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Token design strategies for entrepreneurial crypto projects, a systematic literature review

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This study identifies major approaches in token design for founders in the cryptocurrency/web3/blockchain space. The high failure rate of blockchain companies means that successful long-term performance will depend greatly on well-designed tokens. This study will integrate all prior research to highlight the most important aspects of structured tokenomics, including token utility, governance, and security. The study also contributes to the literature by introducing the Business Model Canvas as a conceptual framework that enables the integration of best practices for token design, drawing on both academic and industry literature. The results indicate significant gaps in the literature. This study offers new and practical insights for founders to enhance stakeholders' engagement, improve regulatory compliance, and ensure project viability in the volatile cryptocurrency market. Furthermore, this research generates new knowledge that bridges the gap between the theory and practice of tokenomics, laying the groundwork for future research to develop and refine token design strategies.

KEYWORDS

blockchain-based organization, business model, cryptocurrency, entrepreneurship, token design, tokenomics, ventures, web3

Introduction

Web3 presents a similar high-risk environment to that of most new ventures—roughly 50% of all businesses fail before reaching their third year of operation (U.S. Bureau of Labor Statistics, 2025). Moreover, because Web3 ventures have been founded in a relatively new digital space that utilizes blockchain technology to create trustless, secure, and decentralized ecosystems, the risk involved in establishing a successful venture in this space is significantly greater. As shown in the previous cryptocurrency market cycle, the mortality rate of Web3 ventures has exceeded 80% (CoinMarketCap, 2025), as indicated by the dramatic decline in the number of top 1,000 crypto firms between 2019 and 2023. Despite these high-risk factors, Web3 continues to attract entrepreneurs who see great opportunities and massive growth potential in the sector, valued at roughly \$3 trillion by 31 December 2025 (CoinGecko, 2025). Blockchain technology is the driving force behind the rapid expansion of Web3 ventures and has enabled the creation of trustless, secure systems across multiple industries (Alkhudary et al., 2020; Attaran and Gunasekaran, 2019; Casino et al., 2019; Frizzo-Barker et al., 2020; Konstantinidis et al., 2018; Lo and Medda, 2020).

The emergence of decentralized digital currency, as represented by Bitcoin (Nakamoto, 2008), marked an innovation in utilizing blockchain technology to facilitate intermediary-free, secure, and transparent transactions. However, it was limited by constraints of scalability, cost, and transaction processing speed. Ethereum (Buterin, 2014) enabled many of the previously mentioned limitations with the development of programmable Smart Contracts, which enabled Decentralized Applications (DeFi), token-based

ecosystems, and a variety of other uses. The innovations above represent the foundational components of Web3, which represent decentralized, open, and permissionless infrastructure, allowing businesses to develop new business models while challenging the paradigm of centralization as defined in Web2 (Konstantinidis et al., 2018; Frizzo-Barker et al., 2020).

Tokens are the backbone of the Web3 ecosystem, as they represent ownership or access rights to digital assets and form the basis for numerous applications, including payment, governance, and supply chain management (Y. Chen, Richter and Patel, 2020). Token design is a key determinant of success for entrepreneurial ventures, encompassing several key considerations, including token economics, utility, governance, and security (Schubert et al., 2021). A well-designed token has the potential to align stakeholders' interests, promote participant involvement, and create a sustainable ecosystem. In contrast, poorly designed tokens may result in issues related to liquidity, market manipulation, and decreased community engagement (Y. Chen, Richter and Patel, 2020).

Although there is an increasing number of token-based ventures, the literature has identified significant voids in the structured approaches to token design—projects develop tokens without utilizing comprehensive frameworks for designing tokens that do not align with their respective business models and stakeholders' needs. Examples of poorly developed tokens can be seen in two recent cases: EigenLayer (an Ethereum re-staking project) and Arbitrum (an Ethereum Layer 2 scaling project), both of which raised questions about the utility of their tokens after launch. Both examples illustrate how speculative motivations frequently take precedence over the long-term value of a Web3 ecosystem, resulting in stakeholders losing confidence in the project's economic viability.

The Car Dossier case study illustrated how frameworks, such as the morphological box and decision trees, offer useful methodologies for assessing the necessity of a token and the degree to which it is aligned with the platform's business model (Oliveira et al., 2018). These frameworks enable decision-makers to determine whether a token is necessary and, if so, how to design it effectively to encourage user incentives and compliance with regulatory requirements. Nevertheless, the absence of a broader, structured framework for token design is a significant constraint, limiting stakeholder engagement and ultimately affecting the long-term sustainability of blockchain-based ventures (Attaran and Gunasekaran, 2019).

This study employs an integrative literature review methodology, as described by Torraco (2016), to synthesize the fragmented body of research on blockchain token design. Torraco's framework highlighted the crucial role of integrative reviews in synthesizing disparate viewpoints to generate new knowledge. Integrative reviews are particularly suitable for emergent areas, such as Web3 token design, where the literature is still dispersed and not uniform. By systematically examining prior research, this study seeks to identify mechanisms through which token designs can be aligned with business models to maximize long-term commitment among stakeholders.

To address the issue of unstructured token design, this review proposes the use of the Business Model Canvas (BMC) framework (Osterwalder and Pigneur, 2010), a commonly used tool for

capturing and visualizing business models across various industries. Although the BMC has proven to be an effective means of developing systematic approaches to business modeling, its application in blockchain contexts requires adaptation to accommodate complexities such as token economics, governance, and regulatory concerns (Taherdoost and Madanchian, 2023). This study will provide a structured basis for designing tokens that align with entrepreneurial objectives and foster sustainable Web3 ecosystems by incorporating blockchain-related concepts into the BMC.

This integrative literature review synthesizes existing research on token design for blockchain-based ventures, filling a void in structured frameworks. This study introduces a conceptual framework—the Token Business Model Canvas (TBMC)—adapted from Osterwalder and Pigneur's (2010) Business Model Canvas core structure and concept—to help practitioners design tokens that align with their overall business strategy. This study contributes to enhancing our understanding of token design by integrating theoretical ideas with practical applications, thereby aiding in the development of sustainable Web3 ecosystems.

In the following section, the paper outlines the theoretical background and situates token design within the broader literature on blockchain economics, entrepreneurship, and business model innovation. The methodology of our research is outlined in the next section, which includes a description of the literature review method, data sources, and classifications used to synthesize previous research into this paper. We then outline the significant results of the literature review, organizing the literature based on the major token design themes and mapping those themes to the 9 TBMC components. Furthermore, we discuss the implications of the findings from this research for both theory and practice, including important gaps, practical lessons learned, and possible avenues for further research. Lastly, we summarize the major contributions of this research and reflect on the study's limitations.

Background

According to Chod and Lyandres (2021) and Chod et al. (2022), entrepreneurs face multiple challenges in designing thoughtful tokenomics, including understanding technological and regulatory nuances, balancing incentives, and ensuring scalability. Addressing these issues requires a multidisciplinary approach that combines technical knowledge, regulatory awareness, strategic market analysis, and user-centered design (Risius and Spohrer, 2017). They argue that entrepreneurs often fail to design tokenomics thoughtfully due to several interconnected factors. Their limited understanding of decentralized technologies, such as decentralized ledgers and applications (dApps), is a primary reason. This lack of comprehension can result in suboptimal token designs that fail to fully leverage the blockchain's capabilities, either in demand (from users) or in supply (from miners/validators), thereby restricting the project's potential for innovation and its ability to introduce novel business models or disrupt existing ones.

Another contributing factor is the underestimation of the innovation potential inherent in tokenomics. Tokenomics can

revolutionize various sectors by enabling innovative financing, governance, and incentive mechanisms. However, many entrepreneurs fail to design their tokenomics effectively, thereby missing the opportunity to establish a competitive edge or attract significant investments and users.

Additionally, neglecting user incentives and governance mechanisms undermines the effectiveness of tokenomics (Ballandies, 2022). Successful projects depend on balanced systems that encourage user participation and investment. Entrepreneurs may overlook this need, resulting in poor token distribution, insufficient stakeholder engagement, or governance models misaligned with the project's long-term objectives.

Regulatory and compliance considerations also pose a critical challenge. Tokenomics must be designed with awareness of the varying regulatory landscapes across jurisdictions. US regulation is not as formalized or rigid as EU regulations; however, both have their own sets of regulatory frameworks for cryptocurrency, including commodities/securities, and real estate doctrine, as well as enforcement actions through the CFTC and SEC. The EU has established a unified regulatory framework under the MiCA Directive, providing a clear direction for regulating cryptocurrencies while offering investors enhanced protection, stronger anti-money laundering (AML) safeguards, and legal certainty for businesses (Bongini et al., 2025). However, the EU and US are both criticized for relying too heavily on securities law/public law perspectives in relation to cryptocurrency regulation, and not enough on the private-law infrastructure for tokenized rights and the innovations occurring in decentralized finance (DeFi), non-fungible tokens (NFTs), and smart-contract-based markets (Lee, 2024). Failing to address these issues can lead to legal challenges that hinder a project's launch or scalability (Casino et al., 2019).

