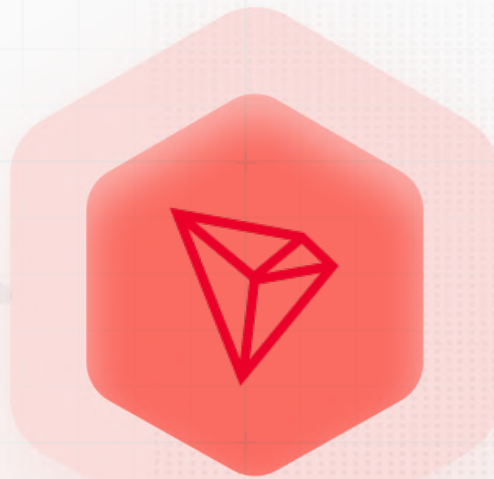




RESEARCH
by COINTELEGRAPH

TRON'S JOURNEY:

THE EVOLUTION OF A BLOCKCHAIN PIONEER



Cointelegraph Research Report

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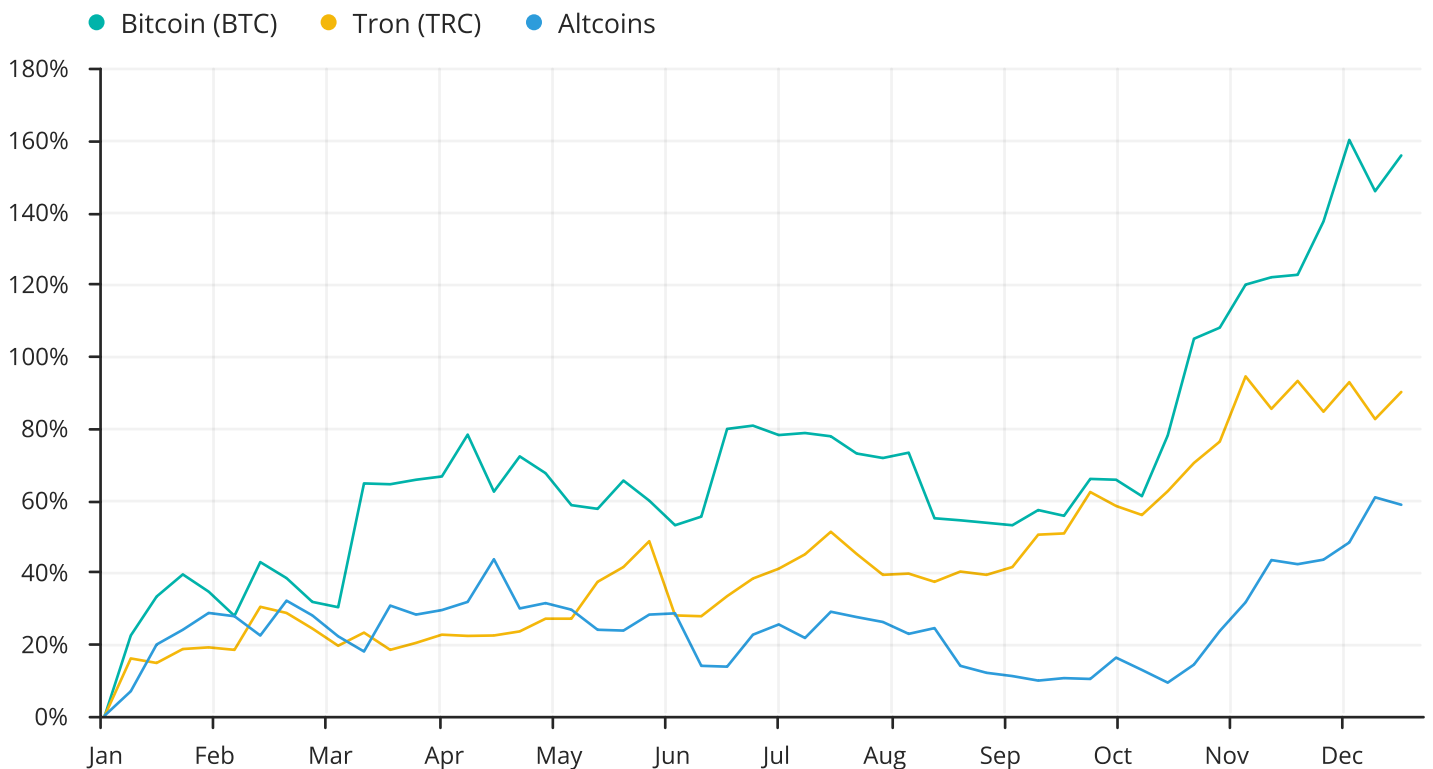
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I. Introduction

