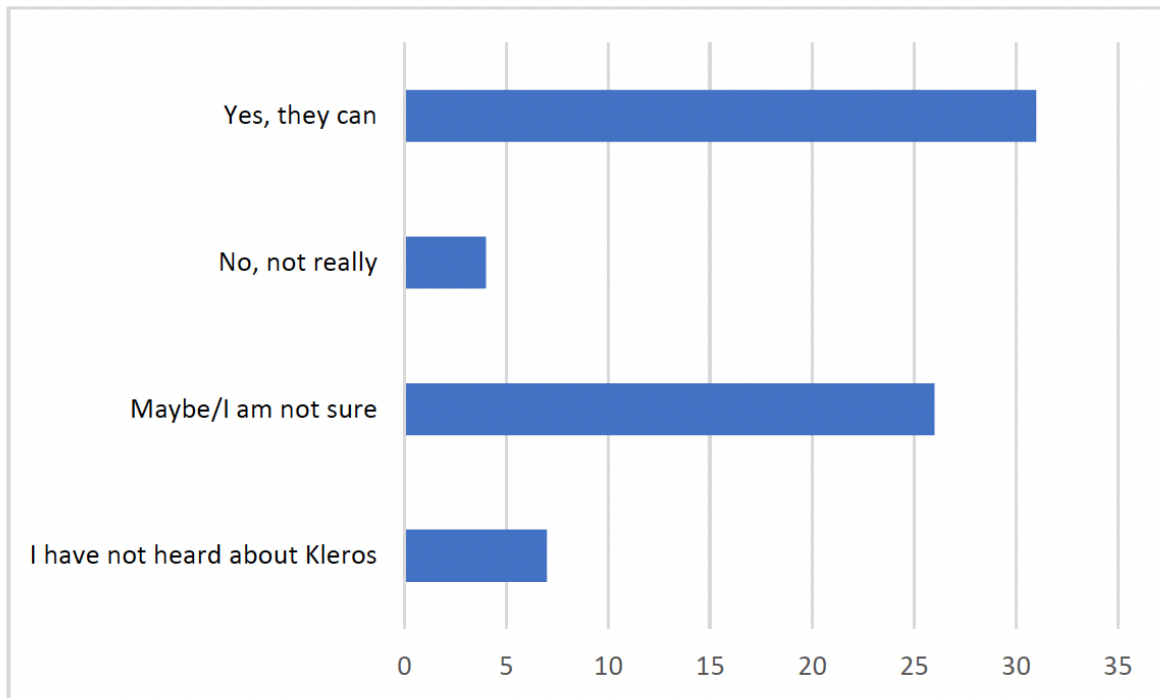
exponentially grow.

Out of all the presented choices, lack of enforceability of its decisions was highlighted by a third of our respondents as the main challenge to be addressed by decentralized justice platforms. Other potential challenges chosen by respondents were the use of anonymous jurors, with no way of proving their expertise in certain topics, a possible financial interest in voting that can subject jurors to bias or impede impartiality, as well as Kleros not being a solution suitable for large-scale complex disputes.

From the 4 received open-ended answers, two of them mentioned enforceability of the decisions involving RWAs and validity of Kleros' decisions and two others mentioned the lack of trustworthiness of jurors and the existence of rigged juries, censorship of discussions and lack of transparency in the decision-making process. It's clear that if Kleros wants to become a trustworthy decentralized arbitration solution, that these questions are addressed as quickly as possible, so that impartiality of the jurors and fairness of their decisions are guaranteed at all times.