Balancing short-term and long-term objectives is another area where entrepreneurs often struggle. Effective tokenomics requires providing short-term incentives to attract users while ensuring long-term sustainability. Many projects prioritize initial fundraising strategies, such as initial coin offerings (ICOs), without adequately considering long-term utility or value, or they fail to offer immediate benefits to early adopters (Gan et al., 2023).

A lack of market analysis and user research further exacerbates design issues in tokenomics. Without a profound understanding of the target market and user needs, entrepreneurs risk creating tokenomics that fail to resonate with their intended audience, resulting in low adoption rates (Freni et al., 2022).

Complexity and poor user experience also deter adoption (Wandmacher, 2019). Overly complex tokenomics systems can confuse users and create cumbersome experiences, diminishing engagement and participation despite the underlying technological innovations.

Finally, scalability and network effects are often overlooked in tokenomics design. Successful blockchain projects frequently rely on solid network effects, where the platform's value increases as more users join. Tokenomics that fail to incentivize user growth or make scaling difficult can limit a project's overall success (Chod et al., 2022).

The negative impact of not carefully designing tokenomics in crypto ventures may lead entrepreneurs to overlook or underutilize opportunities for innovation across diverse sectors through token design, resulting in projects that fail to meet market needs or

differentiate themselves from competitors fully (Lamberty et al., 2020). This oversight can prevent the exploration and implementation of new business models facilitated by tokenomics, such as unique incentives or economic models within their ecosystems, leading to missed opportunities for value creation and project growth. Furthermore, entrepreneurs might not develop a comprehensive strategy that includes a clear vision of how the token will function within the ecosystem, its utility, and its value proposition to users and investors. The complexity of designing effective tokenomics, which balances supply and demand, ensures security, and complies with regulations, is often underestimated, resulting in flawed economic models that fail to sustain long-term project viability. Failing to design tokenomics that create compelling incentives for users and investors can lead to poor adoption and investment (Wandmacher, 2019). Finally, neglecting market dynamics and failing to incorporate feedback from the community and stakeholders can result in tokenomics misaligned with user needs or market realities. These insights suggest that successful tokenomics design requires a deep understanding of blockchain technology, innovative thinking, strategic planning, and responsiveness to market feedback. Entrepreneurs must address these areas to enhance the success chances of their crypto projects (Attaran and Gunasekaran, 2019).

This literature review examines existing research on blockchain-based organization token design and identifies strategies for maximizing long-term stakeholder commitment. The method bridges theory and practice by illustrating how theoretical token design strategies have been applied in real-world projects and their resulting outcomes. This combined focus is important for academic researchers testing and refining theories, as well as practitioners seeking evidence-based strategies to implement. An integrative literature review can utilize research from various fields, offering a multi-disciplinary perspective that enhances understanding of token design strategies and their impact on entrepreneurial success.

The review aims to understand token design strategies that can enhance long-term stakeholder commitment, particularly within the blockchain and cryptocurrency sectors. Firstly, tokenomics provides the blueprint for creating and managing economic incentives within a blockchain project. Entrepreneurs must understand how to structure these incentives to ensure participant engagement from users, investors, and contributors (Zhang et al., 2019). Secondly, through tokenomics, entrepreneurs can design mechanisms that ensure the long-term sustainability of their projects by creating token distribution strategies that prevent market manipulation and guarantee viability beyond the initial hype.

Additionally, understanding tokenomics is crucial for compliance as the regulatory environment for cryptocurrencies and digital assets continues to evolve. Entrepreneurs must design their tokenomics with an awareness of legal frameworks to avoid future regulatory pitfalls, thereby ensuring the longevity of their project (Liu et al., 2022). Well-designed tokenomics can also make a project more attractive to investors by clearly outlining the token's value proposition, utility, and potential returns, increasing trust and investment from retail and institutional investors (Lamberty et al., 2020). Moreover, unique and innovative tokenomics can be a crucial differentiator for blockchain projects in a crowded market (Jürjens et al., 2022). It enables entrepreneurs to leverage tokenomics to offer innovative solutions to existing problems or create new markets,

thereby setting their projects apart. Effective tokenomics can also incentivize users to join and stay on a platform, thereby enhancing the network effects that are crucial for the success of any platform-based business (Voshmgir and Zargham, 2019). Understanding and implementing tokenomics enables entrepreneurs to anticipate and manage economic risks associated with their projects, including issues such as token volatility, inflation, and other factors that impact financial stability (Chen et al., 2023). Tokenomics can also encompass governance mechanisms that enable decentralized decision-making, involving token holders in the project's development to ensure it evolves in a manner that benefits most stakeholders (Chod et al., 2022). Furthermore, by understanding tokenomics, entrepreneurs can optimize resource allocation within their ecosystem, determining how best to incentivize developers, users, and other key stakeholders to ensure efficient resource use (Han et al., 2022). Ultimately, a profound understanding of tokenomics can enable entrepreneurs to anticipate how the market will respond to decisions such as token burns, airdrops, or supply adjustments, providing vital foresight for strategic planning and maintaining a competitive edge in a rapidly evolving industry (Kim and Chung, 2018).

Tokenomics involves creating a sustainable, compliant, and competitive economic model that aligns stakeholder interests, rather than just designing tokens or conducting ICOs/IEOs. For entrepreneurs, mastering tokenomics is essential for the success and longevity of their ventures in the digital asset space (Freni et al., 2022). The study aims to identify key elements from academic research that entrepreneurs should consider when designing crypto project tokenomics and maximizing the chances of success.

The evidence from the literature examined earlier suggests that token design can be viewed as an ongoing series of interconnected design trade-offs, rather than individual design choices. For example, entrepreneurs will have to make decisions concerning token design, balancing immediate rewards *versus* long-term sustainability, decentralization *versus* efficient decision-making regarding coordination, openness *versus* compliance with regulators, and speed of adoption *versus* economic and governance stability. The decision-making process regarding token supply, token utility, token governance, token security, and the funding mechanism for the token is ultimately dependent on multiple conflicting goals and objectives. As such, when decisions are made to improve one area or objective, there will likely be negative consequences or challenges in other areas. Token design viewed through a trade-off framework is a way of viewing and interpreting all design decisions across technical, economic, organizational, and regulatory environments, as well as providing a rationale for why tokenomics that are unstructured and/or based on speculation rarely lead to sustained ecosystem growth. In essence, this perspective emphasizes the need for structured models/frameworks that allow designers to explicitly identify and manage design trade-offs, enabling them to develop more rational and sustainable token design strategies.

Conceptual framework

Zott et al. (2011) research shows that there is no single agreed-upon definition of a business model. Osterwalder and Pigneur (2010) define a business model as:

A conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specified firm, a description of the value [a] company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams. (p. 17)

Other academic researchers have used the versatile nature of the BMC as a conceptual framework in services (Ojasalo and Ojasalo, 2018), in technology fields like 3D printing (Rayna and Striukova, 2016), life science innovations (Zott et al., 2011), cloud technology (DaSilva et al., 2013), and to demonstrate blockchain technologies' value potential (Heim, 2020; Nowiński and Kozma, 2017). The model offers a structured, visual framework for developing new or documenting existing business models (Osterwalder and Pigneur, 2010). It breaks down a business model into nine key components: value propositions, customer segments, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure.

Osterwalder and Pigneur (2010) define value proposition as a company's unique products or services to solve customer problems or satisfy needs. It encapsulates the distinctive value distinguishing the business from competitors, such as innovation, customization, or cost-efficiency. Secondly, customer segments represent the different groups of individuals or organizations a business serves. These groups are identified based on shared characteristics, such as demographics, behavior, or needs. Tailoring the value proposition to specific customer segments is crucial for achieving customer satisfaction and driving business success. Then, channels describe how a company delivers its value proposition to customers. These can include physical stores, online platforms, or intermediaries. Effective channels ensure that products and services are accessible to customers while optimizing communication and distribution.

Additionally, customer relationships refer to the interactions a business maintains with its customers. These relationships can range from personal assistance to automated services, fostering customer loyalty and satisfaction. Revenue streams also represent the income generated from each customer segment. This element encompasses the various ways a business can generate revenue, including direct sales, subscription fees, licensing, and advertising. Identifying and optimizing revenue streams is critical for financial sustainability.