While 2022 and 2023 marked one of the toughest 'crypto winters' seen on record, a clear positive trend in Bitcoin's (BTC) market cap finally materialized late last year. By the time of writing, some of the fresh capital attracted by BTC has started to rotate into altcoin markets. TRON, however, managed to outperform the rest of the altcoin space in 2023 (Figure 1):

Figure 1: YTD Percentage Change in Market Cap of BTC, TRX, and Altcoins in 2023



Source: [CoinMarketCap](#) (as of Dec. 27, 2023)

TRX maintained a superior correlation coefficient of +0.87 to Bitcoin's market cap, as opposed to a market average of +0.67.

This report will evaluate the fundamental reasons for the Tron blockchain's success and dive into its technical performance and tokenomics mechanisms.

It will also investigate Tron's ecosystem, collaborations and developer community in the context of the blockchain's increasing popularity.



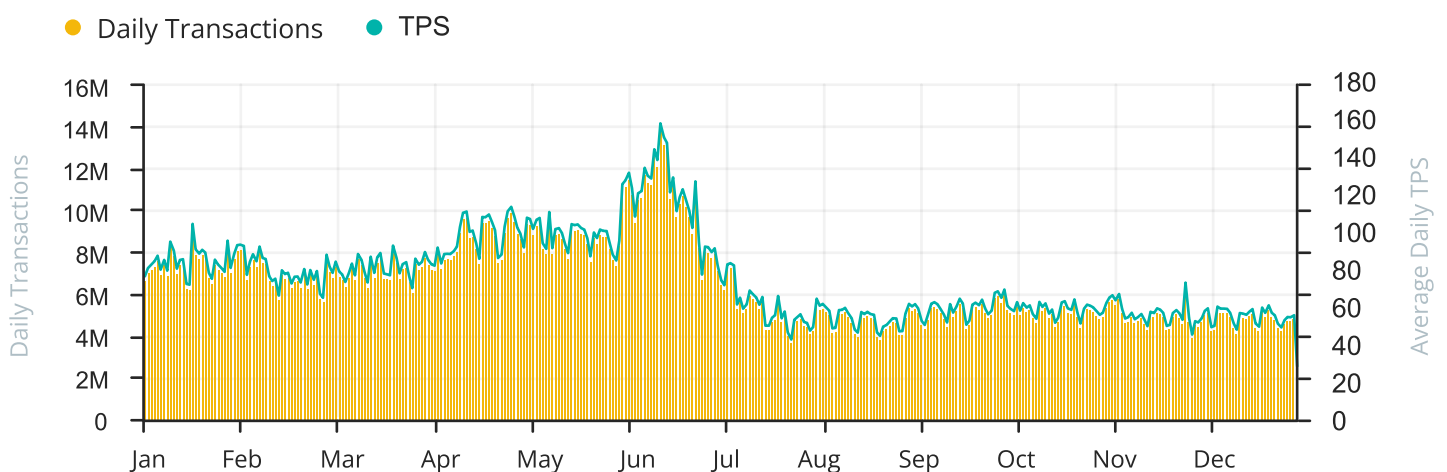
II. Technical Evaluation of the Blockchain

Blockchain Throughput and Live Metrics

Technical performance is ultimately the backbone of any blockchain, directly impacting its popularity among the community. In this chapter, we will evaluate the core of Tron's ecosystem, explaining how the network achieves high throughput and scalability (Figure 2). Namely, the blockchain processed nearly 2.4 billion transactions in 2023. Notably, while the average number of transactions per second (TPS) in 2023 was around 75, the theoretical limit of the network currently stands at 1,000 transactions.¹

Although some competitors cite similar throughput capabilities, it is important to note the level of decentralization present in Tron. In particular, there are over 8,000 nodes, serving over 3.2 million contracts and 84,000 (as of Dec. 29, 2023).¹ Notably, Ethereum only has approximately 6,600 nodes in operation. One of the main factors contributing to this high number is Tron's consensus mechanism, which will be discussed in detail below.

Figure 2: Daily Transactions and Average Daily TPS on the TRON blockchain in 2023



Source: [TronScan](#)

Consensus Mechanism

Tron uses delegated proof-of-stake (DPoS), which executes the functionality for which traditional proof-of-stake (PoS) requires staking pools on the protocol level. TRX holders can use their coins to vote for a so-called “super representative” or “witness,” who will participate in block validation. In turn, they receive transaction fees from the block as a reward. Because this process is handled by the Tron network itself, not third-party applications, users do not have to transfer funds to a different address and do not face the same counterparty risk.

