

Design a blockchain token research framework for investors to evaluate token value. Some ideas re to include key on-chain metrics, developer activity, market sentiment, fundamental valuation, and macro trends. Provide a structured approach to assess liquidity, adoption, and risk.

A seven-category framework for token evaluation was developed, allowing investors to assess blockchain tokens through adjustable metrics covering technical, economic, and adoption factors.

Abstract

This report analyzes 10 studies on blockchain token valuation to develop an investment evaluation framework. The analyzed research includes theoretical models, market analyses, and previous literature reviews across major blockchain platforms like Ethereum and Bitcoin.

The included studies found that on-chain metrics, particularly gas prices and transaction volumes, correlate with token values. User adoption rates showed significant influence on token performance, though measurement methods varied across studies. Both traditional financial metrics and blockchain-specific indicators appeared important for comprehensive token evaluation.

Based on these findings, we propose a seven-category framework for token evaluation: (1) on-chain metrics, (2) network effects, (3) liquidity measures, (4) market sentiment indicators, (5) technical risk factors, (6) economic risk assessment, and (7) adoption metrics. Each category includes specific measurement tools and suggested weightings for different investment scenarios.

The analyzed research showed agreement on the importance of user adoption metrics and on-chain data. However, studies differed in their assessment of token incentive structures and the reliability of market sentiment indicators. While quantitative metrics formed the foundation of most analyses, qualitative factors like protocol governance and ease of use were also identified as relevant considerations.

For practical application, the framework allows investors to adjust metric weightings based on token type, blockchain platform, and project maturity. This adaptability helps address the diverse nature of blockchain token investments while maintaining a structured evaluation approach.

Paper search

Using your research question "Design a blockchain token research framework for investors to evaluate token value. Some ideas re to include key on-chain metrics, developer activity, market sentiment, fundamental valuation, and macro trends. Provide a structured approach to assess liquidity, adoption, and risk.", we searched across over 126 million academic papers from the Semantic Scholar corpus. We retrieved the 100 papers most relevant to the query.

Screening

We screened in papers that met these criteria:

- **Valuation Framework:** Does the study analyze blockchain token valuation frameworks, methodologies, or fundamental valuation models for crypto assets?
- **Quantitative Metrics:** Does the research examine on-chain metrics, market dynamics, liquidity metrics, or trading patterns in relation to token value?
- **Network Analysis:** Does the study analyze adoption metrics, user behavior, or network effects in blockchain networks?
- **Market Factors:** Does the research investigate market sentiment, behavioral aspects, or macro-economic factors affecting cryptocurrency markets?
- **Empirical Basis:** Does the study present empirical evidence or data-driven analysis rather than just opinion or market commentary?
- **Generalizability:** Does the study examine multiple tokens/cryptocurrencies or present findings that can be generalized beyond a single case study?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Data extraction

We asked a large language model to extract each data column below from each paper. We gave the model the extraction instructions shown below for each column.

- **Research Methodology:**

Identify and describe the primary research methodology used in the study:

- Specify the type of analysis (e.g., multiple linear regression, decision-making framework, model-based approach)
- Describe any statistical techniques or modeling approaches
- Note any unique methodological approaches or innovations

If multiple methodological approaches are used, list them in order of prominence. If the methodology is not clearly stated, write "Methodology not clearly specified" and provide any contextual details available.

- **Data Sources and Sample Characteristics:**

Extract information about the data sources and sample:

- Specify the number of blockchain tokens/platforms studied
- Describe the source of data (e.g., cross-sectional data, token price series)
- List the specific blockchain networks or platforms included (e.g., Solana, Polygon, Ethereum)
- Note any inclusion/exclusion criteria for tokens or platforms

If sample size or data sources are not explicitly stated, note "Sample details incomplete" and provide any partial information available.

- **Primary Metrics and Variables:**

Identify and list the key metrics and variables analyzed in the study:

- List all on-chain metrics examined
- Specify off-chain factors considered
- Note any market sentiment or fundamental valuation metrics

- Describe how these variables were measured or calculated

Prioritize variables directly related to token value, liquidity, adoption, or risk. If variables are complex, provide a brief explanation of how they were conceptualized or measured.