Moreover, key resources are essential for delivering the value proposition, reaching target customer segments, and sustaining business operations (Osterwalder and Pigneur, 2010). These resources may include physical, intellectual, human, or financial assets. Another element is key activities, a company's primary tasks or operations to create and deliver its value proposition (Osterwalder and Pigneur, 2010). Depending on the business model, these activities often include production, problem-solving, networking, or customer engagement. The authors define key partnerships that involve collaborations with external entities essential for the business model's success. These partnerships can include suppliers, distributors, or strategic alliances, which help optimize operations, reduce risks, or access additional resources.

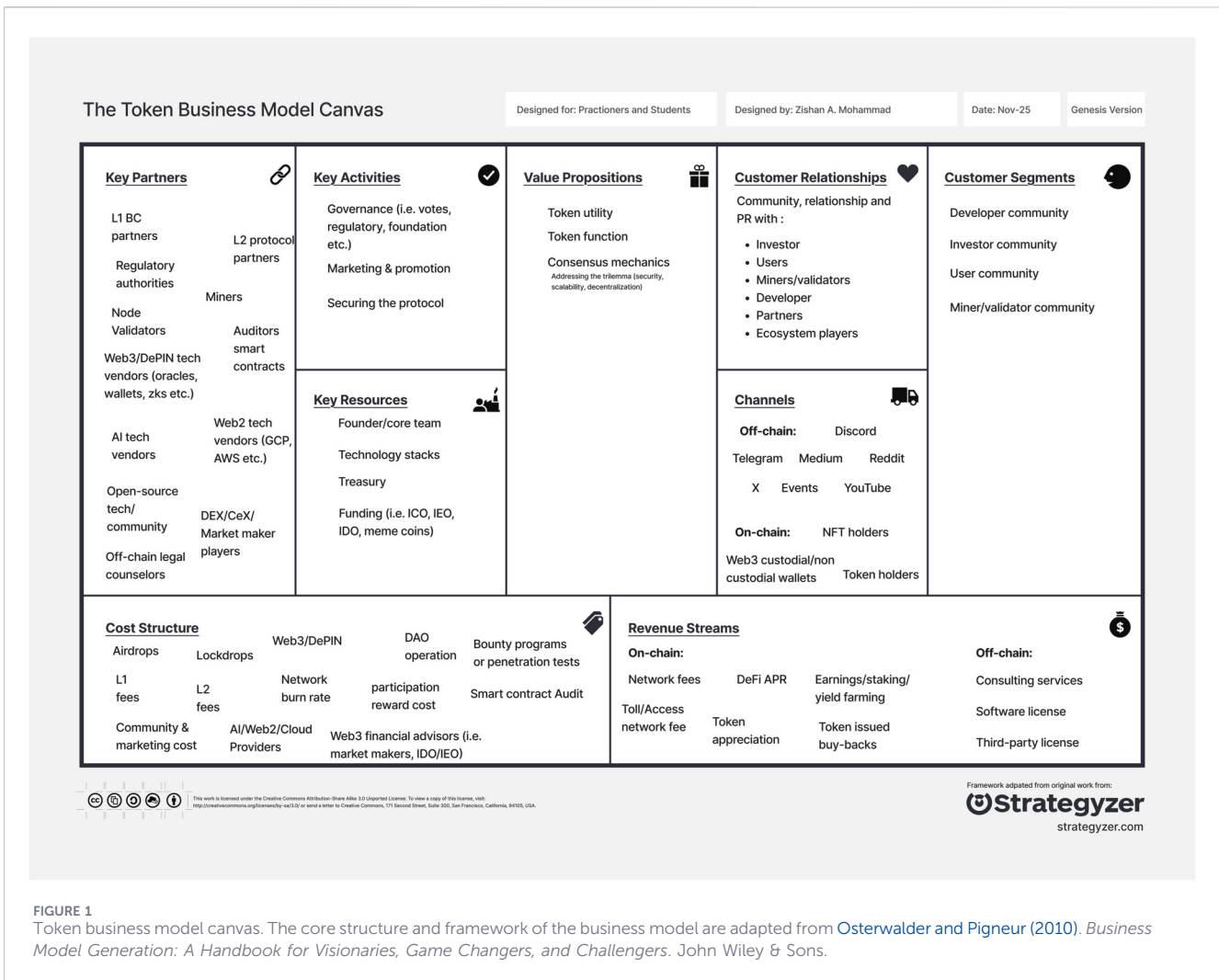


FIGURE 1 Token business model canvas. The core structure and framework of the business model are adapted from Osterwalder and Pigneur (2010). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley & Sons.

The authors then proceed to outline, finally, the cost structure, which details all the expenses incurred to operate the business model. The latter includes fixed and variable costs, economies of scale, and cost optimization strategies. They argue that understanding the cost structure is vital for managing expenses and ensuring profitability.

The Osterwalder and Pigneur (2010) business model canvas framework, with its core structure and concept, could be highly beneficial for designing tokenomics within blockchain projects by focusing on value creation, stakeholder needs, and sustainable business practices (Nowiński and Kozma, 2017). Entrepreneurs can develop tokenomics models that support the long-term success of their blockchain projects. The structured yet flexible and iterative approach of the BMC, advocated by Blank (2013) for startup development, makes it a suitable tool in the complex, dynamic, and experimental nature of blockchain and cryptocurrency ventures (Heim, 2020). Integrating these components thoughtfully into the design and implementation of blockchain projects or tokenomics strategies can significantly enhance their chances of success by ensuring they align with the desires of their market segment, remain operationally and financially viable, and effectively leverage the unique capabilities of blockchain technology, as shown in Figure 1.

Research method and design

According to Torraco (2016), the interrogative literature review method is particularly suitable for our study for several reasons. First, the integrative literature review is designed to create new knowledge by synthesizing existing literature to offer fresh frameworks and perspectives, aligning perfectly with our goal of proposing insights into tokenomics and best practices. Second, this method is ideal for dynamic topics, such as tokenomics, which have rapidly growing bodies of literature but often lack comprehensive reviews. This reflects the issue the study addresses, where entrepreneurs might not fully leverage the potential of crypto projects. Third, the review method involves critically analyzing, reviewing, and synthesizing the literature, which helps resolve inconsistencies and provides new viewpoints, directly supporting our purpose of offering entrepreneurs valuable insights and best practices from academic literature.

Additionally, the method bridges the gap between theory and practice by demonstrating how theoretical token design strategies have been applied in real-world projects and their outcomes. This dual focus is crucial for both academic researchers seeking to test and refine theories and practitioners looking for evidence-based strategies to implement. Finally, token design and crypto projects lie at the

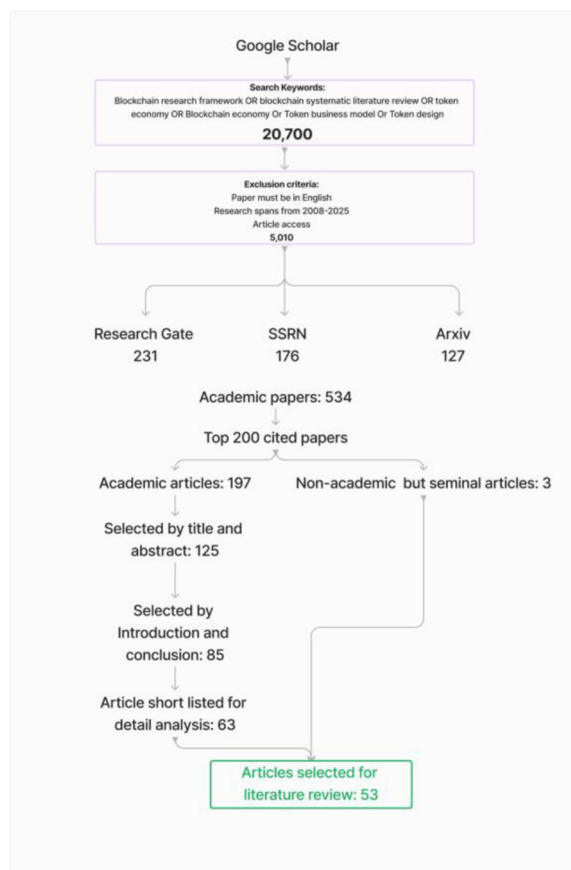


FIGURE 2 Integrated literature research (ILR) search methodology.

intersection of finance, economics, technology, law, and business. An integrative literature review can draw on research from these diverse fields, providing a multi-disciplinary perspective that enriches the understanding of token design strategies and their implications for entrepreneurial success. The article search is described in Figure 2.