The DPoS consensus mechanism was designed to fix numerous disadvantages of PoS, including low throughput, longer confirmation time and a higher incentive to centralize. However, the DPoS consensus necessitates an active community to form for the blockchain to function successfully. Tron resolves this issue by distributing the governance rewards among TRX tokenholders.



¹ [TronScan](#), as of Dec.29, 2023

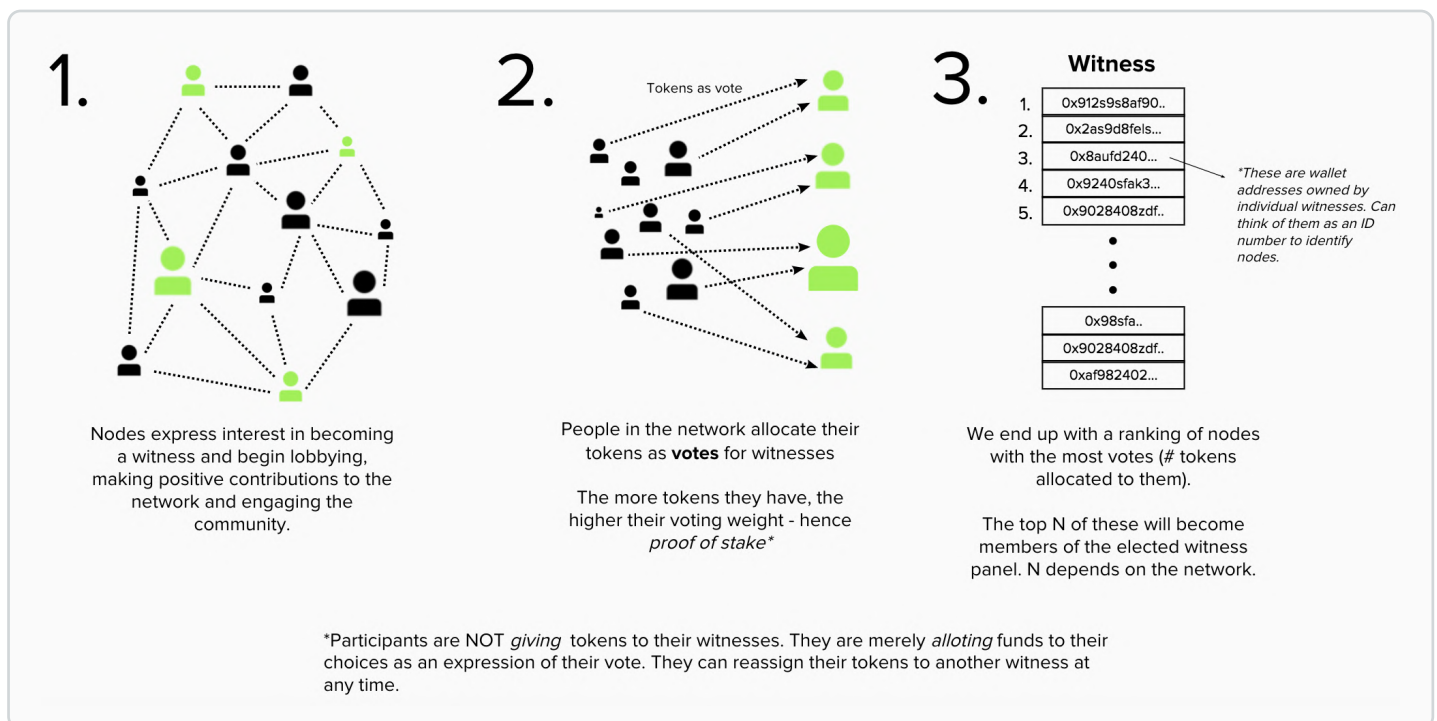
² [EtherNodes](#), as of Jan.9, 2024

On the Tron blockchain, there are 27 super representatives, which are selected during the maintenance period between epochs (four times a day). Additionally, 100 consecutive candidates for super representatives become “super partners,” which have the right to initiate proposals on the functionalities and technical set-up of the Tron network. As of Jan. 7, 2023, there are over 400 super representatives, 127 super partners and approximately 150 super representative candidates, ensuring a sufficient degree of decentralization.

