

Louvain School of Management

Tokenizing illiquidity – a qualitative approach within the European regulatory context

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Declaration regarding AI tool Usage

During the preparation of this master's thesis, the author utilized DeepL, ClaudeAI, GPT-3, and PerplexityAI for the following purposes:

1. **Structure:** those tools were used to help articulate ideas in a coherent and logically structured manner, ensuring natural flow of arguments.
2. **Brainstorm:** those tools assisted in identifying connections between concepts that were not immediately apparent, aiding the development of theoretical frameworks and pushing reflexion further.
3. **Reformulation/Translation:** those tools provided support in expressing ideas more efficiently while adhering to English academic conventions, as the author's native language is French.

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By signing this declaration, the author affirms that the content of this master's thesis reflects his original work, augmented by the responsible use of AI.

A handwritten signature in black ink, appearing to be 'J. P. ...', located at the bottom right of the declaration box.

Aknowledgment

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List of Abbreviations

AMM – Automated Market Maker

CASP – Crypto Asset Service Provider

CEX – Centralized Exchange

DeFi – Decentralized Finance

DEX – Decentralized Exchange

EBA – European Banking Authority

ERC – Ethereum Request for Comments

HNWI – High-Net-Worth Individuals

MiCA(R) – Market in Crypto Asset (Regulation)

NCA – National Competent Authorities

NFT – Non-Fungible Token

RWA – Real World Asset

SPV – Special Purpose Vehicle

TradFi – Traditional Finance

VASP – Virtual Asset Service Provider

INTRODUCTION

Context

Can tokenization really turn illiquid assets into liquid ones, or are its benefits overstated? In a world where financial markets are getting increasingly digitized, the tokenization of real-world assets (RWAs) emerges as the next revolution in the way we own, trade and manage assets, potentially unlocking a \$16 trillion market by 2030, according to Boston Consulting Group (2022). Tokenization, or the creation of digital representations of assets on the blockchain, promises to improve liquidity, reduce transaction costs with faster settlement times, increase market efficiency, and democratize access to investment opportunities that were once reserved to high-net-worth individuals (Benedetti & Rodríguez-Garnica, 2023). According to the Bank of New York Mellon Corporation, 97% of asset managers (n=270) believe that tokenization will revolutionize asset management (BNY Mellon, 2022), and EY projects that 7 to 9% of investor's entire portfolio will be allocated to tokenized assets by 2030 (EY, 2023). Previous research already explore blockchain's potential to disrupt financial markets (Harvey, Ramachandran, & Santoro, 2021; Gorkhali & Chowdhury, 2022; OECD, 2020), and early empirical evidence support this optimism showing that U.S. real estate tokens that are traded on decentralized exchanges show a 25% liquid improvement (Swinkels, 2023; Kreppmeier, Laschinger, Steininger, & Dorfleitner, 2023). This liquidity enhancement is consistently highlighted as groundbreaking, particularly for traditionally illiquid assets, where tokenization could unlock previously inaccessible liquidity.

Additionally, critical barriers persist, particularly in Europe where secondary market infrastructure, institutional participation, and standardized regulatory frameworks remain underdeveloped (Van Der Linden & Shirazi, 2023). Significant gaps remain in understanding how regulation, especially the newest EU's Markets in Crypto-Assets Regulation (MiCAR), will interact with these market dynamics. This paper addresses these gaps by examining the specific mechanisms and externalities through which tokenization could generate liquidity gains for traditionally illiquid assets, analyses MiCAR's impact on these potential benefits, and tries to identify the missing link to broader adoption.

Objective of the research

This thesis explores how tokenization could enhance liquidity for traditionally illiquid assets, with particular attention to Europe's regulatory impact. Based on academic literature and interviews with industry stakeholders such as asset managers, regulators, and blockchain developers, the research investigates two key aspects: what triggers and fuels liquidity of tokenized real-world assets, and what challenges/opportunities European regulations pose for development. The research question at the heart of this work is: ***To what extent could tokenization enhance liquidity of traditionally illiquid assets, and what is the impact of EU's Market in Crypto-Assets Regulation (MiCAR) on this transformation?***

The thesis follows the workflow detailed in *Appendix A: Thesis' writing workflow*. It starts with a literature review on blockchain, smart contracts, and DeFi, setting the context for tokenization. It also examines how tokenizing real-world assets could improve their liquidity, alongside the challenges involved, and discusses the impact of the European MiCAR regulation. This work uses stakeholder interviews to explore the tension between tokenization's potential and regulatory challenges. Findings focus on liquidity drivers and regulatory issues. The discussion critiques overly optimistic views on tokenization, while suggesting future market scenarios. The conclusion finally emphasizes the interplay between the technology, regulation, and liquidity, and brings recommendations for policy makers and stakeholders evolving in that field.

Given the early and ongoing stage of tokenization development, the scarcity of existing research represents a challenge, but also a unique opportunity to bring new perspectives and contributions to this emerging field. While existing literature has examined in isolation notions of tokenization, market liquidity dynamics and the impact of financial regulation, this study brings an analysis of their interdependence. By showing how MiCA regulations interact directly or not with tokenization liquidity mechanisms, such as fractional ownership, secondary market design and market participation, this thesis uncovers broader and deeper interplays affecting liquidity, usually overlooked in deterministic tech-centric literature. The stakeholder-driven approach, absent in prior work's methodology, identifies areas where EU policy aligns with or contradicts the theoretical and technological drivers of liquidity, providing regulators and market architects with actionable insights.

CHAPTER 1 – LITERATURE REVIEW

Given the nascent and rapidly evolving nature of tokenization technology, this literature review aims to analyze and synthesize existing research to define and understand key concepts necessary to better grasp the intricacies of tokenization. It will also help derive propositions which will further help guide semi-structured interviews with carefully selected stakeholders.

1.1. FOUNDATIONAL CONCEPTS

This section establishes the core principles of tokenization, defining key concepts and frameworks essential for understanding real world asset tokenization.

1.1.1. *Blockchain*

A blockchain is a decentralized, cryptographically secured ledger composed of sequential blocks. Each block contains transaction data, a timestamp, and the hash of the previous block, forming an immutable chain (Zhai, Yang, Li, Qiu, & Zhao, 2019). This distributed ledger is maintained across a network of nodes, where each node has a full copy of the blockchain, ensuring transparency and high tamper resistance, as modifying any block requires network-wide consensus. The first major blockchain, Bitcoin ¹ (Nakamoto, 2008), demonstrated how peer-to-peer transactions could operate without intermediaries. Ethereum expanded this functionality by introducing self-executing contracts, smart contracts, with the terms of the agreement directly written into code (Buterin, 2014). These are examples of public, or permissionless, blockchains, meaning that they are open and decentralized networks, where anyone can participate, verify transactions, and maintain the ledger, ensuring transparency and immutability. In contrast, private blockchains are permissioned networks controlled by a single organization or consortium, where only authorized participants can access and validate transactions, prioritizing control, privacy, and efficiency (Sarmah, 2018). For instance, in the healthcare sector, private blockchains like *Hyperledger Fabric* can facilitate secure and tamper-proof sharing of patient records, ensuring data integrity and compliance with privacy regulations (Lavanya & Kavitha, 2022).

These features of immutability, transparency and reduced reliance on centralized intermediaries offer reduced costs and increased efficiency, making blockchain suitable

¹ Bitcoin (with a capital letter) is the blockchain, while bitcoin is the currency that operates on this system.

for record keeping tasks such as storage of financial transactions (Kranz, Nagel, & Yoo, 2019). While cryptocurrencies have demonstrated the viability of blockchain, the technology also serves as the backbone for other transformative applications such as the tokenization of real-world assets, representing them as digital tokens on the blockchain, enabling key features such as fractional ownership and improved liquidity, among others.

1.1.2. Smart Contracts

The term “smart contract” appeared in the nineties as a suggestion to translate contract clauses into code and embedding them in a computer program so that they self-execute, to minimize contractual costs between the parties and avoid accidental exceptions or malicious actions during contract execution (Szabo, 1997). Smart contracts represent one of the most significant innovations introduced by blockchain technology, as those code scripts are designed to automatically execute actions when certain pre-defined conditions are met, without the need for intermediaries. This may include transferring funds, releasing documents, or performing other contractual actions automatically without human intervention (Szabo, 1997). Blockchain is the technology through and on which smart contracts are built and based (Clack, Bakshi, & Braine, 2016; Delmolino, Arnett, Kosba, Miller, & Shi, 2016). They are usually written using a programming language called Solidity, designed to compile code into bytecode, which can then be run on the Ethereum Virtual Machine (EVM) (Wood, 2014). Those automated contracts enable faster transactions, reduce the risk of manipulation and error, and guarantee contract performance as agreed, without the need for trusted third parties (Lin, Zhang, Li, Ji, & Sun, 2022; Bogner, Chanson, & Meeuw, 2016). The table below by Meier and Sannajust (2021) contains a comparison between classic and smart contracts of their respective advantages and disadvantages.

Table 1: Comparison of Smart Contracts and Classic Contracts: Advantages and Disadvantages

	Advantages	Disadvantages
Smart contract	Speed	No recourse
	No renegotiation	High energy consumption
	Decentralized	Inflexible
	Low verification costs	IT costs
	Security for some operations	Post-contract moral risk and opportunism
Classic contract		No legal status
	Recourse possible	Renegotiation is possible
	Flexible	Significant delays
	Pre-contract negotiation is possible	Intermediation
	Oral communication between actors is possible	Post-renegotiation moral risk and opportunism
	Possible to promote ideas	
	Recognized by legal third parties	

Smart contracts are thus fundamental to tokenization, as they automate critical functions such as payments, compliance or ownership verification, through self-executing code. For instance, in tokenized real estate, a smart contract can automatically distribute rental income, similarly to dividends, to token holders based on predefined conditions (proportional ownership, payment schedules, ...). This eliminates manual processing, reduces administrative costs, and minimizes disputes, showcasing how smart contracts enhance efficiency, trust, and scalability in asset tokenization.

1.1.3. ERC Standards

Ethereum Request for Comments (ERC's) are a subset of Ethereum Improvement Proposals (EIP's). Di Angelo & Salzer (2020) define them as templates, providing a standardized set of functions, that must be implemented into the tokens to ensure interoperability between Ethereum based applications, wallet and tokens, making it easier for developers to build consistent and compatible systems. In other words, the Ethereum blockchain is the infrastructure on which assets interact and work, defined by ERC standards. The most widely recognized is ERC-20, designed for fungible tokens, or interchangeable digital assets with equal value, and requires that smart contracts implement nine specific functions and two events (*Appendix B: ERC-20 token standard*) enabling essential operations like transferring tokens, querying balances, or approving third-party transfers. The ERC-721 on the other hand, establishes the standard for non-fungible tokens (NFTs), or unique digital asset representing distinct ownership, enabling the representation of those unique digital assets. This standardization is essential in ensuring compatibility and smooth interaction within the Ethereum ecosystem but for whole the blockchain sector as well (Cuffe, 2018), by providing uniform protocols that enable different applications, platforms, and tokens to function together.

While ERC-20 tokens represent most projects on the tokenization market, (Reiff, 2025), newer and more precise standards are emerging with features tailored to specific asset classes. The main objective being to enable cross-chain interoperability, with seamless trading across different blockchains. However, these advanced capabilities introduce a fundamental trade-off, as adding information in the smart contract increases transaction costs and operational frictions (Vatiero, 2018), which risks compromising the efficiency gains promised by tokenization.

1.1.4. Decentralized Finance

Decentralized finance, or DeFi, is an umbrella term, meaning that it encompasses a broad range of financial systems, services, and applications that operate on blockchain technology (Zetsche, Arner, & Buckley, 2020). It rests on the notion that financial services should not depend on centralized intermediaries such as banks, brokers, stock exchanges or insurers, and that financial services should be instead provided by users for users by deploying software in a decentralized manner throughout a peer-to-peer network, yet without counterparty risk (Schär, 2021). Schueffel (2021) illustrates the efficiency of decentralized finance (DeFi) by contrasting traditional and blockchain-based trading processes. In conventional systems, customers must navigate multiple intermediaries such as banks, brokers, and exchanges, each adding cost, paperwork and potential points of failure (Casu, Girardone, & Molyneux, 2006). By contrast, decentralized exchanges (DEXs) enable direct peer-to-peer transactions through smart contracts, automatically transferring tokenized assets between buyer and seller wallets without intermediary custody or involvement (Schueffel, Groeneweg, & Baldegger, 2019). This process not only eliminates intermediary fees and risk but also increases speed and efficiency. The complete example can be found in *Appendix C: TradFi vs. DeFi trading – example*.

Despite its transformative potential, DeFi faces significant hurdles that slows down its disruptive trajectory. Regulatory uncertainty remains a primary concern, as policymakers struggle to classify decentralized protocols within existing financial frameworks (Zetsche, Arner, & Buckley, 2020). Technical limitations such as scalability bottlenecks and high gas fees during network congestion currently restrict DeFi's accessibility to retail users (Cong, Tang, Wang, & Zhao, 2023).

Collectively, these foundational components of blockchain, smart contracts, token standards, and DeFi protocols demonstrate the transformative potential of decentralized systems and blockchain technology. However, their adoption faces inherent tensions also showcases by the blockchain trilemma, which reveals the fundamental trade-offs between scalability, security, and decentralization (Buterin, 2014). While technological innovations continue to address these limitations, significant challenges persist in regulatory compliance, interoperability, and user accessibility.

1.2. TOKENIZATION OF REAL-WORLD ASSETS

This section explores the notion at the core of this research, defining its component, explaining the process, its transformative potential, and its current barriers.

1.2.1. Definitions

Token: in the context of this thesis and based on Schuffel, Groeneweg and Baldegger's work (2019), a token is a digital representation of a unit of value that can be transferred, stored, or traded electronically. It can serve various purposes within its ecosystem, such as representing ownership rights, facilitating transactions or representing digital collectibles. Two main categories of token can be identified: fungible and non-fungible. Fungible tokens are digital assets that are interchangeable with one another, meaning each unit holds the same value and is indistinguishable from the rest. This characteristic makes them well-suited for use as a medium of exchange, similar to traditional currencies. On the other hand, non-fungible tokens (NFTs) are unique digital assets that cannot be exchanged on a one-to-one basis due to their distinct attributes. As a result, they are particularly valuable for representing ownership of unique items, such as digital art, collectibles, or real-world assets. Beyond the fundamental distinction between fungible and non-fungible tokens, the tokenization landscape also introduces its own distinct categories. Schwiderowski, Pedersen and Beck (2024) provide a comprehensive crypto token classification based on their use case, grouping tokens into three main groups: asset tokens, payment tokens, and utility tokens. This taxonomy, or "tokenomy", visually detailed in *Appendix D: Classification of crypto tokens*, not only clarifies the specific utility and economic function of each token type, but it also provides regulatory authorities with a structured framework to develop targeted policies that account for the distinct characteristics and risks associated with each token category (Schwiderowski, Pedersen, & Beck, 2024).

Tokenization: it is the process of digitally representing traditional real assets on a distributed ledger (FSB, 2019). It is also described as "a method that converts rights to an asset into digital tokens that can be bought, sold, and traded on blockchain" (Kaisto, Juutilainen, & Kauranen, 2024). It transforms the value held in a tangible or intangible asset already existing off-chain, into a token existing on the blockchain, thus enabling it to benefit from its functionalities, such as the ability to interact with smart contracts, and thus to be exchanged, stored, and integrated into decentralized financial systems (Heines,

Dick, Pohle, & Jung, 2021). Tokenization should not be confused with token creation, which refers to the generation of entirely new digital assets or cryptocurrencies that do not necessarily represent ownership of or claims to real-world assets. While token creation often involves the development of native blockchain tokens (Bitcoin or Ethereum), tokenization focuses on bridging the gap between physical and digital economies by digitizing existing assets. Concrete examples of tokenized assets and their applications can be found in *Appendix E: Concrete use cases of RWA Tokenization*.

Real World Asset (RWA): there is no universally agreed-upon definition of what represents a real-world asset, as the concept continues to evolve alongside advancements in blockchain technology, but they usually encompass a wide range of items, including physical assets like real estate, commodities, and precious metals, as well as non-tangible assets such as stocks, bonds, and intellectual property. These assets derive their value from outside of the blockchain, but by tokenizing them, they can be represented digitally on-chain. In theory, everything can be tokenized, but the real intrinsic objective of the technology is to enhance accessibility, liquidity, and efficiency in managing traditionally illiquid or cumbersome assets, while leveraging the blockchain's capabilities, to create new economic and financial opportunities (OECD, 2020). The following table (*Table 2*) drawn up by the CFA Institute Research and Policy Center (2025), helps to get an idea of which financial assets are “tokenizable”. At the time of writing, stablecoins represent the biggest share of tokenized assets, with around \$220B in value according to the leading analytics company RWA XYZ. They are digital currencies most commonly pegged 1:1 to fiat currencies like USD, meaning that they are the same as euros or dollars but on-chain. However, they are out of the scope of this thesis, since cash is by definition the most liquid asset, and this thesis rather focuses on traditionally illiquid assets.

Table 2: Classification of tokenizable assets (non-exhaustive)

General Asset Class	Subcategory
Traditional investments	Equities Bonds
Alternative investments	Private equity Private debt Venture capital Commodities Real estate Infrastructure Art Collectibles
Cash and equivalents	Stablecoins
Money markets	Money market funds Repurchase agreements
Intangible assets	Intellectual property

Source: CFA Institute Research and Policy Center (2025).

1.2.2. How Tokenization Works: Key Steps

The tokenization process involves a series of technical and regulatory steps to record a real-world asset (RWA) into a digital token on a blockchain, thereby representing digitally while ensuring compliance with legal frameworks. The process, highly dependent of the asset type, and, generally, according to Banerjee et al. (2023), and based on tokenization platforms Tokeny, Chainlink and InvestaX, is organized as follows;

The tokenization process begins with the selection and valuation of a real-world asset (RWA), such as real estate, fine art, collectibles, or else, to ensure that its digital representation is supported by verifiable data. Off-chain data feeds called “oracles” maintain accuracy by periodically updating on-chain records with real-world valuation changes, ensuring that the tokenized asset reflects accurate and up-to-date information while mitigating discrepancies between physical and digital asset states. Legal structuring follows, where property rights are embedded in smart contracts to enable fractional ownership. There are two main frameworks: indirect tokenization via a Special Purpose Vehicle (SPV), where tokens represent ownership of the SPV rather than direct claims on the underlying asset, effectively converting the asset into a security within existing regulatory regimes. The second, currently rarer, is direct tokenization, which bypasses intermediaries but faces legal hurdles in jurisdictions with rigid ownership laws, as blockchain-based ownership records still lack explicit recognition.