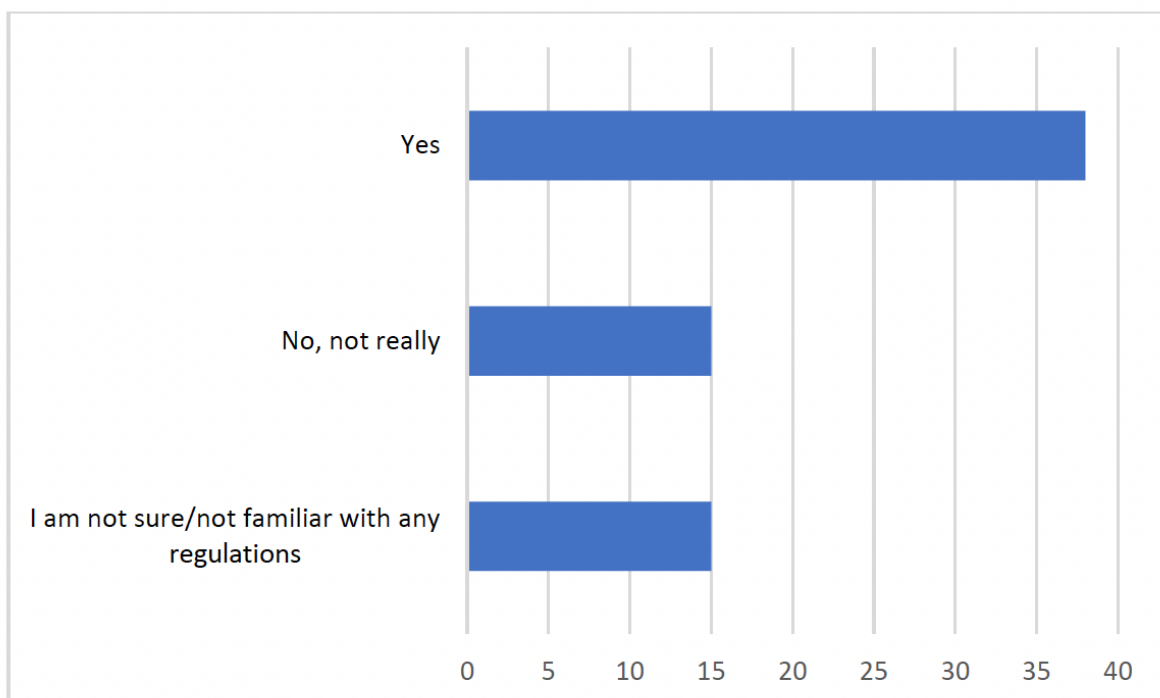
**Question 9** (required) - *Even if you don't believe Kleros can be used to solve these disputes, do you think its anonymous jurors can help with the verification of off-chain assets? E.g. uploading of a video of the real-world asset and the jurors voting if it's real or not.*

Almost half of our respondents (46%) believe that Kleros' already onboarded jurors could be leveraged to help with the verification of off-chain assets, an integration further explored in this research paper, while only a minority (6%) stated that they cannot help. Interestingly enough, a significant part of our respondents (38%) were not sure if Kleros would be able to serve for this type of auditing. This answer can be motivated by the lack of explanation provided in the survey, as only a quick example of uploading a video of the RWA for auditing purposes was given, but also because of the lack of knowledge of how Kleros works and how its multiple solutions can be integrated. One of the aims of this research paper is to contribute to spreading knowledge about Kleros and how it can be used beyond the use case of dispute resolution on digital economy disputes. The rest of the respondents (10%) had not heard of Kleros.



**Question 10** (optional) - *Finally, do you believe future regulation (e.g.: European Union's DLT Pilot Regime) will incentivize more DeFi and tokenization projects to be created?*