Notably, the largest super representative has less than 10% of the voting rights, proving that this model works successfully and is not easily captured by a few economic actors.²

Moreover, all tokenholding nodes (i.e., over 8,000) can allocate their tokens to a particular super partner, thus minimizing the centralization of the network. A diagram of the election process is presented below (Figure 3).

Figure 3: Election Process in DPoS Consensus Mechanism



Source: [Nichanank](#)



These properties of the Tron network and the DPoS consensus itself have several beneficial effects. They not only increase the scalability of the blockchain but also minimize the risks associated with 51% attacks and introduce democratic principles to the system (Figure 4).

Namely, unlike the PoS consensus, voting power is not dependent on the number of tokens staked. Thus, the vulnerabilities stemming from the Matthew effect have a near-zero probability.

Learning toolbox

Matthew effect⁴ – A phenomenon where those who initially had a more beneficial position have a greater chance of increasing their benefits than those with a less beneficial position, eventually leading to centralization of the system.

Figure 4: Comparison of features impacting the performance of PoS and DPoS blockchains

Features	PoS	DPoS
Less incentive to centralize	✗	✓
Higher transaction throughput	✗	✓
Faster confirmation times	✗	✓
Energy efficient	✓	✓
Incentives development	✓	✓

Source: [Saad & Radzi, 2020](#)

TRON Virtual Machine

Some of the main differences between the Tron Virtual Machine (TVM) and the Ethereum Virtual Machine (EVM), as well as explanations of what it means for a developer or an end-user, are provided below (Figure 5):

Figure 5: TRON Virtual Machine vs Ethereum Virtual Machine

Feature	EVM	TVM	Why TVM is Better
Energy/Gas Usage	Gas	Energy and Bandwidth	More cost-efficient, transparent energy pricing benefits users, with three to four free TRX token transfers daily.
Difficulty and Gas Limit Values	Variable	Zero	Simplifies fee calculation, reducing complexity for developers
Contract Address Prefix	0x00	0x41 + keccak256	Enhanced security with a unique prefix formula for contract creation



⁴ S. Acar, 2011, "[Matthew, Pygmalion, and Founder Effects](#)"

Pre-compiled contract 0x09	Blake2F	BatchValidateSign	Introduces a more secure, versatile contract validation method.
Call Fallback Functions to Contracts during Token Transfer	✓	✗	Prevents unintended function calls during simple transfers
Judging Contract Address	✗	✓	Provides a method to determine if an address is a contract
Batch Validations for Signatures	✗	✓	Efficiently processes multiple signatures in batches
Anonymous Contract	✗	✓	Introduces privacy features and new cryptographic functions
Freeze/Unfreeze Functions	✗	✓	Adds more flexibility and control over token freezing
Contract Voting related opcodes and pre-compiled contracts	✗	✓	Enhances blockchain governance with voting-related features
Stake 2.0 related functions	✗	✓	Introduces advanced staking functionalities with version 2.0

Source: [TRON Network](#)

Learning toolbox

Energy - Computational resources required to execute smart contracts and perform various operations within the network.

Bandwidth - The capacity or data transmission capabilities allocated to an account for executing transactions and interacting with the network.

The TVM provides more scalability and flexibility for decentralized application (DApp) developers while ensuring lower or zero transaction fees and a higher degree of security for end-users. Moreover, the energy and bandwidth concept allows large TRX holders or DApps to minimize or cover transaction costs for them or their users.