The subsequent step involves choosing a blockchain platform and token standard, often ERC-20 or ERC-721 for Ethereum-based assets, even though many other standards exist, tailored to specific use cases. This is then followed by the actual minting of the tokens, which digitally represent full or partial ownership of the underlying asset. Finally, the token is introduced to secondary markets, centralized or decentralized, where it is traded, benefiting of blockchain technology capabilities, increasing liquidity. Yet, the extent of these gains is contingent on regulatory clarity, as MiCAR’s treatment of crypto-asset service providers (CASPs) dictates market entry barriers and operational constraints.

1.2.3. Theoretical Advantages

Investors may question what specific benefits make tokenization a transformative shift in the digitalization of finance. While this area is widely researched (Baum, 2021; Momtaz, 2023; Markheim & Berentsen, 2021), many of the advantages remain theoretical or context-dependent, given the current developmental stage of this technology.

One of the most prominent benefits highlighted is that tokenization, through fractional ownership, allows for broader investor participation and portfolio diversification with modest investments (Baum, 2021). In traditional finance, retail investors often face significant barriers when attempting to invest in private market and other illiquid assets, usually reserved to institutions and high-net-worth individuals due to strict requirements, expensive asset prices, and limited exit options (Soni, Fines, & Sun, 2025). Investments in these assets often come with extended lock-up periods, restricting participants from withdrawing their capital for years, which further limits liquidity and accessibility for retail investors (Dimitrov, 2025). For example, United States regulations require those investors to qualify as “accredited investor” to participate in the investment, which means either proving an annual income \$200,000 minimum over the past two years, with expectations of the same earnings for the current year or a net worth of at least \$1 million (Securities and Exchange Commission, 2025). Tokenization promises to divide assets into multiple smaller and cheaper digital tokens, and trade them without the need of intermediaries, opening up markets to wider segments of the population, potentially leading to a more equitable distribution of wealth and diversified investment opportunities (De Filippi & Wright, 2018). However, instruments such as shares, bonds, Real Estate Investment Trusts (REITs), and Mortgage-backed securities (MBS) already enable investors to hold fractional ownership of assets, raising the question of what unique value tokenization brings to the table, beyond fractionalization (Schwarcz & Bourret, 2023).

A key distinction lies in the fact that tokenization inherently incorporates blockchain technology and its associated benefits (Sazandrishvili, 2020). The immutable nature of blockchain ensures that all transactions and ownership records are securely stored and easily verifiable, reducing the risk of fraud and enhancing trust among market participants (Catalini & Gans, 2020) thereby making all transactions transparent and secure. Smart contracts, which automate the execution of agreements based on

predefined conditions, further enhance efficiency by eliminating manual processes and reducing administrative costs (Antonopoulos & Wood, 2018). This automation also enables features such as programmable dividends, where income generated by the asset, such as rental income from real estate for example, can be automatically distributed to token holders, proportionally to his investment in the asset. Some research suggests that, similarly to traditional finance, high-dividend-paying shares often exhibit lower liquidity, as investors tend to hold them longer. However, this ties back to the ambiguity in defining liquidity; even if trading volume is low, when an investor decides to sell, the transaction can still occur easily without significantly impacting the price, meaning the asset remains liquid. This complex notion of liquidity will be further detailed in the following section.

Moreover, tokenization has the potential to democratize access to investment opportunities, also by breaking down geographic and regulatory barriers. Investors from different jurisdictions can participate in global markets without the need for complex cross-border transactions, fostering greater financial inclusion (Zetsche, Arner, & Buckley, 2020). This, coupled with the atomic settlement, described as the instantaneous execution of the contract only if all of its parts are completed successfully, allows for global, near instantaneous, and secured transactions, once again reducing the counterparty risk (Lee, et al., 2021).

Additionally, unlike traditional markets that open and close at specific times, crypto markets enable 24/7/365 trading. Some argue that liquidity will be less concentrated, given the reduced depth of the market (Basar, 2024), and while this might be the case for an order book system, it is less likely the case for automated market, where investors directly trade with a liquidity pool (Mohan, 2022).

Finally, tokenization can lead to improved price discovery and market efficiency. By enabling real-time trading, thanks to the combination of smart contracts, atomic settlement, and greater market participation, tokenized assets can benefit from more accurate pricing mechanisms that reflect true supply and demand dynamics, whereas, in traditional markets, infrequent transactions and information asymmetry often lead to mispricing (Tian, et al., 2020). While the advantages are multiple and the potential for liquidity enhancement is significant, its realization still faces limitations that prevent him from being fully realized.

1.2.4. Barriers and Challenges

In this nascent stage of development, tokenization faces several critical hurdles that limit its widespread adoption. First, low participation itself is a barrier to broad adoption. A paper from the OECD advances that tokenization relies on a critical mass of users to test scalability, refine regulatory frameworks, and prove market viability. Without sufficient engagement from institutional and retail investors, the ecosystem struggles to evolve beyond niche applications (OECD, 2025).

Regulatory uncertainty also remains a primary challenge, as the legal framework governing tokenized assets vary widely across jurisdictions, creating compliance complexities (Zetsche, Annunziata, Arner, & Buckley, 2021). The European Markets in Crypto-Assets Regulation, which will be discussed further in detail, aims to provide clarity but may also impose restrictive requirements, slowing down innovation (Van Der Linden & Shirazi, 2023). The latter doesn't help with the investor skepticism, fuelled by the crypto industry's reputation for volatility, scams, and fraud (Faverio, Dawson, & Sidoti, 2024), making it difficult to attract participants despite the distinct advantages of regulated RWA tokenization. According to a recent Pew Research Center survey, 63% of U.S. adults express little to no confidence in the safety and reliability of cryptocurrency investments (Faverio, Dawson, & Sidoti, 2024).

Additionally, some interoperability issues exist and persist, as fragmented blockchain ecosystems and incompatible token standards limit seamless asset transfer across platforms (Belchior, Vasconcelos, Guerreiro, & Correia, 2021). Liquidity remains siloed, limiting the efficiency and appeal of tokenized markets.

All in all, the tokenization of RWAs is expected to represent a paradigm shift in how assets are owned, traded, and managed. By potentially enhancing liquidity, transparency, accessibility, and market efficiency, tokenization has the potential to reshape financial markets and create a more inclusive economic system, creating opportunities for all stakeholders. This not only benefits investors, but also all stakeholders involved in the process. However, limiting factors remain, slowing down the widespread adoption. While tokenization's potential to improve liquidity is promising, its real-world impact also depends on structural factors, including regulatory frameworks, market adoption, and the specific design of tokenized assets.

1.3. THE NOTION OF LIQUIDITY

With liquidity being one of tokenization's biggest promise, this section reminds its key aspects, its importance, and its functioning in Automated Market Making.

1.3.1. Definition

Liquidity is a fundamental concept in finance, essential for markets to function, influencing asset pricing and investor participation. Despite its centrality, liquidity remains a concept with no single unambiguous, theoretically correct or universally accepted definition (Baker, 1996). Early contributions by Keynes (1930) explain that an asset is more liquid if it is more certainly realizable at short notice without loss. More modern interpretations describe liquidity as the ease with which an asset can be bought or sold in the market without affecting its price, or refers to the speed and ease with which an asset can be converted to cash (Adams, 2024). Kyle (1985) divides liquidity into two dimensions; ease of conversion versus loss of value. Any asset can be converted to cash quickly if we cut the price enough. A highly liquid asset is therefore one that can be quickly sold without significant loss of value, and an illiquid asset is one that cannot be quickly converted to cash without a substantial price reduction. Gerhold et al. (2014) extend this framework by incorporating volume, time, and transaction costs as critical components of market liquidity.

Building on those attempts of definitions, subsequent research proposes to decompose liquidity into measurable dimensions (Bernstein, 1987; Hasbrouck & Schwartz, 1988). Harris (1990) identifies four key elements of liquidity, each interacting with each-other;

- Width: it refers to the cost of trading, which includes the difference between the buying price and the selling price, also referred to as the bid-ask spread, for a certain number of shares, along with any fees or commissions charged per share.
- Immediacy: it refers to how quickly a trade of a certain size can be completed at a specific cost, reflecting the market's speed. In highly liquid markets, immediacy is high, and trades can be executed almost instantly without significant price change.
- Depth: it measures how many shares are available to trade at the current bid and ask prices, showing the market's capacity to handle large orders.
- Resiliency: it characterizes how quickly the market recovers to normal price levels after being disrupted by large trades from uninformed buyers or sellers.

High liquidity can thus be characterized by a tight bid-ask spread (narrow width), a large number of available shares at the current price (deep depth), and a fast trade execution (high immediacy). In contrast, illiquid assets like real estate or certain private equity investments, usually take longer to sell and may require to reduce the price to be sold quicker. These assets typically have wider bid-ask spreads (greater width), limited buyers (shallow depth), and slower transaction times (low immediacy). Moreover, their prices may take longer to recover after large market movements (low resiliency).

Additionally, liquidity is shaped by a complex interplay of direct and indirect factors. Market microstructure, for example, fundamentally shapes liquidity, as the trading infrastructure determines how efficiently assets can be exchanged. Gordon B.'s adage "*you can't build a great building on weak foundations*", expresses the idea that liquidity is inherently dependent of the structures the assets are being traded on. Electronic trading and algorithmic liquidity provision have compressed spreads and improved depth (Hendershott, Jones, & Menkveld, 2011), while fragmentation disperses liquidity across venues (Foucault & Menkveld, 2008). This is where the blockchain comes into play, leveraging the capabilities of DLT to improve traditional finance mechanisms.

Liquidity is further susceptible to macroeconomic forces. Market-wide liquidity tends to co-move with volatility (Chordia, Sarkar, & Subrahmanyam, 2005) and tighten during financial crises (Brunnermeier & Pedersen, 2009), reflecting funding constraints and risk aversion. Investor behavior further compounds these dynamics. Hu, Zhong & Cai (2019) show that, at least in China, behavioral biases and sentiment can amplify liquidity fluctuations, as herding or panic selling disrupts orderly trading. Most critically, liquidity exhibits self-reinforcing properties, as captured by the adage "*liquidity begets liquidity*". Pagano (1989) explains that liquid markets attract participants by lowering transaction costs, which in turn deepens liquidity. Conversely, illiquid markets face a participation paradox, where the absence of traders perpetuates illiquidity, exacerbating market frictions and potential failures.

Tokenization's potential to enhance liquidity must therefore be evaluated against this multifaceted backdrop, where technological innovation, regulatory clarity, and market participants' behavior collectively determine its efficacy.

1.3.2. The importance of liquidity

Although liquidity is an elusive concept, it remains a cornerstone of financial market efficiency and an aspect often researched by investors, allowing them to swiftly and quickly buy or sell their asset without significantly impacting their price, facilitating easier entry or exit. Liquid markets, being characterized by higher participation, ensure that individuals and businesses can convert assets into cash to meet short-term needs or seize new opportunities and therefore reduce their risk (Carruthers & Stinchcombe, 1999). Exchanges, too, prioritize liquidity as a competitive advantage, since deeper markets attract greater order flow and listings, reinforcing their centrality in price discovery and trade execution (Wuyts, 2007).

Beyond transactional ease, liquidity enhances price accuracy. In liquid markets, frequent transactions generate continuous pricing signals, reflecting real-time asset valuations with minimal distortion (Chordia, Roll, & Subrahmanyam, 2008). Conversely, Buss, Uppal, & Vilkov (2015) show that illiquid assets, such as real estate, private equity, or fine art, suffer from opaque pricing and wider bid-ask spreads, necessitating higher risk premiums to compensate for the inability to exit positions at fair value. This illiquidity discount restricts investor participation, perpetuating shallow market depth and low liquidity.

1.3.3. Liquidity and Automated Market Makers (AMMs)

As in traditional financial markets, crypto asset trades can occur via centralized exchanges, such as Binance or Coinbase, which are generally efficient (Barbon & Ronaldo, 2021). The trades generally happen via order book system, where traders list buy orders and sell orders, and the exchange's matches these orders based on price and time priority, to execute the trade. However, centralized exchanges CEXs require users to deposit their assets with the exchange to trade. This means they lose direct access to their assets and must rely on the exchange operator, constituting intermediary risk, exemplified by FTX's 2022 collapse, the third-largest crypto exchange at the time, who misused customer funds and resulted in significant financial losses for its users (Yaffe-Bellany & Goldstein, 2022).

Decentralized exchange (DEX) protocols aim to address these issues by eliminating the need for third parties' trust. They usually rely on Automated Market Maker (AMM), algorithmic agents using liquidity pools funded by users or liquidity

providers to enable trading (He, Yang, & Zhou, 2024; Mohan, 2022). These pools consist of token pairs, such as ETH/USDT², and trading and fee distribution are automated by smart contracts. Prices are determined using algorithms, such as the constant product formula $x \cdot y = k$ (Pourpouneh, Nielsen, & Ross, 2020). This is the simplest formula, where x and y represent the amount of each token in the pool, and k is a constant, ensuring that the product of the number of tokens remains unchanged after each trade, allowing the prices to adjust dynamically based on supply and demand. Liquidity providers earn fees from trades. However, the reliance on algorithmic pricing can lead to inefficiencies in those highly volatile markets, where large trades may cause substantial price slippage.

Nevertheless, AMMs democratize market making, and become a key driver of liquidity in DeFi, as shown by Swinkels (2023), who found that U.S. real estate tokens that can be traded on decentralized exchanges are about 25% more liquid. However, it should be noted that decentralized exchanges (DEXs) remain underdeveloped, weakly regulated, and less widely adopted due to their complexity and lack of user-friendliness. As of February 2025, centralized exchanges still dominate the market, accounting for 82.84% of spot trading volume compared to DEXs (The Block, 2025).

The concluding fact from this section is that liquidity is a non-negligible financial aspect for investors, companies, asset issuers, service providers, exchanges. It underscores the critical need for mechanisms that enhance tradability, especially in sectors dominated by high-value, indivisible assets, and demonstrates the transformative potential that tokenization has to offer in addressing the liquidity constraints of traditionally illiquid assets. According to EY-Parthenon, 56% of institutional investors (n=78) and 51% of HNWI (n=234) see increased liquidity as the top driver to invest in tokenized assets (EY-Parthenon, 2023). However, these assets are highly dependent on regulations, and so does the future of tokenization. Without clear rules, these promises are vain.

² USDT is a stablecoin pegged to the US dollar, designed to maintain a 1:1 value ratio with USD

1.4. EUROPEAN REGULATORY LANDSCAPE

The European Union tries to balance innovation and risk management in digital finance, through its Digital Finance Package, established in 2020, which introduced the Markets in Crypto-Assets Regulation (MiCA). The regulation was proposed by the European Commission, with oversight responsibilities shared between the European Banking Authority (EBA) and the European Securities and Market Authority (ESMA). The implementation and enforcement are then carried out by the respective National Competent Authorities (NCAs).

1.4.1. Markets in Crypto Asset Regulation (MiCAR)

Applicable from December 30, 2024, Regulation (EU) 2023/1114, known as the Markets in Crypto-Assets Regulation (MiCA or MiCAR), promises to be a major milestone for the EU's digital finance landscape. It aims to establish uniform rules across all EU member states, with the objectives of protecting investors, maintaining financial stability and fostering innovation in digital asset markets. MiCA's novelty is its system of classification into three distinct types, each subject to specific regulatory requirements (Table 3).

Table 3: Classification of tokens under MiCA with respective main regulatory requirements

Token in MiCA	Definition	Regulatory obligation	Relevant articles
Asset-referenced	A type of crypto-asset that purports to maintain a stable value by referring to the value of several fiat currencies that are legal tender, one or several commodities or one or several crypto-assets, or a combination of such assets	Must obtain authorization from the EBA, maintain sufficient reserves, and comply with governance and transparency rules	Definition 3(1)(3) Title III, arts. 15–42
e-money	A type of crypto-asset the main purpose of which is to be used as a means of exchange and that purports to maintain a stable value by referring to the value of a fiat currency that is legal tender	Must be licensed as Electronic Money Institutions under EMD2 and comply with additional MiCA's safeguards	Definition 3(1)(4) Title IV, arts. 43–52
Other	Other crypto-asset falling outside the asset-referenced or e-money category. Includes utility tokens, which are crypto-assets intended to provide access to a good or service supplied by the issuer of the token	Must publish a Whitepaper subject to the EBA and ESMA oversight, and comply with Anti-Money Laundering and consumer protection rules	Title II, arts. 4–14

The regulatory scope of MiCA is restricted, as it explicitly excludes several categories of digital assets that are already governed by existing EU legislation (Table 4). This exclusion is deliberate, enabling MiCA to focus specifically on crypto assets that were previously unregulated. The classification of the different types of tokenized asset brought by MiCA is therefore critical, as it determines the applicable regulatory framework and corresponding compliance obligations.

Table 4: Main European directives for crypto assets not covered by the scope of MiCAR

Regulation	Applies to crypto-assets qualifying as	Objective
MiFID II	Financial instruments	Enhances market transparency and protects investors
PSD2	Payment Transactions	Boosts competition, innovation and payment security
EMD2	Electronic Money	Stimulates and regulates electronic money
AMLD2	Virtual Currencies	Prevents money laundering and terrorist financing

Under MiCA, firms that provide crypto services are required to be licensed within an EEA (European Economic Area) country, to benefit from passporting rights, allowing them to offer their services across all other EU member states without needing to obtain separate licenses in each country. These firms are listed in the ESMA interim registers.