According to the PRISMA 2020 guidelines, to provide a comprehensive coverage of all available relevant evidence within the area of blockchain economics and token design (20,700 papers), we identified SSRN, ResearchGate, and arXiv as information sources during the identification phase of this study. SSRN provides researchers with early access to influential working papers in economics, finance, law, and management. ResearchGate helps improve the retrieval completeness by allowing authors to deposit their peer-reviewed articles and other interdisciplinary outputs into the database before they are formally included in bibliographic databases. arXiv is important for identifying foundational and technical preprints in computer science and distributed systems, which are fundamental to blockchain research. Following the application of preliminary filtering criteria related to language, year of publication (2008–2025), and accessibility (5,010 papers), the remaining records were further filtered by journal (534 papers). The relevance of citations, followed by a series of additional filtering criteria related to titles, abstracts, and full texts, finally resulted in 53 papers.

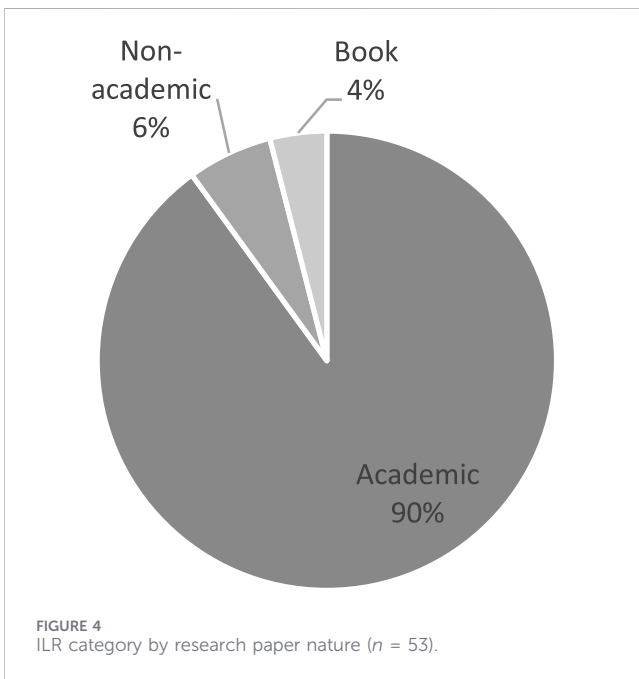
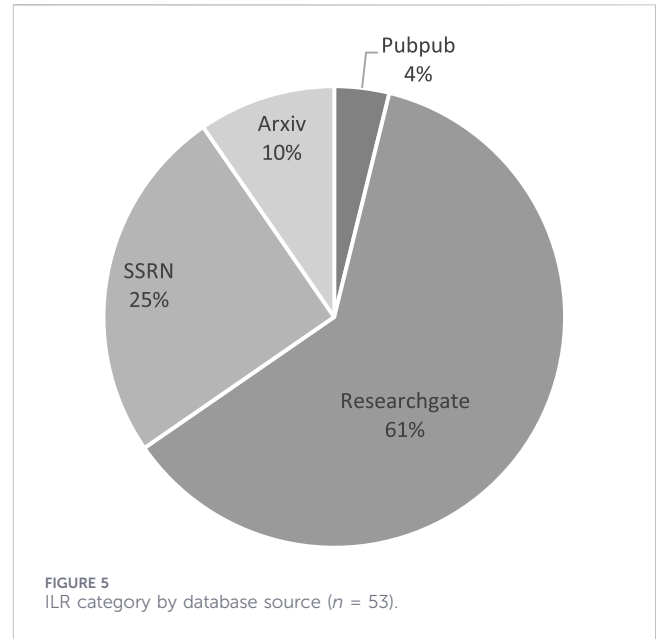
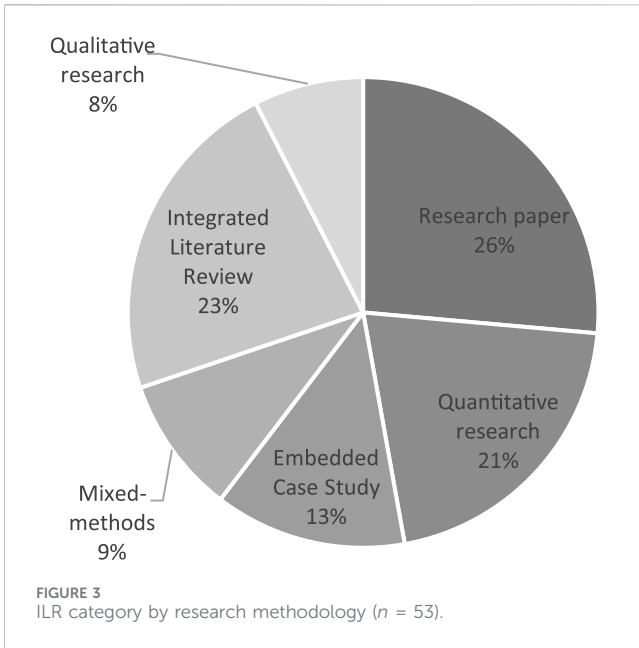
Figure 3 illustrates the overwhelming number of both research, ILR, and quantitative studies within the body of token design literature, which can be interpreted as a strong preference for theoretical models and empirical analyses over qualitative or mixed-methods approaches.

Figure 4 illustrates a strong domination of peer-reviewed academic journals by non-peer-reviewed academic and/or non-scholarly sources, and may indicate that this review was based mainly upon academic research.

Figure 5 illustrates a balanced mix of research papers by methodology type. Expect the two seminal works; all the research is sourced from online academic databases, primarily ResearchGate, followed by SSRN and ArXiv.

Figure 6 shows that more than two-thirds, or 66%, of the research papers have been published between 2020 and 2025, indicating a growing body of literature in recent years. We have observed a prevalence of token design governance research papers in 2024 and 2025 due to institutional adoption and regulation in Europe with MiCA and the USA with the Clarity Act.

Country-wise, the USA leads the pack with 13 research papers, corresponding to a 25% or quarter share of the literature, followed by Germany, with seven publications and a 13% share, and China, with four papers, accounting for 8%, as shown in Figures 7, 8. However, in terms of



In Figure 10, we have classified the article by relevant business model elements among the nine aspects as follows:

1. Key partners: 12
2. Key activities: 24
3. Key resources: 13
4. Value proposition: 30
5. Customer relationship: 13
6. Channels: 15
7. Customer segments: 7
8. Cost structure: 9
9. Revenue streams: 9

The value proposition is by far the article’s most frequently mentioned aspect, followed by key activities, then key partners, key resources, customer relationships, and channels as the second group. Finally, an equally distributed article is mentioned among the other three categories.

Another angle from which to observe the ILR is classified by BMC elements (n = 132, as one theme can be cited in more than one BMC element) and themes, as shown in Figure 11 and Table 1 above. The distribution of critical token design themes within each BMC element reveals a diverse focus across various areas.

Overall, we can classify it into three buckets as shown in Table 2 below. The first would be the most represented theme/BMC element couple, the TBMI in value proposition with 17.4% (n = 132). The second bucket would include Themes/BMC elements couple ranging from 3% to 8% with the following:

- TBMI in the 6 BMC elements.
- The couple governance token aspects in key activities
- The couple governance token aspects in key partners
- Blockchain innovation disruption aspects (BIDA) in all 9 BMC elements

geographic region, European countries lead with 28 publications, representing a 53% share or more than half, while North America totals 16 articles, accounting for a 30% share. Asia ranks third with seven papers, which is 13%.

Figure 9 illustrates the distribution of themes across the articles in the dataset, and the theme distribution is as follows:

- Tokenomics business model innovation (TBMI): 31 articles.
- Governance token aspects (GTA): 12 articles.
- Blockchain innovative disruption aspect (BIDA): 6 articles.
- Token financing innovation (TFI): 4 articles.

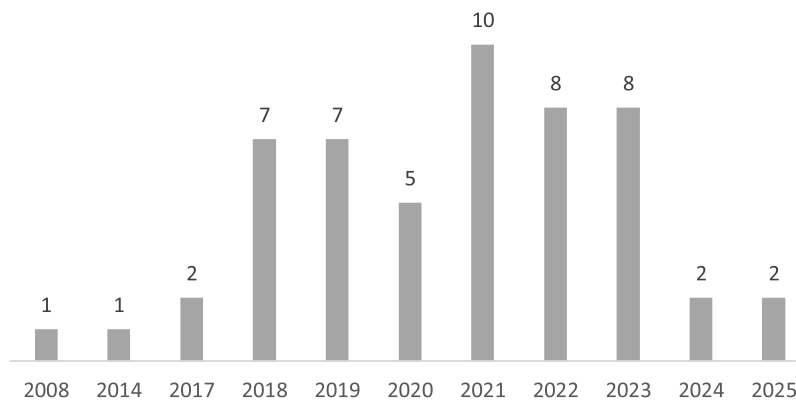


FIGURE 6
ILR research paper categories by publishing date (n = 53).