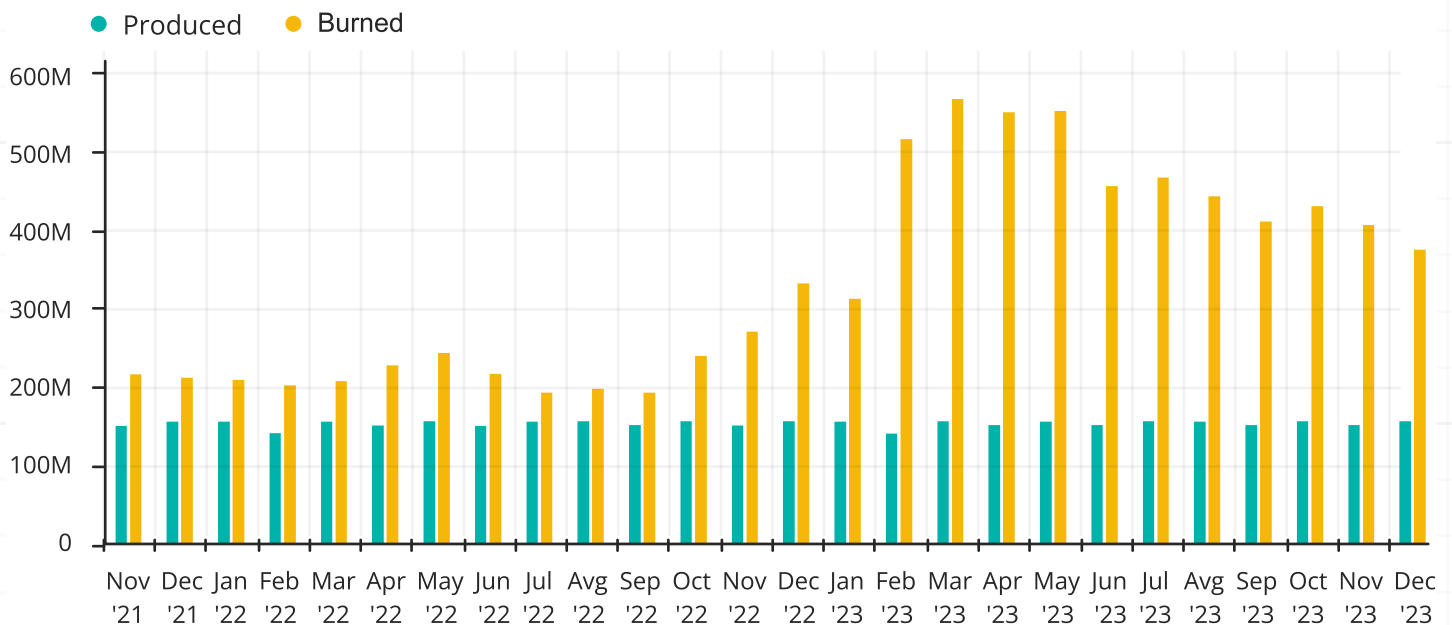
Simultaneously, if a tokenholder or DApp has excess bandwidth and energy, they can sell their resources through various lending platforms, such as JustLend.⁵



Tokenomics

Interestingly, although TRX does not have a maximum supply value and can be deflationary or inflationary depending on the market environment, as well as subsequent blockchain utilization and transaction costs, it has been deflationary for approximately 1.5 years (Figure 6):

Figure 6: TRX Produced and Burned since November 2021

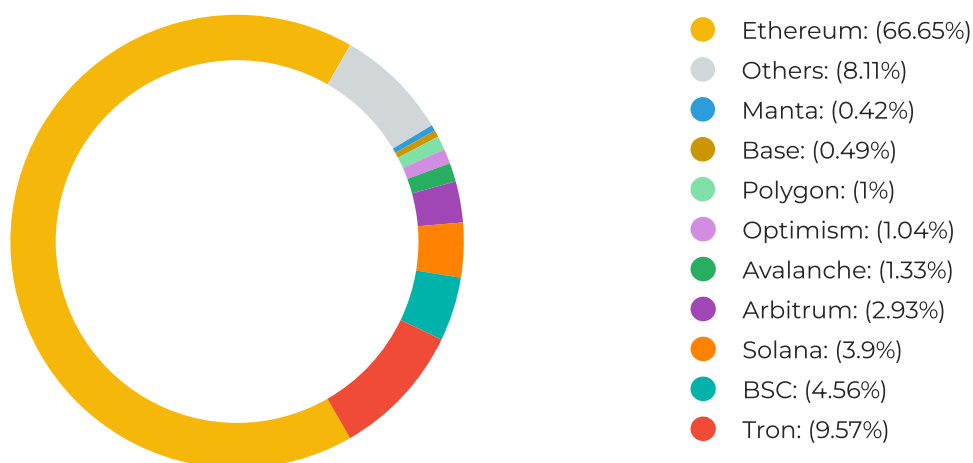


Source: [TronScan](#)

Importantly, almost 100 Committee Proposals over that time helped to sustain a deflationary supply of the token. However, the technical basis and tokenomics underlying the blockchain are meaningless without blockchain adoption among developers and users.

In the next chapter of this report, we will discuss the Tron ecosystem, exploring why it secured second place in terms of total value locked (TVL) to overcome BNB Smart Chain and Solana in 2023 (Figure 7).