Analysis by Jūrmalis, Berķe-Berga and Urbāne (2025) indicates that the EU's regulatory strategies for crypto-assets offer a level of investor protection that is at least comparable to, if not more robust, than in traditional financial markets. Moreover, the MiCA regulation adheres to the principle of technology neutrality, ensuring that its rules do not apply to specific technologies or business models. This approach enables the regulatory framework to remain adaptable and resilient in the face of rapid technological innovation within the crypto-asset ecosystem (Biais, Capponi, Cong, Gaur, & Giesecke, 2023). While this is a good thing for innovation, it is not for traditionally illiquid assets, which are fundamentally more complex and require specific regulations. Additionally, in most European jurisdictions, fractionalization still requires an intermediary structure (usually an SPV) due to national laws that prevent the direct ownership of properties by multiple parties (Jūrmalis, Berķe-Berga, & Urbāne, 2025).

Although MiCA seeks to improve regulatory clarity and broad adoption, previous studies show that it may not significantly accelerate the integration of crypto-assets into the EU financial infrastructure as originally expected (Van Der Linden & Shirazi, 2023). While it is a major step forward in creating supportive regulatory environment for the innovative and safe use of crypto-assets, this approach may not be suitable yet for illiquid assets due to persistent regulatory challenges. As the transition to the MiCA framework is scheduled from June 30, 2024 to July 30, 2026, its true influence on the adoption will only be felt and measured once the regulation is implemented.

1.4.2. The effect of regulations on liquidity

The relationship between regulation and liquidity on markets can be twofold. This mainly depends on the regulation itself, the context, the market structure, the scope analysis, and the type of party implicated.

On one hand, robust regulatory frameworks can enhance liquidity by reducing information asymmetry, increasing confidence, and thus improve institutional participation. Studies on traditional markets suggest that clear custody rules, standardized disclosures, and licensed trading venues mitigate counterparty risks, thereby lowering liquidity premiums (Sarr & Lybek, 2002). A significant increase in liquidity was also observed after the implementation of the Market in Financial Instruments Directive (MiFID), with the bid-ask spread declining by 60 to 100 basis points post-regulation, the impact on stock price informativeness and liquidity being greater for those EU countries that have weaker regulatory environment (Aghanya, Agarwal, & Poshakwale, 2020). The evidence is consistent with Cumming et al. (2011) in that regulatory change improve market liquidity. Applied to tokenization, such mechanisms may similarly attract risk-averse capital. Jiménez (2024) examines the effects of MiCA regulations on tokenized fine wine, considered as an illiquid asset (Coffman & Nance, 2009). The study reports that transparency requirements could boost liquidity by reducing information asymmetry, and that structured trading environments and robust platform design are expected to help maintain liquidity.

On the other hand, paper from the European Banking Authority (EBA) on Basel III warns that excessive regulation can constrain liquidity by imposing compliance costs, delaying settlement finality, or limiting market access for retail investors (EBA's Banking Stakeholder Group, 2012). Further in his paper on tokenized fine wine, Jiménez (2024) notes that including warnings in whitepapers on the possibility of losing the whole invested value, and on liquidity and transferability risks, mandatory under MiCA (cf. art 5.5), may lower liquidity by provoking investor uncertainty.

Ultimately, MiCAR's harmonized rules may benefit digital markets but offer limited solutions for illiquid assets' structural complexities. Its liquidity impact will depend on market adaptation and future regulatory refinements.

CHAPTER 2 – METHODOLOGY AND EMPIRICAL WORK

Building on the literature review, this second chapter presents the empirical dimension of the research. It details the methodology chosen, develops propositions from the literature to address the research question, and presents the empirical findings.

2.1. METHODOLOGY

This section details the research design employed in the study to explore the extent to which tokenization could improve liquidity in the European regulatory context, especially under MiCAR. It also details how data was collected and analyzed.

2.1.1. *Research design*

Drawing on the exploratory aspects of grounded theory principles (Glaser & Strauss, 2017), this study adopts a qualitative approach to understand the link between tokenization, liquidity, and regulation. While the propositions inform the interview guide, they remain secondary to themes emerging from the data itself. Participants were selected using purposive sampling to ensure relevance to the research topic, with emphasis on diversity across roles, when possible, to reduce potential biases.

2.1.2. *Data Collection*

Data is collected through six semi-structured interviews. While an interview guide structured discussions around ten key questions (*Appendix F: Interview Guide*), the flexible format allowed participants to emphasize context-specific notions, depending on their scope of expertise. Time constraints sometimes necessitated a focus on key themes relevant to liquidity and regulation, while still permitting occasional digressions and follow-up questions. Participants were identified through purposive sampling, based on their professional engagement with tokenization projects and public commentary on digital asset regulations. They were primarily contacted via LinkedIn due to its concentration of blockchain and digital finance professionals. Selected participants' name, role and familiarity with tokenization, are summarized in the **Table 5** below. All participants provided informed consent for the use of their insights, except one who requested anonymity. To protect confidentiality, this participant is referred to using the pseudonym 'Alice' throughout the findings. All interviews were recorded and then transcribed using Goodtapes' software.

Table 5: List of interviewees, role, company and expertise towards tokenization.

Name	Role	Company	Expertise
Eric M.H.	Blockchain Engineer	Nethermind	Specialized in smart contract development and tokenization platforms, with a focus on liquidity and tokenization standards.
Philip G.	Tokenization Analyst / Manager	PwC Germany	Focused on digital assets regulations, especially in tokenization and the application of MiCA
Elisenda F.	Tokenization Legal Counsel	Brickken	Expert in legal aspects around the digitalization of real-world assets and financial instruments.
Iman B.	Tokenization Consultant / Associate	Sygnum Bank	Focused on creating viable investment products through tokenization, including legal and technical aspects for liquidity.
"Alice"	Tokenization Consultant	Confidential	Specialized in regulatory licensing (MiCA) for financial institutions. Also supports tokenization of funds and other assets.
Alex M.	Tokenization Platform Co-founder	Toqenize	Expertise in MiCA licensing. Builds tokenization solutions for companies. Clients in real estate and hospitality sector.

Additionally, to further enrich interview findings, insights were gathered from four carefully selected industry conferences, expert panels and public talks, listed in the **Table 6** below. These provided access to high-level discussions among thought leaders who are actively shaping the tokenization landscape, but hardly available for one-on-one interviews. While these source are not primary data, they helped validate emerging themes and identify trends not mentioned in individual interviews.

Table 6: List of secondary data type, event name, topic, speakers, and rationale.

Type	Name	Event	Main topic	Speakers	Rationale
Podcast	RULESMATCH Spot On - Kevin De Patoul (Keyrock)	/	Liquidity	Ian Simpson (interviewer) Kevin De Patoul (Keyrock)	Kevin de Patoul is Keyrock's CEO and Co-founder, a liquidity provider and market maker specializing in digital assets, using algorithmic trading to ensure liquidity on centralized and decentralized exchanges.
Panel	Panel: Creating Liquidity for RWAs. RWA Summit NYC	RWA Summit NYC	Liquidity	Kaledora Fontana Kiernan-Linn (moderator) Colin Cunningham (Chainlink) Kevin de Patoul (Keyrock) Chris Yin (Plume)	In this panel, speakers debate on creating liquidity for real-world assets (RWAs) through tokenization, exploring challenges like utility, adoption, and bridging traditional finance with onchain ecosystems. They discuss the challenges like interoperability, and questioning whether the next killer use case for RWAs will mirror existing assets or emerge as something entirely new.
Podcast	RULESMATCH Spot On - Dr. Joachim Schwerin (EU Commission)	/	MiCAR	Ian Simpson (interviewer) Dr. Joachim Schwerin (EU Commission)	Dr. Joachim Schwerin is Principal Economist at the European Commission and a contributor to the drafting and writing of MiCAR.
Talk	Tokenization & Regulations; Why use Reins to Steer a Formula 1 Car?	Brussels Blockchain Week	MiCAR	Kevin De Patoul (Keyrock)	In this presentation, Kevin emphasizes the transformative potential of digital assets and the urgent need for regulatory frameworks that reflect the realities of modern technology.

2.1.3. Data Analysis

The interview transcripts were lightly edited to remove filler words and repetition, in order to improve readability and clarity while preserving the stakeholders' original meaning. These transcripts are provided in *Appendix G: Interviews Transcripts*. These were then analyzed using thematic analysis (Clarke & Braun, 2017), identifying patterns and key themes in qualitative policy and finance research. This process involved multiple readings of the transcripts, to capture initial concepts and ideas emerging from the data. A semi-structured analysis grid (*Appendix H: Interviews Matrix*) was then structured to articulate the ideas according to key themes, guided by the dimensions of the research question, later allowing recommendations to be made for the parties involved. Quotes from semi-structured interviews are attributed to their respective first name, allowing traceability.

2.2. PROPOSITIONS

While this study draws on grounded theory principles, it also incorporates propositions, rather than hypotheses, derived from the literature, to guide the structuring of interview themes and analysis. According to Avan & White (2001), this approach is suitable for exploratory research, as it allows the researcher to use the propositions as flexible guides, while remaining open to new insights emerging from the data.

P1: *Tokenization significantly enhances the liquidity of traditionally illiquid assets mainly by fractional ownership, increased market access, and reduced transaction barriers.*

P2: *The implementation of the European MiCAR regulation will support and stabilize the liquidity gains from tokenization in the long term, ensuring investor protection and enhancing trust in tokenized markets.*

P3: *While tokenization enhances liquidity, its impact on traditionally illiquid assets will be limited by the regulatory complexities and market maturity of the underlying asset classes, even with the MiCAR framework in place.*

2.3. FINDINGS

The findings from the six semi-structured interviews, and the supplementary evidence from the four selected conferences or talks, with stakeholders across investors, tokenization platforms, banks, and legal experts, are organized into five key themes. First, it examines how tokenization could enhance liquidity through mechanisms like fractionalization and secondary market creation, then, it confronts the misconception that tokenization automatically guarantees liquidity, analyses the twofold impact of MiCAR as enabler and obstacle, and identifies the remaining barriers to unlocking liquidity. Finally, it explores the potential future trajectories for tokenized assets ecosystem.

2.3.1. *Elements Shaping Liquidity*

Fractionalization is the feature that came out of all interviews, as the most promising mechanism of tokenization unlocking liquidity of traditionally illiquid assets, breaking down high-value assets into smaller tradable units, and democratizing the access for a broader range of investors. Eric, blockchain engineer at Nethermind, notes that dividing a property into 10,000 tokens creates new investment opportunities to investors *“that can’t afford a larger part”*. Iman, tokenization associate at Sygnum bank, also highlights how fractionalizing a Picasso painting’s value of into smaller shares lowered entry barriers for a broader range of investors, and Alice, consultant in tokenization and MiCA implementation, adds that tokenization makes it *“cost-efficient to split assets into smaller parts, opening up business cases where lower entry tickets can be offered”*, particularly in sectors like art and real estate.

However, Philip, tokenization analyst at PwC, points out that fractionalization alone does not unlock liquidity. In his view, fractionalization makes the assets more easily *“tradable”*, but if no one trades it, it remains illiquid, as *“liquidity comes from secondary markets”*. Alice echoes this, stating that *“tokenization itself does not automatically make these markets more liquid,”* as regulatory constraints, such as investor eligibility regulations, may still limit participation. In a *RULEMATCH Spot On* podcast (2024), Kevin de Patoul, CEO of the liquidity provider Keyrock, also underscores that, by tokenizing an asset, *“you have something that is potentially a lot more liquid because it is a lot easier to send around and trade”*. In their view, this improved accessibility enabled by fractionalization, through tokenization, coupled with a well-developed secondary market, will facilitate exchangeability, which in turn will lead to greater liquidity.

Another key factor influencing liquidity creation for real world assets is the need for a strong rationale behind tokenization. While, in theory, everything can be tokenized, it does not mean that everything should be. Alex, Toqenize's co-founder, emphasizes by asking *"once it's tokenized, what do you do with your token?"*, and further argues that *"investors want yield, they don't just want to have a certificate of a digital asset that is basically illiquid"*. The true capabilities of tokenization lie in the rationale behind it, as Kevin raised during his intervention in RWA Summit NYC (Centrifuge, 2025), *"you should ask yourself a question before you actually tokenize the asset, why are you tokenizing it, and what is it actually going to bring"*.

Additionally, smart-contracts and token standards are cited as technical enablers of liquidity. As Elisenda, legal counsel at Brickken, says, *"more technology allows more liquidity"*. Eric highlights the role of new token standards, such as ERC-3643, in standardizing the creation of those tokens for easier use across chains and applications, while also embedding compliance checks, noting that such standards *"give you the tools to adapt to regulation"*. These tools aim to automate ownership rights and reduce friction, facilitating tradability and thus liquidity, though their impact depends on regulatory alignment.

Global market accessibility and instant cross-border transactions enabled by tokenization are also mentioned as factors facilitating liquidity. Elisenda observes that tokenization helps companies *"open their market to other markets"*, with Eric emphasizing that blockchain's borderless nature provides *"more access to foreign capital that investors couldn't access otherwise"*. These features, combined with financially more accessible investments thanks to fractionalization, greatly expand the investor pool. He further notes that tokenization also enables 24/7 trading, removing traditional market hour restrictions, which he describes as *"more about convenience than fundamental liquidity"*.

Overall, interviewees stress that fractionalization is one big factor enabling liquidity, but not alone, as it ultimately also depends on trading volumes and secondary market development, not just technological capability.

2.3.2. The misconception around liquidity promises

While all interviewees cited fractionalization as a key enabler to further liquidity, Iman and Eric insist that it highly depends on how the asset is tokenized. Fractionalization *“is not necessarily a given”*, says Eric, and thus is not systematically triggered when tokenizing an asset. If you tokenize a house or a painting, as a non-fungible token, *“it’s still one painting and one cost which is like millions of euros, and it’s not very interesting”*, Iman adds.

Another possibility is thus to tokenize the value of the underlying illiquid asset, or financial claims, such as income streams or ownership rights, tied to the illiquid asset itself. In this case, the asset is not itself put on-chain, but new financial instruments, tied to the asset, are created, on the blockchain. Philip says, *“it’s not that you have a digital copy of the house (...) that doesn’t make any sense, but it’s more like you get access to the profits of the holding company”*. Elisenda develops this misconception, stating that *“the asset itself doesn’t become more liquid because its parts are”*. In her words, tokenization and fractionalization is more about creating *“new liquidity”*, which gives *“more options to your investors, but the asset per se is not liquid”*. Iman parallels this with traditional markets: *“Does buying a share of a company make the company more liquid? Not really”*. Elisenda concludes by saying, *“tokenization is basically what we have been doing a long time, but just with a layer of new technology”*, with tokenization creating new investment possibilities, and bringing DLT’s capabilities along.

2.3.3. MiCAR’s Double-Edged Impact

The European Markets in Crypto-Assets (MiCA) framework draws mixed opinions from interviewees. While Philip acknowledges it as a *“huge step forward”*, and Alex as a *“net liquidity enabler”*, all recognize that MiCA brings a lot of constraints in its complicated licensing and compliance process.

According to Dr. Joachim Schwerin’s (2024), Principal Economist at the European Commission, who contributed in the writing of MiCAR, *“MiCA is a success, because we now have something workable”*. In his view, brings three major advantages; clarity for companies and institutions, the ability to reduce previous burdensome risk

documentation to only a short whitepaper, but more importantly, the passporting rights, allowing companies to operate seamlessly in the 30 member countries³.

However, MiCA's "same activity, same risk, same regulations" principle, while promoting consistency, risks being *"too general"* according to Elisenda, who critiques this one-size-fits-all model, as *"trying to govern everything with the same laws doesn't make sense"*, arguing that tokenization spans too many sectors for uniform rules. She points to sandboxes like the *"DLT Pilot Regime Sandbox"* as better alternatives, where regulators *"test standards by working with companies to understand their issues"*. She also highlights a significant *"disconnection between regulators and companies"* in European mainstream policymaking. Alice highlights that MiCA's indirect approach to illiquid assets means that true liquidity breakthroughs will depend on broader ecosystem maturation and regulatory agility.

In RULEMATCH Spot On's podcast, Kevin also mentions that *"MiCA is incomplete (...) some of the requirements are so strict that it kinds of dilutes the actual added value (...) because it ties them too closely to the traditional system"*. This brings ambiguity and confusion, with Alex for example, and his intention to tokenize revenue streams from the hospitality sector, hesitating whether this real-world asset is considered as an ART under MiCA, or as a utility token, which generates revenue, and therefore falls under MFID 's regulatory scope. Kevin further insists in another talk at the Brussels Blockchain Week (2023), that current regulations were designed for a centralized system that required trust in third parties, which is outdated regarding tokenization.

More positively, Iman recognize that MiCAR helps companies *"navigate with safeguards"*, particularly for institutions requiring licenses to build trust, joined by Philip, who particularly insist that these are the ones asking for regulations, they want to be compliant, and to *"prove that they have measures for risk management, customer protection, anti-financial crime"*. This to reassure clients, but also for *"interbank transactions or institutional trading, where you must be compliant with regulations"*. Elisenda corroborates, saying that *"companies who want to tokenize are the most worried*

³ While MiCA is directly applicable to the 27 EU member states, Dr. Schwerin refer to 30 countries, anticipating that the EEA countries (Norway, Iceland, and Liechtenstein) may also implement these passporting rights.

about everything like AML, MiCA, MFID, wherever they are based”, but adds that some “don’t know how, which doesn’t benefit innovation”.

These issues are exacerbated by national divergences within the EU. Philip emphasizes that in Germany, *“you cannot tokenize real estate”* due to local property laws, the same thing happening in France according to Alex, who notes that *“you cannot tokenize your home like in Dubai for example, because it’s complicated. [In France], you have all the land property registry and the government tax and so on”*. Elisenda highlights that this Europe composition of *“different cultures and regulations”* create grey areas for cross-border solutions. This divergence forces projects into case-by-case compliance, particularly for illiquid assets like private equity or real estate, which MiCA treats ambiguously, as it *“does not directly regulate illiquid assets”*, according to Alice. In RULEMATCH Spot On’s podcast, Dr. Joachim Schwerin, recognizes not having even considered these assets yet, and consider MiCA as *“the tip of the tip of the iceberg”*. Elisenda agrees but adds that *“tokenization platforms and custodians must be licensed and compliant”*, with the reserve that it depends on the case. Additionally, the oversights responsibilities between regulatory bodies makes it harder to articulate. Philip mentions that bodies like ESMA prefer *“to minimize the information that is on-chain”* due to familiarity with traditional off-chain reporting.

