

# Current Development Status, Application Scenarios and Future Trends of RWA

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**Abstract.** The rapid development of blockchain technology has propelled the tokenization of real world assets (RWA) in a new direction in the financial industry. This paper delves into market changes, technology applications, actual cases, and regulatory policies to provide a comprehensive overview of the current development, application fields, and future prospects of RWA. The research found that RWA has already made significant attempts to implement securities, intellectual property rights, artworks, agriculture, and other fields, demonstrating broad market prospects, but there are still problems such as unclear legal frameworks and high technical thresholds to be resolved. In the future, RWA needs to focus on technological innovation, expand the market, improve supervision, strengthen cross-industry collaboration, and build a robust decentralized finance (DeFi) ecosystem. This not only provides decision-making references for relevant parties but also helps promote the development of RWA in the global financial system and the integration of traditional assets and digital assets.

## 1 Introduction

With the rapid development of blockchain technology, RWA's tokenization process is accelerating and becoming a highly anticipated emerging trend in the financial field. RWA aims to digitize and tokenize traditional financial assets and physical assets including securities and artworks through blockchain technology so that they can be circulated, traded, and financed in a decentralized financial ecosystem. As of 2024, the global RWA tokenization market size exceeded US\$15 billion. In recent years, many financial institutions and technology companies have begun to explore how to map real-world assets to the digital world. For example, JPMorgan Chase, Credit Suisse, and other companies have launched RWA-based blockchain projects to build a more efficient, transparent, and secure asset trading and management system.

This article will explore the current development status, application scenarios, and future trends of RWA. Through multi-dimensional analysis of market trends, technology applications, actual cases, regulatory policies, etc., it provides investors, practitioners, and policymakers with comprehensive and in-depth decision-making references to promote the healthy and orderly development of this emerging track. RWA's research involves many fields such as finance, technology, law, and regulation. Its development not only affects the

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operating model of the traditional financial system but also provides new opportunities for the digital transformation of the global economy. Therefore, in-depth analysis of RWA has important theoretical and practical value.

The rest of this article will be arranged according to the following structure: the second part explores the current development status of RWA, including its basic situation, historical development, and current status; the third part explains the application scenarios of RWA in the investment market and financing market; the fourth part analyzes the future trends of RWA and pays attention to its opportunities and risks and challenges; the last part gives conclusions and prospects to provide theoretical support and directional guidance for subsequent research.

## **2 The status quo of RWA**

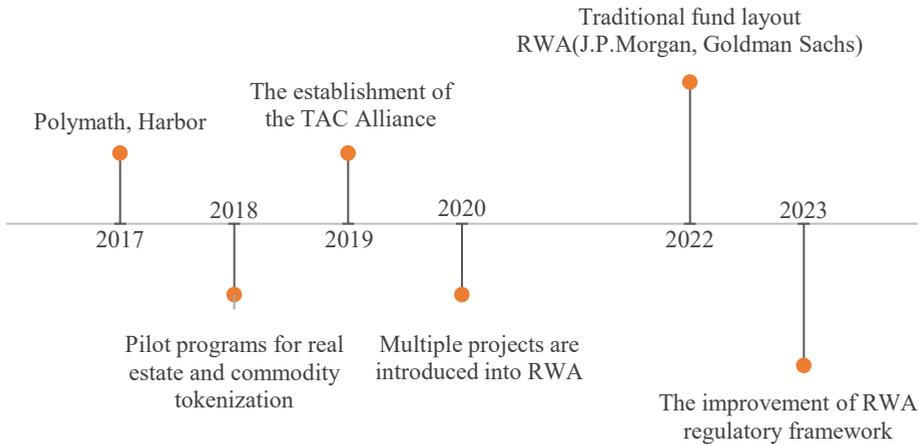
### **2.1 Basic situation**

RWA is a digitization of physical assets in traditional financial markets and converts them into tokenized assets that can be traded, collateralized, or borrowed on-chain through blockchain technology. Its core goal is to achieve efficient circulation and transparent management of assets through tokenization, reduce transaction costs, and simultaneously bring a source of returns with strong stability and low correlation with traditional assets to the crypto market.

The RWA tokenization process usually includes several key steps: first, select assets suitable for tokenization and build a clear legal framework to define the rights relationship between tokens and underlying assets; second, develop smart contracts on the blockchain platform, encode the terms and conditions followed by token operation, and create digital tokens representing the shares or units of the underlying assets; finally, improve liquidity and market participation by promoting token trading on the secondary market or decentralized trading platform [1].