Figure 7: Blockchain Dominance in Terms of Total Value Locked



Source: [DefiLlama](#) (as of Jan.7, 2023)



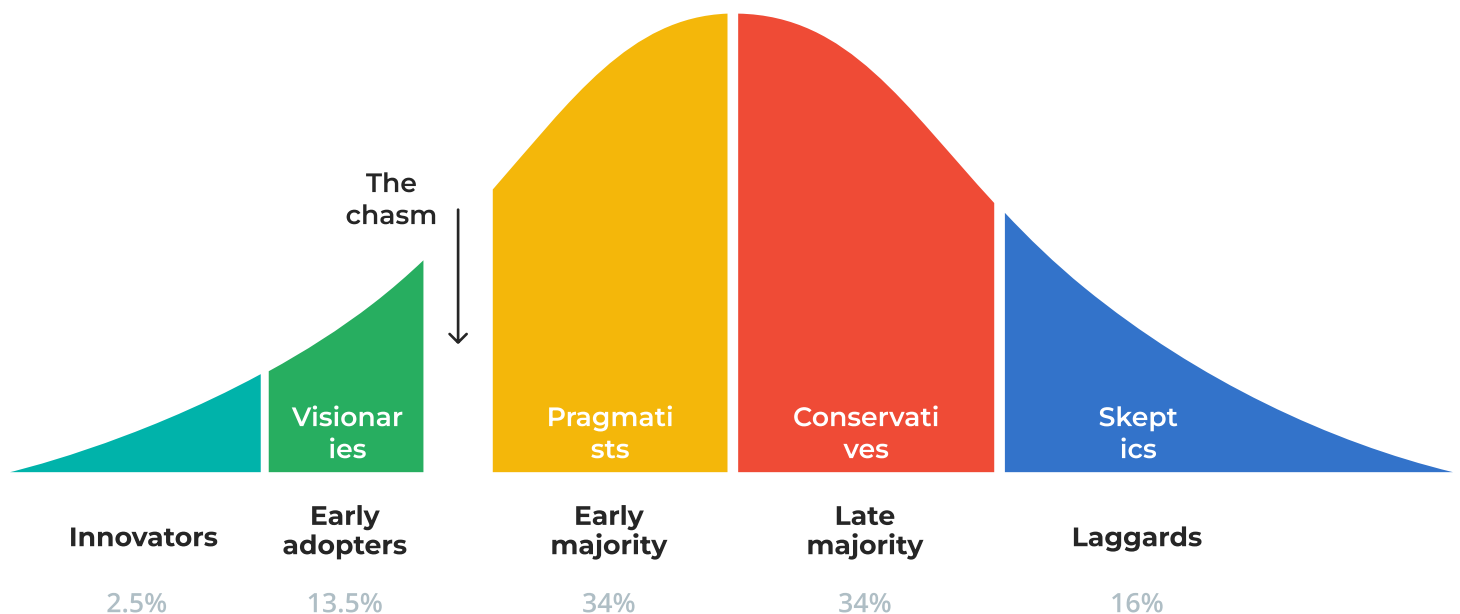
III. TRON in the Vanguard of Blockchain Adoption

Dominance in Crypto-Facilitated Payments

The question of how to best bring about blockchain adoption has long troubled many in the industry. Of all of crypto's use cases, payments are at the forefront of mass adoption, with stablecoins being one of the most commonly used types of tokens. Stablecoins are a convenient way to facilitate cross-border transactions, despite the questions often raised about their backing.⁷

The adoption curve of innovation shows that this particular market segment has at least reached "the chasm," with the matter already being lobbied in the United States Congress (Figure 8):

Figure 8: Adoption curve of innovation



Source: [Al-Ashimori et al., 2022](#)