Moreover, compliance costs further limit the development of tokenization. Iman observes that Europe’s *“better safe than sorry”* approach forces startups to *“bear compliance costs before market entry”*. Alice highlights MiCAR’s strong legal requirements as a double-edged sword; while they enhance consumer protection and provides more clarity, they have *“led to the exit of players”*. This *“high regulatory licensing costs”* disproportionately burden new entrants, potentially stifling innovation.

In a more technical point of view, solutions to these regulatory hurdles are explored by some interviewees. Eric observes that advanced solutions like Zero-Knowledge Proofs, where one party can convince another party that a statement is true without revealing any information, could *“balance compliance and privacy”* but warns that *“verifying these ZK-proofs is not necessarily cheap”*. Alex, on his side, mentions the potential use of AI-agents for more clarity, which could be used on their platform by companies seeking a MiCA license, and that will *“conduct all the phases needed for compliance”*.

2.3.4. *The Remaining Barriers to Liquidity*

The interviews reveal a consensus that liquidity for tokenized assets depends on secondary market development and broad participation, yet critical gaps persist. Despite growing supply, Iman observes *"no demand"* from retail investors, attributing this to poor user experience and crypto's degraded reputation from past scams. Alice adds nuance to this demand gap, noting that even if tokenization could lower entry barriers, *"investments are often restricted to specific classes due to regulatory constraints"*, limiting retail participation despite fractionalization's promise.

In RULEMATCH Spot On's podcast, Kevin insists that, once again, *"the biggest bottleneck (...) is regulatory clarity. We're trying to marginally adapt in a model that is decade olds to something that is a completely different paradigm"*. In another episode, Dr. Joachim Schwerin, who co-wrote MiCA, agrees that *"traditional finance regulations in the field of crypto in my opinion is basically dead"*, and according to him, regulations *"must limit itself to the bare minimum"*, insisting that regulators' mentality has to change, as *"crypto reality is disruptive and we need different process in order to deal with it"*.

An important limiting factor cited is also the low-interoperability issue. Alex describes interoperability is *"fundamental"* to digital finance, as *"you cannot be part of a decentralized organization if you're not open to everything in your ecosystem"*. Eric identifies technical fragmentation as an important drag, stating that *"interoperability between blockchains is definitely an obstacle, (...) even within a single blockchain, it's not great for tokenized assets"*. This fragmentation extends to market infrastructure, as Kevin mentions in RULEMATCH Spot On podcast, *"the more scattered the market, the less efficient and the less liquid it is"*. Iman also criticizes how *"everybody's launching their own chain"* instead of collaborating, as *"fragmented liquidity is a huge field for arbitrage"* compared to unified markets. However, the rationale behind these individual chains is further explained by Chris Yin, during the RWA Summit NYC panel (2025), who highlights that each blockchain develops a unique *"density"*, with their own technology, liquidity, community and narrative tailored to specific use cases. He insists that this alignment is essential for adoption, *"when you deploy something on a chain, it doesn't mean anything. What counts is who buys it, who picks it up"*. Those *"niche"* chains enable institutional players and companies to attract capital by offering them *"specific infrastructure, governance and economic advantages"*, as they meet specific needs that are not met by

more general chains. In his view, these targeted ecosystems accelerate innovation: *"We can go a little faster, bring [use cases], then spread them everywhere"*. He rejects the idea of a single dominant chain, but rather recognize the need of cross-channel protocols to enable *"cash to flow seamlessly through the ecosystem"*. Ultimately, as Kevin insists during the RWA Summit NYC, paradox appears in that *"nobody's willing to build bridges because there's nothing to trade, but if nobody builds, you're back at square one"*.

Therefore, institutional adoption emerges as a major catalyst. Philip stresses that entities, like JP Morgan, drive volume but require *"regulatory clarity"* and *"licenses to prove compliance,"* even when optional. He adds that *"after that, you will be able to have secondary markets, (...), brokers, and everything like that"*. Alice reinforces acknowledges MiCAR's role in building institutional trust: *"Traditional players will only operate in regulated environments (...) innovations must adapt to these frameworks"*.

However, interviewees caution that regulation will follow, rather than lead, innovation. Elisenda says *"liquidity is driven by market forces, not regulations"*, while Philip explains that *"businesses innovate first, then regulatory bodies build frameworks around it"*. This creates a paradox: institutions demand clarity, but markets must evolve organically before rules crystallize. Alice bridges this divide, noting that proactive jurisdictions, mentioning Luxembourg's blockchain laws as an example, can accelerate organic growth while MiCAR provides a baseline: *"The ecosystem needs regulatory certainty, but over-regulation risks stifling the very innovation that attracts institutional interest"*.

2.3.5. Future Trajectories and Implications

The unlocking of liquidity for traditionally illiquid assets also depends on tokenization's future trajectory. Even though the *"adoption curve is very slow"* according to Alex, Iman outlines two divergent paths; either it will be developed on its own, parallelly to traditional finance, or it will be integrated to the current financial markets, where blockchain will become the *"back-end infrastructure"*, leveraging its capabilities. In the first view, regarding automated market making and decentralized exchanges, Alice also recognizes that it is *"still early to assess the full potential of those secondary market designs"*, and that *"it remains to be seen whether pricing can be better obtained through AMMs versus order books"*. The second view is more supported by most interviewees, with Elisenda thinking that *"the technology that fuels tokenization will be*

kind of hidden, and clients will not know that [blockchain] is used by organizations". Alex also says that "users don't want to have to worry about what's going behind the scene", and as Iman summarizes, "the biggest challenge is broad adoption, conscious or not".

Therefore, interviewees also highlight the need of better UX in these solutions. As Kevin mentions in the podcast, *"if you can have that added value with something that looks and feels like something you've done a hundred times before, you're going to do that just because it's a lot easier"*. Alex reinforces this, predicting that *"in ten years from now, almost everything will be tokenized"*, with the reserve that the technology must move from a "tech people to tech people" environment, to solutions designed to the general public. The missing link thus does not lie in technology alone, but in bridging this divide to create markets where tokenized assets can truly circulate.

The concluding facts to highlight from these interviews with stakeholders, with the support and balance from conferences, experts' panels and podcasts, is that, while tokenization, particularly through fractionalization, offers significant potential to enhance liquidity by lowering investment barriers and expanding market access, its full realization depends on robust secondary markets, regulatory alignment, and broader ecosystem development. Interviewees emphasize that it's not the underlying asset that becomes significantly more liquid, but rather the new financial products created through tokenization. This liquidity is not automatically achieved through tokenization alone but requires active trading, institutional participation, and regulatory clarity, with MiCA providing a foundational framework despite its limitations and one-size-fits-all approach. Technical challenges like interoperability and compliance costs further complicate progress, and low demand, coming from poor user experience, regulatory restrictions, and retail investor's skepticism, must be addressed. The future of tokenization may depend on whether it develops as a parallel system or integrates seamlessly into traditional finance, with institutional adoption and regulatory agility playing pivotal roles in shaping its trajectory. Ultimately, the promise of liquidity depends on overcoming these multifaceted barriers and developing a market environment where tokenized assets can circulate effectively.

CHAPTER 3 – INTERPRETATION AND IMPLICATIONS

This chapter synthesises and concludes the research findings, critically comparing the findings extracted from the interview to the extensive literature review, offering key interpretations, recommendations and limitation as an opportunity for future research. First, it analyzes how the results challenge or align with prior theoretical frameworks, particularly on liquidity drivers in tokenization, and regulatory impacts, also uncovering new ideas discovered in the interviews. Finally, it discusses the limitations of this research and offers recommendations for stakeholders as well as for future research.

3.1. DISCUSSION

This section discusses the study's findings in relation to existing literature. New clarifications are also offered when needed, to further explain the concepts.

3.1.1. Tokenization's potential vs. reality for liquidity

As highlighted in the literature and confirmed in the findings, tokenization aims to unlock liquidity, particularly of traditionally illiquid assets, mainly through fractionalization. This aligns with Baum (2021) and De Filippi & Wright (2018), in that splitting an expensive asset into cheaper parts allows for the democratization of the investments, opening them up to a broader pool of investors. Even though dividing assets into smaller shares already existed (split shares, bonds, funds, ...), interviews confirm Sazandrishvili's view (2020), in that tokenization also uniquely integrates fractionalization with blockchain's native capabilities, including:

- Programmability, through smart contracts and automate processes without intermediaries.
- Atomic Settlement, executing transactions completely and simultaneously, reducing settlement risks
- Cross-border transaction, with instant, low-cost, and borderless transactions.
- Security and Transparency, through cryptographic techniques and immutability.

However, a significant misconception, unclear in the current literature, requires clarification. The claim made in most reports that tokenization will automatically unlock liquidity in traditionally illiquid assets is overly simplistic and needs to be significantly nuanced. First, liquidity outcomes depend on the tokenization method employed. For instance, while creating a unique digital copy, or an NFT, may marginally improve

liquidity through the above-mentioned blockchain features, it remains constrained by the need for synchronization with off-chain asset ownership and transfer processes, meaning the underlying asset's illiquidity persists. Conversely, fractionalization via fungible tokens does not directly increase the physical asset's liquidity but instead creates new, tradable financial instruments representing claims on its value, ownership rights or cash flows. Thus, tokenization of illiquid assets primarily generates "*new liquidity*" of the created financial instruments, rather than enhancing the liquidity of the underlying asset itself.

From a technical point of view, interoperability between and within blockchain stand out as a major limitation, aligning with Belchior and al. (2021). Several solutions emerge from the findings. The first, which would be to use token standards to streamline transactions between blockchains or exchanges is aligned with the literature (Cuffe, 2018), but Eric, the blockchain engineer, brings a new perspective by proposing to integrate compliance checks for easier regulatory management within the standards themselves. The CMTA token standard for example, is specifically designed to comply with Swiss law. Although it only applies to Switzerland, it could serve as a valuable framework for other jurisdictions exploring tokenization (Gretz, et al., 2025). This report from Gretz et al. also insists that these standards could be the "*missing link for institutional adoption*", but without cross-chain compatibility, institutions will not participate, and tokenization will stay niche.

Additionally, the amount of information that regulators could put on-chain is still discussed, and currently, more information means higher gas fees, which refer to the cost of executing transactions on a blockchain. They can vary significantly depending on network congestion and transaction complexity, and research shows that high gas fees on networks like Ethereum can repel small traders and liquidity providers, reducing overall market activity (Cong et al., 2023). Speaking of network congestion, another important point to be raised that is also linked to mass adoption and blockchain scalability, is the number of transactions per second. Indeed, while traditional payment systems such as Visa can carry around tens-of-thousand transactions per second, the Ethereum can only support fifteen to thirty (Pandey, 2024). This is a major limitation to be considered before massively scaling the adoption of tokenization technology.

Unfortunately, while decentralized exchanges (DEXs) and automated market making (AMM) present promising potential for enhanced liquidity (He, Yang, & Zhou, 2024), with their possibility to directly trade with liquidity pools without intermediaries, findings show that they are still in a development stage. They lack participation and from observable insights to validate their efficacy. Moreover, their adoption heavily depends on the desired degree of decentralization, as institutional players continue to favour centralized exchanges (CEXs) to maintain greater control over trading activities.

The process of tokenizing traditionally illiquid assets therefore introduces a range of factors that influence liquidity. While fractionalization is often highlighted as a key enabler, other elements, such as technological infrastructure, regulatory compliance, and market accessibility, play crucial roles in determining whether tokenization can unlock liquidity. However, the transformation is not straightforward. The liquidity of tokenized assets depends not only on their fragmentation but also on the development of secondary markets, the interoperability of platforms, and broader regulatory and market conditions. Tokenization adds a new layer of technology. The extent to which tokenization could enhance liquidity will therefore mainly depend on the interplay between technology, regulation, and secondary market development, rather than fractionalization alone.

3.1.2. MiCAR's role; Catalyst or Constraint?

The findings align with the literature, in the sense that, while regulation's impact on liquidity is indirect, it directly influences innovation, adoption, and the development of the tokenization market, which in turn affects trading volume and consequently, liquidity. It is also important to note that while MiCA doesn't directly regulate those traditionally illiquid assets since they are classified as financial instruments and therefore fall under the scope of MFIDII.

Both perspective of regulations, as a facilitator but also as a barrier, also resonates with the findings. Most interviewees recognise regulations as essential for clear development, aligning with Jūrmalis, Berķe-Berga, & Urbāne (2025), with MiCAR providing a classification regulating previously unregulated crypto-asset, and referring the others to clear, well-established guidelines such as MFIDII. In that sense, the findings confirm the literature in that MiCA is a win for large global exchanges and institutions, reducing complexity and offering access to the entire EU market under a single license.

On the other hand, the findings add nuance in that MiCA can be too restrictive, especially for smaller entities as Van Der Linden & Shirazi (2023) advanced. Additional research from Coincub (2025) shows that MiCA has created a regulatory bottleneck for innovation, with licensing and compliance costs multiplied by six, forcing startups to relocate or even shut down. They also highlight that only a few companies are applying for a MiCA license, and that the others, among the 3,167 Virtual Assets Service Providers (VASP) previously registered in Europe, are now leaving for other jurisdictions. This clearly aligns with the findings, where most of the interviewee view MiCA as complex

From a technical point of view, embedding the regulation in token standards, as mentioned previously for better cross-chain interoperability could, probably solve regulation issues. In this “regulation by design” approach, and as defined by Almada, the developers of digital systems must “*adopt technical measures that implement the specific requirements mandated by law in their software*” (2023). However, the number of tokens that can exist, tied to specific assets, makes it hard to actually implement in practice. Indeed, the distinction between different categories of crypto assets, and between different jurisdictions, remains legally ambiguous in certain cases, potentially leading to regulatory arbitrage.

The key emerging theme from the findings is thus the need for a hybrid collaboration model where regulators, technologists, and traditional financial institutions work together iteratively to unlock liquidity in tokenized assets. As mentioned by interviewees, “*what moves the market moves the regulator*”.

3.1.3. Systemic Challenges

While interoperability was already discussed, a key factor in unlocking liquidity, as highlighted in most interviews, is mass adoption. As mentioned in the literature, the widespread use generates volume, which in turn facilitates liquidity in transactions. According to most interviewees, tokenization remains in the early stages of the adoption curve, with most activity concentrated among innovators and early adopters. For the technology to cross the chasm into the mainstream adoption, which will be the necessary volume for liquidity to increase, several barriers remain.

According to Rogers' Diffusion of Innovation Theory (Rogers, 2003), the adoption or new technologies is influenced by several factors, with relative advantage and ease of use being especially relevant for tokenization. Relative advantage refers to the degree to which the innovation is perceived as better than the one it replaces. Even though tokenization offers numerous benefits, the public perception around cryptocurrencies and blockchain remains careful. On the other hand, ease of use, though self-explanatory, is currently lacking in tokenization solutions, as shown in the findings. This, coupled with regulatory ambiguity, further exacerbates confusions and slow adoption.

Another barrier mentioned in the findings is the liquidity-infrastructure paradox. Liquidity depends on robust secondary markets and infrastructure, but such infrastructure requires sufficient liquidity to justify investment and validate its effectiveness. This represents a challenge that slows progress in the early adoption phase.

3.1.4. Future pathways

Interviews have brought new ideas and perspectives regarding the future development of tokenization, which will be key in determining how the liquidity will behave, and how the secondary market will allow, or not, tokens tied to an illiquid underlying asset to fully benefit from the technology's capabilities. Two major views seem to emerge, each with their own strengths and weaknesses towards innovation, regulation mass participation, and thus, indirectly, liquidity.

The first one is the development of DeFi parallelly to TradFi, emerging as a continuity of the decentralization's objective, where tokenized assets would operate independently of traditional finance systems. Liquidity would heavily rely on decentralized exchanges, and permissionless participation. Interviewees highlight its potential for rapid innovation and efficiency gains through smart contracts, with lower compliance costs enabling niche market specialization. However, interviewees caution that these advantages come with trade-offs: liquidity fragmentation across isolated platforms, regulatory arbitrage risks, and the absence of unified safeguards.

The second one integrates tokenization into existing financial infrastructure, prioritizing regulatory alignment and institutional participation. In Elisenda's words, it's "*just a new layer of technology*". The benefits are clear: deeper liquidity from TradFi

pipelines, stronger consumer protections, and risk mitigation through regulated custodians. Yet integration carries its own constraints, including higher compliance costs that may exclude smaller players and slower transformation due to legacy system dependencies. This second perspective aligns with the general sentiment of other stakeholders, who emphasized the importance of institutional adoption, market infrastructure, and regulatory clarity as key enablers of liquidity. In that sense, the integrated scenario appears to reflect the direction most industry actors are currently moving toward. In other words, TradFi needs DeFi capabilities, and DeFi needs TradFi volumes and infrastructure to create a seamless, integrated financial ecosystem. While TradFi brings the stability, regulatory clarity, and volume necessary for large-scale adoption, DeFi offers the innovation, decentralization, and accessibility that traditional finance lacks.

3.2. PRACTICAL IMPLICATIONS

To fully unlock tokenization's potential in enhancing liquidity for traditionally illiquid assets, stakeholders must prioritize two key areas: fostering secondary market development and ensuring regulatory clarity. Asset issuers and tokenization platforms should focus on cultivating robust secondary markets by improving user-friendly interfaces, streamlining onboarding processes, and educating clients on the tangible benefits of tokenization, such as fractional ownership, new yield generating investment opportunities, cross-border accessibility, and operational efficiency. Additionally, collaboration between entities will be critical to driving adoption, especially in building protocols allowing interoperability, to unlock the full potential of tokenization. On the regulatory side, authorities must ensure that MiCAR's implementation keeps a balance in providing protective guidelines without hindering innovation. Additionally, hybrid collaboration between policymakers and industry participants is essential to align regulatory necessities with market needs. Regulatory sandboxes could serve as an effective testing ground for innovative solutions, allowing stakeholders to experiment in a controlled environment while ensuring compliance with emerging standards.