### **2.2 Historical development**

As shown in figure 1, the historical development of RWA can be roughly divided into three stages, namely the early exploration stage (2017-2019), the initial development stage (2020-2022), and the high-speed expansion stage (2023-to-present). In the first phase, with the rise of DeFi, the concept of RWA began to sprout. Some pioneer projects such as Polymath and Harbor began to try to tokenize securities, while RealT tried to tokenize real estate assets. Meanwhile, the establishment of the TAC Alliance promoted the standardization process of RWA. In the second phase, the DeFi project further expanded the application scenarios of RWA, including tokenized receivable accounts and invoices, and used RWA as collateral for lending business. Large financial institutions such as JPMorgan Chase and Goldman Sachs started to study RWA-related issues. The RWA Alliance was also established to promote the standardization development and global promotion of RWA. In the third phase, large asset management companies such as BlackRock and Fidelity began to try to manage part of their asset portfolios through tokenization. Regulators, such as the Securities and Exchange Commission (SEC) and the European Securities Market Administration (ESMA), have also gradually intervened and formulated RWA-related regulatory frameworks to promote market compliance.



**Fig. 1.** RWA development timeline

### 2.3 Current status

In recent years, RWA tokenization has shown a significant growth trend. The total value of tokenized private credit was \$9 million by the end of 2020, and by the end of 2023, that number increased to \$485 million, an increase of more than fifty times. In the same year, tokenized U.S. Treasury bonds increased from \$105 million to \$718 million. Currently, the market is dominated by stablecoins collateralized by fiat currencies, which account for more than 90% of the total market share of tokenized assets. In the past four years, the market value of stablecoins has increased from US\$4 billion to US\$136 billion [2].

However, the global promotion of RWA still faces regulatory challenges. Although a few countries such as Switzerland have formulated specific regulations on asset tokenization and the United States and the United Kingdom have made progress in regulation, a unified framework has not yet been formed. Some countries have even banned initial token issuance or asset tokenization activities. This regulatory uncertainty hinders the further development of the RWA market: in cross-border transactions, multiple issues such as conflicts of legal jurisdiction, compliance barriers, and ambiguity of tax policies emerge in series; policy variability and market fragmentation have also directly weakened investors' confidence and participation will. To address this challenge, the EU passed the Crypto Asset Market Supervision Regulations (MiCA) in 2023 [3], providing clearer legal guidance for asset tokenization.

## 3 Application Scenarios of RWA

### 3.1 Stock and securities

Stock tokenization is a process of issuing company stocks in a digital format based on blockchain technology while maintaining the main functions inherent in traditional stocks. It improves the transparency, liquidity, and security of financial transactions while optimizing operational processes and reducing transaction costs [4]. Although stock tokenization still faces compliance issues, some innovative projects have begun to explore this area.

STOKR is a decentralized platform that provides financing channels for SMEs, allowing them to seek funding from professional and retail investors. STOKR binds each

token to a fixed proportion of the company's future distributable profits by tokenizing the company's distributable profits, which means that companies can issue securities tokens that comply with EU securities regulations and raise funds without the need to transfer equity or affect their independence. For investors, STOKR is also an ideal platform. Investors will participate in venture capital and share the company's future profits according to the proportion of tokens they hold. In addition, the potential investment projects on the platform have been strictly reviewed and cover many industry fields, providing investors with diverse choices [5].

### **3.2 Intellectual property**

Brand RWA is a new way for brand development and financing. By tokenizing the brand's core assets, intangible assets, future returns, etc., it significantly improves asset liquidity. This model effectively solves many pain points in traditional industries in intellectual property management, such as difficulty in confirming rights, high cost of rights protection, opaque distribution, and cumbersome processes. In the RWA mode, intellectual property owners can manage license terms, copyright allocation and use rights with the help of smart contracts. The mandatory rules of smart contracts ensure that any company or individual must comply with preset rules before accessing copyrighted assets, thereby effectively eliminating piracy and illegal use. In addition, tokenization can automatically adjust the use rights and copyright structure according to time changes, ensuring transparent and fair value distribution among various stakeholders.