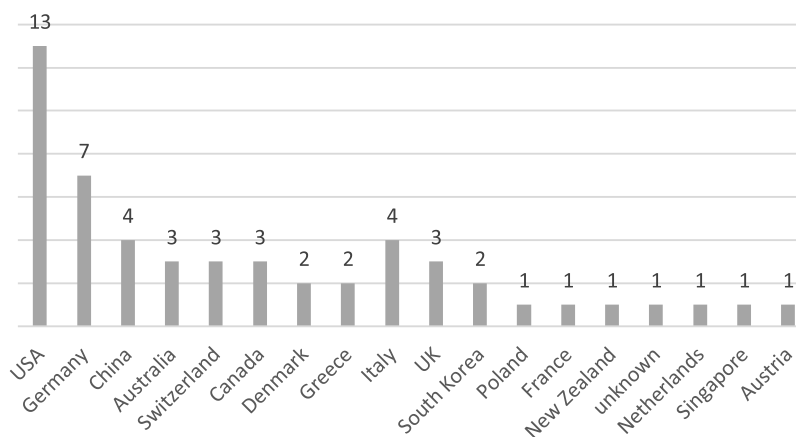


FIGURE 7
ILR research paper by authors' institution or organization affiliation country (n = 53).

The last bucket mainly comprises limited (less than 3% coverage) or absent mentions.

Insights and interpretation

The TBMI themes in the value proposition BMC element are the most prevalent, indicating a strong focus on token design, business applications, modeling, and economic and financial aspects in the literature. This underscores the importance of aligning token design with economic and financial considerations for entrepreneurial success in crypto projects.

GTA in key activities of BMC element is slightly less prevalent but still significant, highlighting the importance of governance and regulation in the crypto ecosystem.

BIDA across BMC elements is also highly represented, emphasizing the necessity of a solid understanding of blockchain and cryptocurrency fundamentals for entrepreneurs in this space.

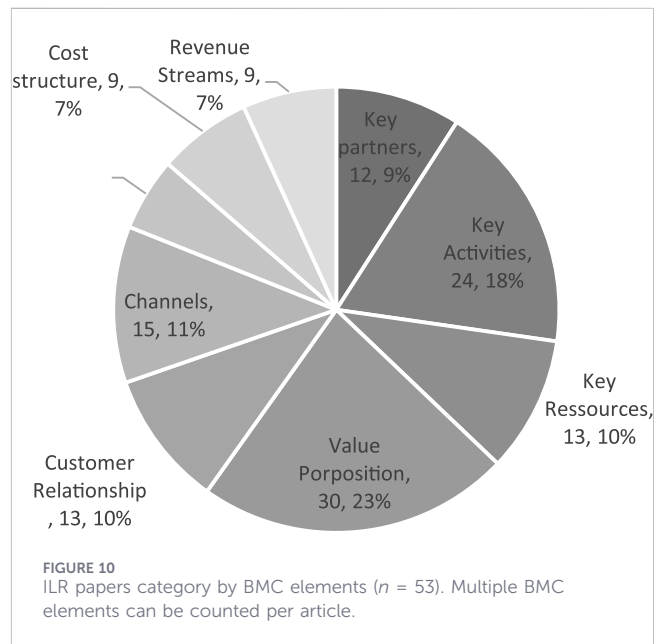
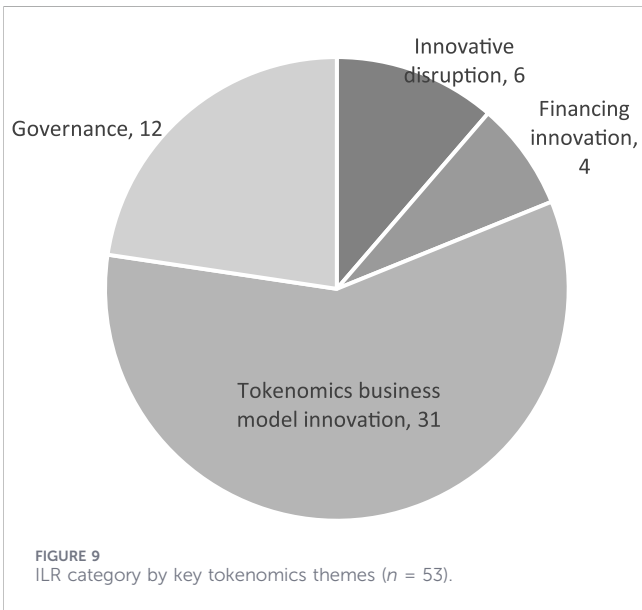
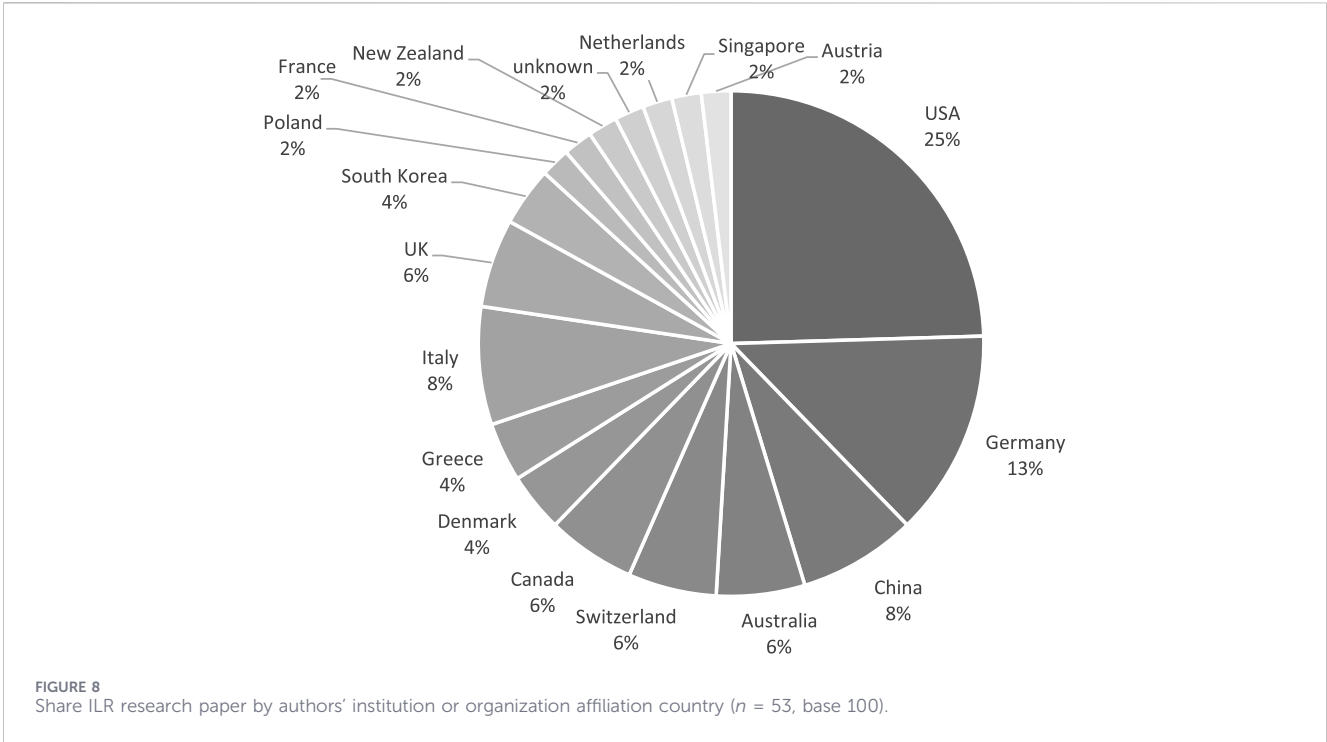
Token financing innovation (TFI) has the lowest representation, suggesting that while the impact of tokenomics and cryptocurrencies is recognized, it may be a more niche or emerging area of focus in the literature.

It is worth noting that BMC elements do not cover GTA in customer relationships, channels, customer segments, cost, and revenue, indicating a less emphasized focus from researchers in past years.

Findings

Tokenomics as a new discipline for business modeling innovation

Tokenomics, the study of the economics of cryptocurrencies and tokens (Oliveira et al., 2018), draws heavily from the precedents set by Bitcoin and Ethereum. It encompasses the incentives, distribution mechanisms, supply dynamics, and utility functions that govern token ecosystems. As we delve into the complexities of tokenomics, understanding the foundational principles and limitations of Bitcoin, as well as the expansive possibilities introduced by Ethereum, is crucial. This exploration offers insights into the evolution of digital assets and the potential for innovative economic models that challenge traditional notions of value, governance, and organizational structures.