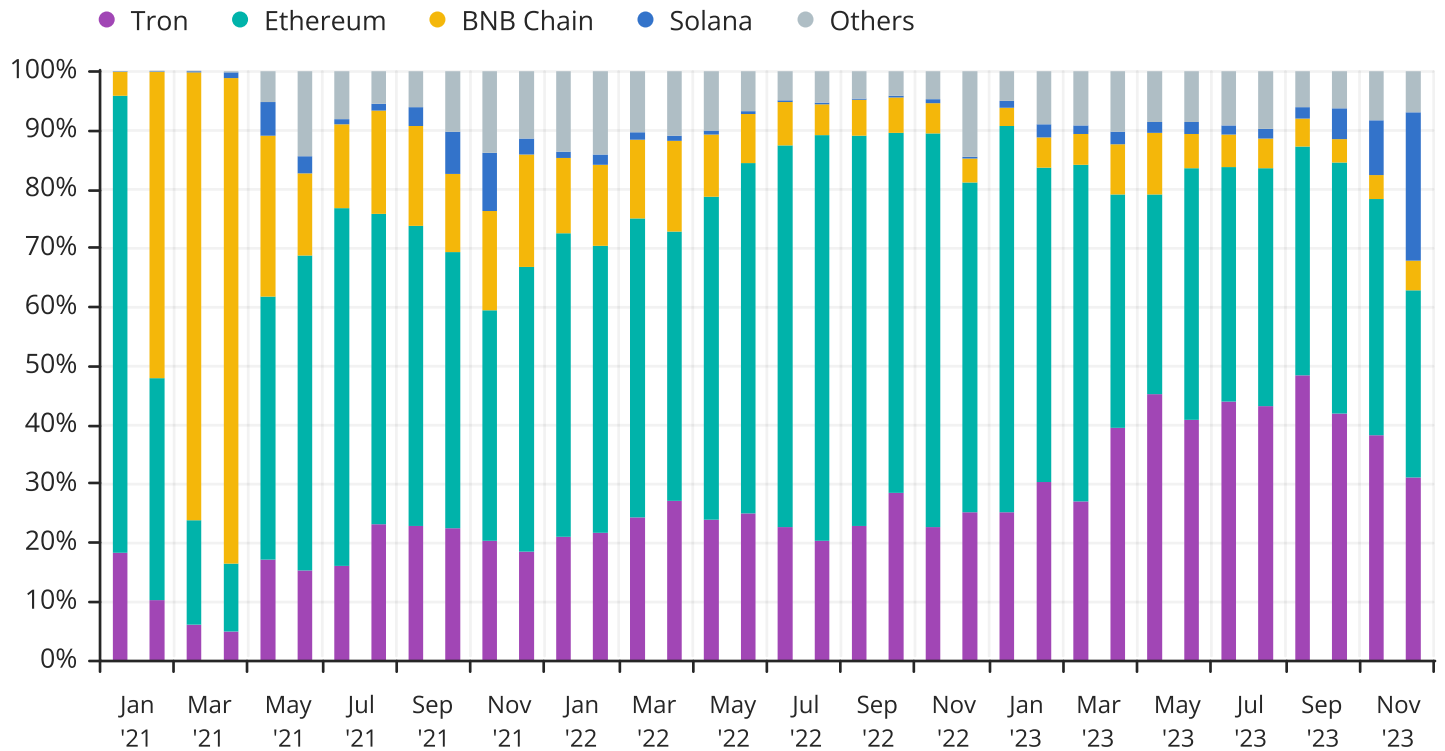
⁷ [European Central Bank](#), Apr. 25, 2022

⁸ [Bloomberg](#), 20 Dec. 2023

In the world of stablecoins, Tether is the leading issuer, with USDT having a market capitalization of \$93 billion.⁹ Over \$47 billion worth of USDT tokens are issued on the Tron blockchain, making it the blockchain with the most USDT in circulating supply.

Moreover, Tron's dominance has been growing over recent years, overcoming BNB Chain in 2021 and having a third of the total transaction volume at the end of 2023 (Figure 9). In absolute numbers, there were \$1.2 trillion worth of transactions on Tron in Q4 2023.¹⁰

Figure 9: Stablecoin transaction volume across blockchains



Source: [Artemis](#) (as of Jan.7, 2024)

Thus, it can safely be said that Tron remains in the vanguard of blockchain adoption due to several factors, including:

- Accessibility of TRC-20 USDT on various platforms worldwide
- Lower transaction costs compared with Ethereum
- Quick transfers, settlements under three seconds on the Tron blockchain
- USDT's popularity as the leading stablecoin in the industry
- High liquidity of USDT on Tron



⁹ [DefiLlama](#), as of Jan.7, 2024

¹⁰ [Artemis](#), as of Jan.7, 2024

Building a Metaverse-Free Port

Setting aside the stablecoin market, the Tron blockchain has significant user engagement, with its TVL exceeding \$20 billion at the end of 2023 (Figure 10).

It is also home to the second-largest protocol for real-world-asset tokenization in the industry, stUSDT, which has \$2.24 billion in assets locked and thus comes close to MakerDAO's \$2.38 billion.¹²

Figure 10: Total Value Locked on the TRON blockchain in 2023



Source: [TronScan](#)

There is also a range of nonfinancial applications on Tron, which are not captured by the TVL calculation.

These are listed in the blockchain's ecosystem map below and include GameFi, infrastructure, SocialFi and storage.