3.3. LIMITATIONS

While this study provides valuable insights into liquidity changes brought by tokenization and the impact of EU regulations, several limitations should be acknowledged. First, the sample size of six participants, though sufficient for the

exploratory purpose of the topic, may not capture the full spectrum of perspectives on liquidity enhancement of tokenized illiquid assets within the European regulatory context. Nevertheless, most of the ideas converge on similar conclusions, supporting the key findings, reinforced by insights from conferences, podcasts and expert panels. Second, the findings may be influenced by the interviewees' biases, as enthusiastic individuals may express their view of tokenization in a positive way. To mitigate this, the study attempted to include stakeholders with different roles, ensuring a more balanced perspective. Third, the theoretical findings would have been more accurately validated with quantitative data. Yet, due to the underdevelopment of secondary markets for tokenized real-world assets, observable data remains scarce, limiting actionable conclusions. This challenge is exacerbated by the nature of the chosen sector itself, where transactional data is rarely disclosed. Additionally, liquidity effects may differ significantly across asset classes, complicating generalized conclusions. Finally, tokenization remains a relatively recent innovation, and its long-term implications for liquidity are still evolving. Thus, while this study provides a foundational understanding of the interplay between tokenization, liquidity, and regulations, ongoing research will be essential, as some conclusions may require reassessment as the market matures and additional regulatory developments emerge.

3.4. RECOMMENDATIONS

Future research should explore the evolving impact of tokenization on asset liquidity following the full implementation of MiCAR, focusing on case studies involving tokenization of illiquid assets. A comparative analysis with leading digital finance jurisdictions, such as Singapore's Project Guardian or the UAE's progressive virtual asset frameworks, could help identify regulatory best practices and their effects on market liquidity. Additionally, quantitative studies examining secondary market data, such as trading volumes and bid-ask spreads, could empirically validate, or refute, tokenization's role in enhancing liquidity for traditionally illiquid assets, and assess whether liquidity gains are only theoretical, or practical. Finally, this study being exploratory due to the limited research available on the topic, future studies could adopt a more granular focus, such as examining specific asset classes or a case study analyzing the tokenization of an asset from its creation to its secondary market trading. Such targeted research would provide deeper insights and derive more precise recommendations for the party involved.

3.5. CONCLUSION

This thesis explores the extent to which asset tokenization enhances liquidity of traditionally illiquid assets and evaluates how the European Union's Markets in Crypto-Assets Regulation (MiCAR) influences this transformation. It provides a nuanced perspective on the so far unsupported promises of liquidity improvement in corporate reports, and brings a new contribution to the limited literature on the interplay between tokenization, regulation, and liquidity. Semi-structured interviews with six tokenization stakeholders, supported by four selected public talks, show that, while tokenization presents a compelling opportunity to democratize investment and create new liquidity through fractionalization, its full realization remains contingent on overcoming structural, regulatory, and market-driven barriers.

A central finding of this study is that tokenization does not inherently unlock liquidity in illiquid assets, but rather generates liquidity in the creation of new financial instruments, directly tied to those underlying assets. Tokenizing an asset as an NFT only creates a digital twin with limited utility, its liquidity remaining almost unchanged. The true value of tokenization lies in its ability to fractionalize ownership rights, cash flows, or value streams, into accessible investments thereby democratizing investor participation. Thus, tokenization of illiquid assets primarily generates "*new liquidity*" of the created financial instruments, rather than enhancing the liquidity of the underlying asset itself. Additionally, as emphasized by all interviewee, it all comes down to clearly defining a clear rationale of why the asset could be tokenize, and what we want to get out of it. In theory, everything could be tokenized, but in practice it does not mean that everything should be.

The findings also reveal several barriers limiting tokenization's growth. The technology being relatively early on the adoption curve, it lacks critical demand. While supply is growing fast, the competition and lack of collaboration between entities leads to interoperability issues across blockchain networks. The research also underscores the need for developing a secondary market, but a paradox arises; liquidity depends on robust secondary markets and infrastructure, but such infrastructure requires sufficient liquidity to justify investment and validate its effectiveness. Secondary markets are critical to liquidity, yet tokenized assets struggle to establish market depth.

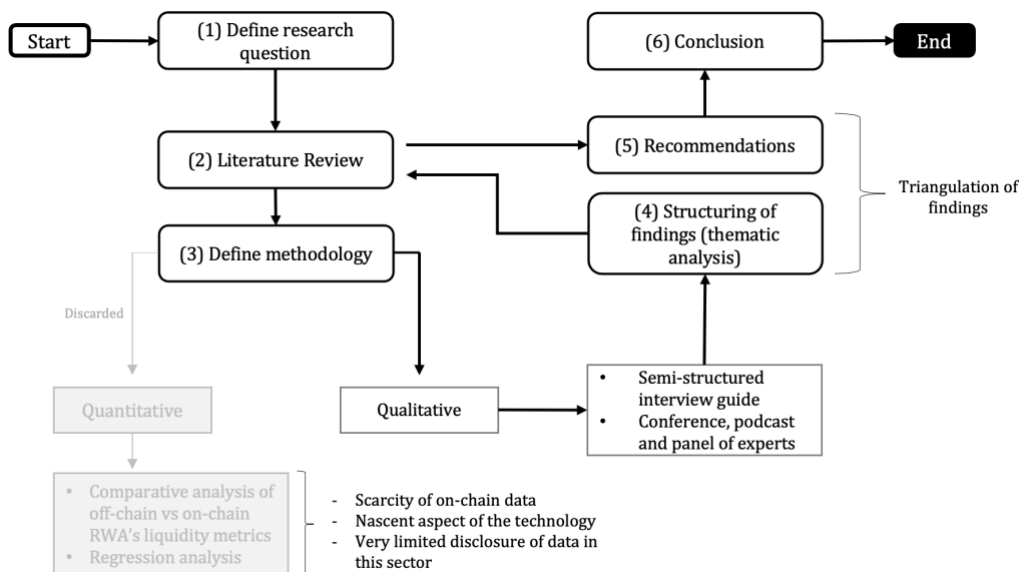
MiCAR's impact on the liquidity tokenized traditionally illiquid real-world assets is limited. While MiCAR has established foundational regulatory frameworks for crypto-assets, its direct influence on liquidity remains minimal at this stage, but its impact on the industry is major. It brings clarity to so far unregulated aspects of the digital assets' space, guiding institutions towards compliance and licensing. However, the process is complex, at the expense of smaller players, which must comply to strict rules, with expensive licensing costs, slowing down innovation and sometimes even resulting in their exit from the EU ecosystem. While MiCA emerges as the first attempt to regulate such asset, regulators must change their view and collaborate with industry players,

The promise of tokenization is clear, but its full potential will depend its future path. The "integrated scenario," where tokenization becomes a seamless tool within established institutions, seems to be the most supported, as major institutions are already adopting tokenized solutions, indicating that tokenization could become more of an operational enhancement to traditional finance, rather than a disruptive force. DeFi and TradFi are interdependent, as TradFi brings the stability, regulatory clarity, and volume necessary for large-scale adoption and DeFi offers the innovation, decentralization, and accessibility that traditional finance lacks. Coming back to the blockchain trilemma, this path will support scalability through mass adoption, and security through regulatory measures, as required by institutions who want to be compliant. But isn't decentralization becoming centralized?

Ultimately, tokenization is poised to enhance, or at least create, liquidity, but the extent of this enhancement will largely depend on the trajectory of market development and regulations. Tokenization brings the democratization of investment, creating new financial products, and unlocking access for a broader range of participants. This, coupled with DLT's capabilities, could significantly enhance the liquidity. MiCAR's impact on this transformation is currently welcome by institutions but constraining for smaller innovative entities. Continued collaboration between stakeholders will be essential in addressing the barriers of fragmentation and secondary market development.

APPENDIX

Appendix A: Thesis' writing workflow



Appendix B: ERC-20 token standard

The ERC-20 standard stipulates that a smart contract must implement nine *functions*:

```

function name()
function symbol()
function decimals()
function totalSupply()
function balanceOf(address _owner)
function transfer(address _to, uint256 _value)
function transferFrom(address _from, address _to, uint256 _value)
function approve(address _spender, uint256 _value)
function allowance(address _owner, address _spender)

```

There are also two *events*:

```

event Transfer(address indexed _from, address indexed _to, uint256 _value)
event Approval(address indexed _owner, address indexed _spender, uint256 _value)

```

Appendix C: TradFi vs. DeFi trading – example

“In the past, customers first had to establish a business relationship with a bank. Subsequently they would need to contact their bank and place the buy order. The bank in turn placed the order with a broker. The broker then deposits the order with the stock exchange. The broker thus acquired the security for the customer on the stock exchange (Casu, Girardone, & Molyneux, 2006). (...) Each of these five intermediaries not only charge the customer for their services but are also potential sources of error throughout the buy and sell process. Today, any customer independent of his or her geographic whereabouts surfs with a smart phone or computer to a so-called “Decentralized Exchange” or “DeX” as these types of DeFi-exchanges are called. There he or she places the purchase order for a digital asset or a «token». Such tokens essentially represent a property title for any type of asset (Schueffel, Groeneweg, & Baldegger, 2019). Smart contracts execute the order as soon as the parameters match the purchase order. As the user is the also the custodian of the assets, the token is transferred directly from the seller’s wallet to the buyer’s wallet. At no point does the token come into the possession of an intermediary. Instead, first the seller is the owner and custodian of the asset and so is the buyer after the trade. What is more, this business transaction is completely anonymous.” (Schueffel P., 2021)

Appendix D: Classification of crypto tokens

	Token Type	Description
Utility Tokens	Energy Tokens	Represent units of energy, enabling peer-to-peer energy trading
	Governance Tokens	Grant holders voting rights to influence decisions
	Basic Attention Tokens	Reward users for engaging with digital ads
	Work Tokens	Required to perform tasks or services within a network
	Donation Tokens	Facilitate transparent charitable contributions or crowdfunding
	Membership Tokens	Act as digital subscriptions or access passes to exclusive groups/services
	Reward Tokens	Incentivize user participation
	Loyalty Tokens	Issued by businesses to reward repeat customers
	Reputation Tokens	Track and quantify a user's standing or contributions within a community
	Access Tokens	Grant holders rights to use specific features, platforms, or content
	Consensus Tokens	Used in blockchain validation mechanisms
	Participation Tokens	Enable involvement in events, games, or decentralized applications
	Voting Tokens	A subset of governance tokens, specifically for voting on proposals
	Usage Tokens	Required to operate or interact with a particular service
Payment Tokens	Exchange Tokens	Native tokens of crypto exchanges offering fee discounts or perks
	CBDC	Central Bank Digital Currencies, or digital fiat currencies
	Cryptocurrencies	Decentralized digital money
	Tokenized Funds	Represent ownership in traditional investment funds on blockchain
Asset Tokens	Investment Tokens	Securitized assets tied to investments
	Bonded Tokens	Locked as collateral to receive benefits
	Funding Tokens	Raise capital for projects
	Staking Tokens	Used to participate in proof-of-stake (PoS) networks, earning rewards
	Digital Assets	Broad term for blockchain-based representations of ownership
	Security Tokens	Compliant financial instruments representing real-world assets
	Yield Tokens	Generate passive income from lending or staking
	Share-like Tokens	Mimic traditional equity shares but on blockchain
	Certificate Tokens	Digitally verify credentials
	Derivative Tokens	Track value of underlying assets
	Credit-linked Tokens	Represent debt obligations or credit agreements
	Equity Tokens	Tokenized company shares, granting ownership rights
	Debt Tokens	Digital representations of loans or bonds
Mixed	Identity Tokens	Store and manage decentralized digital identities
	Stablecoins	Price-stable tokens pegged to assets like fiat
	Platform Tokens	Power specific ecosystems
	Network Tokens	Used for network-specific operations

Appendix E: Concrete use cases of RWA Tokenization

- Real Estate: A luxury resort in Aspen, Colorado, decided to tokenize a portion of its ownership. From a minimum investment of 10,000 tokens, at \$1.0 per token, each holder is entitled to a share of the revenue generated by the resort. Moreover, every owner would benefit from a 20% to 50% cashback on hotels rooms depending on their stake in the resort. The resort managed to raise \$18 million (Pham, 2022).
- Art: Rubey, a digital art platform, tokenizes artworks, allowing fractional ownership of high-value pieces of art. Users can buy tokens representing a share of a specific artwork, receiving proportional shares of the resale value when the artwork is sold or when it generates exhibition-related revenues. This democratizes access to the art market, allowing smaller investors to participate in high-value art investments (Rubey, 2025).
- Energy: Enel Group, the largest energy provider in Italy, has launched a tokenization project to enable fractional ownership of solar panels. This would allow individuals to invest in solar panels that are not on their roof and use the returns to offset their residential energy bills (Algorand Foundation, 2025).
- Royalties: The rapper NAS tokenized one of its songs; “King’s Disease”, allowing its fans to purchase tokens that represent a share of the streaming royalties. This provided the rapper with immediate funding, and provided its fans with streaming revenues, distributed to token holders based on the number of tokens they owned (Ryu, 2024).
- Sports: Watford Football Club's tokenization allows fans to buy up to 10% of the club's equity. Fans benefit from ownership stakes, exclusive perks, and potential financial returns, while the club gains increased funding, and broader investor base (Lehavi, 2024).

Appendix F: Interview Guide

Introduction
Q0. Could you please introduce yourself, your role and your familiarity with tokenization?
Liquidity
Q1. Tokenization is often presented as a solution to illiquidity in assets like real estate, private equity or art. From your perspective, how does it address liquidity challenges in these markets?
Q2. What do you see as the most persistent barriers to liquidity for tokenized assets, that blockchain alone cannot solve?
Regulations
Q3. Do you think regulations generally help or hinder liquidity?
Q4. Do you see MiCAR as a game-changer for tokenized assets, or is it too blurry/too restrictive?
Q5. Some argue that regulation is the missing link to unlocking liquidity for real world assets. Do you agree? Why (not)?
Q6. Is Europe a conducive environment for tokenized RWAs, or will other jurisdictions like the US, Singapore or the UAE dominate this space? Why?
Q7. If you could advise regulators on one change to improve liquidity for tokenized assets, what would it be?
The missing link
Q8. In your view, what's the single biggest challenge to achieving widespread adoption and thus liquidity of tokenized assets today?
Q9. How do you envision the evolution of RWA tokenization over the next 5-10 years?
Q10. Is there anything we haven't covered that you think is important to mention?

Appendix G: Interviews Transcripts

Interview 1 & 2

Q0. Could you please introduce yourself, your role and your familiarity with tokenization?

Interviewee 1 - My name is Eric I'm a blockchain engineer at Nethermind for three years now and my focus is mostly on smart contract development. I've been working also on labor capital. I'm not sure if you're familiar, but it's like a tokenization platform. So, it's one of our clients and we've been helping them build it. So, yeah, I would say my experience with tokenization is more on the tech side around standards, maybe I can talk a bit more like about liquidity and liquidity fragmentation and also like the benefits of tokenization on that side.

Interviewee 2 - My name is Philip. I'm a manager at PWC Germany and I've been working with PWC for let's say five years now and four years ago we started an initiative on digital assets

together with a colleague, I formed our task force or interest group on digitalization and tokenization. Also, working at a big four company, you get in touch a lot with regulations, of course, and that's what I was focusing on how regulation forms around this industry, the ecosystem and how tokenization can play a role in it. Yeah, that's basically what I did for the last, let's say, four and a half years.

Q1. Tokenization is often presented as a solution to illiquidity in assets like real estate, private equity or art. From your perspective, how does it address liquidity challenges in these market?

Interviewee 1 - I mean, I would say the main benefit I see here is fractionalization, which is not necessarily a given when you tokenize an asset, but a lot of times they go hand in hand. So, if we're talking about real estate, for example. Like I could tokenize a house, let's say, and I could just have it as ERC 721, a non-fungible token. And there I'm not really addressing the illiquidity of it because it's still like one single asset. You could argue maybe being able to trade it on a blockchain, maybe there's more access to the sorting capital there that couldn't access it otherwise, and you could argue that could increase liquidity. But I think the biggest change is if we fractionalize it. And suddenly I have like 10,000 tokens that are representing this property, then there's lots of things you can do. You can sell to investors that want to, or that can't afford maybe a larger part or something like that, or that maybe you're looking to diversify and don't want a single property, but maybe you want small portions of multiple ones to kind of hedge risk against certain areas of the city or whatever it can be or it could even be that you're looking for liquidity without necessarily losing control of that asset so you could maybe sell only 40% of that asset of this like house in this case, and depending on how it's set up, if these shares come with voting rights and stuff like that, obviously still retain like certain control there. This is a bit abstracted away from regulations because depending on where you are and what the asset is, you kind of kept do like some of these things. But at least in theory, that's where the liquidity side comes in. Yeah, I would say that 24 seven trading is also a factor. I would say that goes more into the convenience aspect of it.

Interviewee 2 - So maybe just to add here, it's a fractionalization from my point of view, not only or the main factor is not that it makes illiquid as its liquid. It's more like because they it makes it tradeable. The liquidity comes from the volume, comes from the amount of people that are trading it. Because if you have it fractionalized, but only make it credible between, let's say, institutions, two institutions, three institutions, it's not per se a liquid asset. Liquidity comes from secondary markets, comes from trading. So yeah, and maybe I would add that from the regulatory point of view, especially when you talk about real estate, when you talk about art, you have to differentiate between making the asset tradable or in your words, liquid, or making the asset and the underlying that becomes fractionalized or becomes liquid. Because especially in Germany, so I can only tell you from the German experience with real estate, you cannot tokenize real estate. because you do have to have like a registrar. You have you do have to have like a paper deed that is in the traditional world really a paper deed and these kinds of things they cannot really be organized. When we talk about real estate or art, but especially for real estate, you talk about organization of cash flows of rent or you talk about organization of usage rights, something like that, but not the real estate per se that your linkage to a regulation because by law, it is not yet possible. Also, when you talk about tokenizing cash flows, it's more like you have a company that holds the rights or holds the real estate and the company get some kind of payment, let's say, rent and then they say, okay, if you want to invest in our company that as one income as rent, then you get the right to get the access to this income, let's say the profit or anything else. That's what you get from it. It's not that you and have a digital copy of the house or something that doesn't make any sense in that context and from a regulatory point of view, but it's more like you get access to the profits of the holding company or you, as I said, you can tokenize the usage rights, because these are rights, you can tokenize from a regulatory point of view. But not but not the ownership of the house, you cannot do that. But again, this this is in Germany, but it really applies to a lot of other European countries as well, because law is pretty similar to that. In the US, it's a little bit different. In the US, there are companies that really tokenize the shares of the real estate. But at

least in a lot of countries in Europe, it's not really that possible. In general, tokenization use-cases differ a lot between the US and Europe.