The advancement of blockchain and DLT has introduced a fundamental shift in global business models (Y. Chen, Richter and Patel, 2020). This progression from product-centric to platform-based and ultimately to protocol-oriented frameworks underscores a strategic transformation in how value is created, exchanged, and distributed. In this new paradigm, the emphasis shifts towards designing underlying protocols on which platforms and products are built. This shift is significantly powered by the concept of tokenomics, which lies at the heart of many Web3 projects. Tokenomics, a combination of tokens and economics, refers to the design and implementation of economic models for blockchain-

based ecosystems (Jürjens et al., 2022). These models dictate tokens' distribution, ownership, and value exchange mechanisms within these ecosystems, influencing user behavior and ensuring network security and sustainability (Voshmgir and Zargham, 2019).

Tokenomics is fundamental to the success of Web3 projects, serving as a critical factor in their design, launch, and long-term viability (Van de Vyver, 2023). Through carefully crafted token models, projects can incentivize participation, align stakeholders' interests, and create robust, decentralized economies (Pietrewicz, 2019). Tokens can serve various functions (Lamberty et al., 2020),

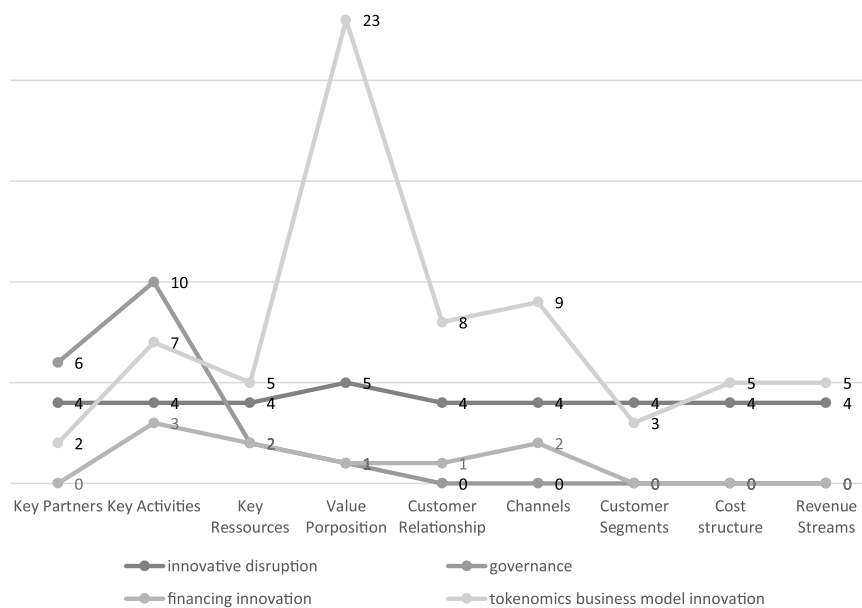


FIGURE 11 ILR papers category by themes and BMC elements (n = 53).

including but not limited to governance, where token holders vote on critical decisions; utility, where tokens grant access to services or resources within the ecosystem; and rewards, where contributors to the network are compensated. This multifaceted role of tokens enables a more equitable distribution of value among users, developers, and investors, fostering a sense of ownership and community engagement that is often absent in traditional business models. The introduction of tokenomics has thus opened new avenues for funding, community building, and value creation, emphasizing the shift towards decentralized, protocol-driven innovation. As the Web3 space continues to mature, the development and refinement of tokenomics models will remain crucial in unlocking the full potential of blockchain and DLT, paving the way for more transparent, inclusive, and efficient digital economies.

Tokenomics, as a burgeoning discipline, is becoming essential for entrepreneurs to understand and integrate into the design or update existing business models. This integration is not merely an addition but a transformative approach that necessitates a comprehensive understanding of decentralized networks and economies (Freni et al., 2022). As we delve deeper into the components and innovative parameters of tokenomics, this discipline introduces novel considerations that significantly impact the structure and strategy of business models in the digital and decentralized era.

The BMC, a strategic management template for developing new or documenting existing business models introduced by Osterwalder and Pigneur (2010), is an excellent framework for illustrating the incorporation of tokenomics. The BMC comprises nine critical elements—key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structure, and revenue streams—and offers a holistic view of a business’s operational and strategic considerations. Each element can be re-envisioned when applied

to tokenomics to highlight the unique aspects and opportunities presented by blockchain and DLT technologies, as illustrated in Supplementary Table S3 (see Supplementary Material).

Incorporating tokenomics into the BMC necessitates rethinking traditional business strategies to embrace Web3’s decentralized, inclusive, and transparent ethos. As we discuss the additional and novel parameters of tokenomics to consider in a business model, it will become evident how this discipline reshapes the foundation of the business model design, offering unprecedented opportunities for value creation and capture.

The sub-categories will discuss the findings in relation to the nine business model canvas elements.

Value propositions

Different token types and categories

Blockchain tokens can be broadly categorized based on their functionality, underlying value, and intended use within the ecosystem. Three types of tokens are cryptocurrency, utility, and security tokens (Schwiderowski et al., 2023). Cryptocurrencies, such as Bitcoin, serve as digital currencies without a central issuing authority. Utility tokens provide access to a blockchain-based product or service, facilitating ecosystem interactions without necessarily representing ownership or equity. Security tokens represent investment contracts, where the investment in the token results in an expectation of profit from the efforts of others, making them subject to regulatory scrutiny (Jürjens et al., 2022; Kaal, 2018).

Different types of token utilities

The utility of tokens varies significantly across blockchain ecosystems, influencing user participation and ecosystem health. Utility tokens have been emphasized to enable platform

TABLE 1 ILR papers category by themes and BMC elements ($n = 53$).

Keyword	Key partners	Key activities	Key resources	Value proposition	Customer relationship	Channels	Customer segments	Cost structure	Revenue streams	Total	Share by keyword
Blockchain innovative disruption aspect (BIDA)	4	4	4	5	4	4	4	4	4	37	28%
Governance token aspects (GTA)	6	10	2	1	0	0	0	0	0	19	14%
Token financing innovation (TFI)	0	3	2	1	1	2	0	0	0	9	7%
Tokenomics business model innovation (TMBI)	2	7	5	23	8	9	3	5	5	67	51%
Total	12	24	13	30	13	15	7	9	9	132	100%
Share by BMC	9%	18%	10%	23%	10%	11%	5%	7%	7%	100%	

TABLE 2 Simplified ILR papers category by importance and themes and BMC elements ($n = 53$).

Keyword	Key partners	Key activities	Key resources	Value proposition	Customer relationship	Channels	Customer segments	Cost structure	Revenue streams
Blockchain innovative disruption aspect (BIDA)				Bucket 2: Partially covered					
Governance token aspects (GTA)						Bucket 3: Very low or No coverage			
Token financing innovation (TFI)									
Tokenomics business model innovation (TMBI)				Bucket 1: Highly covered					

functionalities such as participation in governance, access to services, or entitlement to future profits. The utility often aligns with the platform's goal, whether by incentivizing specific actions, such as network security (*via* staking), or facilitating the use of dApps. Moreover, tokenomics incorporates the strategic design of tokens to enhance network effects, encourage desired behaviors, and ensure the long-term viability and growth of the platform (Jürjens et al., 2022).

Principles for designing sound blockchain governance

Sound blockchain governance entails mechanisms that ensure the fair, transparent, and effective management of the blockchain ecosystem. The governance framework should include clear rules for decision-making, dispute resolution, and updates to the protocol. Moreover, it should allow adaptability to technological advances and changing stakeholder needs. Effective governance models often incorporate token-based mechanisms, where token holders can participate in governance decisions directly or through delegated representatives, thus aligning incentives between the platform and its users (Zhang et al., 2019). A comprehensive governance framework addresses both on-chain and off-chain governance structures, ensuring that technological and organizational aspects are covered (Kaal, 2018).

Token design considerations and functions

The foundation of a thriving token economy lies in meticulous token design, which requires, on the one hand, addressing several critical considerations (Schubert et al., 2021) and, on the other hand, ensuring the token's functionality within the ecosystem, which is paramount (Khaqqi et al., 2018; Schubert et al., 2021). Refer to [Supplementary Table S5](#) in the [Supplementary Material](#), which outlines token design considerations and functions.

The proposed tokenomics design approach integrates comprehensive considerations and functions to guide the creation of balanced and sustainable token economies. This approach aims to facilitate the development of equitable, efficient blockchain ecosystems that comply with regulatory standards by addressing critical design aspects and embedding essential token functions.

Token incentives are designed to increase the value of a token

Efficient token incentive designs, acknowledging the factors affecting token economics, and navigating the inherent challenges are essential for the flourishing and sustainability of token ecosystems. By carefully considering user adoption, expected future utility, token riskiness, and the scalability-decentralization balance while addressing the intricacies of integrating multiple tokens, diminishing impacts, ethical dimensions, volatility, and scalability-security issues, token ecosystems can achieve and maintain long-term value (Khaqqi et al., 2018; Tan, 2019; Wandmacher, 2019). The main factors that enhance token value and its inhibitors are represented in [Supplementary Table S6](#) in the [Supplementary Material](#).