¹¹ [TronScan](#), as of Jan.7, 2024

¹² [DefiLlama](#), as of Jan.7, 2024

Tron Ecosystem

Infrastructure

 SHASTA	 TronGrid
 Tron IDE	 Cointool
 TronWeb	 TRONSCAN

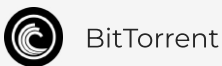
DeFi

 JustMoney	 InterCroneSwap
 Zethyr Exchange	 Newdex
 SocialSwap	 TronPad
 JustLend DAO	 SunSwap
 Transit Finance	

NFT

 Talken	 DeFine
 APENFT	

Storage



Oracle



GameFi

 Blockchain Cuties	 Lulu Market
 Devikins	 IMOV
 888Tron	 Mega World
 MixMarvel	 Evolution Land
 Polker	 WIN NFT HERO
 BLOCKLORDS	 WIN NFT HORSE
 ChainZ Arena	

Stablecoin

 TrueUSD	 Just Stablecoin
 USDC	 JustStable
 Tether	 Decentralized USD

Wallet

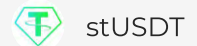
 [LEDGER]	 iToken HD
 Trezor	 Token Pocket
 Trust	 BitGet
 Math	 Guarda
 Atomic	 coinomi
 SafePal	 imToken
 Exodus	 Cobo
 Klever	 imKey



Staking

 TronNRG	 Degree Crypto
 NEOPIN	

RWA



Cross-Chain

 Bitcoin	 Litecoin
 Wrapped Bitcoin	 Klever
 Ethereum	 WINKLink
 Wrapped Ethereum	 APENFT
 Huobi Token	 BTT



IV. Collaborations and Community

Governance and Community Expansion

The blockchain's governance has been fully decentralized since December 2021, when the Tron DAO gained full community governance, ensuring that each TRX holder has an equal vote, independent of the number of tokens held.¹³

Moreover, it is important to note that the expansion of the developer community is incentivized through a range of products,

a cornerstone of which is the HackaTRON, which has already become a tradition and is dedicated to attracting developers by offering several prizes for the winners.¹⁴

In addition, Tron DAO also provides grant programs for community ambassadors, developers and influencers, ensuring the network's ecosystem continues to grow sustainably.¹⁵

Collaborations

On the other hand, despite the regulatory pressure on cryptocurrencies over recent years, Tron successfully secured a place as the national blockchain for the Commonwealth of Dominica. This showcase has potentially provided a pathway forward for other governments' subsequent adoption of Tron once the regulatory landscape is thoroughly established.

Moreover, several strategic collaborations in not only the blockchain space but also in a broader technological landscape ensure the ecosystem will continue to expand as Tron gets exposed to a larger audience and expands its functionalities (Figure 11).

Figure 11: TRON's Strategic Collaborations

Company	Nature of Collaboration with TRON
BitTorrent	Acquisition by TRON, Integration for Decentralized File-Sharing
Swisscom Blockchain	Collaboration for Blockchain Solutions and Innovation
Opera	Collaboration for integration of Tron wallet and DApp support
HTX (ex-Huobi)	Collaboration in the cryptocurrency and blockchain space
Oraichain	Collaboration for oracle services and smart contracts
MetaEstate	Integration for blockchain-based virtual real estate platform
Ankr	Collaboration for decentralized cloud computing solutions



¹³ TRON DAO Governance information can be found [here](#)

¹⁴ More information about HackaTRON can be found [here](#)

¹⁵ More information about grant programmes can be found [here](#)

Certik	Collaboration for smart contract auditing and security services
Curv	Collaboration for institutional digital asset security
Sony Interactive Entertainment	Collaboration for innovation in Web3 gaming
Blockchain.com	Collaboration for wallet integration and blockchain services
Google Cloud	Inclusion in Google Cloud's BigQuery public blockchain data sets
Huawei	Support from Huawei for Tron's development and initiatives
JCBA	Membership in the Japan Cryptoasset Business Association (JCBA)
Nansen	Collaboration for blockchain activity insights
Arkham	Collaboration for Tron support and services

Source: Cointelegraph Research

Conclusion

Despite the hurdles the crypto market faced in 2023, Tron managed to outperform most of its competitors, further establishing itself as a blockchain with solid technical fundamentals. Moreover, these fundamentals led to significant successes and breakthroughs,

positioning Tron as the leading network for payment facilitation and allowing the project to form several strategic collaborations. Thus, we expect the continued growth of Tron in the market alongside its expansion in decentralized finance.



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