- **Outcome Measures:**

Extract the primary outcome measures of the study:

- Specify the main dependent variables (e.g., token volatility, returns, liquidity)
- Note the statistical significance of key findings
- Record any predictive model performance metrics (e.g., R-squared, Mean Square Error)

If multiple outcomes were studied, list them in order of the study's emphasis. If outcome measures are not clearly defined, note "Outcomes not clearly specified".

- **Key Findings and Implications:**

Summarize the main findings of the study:

- Describe the most significant factors affecting token value
- Note any unexpected or counterintuitive results
- Extract any recommendations for investors or token evaluation

Focus on findings directly relevant to the research framework for token value assessment. If findings are complex, provide a concise summary of the key insights.

Results

Characteristics of Included Studies

Study	Full text retrieved	Research Focus	Methodology	Key Metrics Analyzed	Platform Coverage
Brown, 2018	No	Trust dynamics in blockchain financial systems	Evolutionary Computing, Topological Data Analysis, Fields Finance, System Dynamics	Trust metrics, information flows, transactions	No mention found
Chen et al., 2020	Yes	Volatility effect on tokenomics	Model-based approach, empirical analysis	Platform productivity volatility, user adoption, token price stability	Bitcoin, Ethereum
Cong et al., 2020	No	Dynamic adoption and valuation of tokens	Dynamic asset-pricing model	User transactional demand, platform adoption	No mention found

Study	Full text retrieved	Research Focus	Methodology	Key Metrics Analyzed	Platform Coverage
Eick, 2024	No	Intrinsic value prediction of Ethereum	Linear multiple regression	Gas price, transaction fees, miner rewards	Ethereum
Li, 2022	No	Strategic earning on tokenized platforms	Decision-making framework, Monte-Carlo methods, Reinforcement Learning	Investment intensity, laboring intensity, token price	No mention found
Marin et al., 2023	Yes	Token creation and valuation	Systematic review (PRISMA)	Demand-supply dynamics, social incentives, market conditions	Multiple (focus on Ethereum)
Nadler and Guo, 2020	No	Pricing of risk factors in cryptocurrency markets	Asset pricing model	Market risk, blockchain-specific risk factors	Bitcoin, Ethereum
Sareen, 2023	No	Factors affecting gaming crypto tokens	Multiple linear regression	Token volatility, returns, liquidity	Solana, Polygon
Stanley, 2019	No	Behavioral heuristics in Initial Coin Offering (ICO) valuation	Correlation analysis, hybrid model	Return on Investment (ROI), ease of understanding, market sentiment	No mention found
To, 2023	No	On-chain cashflows and cryptocurrency returns	Cross-sectional analysis	Revenues retained by protocols, token incentives	Multiple (not specified)

Analysis of the included studies:

1. Research Focus:

- We found a diverse range of research focuses across the 10 studies.
- The most common focus was token adoption and valuation, appearing in 2 studies.

- Other focuses included trust dynamics, tokenomics, value prediction, strategic earning, risk factors, gaming tokens, ICO valuation, and cashflows and returns.

2. Methodology:

- We found various methodological approaches:
 - 3 studies used multiple methods
 - 2 studies used asset-pricing models
 - 2 studies used regression techniques
 - Other methodologies included empirical analysis, systematic review, and cross-sectional analysis

3. Key Metrics:

- We found a wide array of metrics used across studies:
 - The most common metrics were transactions, volatility, and adoption, each appearing in 2 studies
 - Other metrics included trust, information flows, price stability, gas price, miner rewards, investment intensity, market conditions, liquidity, ROI, and token incentives, among others

4. Platforms:

- Based on the platforms mentioned in the studies we reviewed, Ethereum was the most frequently studied, appearing in 4 of the 10 studies.
- Bitcoin was studied in 2 studies
- Solana and Polygon were each studied in 1 study
- 2 studies mentioned multiple platforms without specifying
- We didn't find platform information for 4 studies

Thematic Analysis

Fundamental Value Drivers

On-chain Metrics Analysis On-chain metrics emerge as crucial indicators for token valuation across multiple studies:

- Eick (2024) identifies gas price per block, transaction fees, and rewards to miners as significant factors affecting Ethereum's intrinsic value.
- To (2023) emphasizes the importance of on-chain cashflow characteristics, particularly revenues retained by protocols, in determining token value.
- Chen et al. (2020) link platform productivity (which can be inferred from transaction data) to token price stability and user adoption.
- Cong et al.'s (2020) model bases token valuation on aggregated user transactional demand.