The case of dual token-design tokenomics

The article by Dimitri (2023) explores the economic foundations of dual-token blockchain platforms, explaining how these systems determine the monetary value and market desirability of their constituent tokens. Dual-token systems introduce a nuanced architecture within blockchain ecosystems, separating governance tokens from those used for transactional purposes. This segregation clarifies the utility and role of each token type, aiming to decouple transaction fees from market volatility and foster a more stable economic environment for platform operations. The author's central insights and contributions are multifaceted. Firstly, market prices of tokens serve as pivotal indicators of their desirability, reflecting the community's valuation of the tokens' utility and potential for future rewards. The dual-token model enhances this understanding by allowing distinct market reflections for governance *versus* operational utility, providing nuanced insights into platform engagement levels and user priorities. Secondly, the study introduces individual indicators for prices and quantities, positing that while prices offer a snapshot of current value, traded quantities provide insights into the tokens' circulation and demand dynamics. This dual perspective enriches the evaluation by capturing both immediate market reactions and longer-term trends in token utility and adoption. Combining price and quantity indicators yields a holistic view of token desirability and economic success. This approach aligns with the multifunctional roles of tokens within ecosystems, while addressing their speculative value and functional use in governance or transaction facilitation. The insights from evaluating dual-token systems have significant policy implications, guiding platform decision-making regarding token supply management, service quality enhancement, and fee structuring. These indicators can serve as instrumental tools for strategic planning and operational adjustments within blockchain platforms.

The dual-token model's inherent flexibility also supports tailored incentive mechanisms and economic structures, enabling platforms to adjust their strategies in response to evolving user behavior and market conditions. This adaptability is crucial for sustaining platform growth and user engagement over time (Dimitri, 2023).

In integrating insights from Dimitri (2023), Schubert et al. (2021), Khaqqi et al. (2018), and Tan (2019), it becomes evident that the dual token model not only offers a nuanced approach to blockchain economics but also addresses inherent challenges such as volatility and token dilution.

The dual token model delineates token functions, enhancing platform stability by segregating governance from operational activities (Dimitri, 2023; Schubert et al., 2021). This separation allows for a more targeted approach to incentivization and token utility, aligning token distribution and use with specific ecosystem needs (Dimitri, 2023).

Furthermore, the model offers a dynamic framework for understanding and managing the economic implications of token issuance and market behavior, thus mitigating risks associated with token volatility and dilution (Khaqqi et al., 2018; Tan, 2019). The inclusion of numerical indicators based

on market prices and traded quantities, as discussed by [Dimitri \(2023\)](#), complements this framework by providing a tangible method for evaluating token desirability and economic value. These indicators reflect immediate market valuations and capture broader trends in token circulation and demand, offering insights into both speculative value and practical utility within the blockchain ecosystem.

Moreover, the dual token model's inherent flexibility supports the customization of economic structures and incentive mechanisms, which is crucial for adapting to evolving user behaviors and market conditions. This adaptability is essential for sustaining platform growth, user engagement, and long-term ecosystem viability.

The case of play-to-earn (PTE) and play-to-X (PTX) tokenomics

The emergence of play-to-earn (PTE) games represents a significant evolution in the gaming industry, combining the allure of gaming with the financial incentives offered by cryptocurrency and blockchain technology. Through an analytic hierarchy process (AHP) analysis, [Lee and Park \(2023\)](#) examine the factors that motivate players to participate in PTE games. This analysis revealed three primary motivating factors. Firstly, the gaming experience emerged as the most critical factor, emphasizing the intrinsic value of fun and engagement in PTE games. Players prioritize the enjoyment derived from gameplay, indicating that the appeal of PTE games extends beyond mere financial incentives. Elements such as game quality, genre, and level of challenge significantly contribute to player satisfaction and retention. Then, the economic outcomes are essential for players. This factor encompasses the potential for earning through gameplay, including tokenomics, return on investment (ROI), the reliability of the game company, and the fluctuating price of in-game currencies. The analysis suggests that while financial incentives are a strong motivator, they are secondary to the core gaming experience. PTE game awareness ranks as the third motivating factor. This encompasses the players' awareness and understanding of the game's mechanics, entry timing, platform, and the community surrounding the game. Knowledge and timely participation in PTE games can significantly affect players' experiences and potential financial gains.

The findings from the AHP analysis illuminate the intricate balance between entertainment and economic incentives in PTE games. While financial outcomes and game awareness undeniably influence player engagement, the gaming experience remains the fundamental driver. In the PTE model, fun is paramount; merely having a token or the prospect of earning is insufficient to sustain player interest. Successful PTE games, such as *CryptoKitties*, *Axie Infinity*, and *Decentraland*, have thrived by integrating compelling gameplay with the financial benefits of blockchain technology ([Lee and Park, 2023](#)). As the PTE and generally PTX sector evolves, developers must continue to innovate, ensuring that games and dApps with gamification, such as *StepN*, remain engaging and enjoyable to sustain and expand their player base.

NFT and business model innovation

NFTs represent a transformative development in the digital landscape, fundamentally redefining the concept of ownership and driving the evolution of innovative business models. As [Li and Chen \(2023\)](#) outlined, NFTs are unique, blockchain-based digital assets that provide a transparent, secure, and transferable ownership mechanism over digital goods. The author argues that NFTs have facilitated the emergence of novel value creation and exchange paradigms across various sectors. Initially, NFTs enabled the establishment of unambiguous, secure, and transferable digital property rights. NFTs address a longstanding challenge in digital commerce: the lack of clear ownership of digital goods. This paradigm shift enables a vibrant market for digital assets, where creators and consumers can freely create, own, exchange, and monetize digital content. The sale of Beeple's digital art piece, "Everyday: The First 5,000 Days," sold for \$69 million at Christie's, exemplifying the monumental impact of NFTs in recognizing and valuing digital creativity ([Li and Chen, 2023](#)). NFTs have enabled the creation of new business models that prioritize decentralization, user empowerment, and community engagement. These models leverage the unique characteristics of NFTs, including digital ownership and asset composability, to foster decentralized communities and democratize content creation and distribution.

A notable instance is the *CryptoPunks* project by Larva Labs, or more recently, *Pudgy Penguins*. They have achieved significant commercial success and cultivated a robust community around their collectibles, demonstrating the potent combination of NFTs and community-driven value creation. Additionally, NFTs enable the integration of digital attributes with physical products, providing enriched consumer experiences and opening new avenues for engagement and value creation. This innovative approach enables product differentiation and the introduction of unique digital experiences without incurring additional production costs. For example, Nike's acquisition of *RTFKT* and the subsequent launch of *CryptoKicks* digital sneakers highlight how NFTs can enhance physical products with digital features, opening new markets and engagement strategies.

Finally, NFTs enable direct-to-consumer interaction and community building. Through digital wallets and blockchain technology, NFTs enable direct engagement between creators, brands, and consumers, strengthening relationships and fostering community involvement. This direct interaction supports the creation and co-creation of shared value, allowing communities to actively influence and participate in the evolution of brands and products. The Starbucks *Odyssey* program, which utilizes NFTs to reward and engage customers in unique experiences, exemplifies how NFTs can build and nurture loyal customer communities. NFTs present vast opportunities for business model innovation, underpinned by new forms of digital ownership and enhanced community engagement. However, leveraging these opportunities demands overcoming challenges such as sustaining active communities, navigating uncertain legal landscapes, and addressing technical limitations. For companies to fully capitalize on the potential of NFTs, adapting to the decentralized ethos of Web3 — characterized by empowerment, transparency, and

collective participation—is crucial. Highlighted by the success stories of CryptoKitties, Pudgy Penguins, Axie Infinity, and Decentraland, NFTs demonstrate the significant potential to cultivate dynamic, decentralized communities and redefine digital content and commerce.

Token interoperability matters

Kaal's (2018) article offers a comprehensive analysis of the token model landscape within the cryptocurrency market, highlighting the growing trend toward interoperability among digital tokens. He demonstrates that 60 of the 100 tokens analyzed either currently allow or intend to facilitate intersystem functionality, suggesting a strong inclination towards interoperable designs in the competitive token market. This trend is driven by the desire to attract a broader user base and enhance the utility and applicability of tokens across various systems and platforms.

Conversely, 32 out of the 100 tokens are designed to be restricted to specific ecosystems, so a decision was made to preserve their unique value propositions within their native environments. This design choice highlights the diversity of strategic approaches within the token market, striking a balance between exclusivity and widespread applicability.