Q2. What do you see as the most persistent barriers to liquidity for tokenized assets, that blockchain alone cannot solve?

Interviewee 1 - I would say interoperability, like between blockchains is definitely an obstacle and I think we're seeing that as an obstacle, even like for cryptonative products. But I think tokenization isn't there yet where it's like that is the limiting factor. I think interoperability, even like within a single blockchain right now, is not great for tokenized assets with the exception of like stable coins. Like if I have USDC, or EuroE or something like this, I can go and put it into different DeFi protocols, I can take loans against it all that sort of thing. It's very composable. But currently the other tokenized assets, we have originally quite restrictive either because there's certain regulation that requires the only KYC investors can hold it or that sort of thing. So, I think right now that is kind of what's holding it back a bit more because part of the appeal of tokenization is kind of the utility you can get, right, by putting these assets on chain and kind of having access to all these different like refinements.

Q5. Some argue that regulation is the missing link to unlocking liquidity for real world assetss. Do you agree? Why (not)?

Interviewee 2 - It's a difficult question because, how do European regulatory bodies work is either they see a blind spot in the current regulation for this ecosystem, they want to monitor or want to manage, or they actively work together with market participants on regulation. And so, you cannot really say that once regulation is done, then the ecosystem will work, and it will unlock the full potential of the ecosystem. Because oftentimes it doesn't work like that, oftentimes it's innovation first and then go to market, and then regulatory bodies will start working on regulations. On the other side, and that's kind of a complex situation now because, market participants, especially when they work with large volumes or with regulated or compliant bodies like institutions, banks and so on and so forth, they want to have regulatory clarity. They don't want to build a product and then maybe one year or two years or five years later they have to reevaluate whether their product is still marketable or not because regulation comes. So, it's kind of a delicate situation, but um from what we discovered in talks with regulatory bodies like the ESMA or the European Securities and Markets Authority, they are in this case, in digital assets, they are very, let's say innovative with their own approach. They talk a lot with market participants how their possible the future solution could look like and how they can apply already existing regulation to it. With MiCA, we they did a huge step forward because they regulated a lot of parts of the of the digital assets industry before they went live. So, they regulated stable coins before there are a lot of European solutions out there in the market. With digital assets, it's a little bit, let's say, market friendlier, I would say, because regulation comes a little bit first and then everybody can see what they have to implement. But I wouldn't say that is it will be the same in the future because regulatory bodies state doesn't work like that.

Extra. Could embedding regulatory compliance into token standards (a sort of programable compliance) help overcome most of the above mentionned challenges?

Interviewee 1 - You can see that with the Swiss token I would say it's kind of an effort by the market participants, to kind of adjust a token for a specific use case that will still be general enough that it can serve like different products. But I think Philip we've had these discussions previously because at the beginning we weren't as aware of the regulation. And we were thinking like, which token is better to fit the regulation, but even with a single token standard, you could have different products, like one could be share of a company and another one could be like real estate or something where the technical implementation doesn't differ that much. But the underlying regulation that the covers it is completely different. So, it's hard to make them necessarily go hand in hand. It seems right now, the tokens of approach it more in a way we're kind of giving you the tools to be able to adapt to that regulation, something like ERC 3643 or something like that.

Interviewee 2 - From a regulatory point of view, also here, regulatory bodies tend to minimize the on-chain information, let's say it like that. So, we saw that with DLT Pilot Regime, where we did at PWC, we just studied together with the European bodies and they were very very hesitant to talk or to discuss how much information on the transaction, for example, should be put on chain. Not only because they are not really familiar with what is on-chain or what does on-chain really mean, but they are very familiar what off-chain means. And because every market participant as of now, they use off-chain data, and they report off-chain data, and they can be brought to court for off chain data. So that's why ESMA is really focusing on that. But also, that that's basically it, but I guess that regulation will also try to put into perspective what really does make sense to have on chain because not every information has to be on chain, like KYC data of the party data. And when you talk about institutional trading it's a lot different because the disclosure level is a little bit different there and compared to retail kinds. So that you have to put into consideration when we talk about how much information is on-chain and off-chain. And the regulatory bodies they adhere to that. They really see what makes sense and basically from a customer protection point of view and everything, they really want to minimize the information that is on chain.

Interviewee 1 - And from an automation point of view, like on the technical side, what we're seeing right now is like flexibility in these standards. You have specific ones like the the Swiss one, but even that one has a lot of like optional components to it to be able to cater to different requirements. With something like ERC-3643, you have the ability to kind of add identity texts but it's kind of open there as well and kind of have custom rules and that sort of thing. So I think at least right now that's the approach if it becomes much more clear in the future, like what information has to be unseen which one doesn't, like Philip was saying, I would expect either standards to evolve or necessarily people to just follow a more defined version of a standard rather than necessarily a more general flexible one that might not be needed as much in the future.

Interviewee 2 - And Eric, the transaction costs they get much higher, right? If you put in more context and more information on in in the transaction?

Interviewee 1 - I would say in general, yes, but there's a few caveats. Like, for example, something that I think is going to become very relevant is the use of Zero Knowledge Proofs for identity. Because it can allow you in certain cases to be able to, and to be honest, I don't know if the regulation is there yet, to kind of like interpret this as a valid check or something. But in theory, you would be able to prove, you know, certain compliance without revealing private investor information. You want to have this information on saying, but on the other hand, verifying these ZK-proofs is not necessarily cheap. So, it could still be more expensive in some cases.

Q3. Do you think regulations generally help or hinder liquidity?

Interviewee 1 - So, I would say it depends a lot on the kind of regulation. If it's a kind of regulation that's very hard to deal with, from a crypto or defi point of view, there's not kind of like a compromise between this is new technology, and this isn't. It works a different way. If you just try to apply the same rules that already existed to one product, I feel that can kill or limit some use cases. But on the other hand, there's already a lot of use cases that are under that. Like Phillip said like, if you want to tokenize real estate in Germany, you just can't and you're never going to see liquidity for that until that changes from the regulation side.

Interviewee 2 - Yeah, the same answer, but obviously you do have a point on compliance costs because they rise and then potentially, either the transaction fees or the spread is a little bit different for that transaction. I'm not sure whether retail clients really care about regulation. At least I don't. Even when investing or trading traditional instruments. I don't really care if there's regulation for that. But you get a lot of volumes and trading activity from having institutional clients or having onboarded institutional clients. Let's say you do have a market infrastructure that that has onboarded J.P. Morgan. The volume JP Morgan does with one transaction is higher than potentially all your retail clients in the month. And then, they really think about regulation. They have departments for regulation, and they have departments for monitoring whether their

business partners are compliant with regulation. So, the barrier for JP Morgan or for you to have onboarded a player like JP Morgan is much higher than for retail lines. Of course, you do have regulation for customer protection and everything like that. But that's basically easy, I would say, but for interbank transactions and institutional trading, you must have regulation, and you must be compliant with regulation. And I guess after that, if you have done that, you will be able to have secondary markets and you will be able to have brokers and you will be able to have other market infrastructures and everything like that. And that's basically in general, the point where institutional kinds focus on. And that's also why we see a lot of um licensing procedures in Europe because oftentimes a market infrastructure or an issuer, or a custodian, they do have a good solution, but they want to have a license, not because they require a license, but they want to show that they are compliant with regulation. Even though sometimes it isn't already in place, or it isn't already live. But they want to show that they are compliant, and they want to show that we do have measures for risk management for customer protection, for anti-financial crime, everything like that. So, you must have that in order to get the license and they want to have a license to show we have these kinds of processes in place. And so, it's a hard question again, and it's a twofold answer again because the market isn't just the market. You have to distinguish between retail clients and what their needs are and at least from my point of view, and I haven't seen a study where it says differently. Another example, I'm with Trade Republic as a private client and it only became only became recently aware that when I gave, so they do have a deposit account now so they offer that, but different to other banks, they don't really give the money to other banks to deposit there. They put it in a money market fund. And that's a little bit different in case of an insolvency. I don't know if you heard that But I wasn't aware of that as a client because I didn't care. It's somewhere in the in the terms and references, it's somewhere there. But I don't really care where my money is, I just see my bank account and then there's a number. And I guess for trading in digital assets is pretty much the same. But on the other side, you have the institution apart and they care a lot about regulation, because it's protection for them as well because they owe their customers that they do business only with compliant business partners. So, you have to distinguish really about between these two.

Interviewee 1 - And the answer is every time it's a little bit different for any side. I will say also for kind of like retail investors, they might not care about the regulation, but it could be that sort of regulation prevents a product from reaching it's peak, let's say, if it kind of limits certain technology or certain use case

Q6. Is Europe a conducive environment for tokenized RWAs, or will other jurisdictions like the US, Singapore or the UAE dominate this space? Why?

Interviewee 2 - Maybe I should start because I really have a sharp timing, a half a year ago, or a year ago, I would say that Europe had a pretty strong position because they have a lot of regulation already in place and a lot of market stability also already in place. And the customer base in Europe, per se, is pretty much the same everywhere. But now with the administration in the US, the this can change because, from what I get, the administration, as chaotic as they are, they tend to like the digital asset space, not only because they issued some meme coins, but also, they have huge holdings in different currency and everything like that. And they also are a little bit on in a war with their own SEC, the authorities. So, I can't imagine that this changes in the in the next one or two years. And this also has been implications on the market position of Europe

Interviewee 1 - I would say though to me at least it appears like the European strategy is much more intricate while the US seems more just kind of at least right now, as a deregulation approach, kind of like hands off and let market players just figure it out between themselves, which is significantly different, I would say.

Interview 3

Q0. Could you please introduce yourself, your role and your familiarity with tokenization?

Interviewee 3 - My name is Elisenda, I'm the general council of a Spanish company that is called Brickken. What I do as a general council is review legal complexities, legal documents, I draft documentation, normally for internal purposes, I advise the company internally. Sometimes it could be possible that I provide something to clients, but that is not the main scope of my job. And what we do at Brickken because basically it's better related to what you are talking about, is that we provide a software. Now it works like a SAS, but also we provide APs or while labels, so that company, can use the software to digitalize, to tokenize their assets, for instance, financial instruments or Real-World Assets, as we can see. And that's the main objective of our company, you know.

Q1. Tokenization is often presented as a solution to illiquidity in assets like real estate, private equity or art. From your perspective, how does it address liquidity challenges in these markets?

Interviewee 3 - This question is a little bit difficult to answer. What I experience is that there is a lot of misunderstanding, people don't know how tokenization works. They think that it is a very difficult concept or it's difficult to implement or how liquidity works, For instance, at Brickken we create a solution, that basically is a manner you can use to be able to digitize that asset value, but still, there is also, from my perspective as a lawyer, a lot of misconceptions, about the legality of tokenizing assets and converting them into liquid. Sometimes it's not only liquidity that you are searching for. Because it depends on the asset you are tokenizing. For instance, if you are tokenizing a financial instrument, or what we call in Spanish "value negociable", but in English, it could be, for instance, bond, shares, all of these is liquid assets. And with these, what we are only doing, okay, is putting a layer of technology. But sometimes companies are not searching for liquidity. They are searching, for instance, for more efficiency, or opening their market to other markets, like, if you are based in Spain and you want to sell your, quotas, which is different from shares, to Belgium, and this is why I'm saying that there is a lot of misconception about what liquidity means, because if you want to tokenize a share, you will not provide to this asset liquidity, because you will make it non fungible. For that reason, there is a lot of misconceptions for me, also legally. For instance, MiCA and how it applies to liquidity and to which assets, because sometimes, as you can see I one article I wrote about MiCA, I talk about MFIDII because the assets that are tokenized are not fungible or could be fungible, sometimes national laws apply, and for that reason is tokenization is really good to replicate fungible assets, liquidity, but sometimes it's not always the purpose of tokenization. Sometimes making it more available. The term for me liquidity, is a very technological or technical, but from the legal perspective I think that tokenization, it's very fun because we have like the concepts that are technical are not the same in legal. What means fungibility or liquidity in a technical point of view does not mean the same in the legal point of view.

Q3. Do you think regulations generally help or hinder liquidity? + Q4. Do you see MiCAR as a game-changer for tokenized assets, or is it too blurry/too restrictive?

Interviewee 3 - I think that more technology allows more liquidity. Because for instance, regulation is already there. The main purpose of MiCA, based on tokenization or on my perspective, I have seen from client asset referenced tokens, because sometimes a client may want to tokenize something that is oil, gas, or something like that, but it's not the normal case. The clients do not have this necessity. Normally, what they want to tokenize is more like, quota, shares, bonds, other financial instruments. What happens about the for instance, the institutions is that they already know the regulations. For instance, in real estate, normally there is no specific regulation for real estate, what real estate does, and this is also a misconception, as people think that when they tokenize real estate, what is that you are tokenizing in reality? You are tokenizing a financial instrument, which could be a revenue stream based on the benefit you take renting, or selling, or debt, when you are asking for money and then returning to your investors, or even shares or quotas, you are in fact selling part of your company that owns the real estate, and for that reason, what applies here are regulations that already exist and institutions already know

them, like MFIDII applies when it's a financial instrument like bond shares and others, and national laws, when it is, for instance, quotas. What happens is that when MiCA enters, in cases where you are using a tokenization platform and such platform, for instance, as a custodian or has other tools that make you obliged to be compliant with it. But if the financial institution has to comply with MiCA depends on if they custody or not, depends if you they are using a provider and that's why I was talking about the regulation DORA, but there is regulation specifically focus on digital providers to financial institutions. It could be crypto ones or a normal software. This is one thing. And what they want is that they not only want to tokenize what they have been doing for a long time. They have been managing shares for a long time but now they want to open other markets, like private markets. Being able to sell quotas off companies that are not public companies, it could be something that some investors are interested into, and institutions want to provide to their clients that solution. That availability of new liquidity, you are giving more options to your investors, but the asset per se is not liquid. And we are not considering it fungible liquid, but you are giving more options to invest. It's more like that. And that doesn't change the regulation because financially, the asset has been already governed for a long time. Normally financial institutions, they do not develop internally, a cryptoplatfrom or a tokenization platform, they will rather hire a provider that is already compliant with their standards. But if you are a real estate agent for example, you have to comply with the laws that apply to promotion of real estate, but because you are a promoter doesn't mean that because you are using tokenization that regulation is going to change, it's the laws that already exist that apply. Institution are tokenizing and are not waiting for MiCA to set the rules, but they still uh follow regulation based on the underlying assets. So they have to follow the rules from real estate, for example, and then, as well from financial instruments, that's what's complicates things.

Q5. Some argue that regulation is the missing link to unlocking liquidity for real world assetss. Do you agree? Why (not)?

Interviewee 3 - Well, of course, MiCAR is going to help. Stablecoins also enables to understand more digitalization per se. It's not that I say it's not helping. A lot to companies like Brickken, to understand how we have to comply, what we have to do. But I think that it's more the business interest, it's more than the hanger of the markets, and I think that financial institutions see the benefit of tokenization. They are starting to to do it and starting to see, this may allow me to sell to my clients, to my investors. That is something I never been able to sell, but now I can sell it because I can digitize it, it's easier, it's faster, I can access more markets. For me, the missing link isn't laws, it's businesses. Like everything in any emerging market and I think you the technology that fuels tokenization will be kind of hidden and clients will not know that it is used by organizations, but it's more the business that use it because of all the benefits. For instance, we have a lot of SME clients, or small medium enterprises, and basically, they don't care about blockchain. They don't care about all of these, they just want to be able to be fast, efficient, cost efficient, reduce cost of people, intermediaries, cost of transactions, easy cross-border transaction, and so on. They don't care about the technology, and some are even still a bit afraid of crypto volatility and big scams from the past.

Q7. If you could advise regulators on one change to improve liquidity for tokenized assets, what would it be?

Interviewee 3 - I will recommend you read the guidelines of the European Union because they did a sandbox, which is a testing environment, and they did the DLT pilot sandbox, but I'm not talking about this one, and they did another one that is less known which is the DLT Sandbox, where you present your technology, and they do tests where they try to see how to implement or how to resolves from doubts or misconceptions about something, and in this case they talked about token standards, because there was a company that presented their case and said, I have this standard and I want to know if this standard benefits tokenization. And they said, the standard is good. If it helps you to replicate the asset, the real asset into the blockchain, it is beneficial but is not a requirement. That company was probably more digital or crypto known because in our heads or technical heads, we think a standard for fungible, it's the same as an asset but no, we have to separate the technical part from the legal part. Of course, there should be something or

more information about standards with that I agree. And what I will say if I was a regulator is request to the regulator to make, for instance, the regulation that already exist and to, of course, more sandboxes because you work with companies and understand their issues. But sometimes the regulations are too general, and in tokenization there is so many possibilities, the regulator doesn't know how companies work, and this in several sectors, with specific assets. There are companies that tokenize, for instance, the real assets, there are company that do custody or other that provides services, and so on. But trying to govern everything with the same laws doesn't make sense. There are several sectors, for instance, in the automotive sector, you will not regulate all the automotive sector by the same law. It doesn't make sense because you have electric vehicles, gas vehicles, hybrid vehicles, it's not the same and that why regulations are different. Trying or wanting to create a general regulation for everything that runs in blockchain doesn't make any sense, because it's totally different. I will be messy because then as a company you ask yourself whether this regulation may or may not apply to you and you have to start analyzing, how it could apply, but sometimes there is this grey area, but because you don't know how this can be, and that's why sometimes regulations come after when you've tested. But the issue that there is so many things to test but it's not possible to test everything and see if there is a potential risk for investors. They have to separate what is, for instance, a utility that I think it's very good and that exists for that, you have to publish your paper and things like that because, of course, there is an investor, a person that invests and that is a risk. That is not the same as a B2B that wants to tokenize their assets like a share, as that is something that already exists. You are just providing new technology to help them. I think they are trying to do their best, but I think there is a problem, I think in in Web3 environment, which is a total disconnection between companies that try to navigate through the laws, and regulators. There is a disconnection, and I think that is what has to be resolved.

Q6. Is Europe a conducive environment for tokenized RWAs, or will other jurisdictions like the US, Singapore or the UAE dominate this space? Why?