Breaker is a representative project in this field. It is a blockchain-based content distribution platform, which enables artists and creators to trade directly with consumers and audiences and break down barriers to traditional intermediaries. The Breaker platform runs on the Ethereum blockchain and relies on a tokenized smart contract system called SNGLS to achieve decentralized value transfer. These SNGLS tokens not only represent a part of the Breaker platform's intellectual property (IP) but also provide creators with a completely new way to generate revenue. The Breaker platform has issued a total of 1 billion SNGLS tokens, of which 50% are provided to the market through public offerings, 40% are stored in a dedicated reserve to support the platform's sustainability and reinvestment, and the remaining 10% are allocated to Breaker's major investors. On this platform, content creators can represent their projects or works by creating tokens. Tokens can be distributed to all parties who work with creators, such as directors and actors, or sold directly to consumers, thereby achieving more efficient transactions and copyright transfers. Since the token is built on smart contracts, content creators can set detailed reward allocation rules for each token. Such a design allows creators to distribute the benefits generated by the work and ensures that token holders directly earn proportional income based on the amount they hold without relying on traditional intermediaries or regulators [6]. Through this mechanism, the Breaker platform has achieved a more direct and transparent value exchange between content creators and audiences, promoting the development of the creator economy.

### **3.3 Art and collectibles**

Tokenization of art and collectibles allows people to trade various ownership, access rights licenses, and royalty rights of physical or pure digital art through distributed ledgers as an alternative to traditional paper exchange [7]. It can serve as proof of the source of assets, improve asset transparency, promote the fragmentation of ownership, lower the threshold for high-value investments, and provide higher liquidity.

Source information is crucial to artworks and collectibles because it is directly related to the monetary value of these assets. Through its globally applicable Codex protocol, CODEX tokenizes source information to the needs of creators, auction houses, and collectors, solving the problems of sharing difficulties, ease of forgery, and repeated verification of traditional paper documents. Any information related to the identity or history of the item can be uploaded to the Codex record, including digital receipts, receipt photos, and identification certificates. Blockchain transactions of this information will be recorded under the "Source" item. When ownership of underlying assets changes, blockchain transactions will automatically record these changes, helping artists track the flow of their works. Because these transactions are not tampered with, it becomes almost impossible to forge works. In addition, recording the sale of artworks through blockchain can also effectively track the payment of resale royalties to ensure that the rights and interests of artists are protected.

### **3.4 Agriculture**

Tokenization of agricultural assets converts physical agricultural products into digital futures contracts. Manufacturers convert the harvested grains into digital assets and exchange them for goods or services, allowing SMEs to participate more effectively in the global commodity market [8]; merchants accept agricultural tokens in exchange for goods or services; participants in grain tokenization and platform users form a potential audience; investors engaged in crypto asset trading can purchase agricultural tokens on major exchanges. This constitutes a complete investment logic chain [9].

Agrotoken is a representative project in this field. It is a digital platform powered by Argentine capital that enables agricultural and animal husbandry producers to convert their grains, such as soybeans, corn, and wheat, into crypto assets in a simple, fast, and secure manner. These crypto assets can be used to purchase means of production, access services, or secure financing tools. Agrotoken is a business that involves three main participants: producers, buyers and exporters, and franchisees. It transforms idle agricultural product harvests into tokens, with each ton of grain being converted into a corresponding amount of tokens. A ton of grain is then delivered to the acquirer as collateral and for certification purposes. All tokenized grain tonnes are verified by the "Certificate of Cereal Reserve," a transparent, secure, and decentralized system that can be audited at any time through the Ethereum blockchain. Agrotoken's agricultural commodities-based stablecoins complement those secured by fiat currencies. Institutional investors can use these two types of assets to diversify risks in their portfolios. Additionally, these stablecoins serve as an excellent anti-inflation tool and are utilized by medium- and low-risk investors for medium- and long-term investments [10].

## **4 Future Trends of RWA**

### **4.1 Technical level**

Considering that the connection problem between the off-chain and the on-chain world is not solved, future technology developers need to build a powerful technical framework to manage the data and metadata that connects value tokens (located on-chain) with real-world physical assets (located off-chain), thereby achieving verifiable traceability of asset sources [11].

In the future, RWA projects will develop more sophisticated risk assessment models for different entities and risk types to improve structural and security flaw issues. Targeted

improvements are made to the significant defects in user identity identification, verification, and user fund investigation, and the risks of stablecoins, blockchain oracles, and loan defaults are solved. For example, using decentralized Oracle networks to improve the reliability and security of oracles [12], and providing accurate and tamper-proof data feeds for smart contracts [1].

In the future, the cross-chain technology and interoperability of RWA will be enhanced. As the cross-chain technology between different blockchain platforms continuously matures, tokenized assets will be freely flowed and traded between multiple blockchain networks. Cross-chain interoperability is conducive to improving the scalability of transactions in blockchain networks, and providing new ideas for solving the triad difficulties of blockchain [13]. It will also break down platform barriers, promote the interconnection of the RWA market, and improve asset liquidity and market efficiency.