However, the studies differ in their assessment of token incentives:

- While some models incorporate them as key factors, To (2023) finds that token incentives as a cost of revenue measure have little pricing power.
- This discrepancy suggests that the role of token incentives in valuation may be context-dependent or require further investigation.

Network Effects and Adoption Metrics Network effects and user adoption emerge as critical factors in token valuation across multiple studies:

- Cong et al. (2020) emphasize the importance of user network externality and platform adoption in their dynamic asset-pricing model.
- Chen et al. (2020) link high userbase adoption to stable token prices.
- Li (2022) develops a decision-making framework that integrates participants' roles as users, investors, and laborers, highlighting the complex interplay between different stakeholders in determining token value.
- Sareen (2023) provides empirical support for the importance of adoption metrics, finding that Monthly Active Users significantly affect token volatility in the context of gaming tokens.

These studies consistently highlight the importance of user adoption and network growth metrics in their token valuation approaches. However, they also indicate that the relationship between adoption and value is not always straightforward, often following an S-curve pattern as described by Cong et al. (2020).

Technical Market Indicators

Liquidity Metrics Liquidity emerges as a factor in token valuation, although it is not uniformly addressed across all studies:

- Sareen (2023) explicitly includes liquidity as one of the main dependent variables in their analysis of gaming tokens.
- The study finds that the number of faucets for a game and the percentage of tokens dedicated to rewards and private sale significantly influence liquidity.
- While other studies do not directly measure liquidity, several touch on related concepts:
 - Cong et al. (2020) discuss how introducing tokens can lower users' transaction costs on a platform, which could be seen as a proxy for improved liquidity.
 - To (2023) focuses on on-chain cashflow characteristics, which are closely related to a token's liquidity profile.

The varying approaches to liquidity across studies suggest that while it is recognized as important, there is no standardized method for its incorporation into token valuation frameworks.

Trading Volume Analysis Trading volume, while not explicitly analyzed in all studies, is implicitly considered in several:

- Chen et al. (2020) discuss the volatility of cryptoassets, which is closely related to trading volume.
- Nadler and Guo (2020) examine both on-chain and off-chain trading activity, suggesting that trading volume in both contexts is relevant to token valuation.
- To (2023) focuses on on-chain cashflow characteristics, which would likely include measures related to trading volume.
- However, To's finding that token incentives as a cost of revenue measure have little pricing power suggests that the relationship between trading activity (often stimulated by such incentives) and token value may be complex.

Market Sentiment Indicators Market sentiment emerges as a significant factor in several studies, albeit with varying degrees of importance:

- Stanley (2019) explicitly includes market sentiment as one of the key variables potentially impacting investment decisions in ICOs.
- Interestingly, this study finds that "ease of understanding" is significantly correlated with ROI, suggesting that investor perception plays a crucial role in token valuation, particularly in the early stages of a project.
- Marin et al. (2023), in their systematic review, identify market sentiment as one of the key factors affecting token valuation.
- They note the impact of news and events on token prices, highlighting the volatile nature of sentiment in the cryptocurrency market.
- However, not all studies give equal weight to market sentiment:
 - Eick (2024) finds that features of the Ethereum Blockchain Network and valuation metrics have more predictive power than market sentiment in determining ether's intrinsic value.

The varying emphasis on market sentiment across studies indicates that its importance may depend on factors such as the maturity of the token, the type of blockchain platform, and the specific use case.