Interviewee 3 - I don't think that is that and what they do is still very good, and the US are probably freer, but we have seen SEC penalizing some actions after without any lobby, more than a use case based afterwards and that is not good neither. It is difficult. It's a question that I always receive. No. What do you think? Is Europe too restrictive, is not restrictive enough, is not trying enough? No, I think it's a process that every nation has to follow. When the first car appeared, they had to start knowing how to regulate or all the regulations in financial instruments, they are evolving every day. You know? And in Europe, you have many countries in the US. There is just one country. When you look in Europe, Switzerland is very advanced, but other countries are not even aware of the capabilities of blockchain and are still banning crypto for example and I think that is the main problem also, because there are so many different ways and things to regulate. In Europe, there are countries, that are based on "everything that is not regulated is allowed", and others, "everything that is not regulated is not allowed". It's difficult for companies to grow in that, because if we are saying in our case, no, that sometimes in the Web3 space, we are in gray areas because our object is not regulated in MiCA, you could still do it in some countries and not do it in others. Europe has to put different cultures, different countries with different regulations, and it's not, I don't think it's not an easy job for the regulator, but I also think that one of the main purposes of the European Union, is that the moto that the governs all the regulation of Europe is to promote innovations. It's not an obligation that the European Union forces its regulator to promote innovation. But they are doing it. Let's talk in a one year and see if they if they do it or not.

EXTRA. If I had one thing to remember from this conversation, what would it be?

Interviewee 3 - Regulation doesn't really drive innovation. It's more innovation that drives regulation. Exactly, but I think it's in all sectors. I used to work in the automotive sector, and it's also difficult because if it's something new appears, you have doubts. How it's going to go and who is going to go, then new regulations apply that you are now not authorized to do something anymore. But the thing is, is what moves market, moves the regulator. If there is no economic interest, I don't think regulation may be annoying for a business, but it's good for clients, and I can tell you that they ask a lot if their provider or asset manager respects compliance laws, like AML,

all of that, you know they search a lot for that. And sometimes I think crypto has a bad reputation, and big misconception, tokenization included. Actually, what tokenization means, it's basically what we have been doing a long time, but just with a layer of new technology. But because it's blockchain, they think everything related to it is the same and that it's not good for us. Sometimes it scares people, now new clients try to know if you provide KYC, KYV services, and several providers provide that and you get can put it in your software. I think that there is a misconception also from the vast majority of people thinking that companies who want to tokenize are not worried to be compliant. They are the most worried ones. My clients are the most worried about everything, like AML, MiCA, MFID, everything. Bank of Spain, Bank of..., wherever they are based, they want to stick to the rules. And I think that is something everyone should know like if they want to be compliant but sometimes if you don't know how to be compliant and you get super scared, and you don't know what to do. And that doesn't benefit innovation, of course.

Interview 4

Q0. Could you please introduce yourself, your role and your familiarity with tokenization, and explain a bit what Sygnum does?

Interviewee 4 - Yes, so my name is Iman and I've been at Sygnum for over a year and four months, something like that. I started directly in the organization team and prior to that, I've been interested in blockchain and crypto and tokenization just by myself. I never worked in it before joining Sygnum, similarly to my colleagues, who come from different backgrounds, so it's very interesting that everybody has a different story. Since I joined, we had a number of projects that went live talking about exactly the topics you're interested in, about unlocking the liquidity of the assets that are usually not very accessible to, let's say general public or more precisely, to a wider range of investors. What we do at Sygnum, more broadly, is that we take full process from the beginning to the end. We first assess, if it even makes sense to tokenize something, because what a lot of people do, and this is kind of one of the limiting factors to broader adoption, is that, in theory, you can tokenize anything you want, but you still need to create a valuable investment product out of it. Does it make sense to invest into it? How long you have to hold on to it? What can you do with it? Can you land against it? Or can you trade it? And, how can you exit that investment? Basically, when a company comes to us and they say we want to organize a certain asset, will help them to make an investment product out of it with all the legal work behind it, the technical work and really create like a valid business case for it.

Q1. Tokenization is often presented as a solution to illiquidity in assets like real estate, private equity or art. From your perspective, how does it adress liquidity challenges in these market?

Interviewee 4 - The main, let's say a reason for it, is that tokenization allows for fractionalization, so you can take one asset and basically breaking down in a lot of little pieces and invest in a fraction of a total thing and that makes it a lot more affordable. For example, we did that with the tokenization of a Picasso painting, where basically, we had three approaches to how to do it, and one of them was that you could sell it a lock chain as one NFT, but then it's just still one painting and one cost which is like millions of euros and it's not very interesting. Then we had an option of dividing the painting into several pieces, not physically, but also digitally, and have like a pixel NFTs, but again, it would mean that you would only own like a bottom left corner of the thing. And it's more difficult to trade, and you can't split it indefinitely. In the end, what was done is that the value of the painting as a whole was kind of divided digitally into a thousands of pieces, not of the painting, but of the value of it and then this way, people could invest. I think starting from 5000 franc, which for a painting that's worth like four million francs, this is a much more accessible way to own a piece of art. I mean, you don't have it in your home, but you do have the voting rights, the ownership rights over that piece, and can benefit the revenue proportionally to your investment if it's rented to be exposed somewhere or else. This is what we did with fine art. In private equity,

we managed to lower the minimum ticket size as well, and from what's usually in private equity like 100,000 or 200,000 tickets, we managed to lower it to 1000. It's a lot more accessible again to a larger part of investors. More technically and how we put it on the blockchain is that, well, there is always legal constraints to all of those things, so SPV is a common way of doing it because you create a vehicle specifically for this purpose, and then you kind of tokenize the shares of it. But, in case of Sygnum, it always depends, and it changes from project to project and the legal requirements also not only Switzerland, but of the fund or, you know, where they can distribute and how they can distribute. And it's a lot of the legal work behind it. But yeah, it's kind of still customized to each project, I would say.

Extra. So, do you think that tokenizing an illiquid asset will inherently make the assets more liquid?

Interviewee 4 - I mean just purely in the economic value, yes, but could everyone who owns a share of Picasso have Picasso in their living room? I don't think so. You know what I mean? It has to be seen more as investment opportunities. It's like what's real estate portfolios, right? It doesn't mean you can go and live in that flat, that you own a fraction of for like a day, in a year. So. I mean, it's the same way with, like traditional shares, right, right? Like, would you say, does it make the fact that you can buy a share of a company? Does it make a company more liquid? Not really.

Q3. Do you think regulations generally help or hinder liquidity? + Q5. Do you see MiCAR as a game-changer for tokenized assets, or is it too blur/too restrictive?

Interviewee 4 - I mean, for each company, the regulations are different, based on the countries they're operating into. If you look at the EU, with the MICA framework, they kind of took the better safe than sorry approach. Whereas in the US they do the opposites. It's always been a better ask for forgiveness than permission, which is not something that Europe does. So in case of European regulation, I think it's a positive development for like larger institutions as they would then have the clear path to entry because they need that regulatory clarity. They need to know what is allowed, what is not allowed. Everybody is trying to avoid the grey areas as much as possible, right? So for Sygnum at least, it's a good thing as it gives us a clear path to an engage with European clients for the European market. Not for European clients, let's say European issuers issuing in Switzerland, but then going outside of Switzerland as well. Switzerland has its own framework. But at the same time, I'd say it would put a lot of pressure on the smaller players, like startups, because they would have to then bear a lot of the compliance costs before even going to market. And this is what I mean by like, better save this because, you know, in the US you can kind of test a lot of things and do a lot of things before you even set up a company and before you go through all this regulatory stuff. Whereas in Europe, it's the other way around. You have to prove everyone that it's safe and compliant and it works and only then you can go and test it. But overall I think just the fact that it's, you know, that this is already a conversation in Europe, that they're talking about it and they're however restrictive or not they develop things with that in mind, that this is a good thing. It's much better than just denying. You know, which is what they were kind of doing in the beginning. If I'm not mistaken with Christine Lagarde, she said something like, No country will have Bitcoin in their treasury or something like that. And now it's kind of, okay, well, let's talk about it.

Q9. How do you envision the evolution of RWA tokenization over the next 5-10 years?

Interviewee 4 - I mean, the biggest challenge, I think, is broad adoption of the technology or the broad use of it, whether it's conscious or not you know? There are these two views like on one side it could develop on its own and DeFi could grow fast but it's risky because it needs participants to work and with the bad reputation around crypto I don't think it will attract many people. Now, on the other side, I think most of these capabilities could just be integrated into existing institutions so that investors benefit from all the advantages. At the end of the day I think there's still going to be this divide, you know, which way we're going and how much decentralized and autonomous can we go. But overall, I just think that blockchain in general is a back-end revolution, it's a behind the scenes revolution. At the end of the day, you shouldn't care whether you invest on chain or not. All you care about is the return, right? So it's kind of like. I mean still,

if you trade on chain, like if you do any of the stuff yourself, you still see how kind of cumbersome it is, you know, if you also do it not just with like MetaMask, with physical wallets and stuff. It's still very not user-friendly. I think in the future, in the far future, it will just become kind of the back end, the infrastructure and people like normal users will just will not even know that it's blockchain because they shouldn't really care that it is.

Q8. In your view, what's the single biggest challenge to achieving widespread adoption and thus liquidity of tokenized assets today?

Interviewee 4 - That's a million dollar question. Yeah. I mean, that's kind of the chicken and egg situation, right? It's a bit tricky because you see with companies with tokens like BUIDL, you know, with Black Rock, they're chasing competitions for treasury management, like \$10 million. What is \$10 million to them? It's absolutely nothing. But there's just, there is no demand, you know, there's lots supplied. Everybody's tokenizing everything now, but there is no market to play in that. And if I knew how to fill it, it would already be done you know? I think it's about creating a valid business case because a lot of those investments, you buy and forget, and this is why there is no market as well. So it's kind of it's kind of on both sides to keep trying to create those products, but also make it easier for people as much as possible. And again, make it maybe clear to them that you know it doesn't matter whether it's on chain or not. Just invest in it. I also think that a lot has to do in partnerships right now because he has people, everybody's launching their own stable coin, Everybody's launching their own chain, you know. And at some point, if you want to market, you have to consolidate all of that somewhere. Otherwise, you have the issue you already have with fragmented liquidity, you know, which is a huge field for arbitrage and stuff, but in terms of creating one market, it's very hard, because for now everybody's creating their own thing, whereas I feel like now it's time to collaborate between all those companies and that would hopefully then create that market and the liquidity that people can actually benefit from. It's always a bit complicated. But this is the general trilemma of blockchain, right? Do you want to decentralized and secure, or do you want it decentralized and scalable or you want it secured and scalable but then, you know, there are going to be trade-offs at some point, and if you want broad adoption it has to be scalable, and for regulators and institutions to authorise it, it has to be secure right? So maybe the decentralized part will still lag a bit behind you know.

Q10. Is there anything we haven't covered that you think is important to mention?

Interviewee 4 - I really want to emphasize that the topic main in the industry right now is that, and what makes a difference between some projects and the others is that what are you really tokenizing? Like, are you really giving the rights and the ownership to the token holders? Or do you just promise them that they are owed this much money if this growth, you know, like, do they have the, basically, do they have the shareholder rights or do they have claim to the economic value of what they're investing in and that's it? And this is a very different conversation because legally the different process wise it's also different and also, you know, what rights do you have attached to the product that you're buying and often it's not very clear between some of the projects or another one is also the source of truth, right? For example, BUIDL. If you look at their documentation, although they created all these, you know marketing noise around them. The source of truth for that product is not on chain. It's an off-chain register. So you know, a lot of those projects you have to really question, what is being tokenized as a token holder, what are you actually getting? Is it just the money or is it the rights as well and if anything happens to the blockchain or the off-chain world, like where does the truth lie? Like, where are you entitled to? And. So that's kind of, there's a lot of projects right now, but these are, say, the fundamental differences between them that yeah, that differentiate them and make ones stand out versus the others.

Interview 5

Q0. Could you please introduce yourself, your role and your familiarity with tokenization?

Interviewee 5 - My name is *Alice* I am specialized in digital assets, blockchain and tokenization, and I support financial institutions through regulatory licensing processes such as MiCA but also laws specific to Luxembourg. I've also worked with clients tokenizing funds and assisted in the development of digital asset platforms.

Q1. Tokenization is often presented as a solution to illiquidity in assets like real estate, private equity or art. From your perspective, how does it address liquidity challenges in these markets?

Interviewee 5 - Tokenization itself does not automatically make these markets more liquid. Regulations also play a key role, and sometimes investments are restricted to certain types of investors. If tokenization is introduced to these markets, it may still be limited to a specific investor class due to regulatory constraints.

However, tokenization allows for the fractionalization of assets, which was previously difficult, especially in sectors like art and real estate. More importantly, tokenization makes it cost-efficient to split assets into smaller parts, opening up business cases where lower entry tickets can be offered. For private equity funds, tokenization reduces the cost of handling subscriptions, redemptions, and investment/divestment operations. Thus, tokenization can address liquidity challenges in illiquid markets by making investment management more efficient—provided that regulation supports it.

Extra. Have you observed enhanced liquidity as a result of tokenization when working with clients?

Interviewee 5 - Well, I cannot talk about specific projects, but it's clear that players in the industry are actively exploring tokenization as a solution to improve liquidity. There is ongoing movement in this area, but traditional financial services move at a slower pace. Progress is being made, though, and it's likely that we will see greater adoption over time.

Q2. What do you see as the most persistent barriers to liquidity for tokenized assets, that blockchain alone cannot solve?

Interviewee 5 - Technology itself is not a barrier—it's available and capable. The primary issue lies in the slow adoption of the ecosystem. For instance, imagine a tokenized fund where an investor stores their units in a private wallet. To manage a tokenized fund, one needs to set up wallet infrastructure, and custodians and service providers (like accountants and transfer agents) must support tokenized assets, which requires time and effort.

The adoption of stablecoins for subscriptions and redemptions is still limited, especially among traditional financial players. As more players adopt tokenized solutions, it will be easier for new players to join and for services to improve. Currently, there are limited players offering tokenization services, which creates dependence on specific service providers—something that businesses want to avoid. However, new regulations, such as MiCA/LU Blockchain Laws, are pushing the ecosystem forward. Over time, this will become a more cost-effective and efficient way to offer tokenized products.

Extra - Building on that, do secondary market designs proposed by DeFi, with automated market makers for example, greatly impact liquidity?

Interviewee 5 - It's still early to assess the full potential of secondary market designs, as there are not many use cases for tokenized assets trading at this point.

However, I believe Automated Market Makers (AMMs) have significant potential, especially for financial instruments. That said, AMMs cannot operate in the same way as they currently do in decentralized markets like Uniswap, as financial instruments need to be traded in a regulated and KYC-compliant environment. It remains to be seen whether pricing can be better obtained through AMMs versus order books.

Q3. Do you think regulations generally help or hinder liquidity? + Q4. Do you see MiCAR as a game-changer for tokenized assets, or is it too blur/too restrictive?

Interviewee 5 - European regulations, such as MiCA, are a step forward in fostering market adoption, which in turn drives liquidity. However, MiCA can be burdensome, especially for new entrants, as the regulatory licensing costs for offering crypto-asset services in the EU are high. In Luxembourg, the local blockchain laws are proactive in supporting the tokenization of financial instruments, which could help accelerate the adoption of tokenized products in Europe.

On the other hand, MiCA sets strong requirements for stablecoin issuers (EMTs) which have led to the exit of players like USDT (Tether). While MiCA pushes for more clarity and adoption, regulatory hurdles can still pose challenges. Also, MiCA does not directly regulate illiquid assets such as real estate, private equity, or fine art. It also excludes non-fungible tokens (NFTs).

MiCA regulates crypto asset service providers (CASPs) and issuers of crypto assets (including EMTs, ARTs, and other crypto-assets). If an illiquid asset is considered a financial instrument, it would fall outside MiCA's scope. For example, real estate, fine art, or PE assets are often commercialized through funds, which are considered financial instruments and therefore not covered by MiCA. I think MiCA's impact on illiquid assets would be indirect, as it could affect the settlement of financial instruments using EMTs, but not the financial instruments themselves.

Q7. If you could advise regulators on one change to improve liquidity for tokenized assets, what would it be?

Interviewee 5 - I would advise regulators to review and adjust the regulatory framework to make it more business-friendly and easier for companies to adopt. While MiCA has been a great step forward, it's essential to avoid over-regulation that could stifle innovation. Comparatively, the US while it is substantially behind EU, is now moving quickly in this area, so it's important that Europe doesn't fall behind in terms of innovation and regulatory clarity.

Q9. How do you envision the evolution of RWA tokenization over the next 5-10 years?

Interviewee 5 - DeFi infrastructure is innovative and has a lot of potential to integrate with traditional financial systems. However, traditional financial players will only work within a regulated environment. Therefore, while tokenized assets and DeFi can bring innovation, they will need to adapt to regulatory frameworks to be integrated effectively into traditional finance.

Interview 6

Q0. Could you please introduce yourself, your role and your familiarity with tokenization?

Interviewee 6 – Yes, well I'm Alex and I'm the co-founder of Toqenize, which is an asset tokenization platform enabling real-world assets (RWAs) to generate, stream, and distribute value in real time. So, beyond that, we've built the platform to be fully MiCA compliant, which ensures we're aligned with the upcoming regulatory framework in the EU, but I'll probably talk about it later once you ask me questions about it right?

Q1. Tokenization is often presented as a solution to illiquidity in assets like real estate, private equity or art. From your perspective, how does it adress liquidity challenges in these market?