Advanced technologies such as big data and artificial intelligence will be more widely used in the RWA field, deepening the digitalization and intelligence of RWA. The improvement of smart contracts has reduced RWA manual intervention and improved the automation and security of RWA products. Meanwhile, combining AI for risk management and real-time monitoring, using Internet of Things (IoT) technology to track and protect digital assets in real time will effectively reduce risks.

## **4.2 Market level**

According to estimates by Boston Consulting Group and other institutions, the global RWA market size is expected to reach hundreds of billions of dollars in 2025. With the tokenization of more asset types and the participation of investors, the market size will continue to expand in the future. It is predicted that by 2030, the RWA market size will be at least US\$4 trillion, and at most, it will exceed US\$30 trillion.

The types of tokenized assets will be more abundant. In addition to existing assets such as real estate and bonds, commodities, intellectual property, notes, and receivable accounts will be tokenized more through RWA, thus bringing revolutionary changes to many industries. Extensive tokenization also has the potential to greatly reshape global financial markets and investment strategies. Blockchain can make investment opportunities more democratic, and the higher transparency and efficiency it brings can also create a stronger and more resilient financial system [14].

## **4.3 Regulatory and compliance levels**

With the development of RWA, combining it with the escrow mechanism will become an important trend. The custodian not only needs to ensure the secure storage of digital assets but also bear regulatory compliance responsibilities. In the future, regulators need to develop unified industry standards to ensure that asset custodians have sufficient capabilities to manage and protect digital assets.

Most RWA projects currently have shortcomings in legal compliance, especially in terms of risk disclosure and legal protection of off-chain assets. In the future, it is necessary to improve the management of off-chain asset valuation and legal risks, and formulate unified standards on a global scale [15]. Clarifying the legal status, compliance requirements, investor protection, and other contents of RWA can provide clear guidance for market participants, reduce legal risks, and promote the healthy development of the market.

Regulators will use regulatory technology means including blockchain regulatory platforms and smart compliance tools to conduct real-time monitoring and risk prevention

and control of the RWA market. Ensure that market participants comply with laws and regulations and prevent illegal acts integrating money laundering and market manipulation.

#### **4.4 Financial ecology level**

RWA will serve as a crucial form of collateral and asset class, deeply integrating into the DeFi ecosystem. Investors can use RWA tokens on DeFi platforms for lending, liquidity mining, stablecoin issuance, and other operations, gaining access to a wider range of financial services and revenue opportunities.

Traditional financial institutions such as banks, asset management companies, and insurance companies will expand their layout in the RWA sector. Leveraging their capital, customer base, and expertise, they will engage in RWA operations and introduce related financial products and services, fostering the integration of traditional finance with RWA. The collaboration between banks and technology companies will continue to deepen. Banks will provide tokenized deposits as settlement instruments, while technology companies will offer blockchain infrastructure, together building a closed loop of "issuance-trading-settlement." In the RWA issuance and underwriting process, asset management companies will screen, evaluate, and combine underlying assets based on investor needs and market conditions, packaging them into fund products or other forms for tokenization; securities firms will help asset owners design reasonable RWA issuance plans and promote and sell the related assets to investors.

In the future, cooperation between technology developers, financial institutions, regulatory bodies, and end-users will be strengthened to promote the healthy development of the RWA market. Establishing a collaborative ecosystem and advancing public-private partnerships, industry alliances, and the formation of standardized protocols will be pivotal in addressing market challenges, enhancing interoperability, and driving market adoption [1].

## **5 Conclusion**

This article discusses the basic concepts of RWA, the tokenization process, and its role in the blockchain ecosystem. It also reviews the three stages of its historical development and analyzes key technological breakthroughs and market evolution. Currently, RWA is used in securities, intellectual property, artworks, and agriculture, showing colossal market potential. However, its development still faces many challenges including regulatory uncertainty, the need to improve technical architecture, and issues related to asset valuation and compliance. To advance, RWA must focus on technological innovation in the future, such as enhancing cross-chain technology and decentralized oracles, to boost asset liquidity and security. Market expansion and diversification are crucial, with RWA applications extending beyond traditional financial assets to cover more industries like energy and healthcare. Additionally, improving the regulatory framework is essential. Countries should accelerate the formulation of relevant laws and regulations, establishing unified standards for asset valuation, legal protection, and investor protection. Moreover, the cross-industry collaboration will drive RWA's development. Establishing industry alliances, standardized agreements, and public-private partnerships will increase market acceptance and promote its adoption in the global financial system, enabling RWA to serve as a vital bridge between traditional and digital assets and unlock new investment opportunities in financial markets.

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