Risk Assessment Framework

Technical Risks Technical risks emerge as a crucial component in several studies' approaches to token valuation:

- Nadler and Guo (2020) explicitly investigate blockchain-specific risk factors alongside traditional market risks.
- Their finding of a shift in risk factors from Bitcoin to Ethereum highlights the evolving nature of technical risks in the blockchain space.
- Li (2022) addresses technical risks through their decision-making framework, which uses Monte-Carlo methods to address parameter and system uncertainties.
- This sophisticated approach suggests that technical risks in token valuation are complex and may require advanced modeling techniques to accurately assess.
- Eick (2024) indirectly addresses technical risks by focusing on Ethereum-specific metrics like gas price and transaction fees.
- These factors, while fundamental to the network's operation, also represent potential sources of technical risk that could affect token value.

Economic Risks Economic risks are addressed in various ways across the studies:

- Chen et al. (2020) focus on the volatility of platform productivity and its effects on token price stability, highlighting the economic risks associated with platform performance.
- Cong et al. (2020) incorporate economic risks in their dynamic asset-pricing model through the concept of user transactional demand.
- Marin et al. (2023), in their systematic review, identify several economic risk factors affecting token valuation, including market conditions and macroeconomic factors.
- To (2023) approaches economic risks through the lens of on-chain cashflow characteristics. By focusing on revenues retained by protocols, this study provides insights into how economic performance at the protocol level can affect token value.

Adoption Risks Adoption risks feature prominently in several studies, reflecting the critical role of user adoption in token value:

- Cong et al. (2020) model platform adoption as following an S-curve, highlighting the potential volatility in the middle phase of adoption.
- Chen et al. (2020) link adoption to platform productivity and token price stability, indicating that adoption risks are closely tied to overall platform performance.
- Sareen (2023) provides empirical evidence for the importance of adoption metrics in the context of gaming tokens, finding that Monthly Active Users significantly affect token volatility.
- Li (2022) addresses adoption risks through their decision-making framework that integrates different roles of participants (users, investors, laborers).
- This approach suggests that adoption risks are multifaceted and involve complex interactions between different stakeholder groups.

Framework Integration

Based on the thematic analysis, we can propose an integrated framework for token valuation that incorporates the key insights from the reviewed studies:

Metric Category	Key Indicators	Assessment Method	Risk Weight
On-chain Metrics	Gas price, Transaction fees, Retained revenues	Quantitative analysis of blockchain data	High
Network Effects	User adoption rate, Network growth	S-curve modeling, User engagement metrics	High
Liquidity	Trading volume, Bid-ask spread	Market data analysis	Medium
Market Sentiment	Social media sentiment, Search trends	Natural language processing, Trend analysis	Medium
Technical Risks	Protocol upgrades, Security measures	Qualitative assessment, Expert evaluation	High
Economic Risks	Protocol revenue, Market conditions	Financial analysis, Macroeconomic indicators	High
Adoption Risks	User growth rate, Competitor analysis	Trend analysis, Market research	Medium

Analysis of the integrated framework:

1. Metric Categories:

- We found 7 metric categories for assessing blockchain projects.
- On-chain Metrics had the most key indicators (3), while all other categories had 2 indicators each.

2. Assessment Methods:

- 4 categories were assessed using quantitative methods
- 2 used mixed methods
- 1 used qualitative methods

3. Risk Weights:

- We found 4 categories with high risk weight
- 3 categories had medium risk weight
- We didn't find any low risk weight categories in this table

4. Key Indicators:

- On-chain Metrics: gas price, transaction fees, and retained revenues
- Network Effects: user adoption rate and network growth
- Liquidity: trading volume and bid-ask spread
- Market Sentiment: social media sentiment and search trends
- Technical Risks: protocol upgrades and security measures
- Economic Risks: protocol revenue and market conditions
- Adoption Risks: user growth rate and competitor analysis

5. Assessment Methods:

- Quantitative approaches: blockchain data analysis, S-curve modeling, market data analysis, and financial analysis
- Mixed methods: natural language processing, trend analysis, and market research
- Qualitative assessment: expert evaluation for technical risks

This integrated framework synthesizes the diverse approaches found in the reviewed studies, providing a comprehensive structure for evaluating blockchain tokens. It incorporates both quantitative and qualitative metrics, reflecting the complex nature of token valuation in the blockchain ecosystem.

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