Interviewee 6 – Well, I think liquidity is actually the major problem we are trying to solve with Toqenize, and with the tokenization of RWA, the real-world assets, the main focus is to make assets that are normally illiquid, liquid, by tokenizing them or fractionalizing them into tokens, which are, under MiCA, will be classified as ARTs, asset reference token, but in our specific product, what we're doing is we're building a streaming protocol that it aims at activating liquidity, because of course, RWA's, though they make illiquid assets like real estate or, you know, intellectual properties, whatever, liquid, but in general, they become illiquid, because once it's tokenized, what do you do with your token? And so, this is where we're introducing a streaming protocol, which is designed to generate yield and stream the yield from the underlying activity of the assets. For example, we tokenize real estate in the hospitality industry, the hotels, for example. Because hotels make revenue from selling nights, rooms, you know, events, spaces, whatever, or another example could be intellectual property, which gets revenues through royalties. So, what we do is from this revenue, we have a protocol that will calculate the yield and directly stream it to the wallet of the investor. The idea is to provide some kind of an incentive because the adoption of RWAs is very slow because what investors want is yield, they don't just want to have a certificate of a digital asset that's basically illiquid and therefore, we put in this protocol that brings the yield. And when we're trying to do is to use a utility token to generate this yield, but now I'm asking myself today, am I transforming the RWA, which is essentially is an ART into a security because it generates yield, because under MiCA you know, tokens cannot generate dividend interest or anything. And I'm trying to go around this with using stablecoins to tokenize, I mean looking if the token or stablecoins to tokenize the asset and then to generate the revenue, the stream from the underlying activity, I'm using this utility token, but it generates revenue, and therefore, does it fall under MFDI or is still under MiCA. So, that's a very, that's a very important question I have to find an answer to, because of course, MiCA is a net liquidity enabler, that's for sure, because it has clear rules for tokenized assets and infrastructure, and then in some respects, the assets will not become automatically liquid, so we need to have this activation mechanism and this is what we're building with our streaming protocol. By the way, we're building a platform on Hedera which is an enterprise grade network. It has been designed for institutional trade. On their governance board, they have prof manufacturer like Boeings, they have banks like standard bank of South Africa, they have electricity company like EDF of France, or they have Ubisoft. All different kind of companies which operate the nodes. And that's one advantage is because it's been designed for enterprise ready network, but it also has the lowest trading fees for mass transactions. It's also in terms of ESG, it's the greenest of most sustainable network there is. It's very robust and it is MiCA compliant and it has a very, very robust, very secured environments. So that's one of the reasons we chose Hedera and also because we've very much been involved into their ecosystem and we are actually at the moment we're talking to them, because they are very interested in what we're doing. They want to make our protocol a layer in Hedera so they can be used by, you know, anyone who's building on Hedera. So, we developing on Hedera, and we are providing interoperability to the other blockchains and we will you know we will develop on of the blockchains. But that's one of the reasons we chose Hedera. And we have just been, actually yesterday, approached by the Mika Crypto Alliance which is an organization who provide support to startups, to industries, companies that want to make their infrastructure or whatever they're doing, MiCA compliant. So, they have just asked us to be part of their MiCA launcher, so we will be one of the first startup to integrate that because MiCA was very much at the at the start of

our project as we wanted to make sure that compliance was at the heart of all of what we were doing. We started as developing a tokenization platform but tokenization has become a technology that is very codified now, which is well established. You have Hedera, you have Centrifuge, also with their own systems, you have polymath and so on. So, we realized we cannot just be a tokenization platform. We had to have a very strong differentiator in order to attract investors and therefore, we asked the questions, what is needed in the RWA to help adoption? Because adoption curve is very slow, but it's coming there. You see big financial companies such as Blackrock, Forge and so on coming into it. So, it's slow to happen, but it's going to happen and it's going to be fast and we have to be to be ready. If we want to develop RWAs, we need to have something that's liquid. And though, as I say, MiCA is an enabler, but at the same time, there are a lot of constraint because in terms of regulation, it becomes very complicated and there is a lot of constraint compared to other countries. For example, I was in Dubai for Token2049, and they have a framework, which is a lot simpler than the European ones. And so, we thought, we need to address this activation of the liquidity, the liquidity is possible we need to activate it and this we come up with a protocol that Hedera is now interested in. And we thought that once we enabled the yield, that means we also need a secondary market, and there isn't really a secondary market today for RWAs. When you tokenize there's two ways you can make it liquid, either by generating yield or by making it available on a secondary market so that it could be exchanged and used to contract DeFi loans, or for staking, and so on. So that's the second thing we are developing as part of our own ecosystem, which, by the way is called Osmium. So, we are also developing this second new market, which we also help the liquidity of tokenized assets, basically.

Q3. Do you think regulations generally help or hinder liquidity? + Q4. Do you see MiCAR as a game-changer for tokenized assets, or is it too blur/too restrictive?

Interviewee 6 – Well, I mean, the challenge with MiCA is that there's all this requirement, of course, on AML, KYC, security and all that. So, we have totally integrated it and actually, we are using AI agents, well, at the moment, we're using third parties for you know, but we are developing an AI agent that will uses of our platform to conduct all the different phases and what is needed for compliance. But of course, there's a cost behind it because it means you have to have someone within the company that what that is that the reference person for security, for KYC, for all of that. And of course, to get a license, you also need to have a good insurance today and I don't think there's many companies that want to insure crypto markets, therefore, you need to have a lot of capital aside. So, you need to make sure that all of this is in place and it does not necessarily take time because MiCA has the advantage of giving you a very clear picture so you know what needs to be done, whether for the white paper, and all the different steps they need to take. So, it's mostly a question of resources, both human, material and financial. But this can take time because the process also depends on the country where you're doing it. We want to do our application in France because this is where we're based, but this is one of the most complicated processes. I think it's a lot easier to get in in Lithuania or some other places in Europe. The other difficulty is trading. The good thing also is that you can work around the constant, because for example, if we aim to launch a stablecoin, an RWA backed stablecoin, because that's something we want to do, because there aren't many Euro stablecoin at the moment and that's also due to MiCA because a lot of stablecoins were decommissioned from exchanges because they were not MiCA compliant. We want to take our time, and we hope to have one of the targets Europe denominated stablecoin. So to do that, of course, we have to make sure all the requirements for the MiCA license are in place, but we know that there is an exemption, for example, if you, if we're going to start small, if we issue less than five million worthless stablecoin and remain in the professional realm, we can, you know we can start that and then the most difficult, the most challenging issue is of course, to have investors coming on board and, adopt our stablecoin, knowing that it will require a lot of investors to build something that is sustainable in terms of growth. But, I think MiCA, for myself, I don't see it as a constraint, I see it more as a challenge, but something which is good, because we know we need some time to have some kind of structure or some kind of regulation. We know that without regulation, things go all kind of ways and five to ten years down the road, we don't know what it's going to happen. So, I want to see MiCA as an opportunity. This is why we integrated right away in in our construction, and we're going to rely upon it.

Q8. In your view, what's the single biggest challenge to achieving widespread adoption and thus liquidity of tokenized assets today?

Interviewee 6 – I think mass adoption is going to be the key, of course, but one of the reasons why it's not happening yet, it's like when someone buys a car, he doesn't want to know how, you know, the engine works. You just want to drive the car. And organization to be adopted by the general public will be the same thing. We want to hear less about the developers and the technology and more about the user experience. And this is why we're building the user experience around what the user wants. The user wants yield, he wants return from his investment and want a friendly interface, not having to worry about what's going behind the scene. Also, yes, that's where regulation has to make a move forward. Because today, for example, if I take the market in France, like I said, you cannot tokenize your home like in Dubai, for example, because it's complicated, you have all the land property registry and the government tax and so on. So, you cannot really say, I'm going to organize my home or I'm going to tokenize my car. My neighbor he likes driving a Porsche, but he doesn't have the money to buy a Porsche, but he can you know, tokenize it and have a fractionalized bits of the car represented by those tokens, and anyone can buy a token, and maybe as an incentive, they can get one day free rental of the car or whatever. The day this will happen, it will mean that we have really democratized tokenization. But now it's still an emerging technology. It's general of the blockchain anyway, especially when it comes to tokenization. But there is so much potential. There is a lot of things happening. For example, when I was in Dubai, I met with a fertilizer trader. There's a huge demand for fertilization product, especially since COVID, every country want to be able to manage their crops because you know if you don't do that, well, it's to be complicated. So, they want to tokenize fertilizer crops because they see an interest in doing that. And I think this is going to happen everywhere in the supply chain. I think in 10 years from now, everything almost would be will be tokenized. But I think the strongest barrier to adoption, is that it has to be simple for people. And this has not happened yet because we still very much in a tech kind of you know, environment where it's tech people to tech people, building poor products, we need now to build products for the grand public. We're starting with the institutional with the banks with the companies and the next step will be to go to the B2C. To me, it's all in developing the right user experience, for the corporations, institutions, governments, and so on.

Q2. What do you see as the most persistent barriers to liquidity for tokenized assets, that blockchain alone cannot solve?

Interviewee 6 – I think cross chain is it's already something that is happening and definitely yeah, but interoperability or the ability to operate cross-chain is going to be fundamental because they will not be one solution fits all, you know, I don't think there will be like a Google or Amazon of tokenization. But I do think there might be one in the interoperability protocol, perhaps. I know today we're using ChainLink as our protocol, but it's very important to have cross chain, and that's the essence of decentralization, to be able to use every available protocol without being encapsulated in one. Because then if you do that, you defeat a decentralization completely. So, yeah, this is key. I think there are even Hedera is actually using Chainlink to provide interoperability. So yes, it must be, even if you choose a specific platform for whatever purpose, you need to be open to cross-chain in in any case, because you cannot be part of decentralized organization if you're not open to everything that's around in your ecosystem.

Extra. Do you think tokenization fundamentally changes the liquidity profile of these assets, or does it create a different kind of liquidity around them?

Interviewee 6 – I think this is part of what I mentioned earlier in that for example, it depends in which country you are, because the regulation changes and it's very different. But of course, in France, you cannot tokenize your house unless you transform it into a company and you create an SPV to manage the tokens at the same time. The reason is because I think it's not just a matter of the system, not enabling that yet. But I think it's also in the mentality of people, because people say, well, at my house is my property, when I fractionalized it, does that mean that I'm no longer the owner and the ownership is very important and that's also a process when you to organize

you have to make sure that you have the the proof of ownership. And if you remember, for example, FTX, this big exchange that collapse, is because they said they had the assets, but no one bothered about checking the in that case was the proof that they had the proof of ownership of what they were saying. And I think in the mind of people, ownership is something that you could not organize. Indeed, so what you will tokenize is the financial instruments that you use for purchasing a house, example or if you tokenize the representation of the house. Because if you have a house, what do you what do you want to tokenize it for? When you tokenize, it ultimately is to make it liquid because you have your house and you need funds to other make it bigger make some improvements or you know or build another house on your land or whatever. This enables you to raise capital, but while keeping the ownership of your house, the investor is not buying a piece of your home. It's buying a piece of the representation of it, which can be linked through the financial instruments to the asset itself. And this is why you need to make that happen, you need to have a secondary market, because what happened when someone who bought 10,000 tokens of your property say, well, now I want my money, then you need to be able to sell the tokens on the secondary market because he's not going to sell your house to get it. And that's what people think, oh my God, he's going to sell the house. So, the mentality needs to be changed to understand that we are in almost in a virtual, it's a virtual asset, really. What you are dealing with is the virtual representation of a real-world asset and therefore when you when you tokenize a house, you are creating the virtual twin of your house. And it is this virtual twin, which is going to be exchanged on the market, and that you sell to generate liquidity and to be able to get loans on DeFi and so on. And I think once a general public will pass that psychological barrier that, no, it is not actually my house that I'm going to lose ownership of. It's the representation in tokens that is traded on the market. And I think we would have a lot more people getting into it.

Appendix H: Interviews Matrix

Key Themes	Liquidity Facilitator	Liquidity Barriers	Views on Regulations	MiCAR's Impact	The Missing Link
Eric (Blockchain Engineer)	Fractionalization is the main factor, but is not necessarily a given, as an asset can be tokenized without being fractionalized (NFT). 24/7 trading is also a factor.	Interoperability between blockchains and even within a single blockchain is still restricted due to KYC regulations, but also because the technology is still in its development stage.	Applying the same rules for all the new products can kill some use cases. National regulations can also completely block some applications of tokenization (Real Estate in Germany for example).	Great initiative, but could benefit from more clarity and specification regarding the classification of tokens. Token standards like ERC-3643 could be adapted for compliance, facilitating the work of companies. However, there's too many specific cases.	/
PHILIP (Tokenization Analyst)	Fractionalization make the asset more tradable, but liquidity comes from the trading volume, from secondary markets, so fractionalization alone doesn't improve liquidity if not traded. Also, what we tokenize is more cash flows, rent, or usage rights, tied to the underlying asset (usually through an SPV), rather than the asset itself, at least in Germany.	/	Retail investors don't really care about regulations, but institutions do, and want to be compliant and obtain licenses, even when not obliged.	MiCAR is a major step for preemptive regulation. Its great for digital assets, so that firms already know what and how their product must be created and traded to comply with regulation, but this won't be the same in the future, as regulators rather regulate after the innovations have gone to market. Regulators should collaborate with institutions to fit regulation to business needs.	Liquidity needs market participation, not just tech. Institutional adoption is starting to grow, we'll see if retail investors will follow.
ELISENDA (Tokenization Legal Counsel)	More technology = more liquidity. / But, people misunderstand the concept, tokenization doesn't unlock instant liquidity, but tokenization creates new investment opportunities, similar to financial instruments, but with a new layer of technology, making it more efficient. It's rather "new liquidity" creation, but <i>the underlying asset does not become more liquid per se</i>.	Trying to govern every blockchain related product with the same laws doesn't make any sense. Regulations already exists for financial instruments, and for specific sectors such as Real Estate, Private Equity and Art and it's confusing for such businesses because there is a mix between applying rules relative to asset itself, but also to CASPs under MiCA, and also to financial instrument under MFID II, ...	MiCAR helps clarify obligations, but is too general compared to all the possibilities of tokenization. Even if financial instruments are out of MiCA's scope, the companies issuing it must be compliant and licensed, providing guidelines to institutions. National divergences within EU makes it even more complicated, but EU is trying to promote innovation while protecting the investor, and that's a very good point. Currently there is a huge disconnection between businesses and regulators. More sandboxes should be used and rules should be sector-specific to avoid over-generalization.	The missing link isn't law, it's businesses, participation. Most clients don't care about the technology, they just want cost-effective solutions.	

Key Themes	Liquidity Facilitators	Liquidity Barriers	Views on Regulations	MiCAR's Impact	The Missing Link
IMAN (Tokenization Consultant)	Tokenization allows for fractionalization. Liquidity impacts depends on the approach. A Picasso painting can be put on-chain as one NFT, but it's still only one asset and it still costs millions. Dividing the value of the painting into tokens (usually through an SPV) creates new investment opportunities and allow holders to benefit the revenue proportionally to their investment. But after all, the painting itself is <i>still the illiquid painting, it's the tokens representing it's value that are traded and liquid</i>. Same in Private Equity.	Everyone building their own chain, and at some point, if not consolidated, it will create fragmented liquidity. The blockchain trilemma also plays a role in this development, depending on which aspects are favored between scalability, security and decentralization.	Regulations are positive for large institutions, providing guidelines, to avoid grey areas. However, it can lead to overregulation. They can be less beneficial for startups coming with new products, waiting for approval and regulatory clarity.	MiCAR is positive for larger institution and provide safeguards for development. It's a "better safe than sorry" approach. Puts huge pressure on small players, highly affected by huge compliance costs and licensing fees. Great step forward, trying to regulate means they're starting to accept this technology, which is better than just banning all DLT related product	Coherence in tokenizing things that make sense and create value. Broad adoption, user-friendliness, or even if it'd a back-end revolution, it has to be used to unlock the benefits of it
ALICE (Tokenization Consultant)	Fractionalization is enabled by tokenization, which was previously difficult in traditional markets. It addresses liquidity challenges in illiquid markets by making investment management more efficient. It offers lower entry tickets. However, tokenization alone doesn't make the assets more liquid, regulations play a key role.	Technology is available and capable, the issue lies in the slow adoption of the ecosystem.	Regulations sometimes restrict certain types of investments to specific investor classes. However, they can foster market adoption, which in turn drives liquidity. Traditional institutions only work within a regulated environment.	MiCAR regulates CASPs, ARTs, EMTs, and the other cryptoassets, but not the assets themselves. It can be burdensome for new entrants, as licensing costs are high, and the regulation sets strong requirements, which have led to the exit of big players. MiCAs impact on illiquid assets is indirect. It should be more business-friendly, easy for companies to adopt, and absolutely avoid over-regulation, otherwise talents and innovators will leave to other jurisdictions	Time, adoption, and forward looking regulations.
ALEX (Co-Founder Tokenization Platform)	Fractionalizing into tokens help enhance liquidity of the asset. Choosing the right protocol and the right chain is essential, as well as a developed secondary market.	Finding a utility is key, otherwise you have something tokenized but if it doesn't bring an added value it's unusefull and illiquid. Interoperability protocols are also fundamental.	Compliance is more a challenge than a constraint, but it requires significant resources (human, material, financial).	MiCA is a net liquidity enabler as it provides clear rules for tokenized assets and infrastructure. However, it's sometimes confusing depending on the asset you're issuing.	The most challenging issue is to have investors coming on board. It has to be more user friendly. Mentality and education has to evolve regarding tokenization technology.

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ABSTRACT:

Emerging alongside blockchain technology and decentralized finance (DeFi), the tokenization of real-world assets promises to revolutionize the way we own, trade and manage assets. Yet its real impact on liquidity, particularly of traditionally illiquid assets, remains both overstated in industry narratives and undertested in practice, while the regulatory implications of the newest Markets in Crypto-Assets Regulation (MiCAR) remain uncertain. This thesis qualitatively examines whether tokenization truly enhances liquidity or merely reshapes it, while critically assessing the influence of MiCAR on these developments.

Findings argue that tokenization does not “unlock” liquidity in illiquid assets directly, but rather creates new financial instruments with their own liquidity dynamics, a distinction often overlooked in industry discourses. Interviews with six key stakeholders highlight fractionalization as the most transformative aspect for liquidity brought by tokenization, though all insist that this liquidity remains contingent on mass adoption, robust secondary market development, and a coherent value proposition.

The impact of MiCA is nuanced; while it provides essential legal clarity for asset tokenization, finally offering market participants a defined regulatory framework, its complexity risks creating unintended barriers. Institutional players welcome the certainty, but smaller firms face burdensome licensing requirements and compliance costs. Additionally, interviewees point out the outdated aspect of some regulations, and the critical need for a new mindset adapted to the new vision offered by tokenization and Distributed Ledger Technology more broadly.

This thesis contributes to the ongoing research momentum around tokenization, by clarifying its practical effects on asset liquidity, and revealing the dual-edged nature of MiCAR. This, by adopting a qualitative, stakeholder-driven methodology, absent in most prior research, providing grounded insights rather than purely theoretical projections.

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