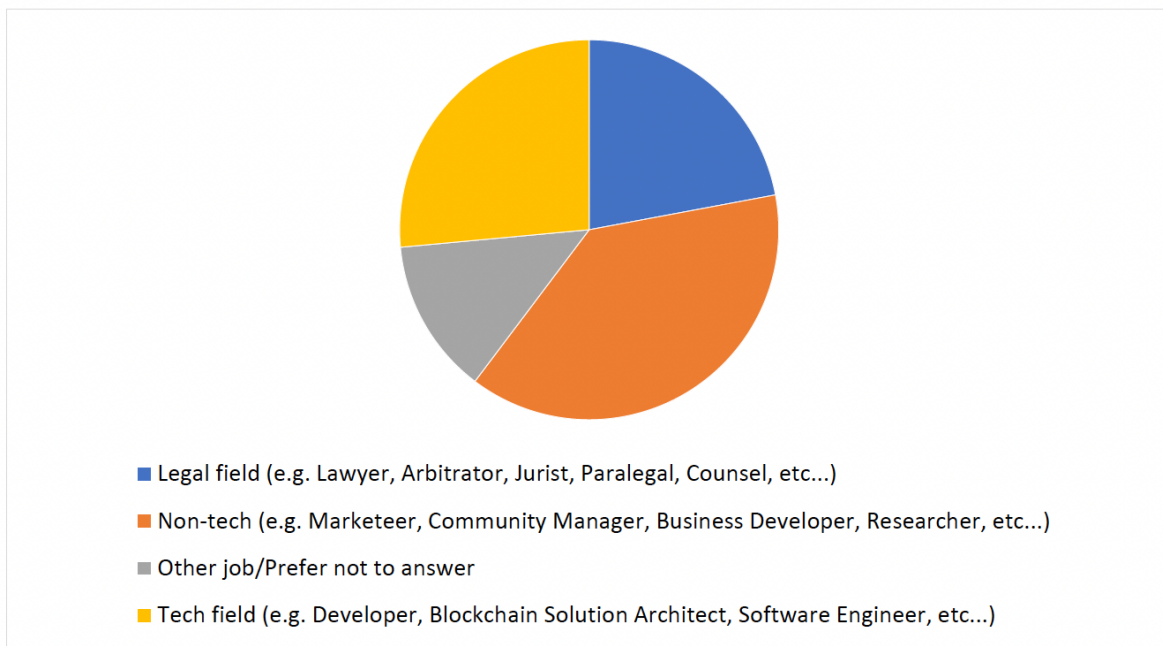
More than half of the respondents answered that they believed future regulation could incentivize the creation of more tokenization projects, as regulatory uncertainty can hinder some founders to launch these types of companies, either from a lack of legal knowledge or fear of incurring in sanctions and fines by existing regulatory entities.





**Question 11** (Optional) - *In which field do you work?* Please answer with your main profession/day job.

This survey was answered by Web3 natives as well as people that were not familiar or were curious about blockchain technology. 38% of the respondents worked in non-tech roles, 27% on technological roles, 22% in the legal field and 13% did not specify which job they worked.





## 5. Conclusions

Blockchain is still a nascent technology, getting new practical applications every year as we move into the era of "Blockchain 4.0". With the unfortunate collapses of various CeFi companies during the year 2022, and a still general mistrust of the crypto ecosystem, DeFi protocols have been on the rise. It's expected that more tokenization platforms will keep being developed, each one offering different solutions and specializing in a different type of tokenized asset. Web2 companies are also looking to tokenization as their next technological innovation, and it seems like this can be one of the biggest trends of 2023 for the Web3 ecosystem.

RWAs can become the bridge between TradFi and DeFi and bringing these assets onto the blockchain contributes to lowering the global trade finance gap. However, this can only be made viable through a solid tokenization infrastructure, with clear regulatory and compliance frameworks. As crypto usage becomes mainstream, and as more tokenization companies and solutions are created, it is expected that regulators will start discussing the best approaches and frameworks for the ecosystem, in order to protect investors and boost the growth and adoption of tokenization of RWAs. While mass adoption of tokenization will not come for a few years, it's important that startups and companies in this space participate in the regulation process, in order to build a solid ecosystem that allows for the development of new solutions as well as protecting investors. The launching of tokenization initiatives by well-known brands will increase retail investors' confidence in using blockchain technology and investing in tokenization projects.

A 360° solution that is able to support the tokenization process from start to finish and validate each step with a stamp of approval with the help of a decentralized community, does not seem to yet exist in the market. Kleros, as an ever-developing blockchain-based solution, can fill some of those necessities, since the available Kleros products can already be implemented onto tokenization platforms. And while the concept of decentralized justice seems to be unknown to most people, including those working in the Web3 ecosystem, as demonstrated in the conducted survey, integrating Kleros into tokenization platforms can be a way of publicizing the benefits of decentralized arbitration and curated registries to the general public and to blockchain enthusiasts.

This research paper was only an introduction to the possibilities opened up by blockchain and decentralized justice protocols, and the proposed Kleros' integrations will need to be further studied, through test pilots with tokenization platforms, like Defactor Labs, in order to assess their feasibility and technical limits and challenges. Nevertheless, the Author hopes that this research paper is useful for companies looking to integrate the different Kleros' solution onto their platforms, in order to make tokenization of RWAs more accessible and transparent to SMEs and investors alike, as well to enthusiasts in the various practical applications of blockchain technology, especially for "social good" purposes.



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