The findings from Kaal's (2018) research underscore the significant influence of interoperability on token design within the competitive cryptocurrency market. The inclination towards interoperable tokens reflects a strategic effort to enhance the utility and market appeal of tokens. However, the study also highlights the complex challenges of this trend, including the need to maintain an engaged community, navigate uncertain legal frameworks, and address technical limitations such as fractionalization. As the blockchain and cryptocurrency industry continues to evolve, companies and projects must adapt to and embrace the decentralized ethos of Web3, leveraging the opportunities presented by interoperability to foster innovation and growth.

Key activities

Securing the blockchain through tokenomics

The integration of tokenomics into blockchain technology has ushered in a new era of digital economics, emphasizing the necessity for robust security measures. As highlighted in recent studies (Kampakis, 2018; Nasrulin et al., 2022), securing the blockchain infrastructure is crucial for maintaining the integrity, privacy, and overall functionality of these decentralized networks.

Importance of securing the blockchain

Securing the blockchain is critical for maintaining its functionality and reliability (Kampakis, 2018). Robust security measures ensure the integrity of transactions by preventing unauthorized modifications that could result in fraudulent activities. Additionally, safeguarding privacy is essential, as it protects sensitive information from malicious actors who might exploit vulnerabilities. Furthermore, effective security fosters trust among users, a foundational element for the widespread adoption of blockchain technology and its diverse applications. By addressing

these security imperatives, blockchain systems can sustain their promise of decentralization, transparency, and reliability in various domains.

How tokenomics addresses blockchain security, privacy, and integrity

Tokenomics enhances the security, privacy, and integrity of blockchain systems (Nasrulin et al., 2022). Through the design of token-based incentive mechanisms, blockchain networks encourage behaviors that contribute positively to the ecosystem's health. For instance, proof-of-stake (PoS) consensus algorithms reward participants for validating transactions and securing the network against fraudulent activities. Additionally, tokenomics can incorporate privacy-enhancing features, such as zero-knowledge proofs (i.e., zk-proof), to conduct transactions without revealing sensitive information, thus maintaining users' privacy and the system's integrity. For illustration, it is like someone buying bread at the bakery and leaving their banking statement to the baker. Examples like DeepChain, which utilizes zero-knowledge proofs for privacy-preserving computations in AI and deep learning contexts, showcase the innovative applications of tokenomics in enhancing blockchain functionalities (Weng et al., 2019). However, despite these advancements, issues such as effective community engagement, legal uncertainties, and the potential for centralization within token-based governance models persist, underscoring the need for continued innovation and regulatory evolution.

Main measures to secure the blockchain

Researchers have identified measures to increase and inhibit blockchain security, as summarized in [Supplementary Table S7](#) in the [Supplementary Material](#). Tokenomics and the design of token incentives are integral to addressing the challenges of blockchain security, privacy, and integrity. Innovations like BasedAI and VeniceAI, which integrate AI and run large language models (LLMs) on blockchain through mechanisms such as zero-knowledge proofs (zk-proof), showcase the potential for advanced security solutions and AI privacy.

Governing the blockchain through tokenomics

The integration of tokenomics into blockchain governance frameworks is pivotal in addressing the complex challenges of decentralized systems (Han et al., 2022). Governance in the blockchain is fundamental for several reasons (Liu et al., 2022). It ensures that the system operates efficiently and that decisions are in the best interests of all stakeholders. Effective governance mechanisms help maintain the blockchain's integrity, transparency, and trustworthiness, which is crucial for its adoption and functionality.

How tokenomics addresses firm governance limits

Tokenomics provides a novel approach to address the limitations of traditional firm governance by incentivizing

behaviors that align with the long-term health and sustainability of the ecosystem. By embedding economic incentives into the token design, such as staking or voting rights, tokenomics aligns the interests of diverse stakeholders, promoting cooperative behavior and mitigating conflicts typically seen in corporate governance structures (Gan et al., 2023).

Supplementary Table S8 presents the main measures observed to govern a token-based blockchain project (see Supplementary Material). Decentralized Autonomous Organizations (DAOs) enable decision-making through smart contracts and community votes, removing central authority and aligning with the blockchain's ethos (Beck et al., 2018). However, voter apathy and dominance by major token holders can undermine equitable governance. For example, the Uniswap (a major DeFi dApp on Ethereum) governance vote controversy highlighted the challenges of decentralized decision-making when venture capital firm Andreessen Horowitz (a16z) used its token holdings to influence a proposal. Critics argued that this showcased centralization risks and opaque power dynamics in supposedly decentralized governance systems, undermining trust in fair and equitable decision-making processes (Kessler, 2023).

Token staking and voting empower participants to influence a project's direction by staking tokens, enhancing network security and community engagement (Cong et al., 2020); however, skewed token distribution risks centralization, granting large holders disproportionate control.

Delegated Proof of Stake (DPoS) enhances scalability by electing delegates for decision-making, blending efficiency with decentralization (Allen et al., 2023). Nonetheless, reliance on a few representatives raises concerns about power consolidation and collusion.

Marketing and promoting through tokenomics

Marketing and promoting a token are crucial in the blockchain environment due to the inherent need to build and maintain a robust user network that enhances the token's utility and value. The effective promotion of a token catalyzes network effects, where the token's value increases with the number of users (Cong et al., 2020). This phenomenon is crucial for achieving critical mass, which is necessary for the token's sustainability and success.

How entrepreneurs and ventures promote and market their tokens through communities

Entrepreneurs and ventures primarily promote their tokens by building communities around their platforms (see Supplementary Table S9). This involves engaging potential and existing users through forums, social media, and direct engagement activities to foster a sense of ownership and involvement. Examples include platforms like Filecoin (a decentralized storage crypto project), where tokens are used for payment for services like data storage, creating a community of users who benefit directly from the network's growth (Cong et al., 2020).

The authors emphasize the importance of marketing and promoting tokens to initiate network effects and foster community adoption. Effective promotion strategies are vital for establishing a user base that appreciates the token's value and

contributes to its ecosystem. However, challenges remain, including the risk of attracting short-term users and the dependency on influencer partnerships, which may not always align with the token's strategic direction. Token design, by incorporating strategic marketing and community-building aspects, addresses blockchain governance hurdles, as seen in platforms like Ethereum, which employs a comprehensive approach to community engagement and consensus mechanisms. However, issues such as the potential for centralization and the need for continuous community engagement remain critical.

Key resources

Raising capital (i.e., ICO, IDO)

Funding is essential for blockchain projects as it provides the necessary capital to develop technology, maintain operations, and expand the ecosystem. Initial funding helps cover upfront costs crucial for technological development and achieving a sufficient level of decentralization necessary for the blockchain's security and trustworthiness (Conley, 2017)

Likewise, maintaining liquidity is critical in a token-based blockchain project. Liquidity is crucial in token-based projects as it ensures that tokens can be easily traded without causing large price fluctuations. High liquidity attracts more users and investors, contributing to the overall health and stability of the ecosystem. Liquidity also plays a vital role in facilitating the use of tokens as a medium of exchange within the platform, thus enhancing their utility (Howell et al., 2019)

Specific to Web3, entrepreneurs could utilize initial coin offerings (ICOs) to raise funds by issuing new tokens (Schückes and Gutmann, 2020). These tokens typically confer various rights, such as participation in project governance or claims on future revenues. The success of ICOs often relies on building strong communities around the projects, which contribute financially and help validate transactions while securing the network (Catalini and Gans, 2018). The authors cite some advantages and limitations of token funding vehicles:

- Advantages:
 - a. Broad access to capital: ICOs provide access to a global pool of investors, often more expansive than traditional funding routes.
 - b. Aligning interests: By holding tokens, investors and users are vested in the platform's success, aligning the interests across the ecosystem.
- Limitations:
 - a. Regulatory uncertainty: The legal status of ICOs is still evolving, which can pose risks related to compliance with securities laws and regulations.
 - b. Market volatility: The value of tokens can be highly volatile, which might deter conservative investors and affect the stability of the funding base.

Investors in token-based projects typically seek innovative solutions that solve real problems using blockchain technology. They assess the potential for large-scale adoption, the robustness of the underlying technology, the credibility of the team, and the

clarity of the token economics model. They are mainly concerned with how well the token integrates within the ecosystem and its utility in driving platform engagement (Momtaz, 2021).

Funding a token-based blockchain project is crucial for its development and operation (Schückes and Gutmann, 2020). Token-based blockchain projects introduce novel means of raising capital that bypass traditional financial intermediaries. Marketing and promoting the token effectively are crucial to kickstarting network effects and community adoption, which are vital to the project's success. However, challenges such as regulatory uncertainty, the potential for market manipulation, and the inherent volatility of tokens remain. These issues necessitate ongoing attention and adaptation to ensure the sustainable growth of token-based ecosystems.

Private token sales to venture capitalists and other early investors

In addition to public fundraising mechanisms such as ICOs (Initial Coin Offerings), IDOs (Initial Decentralized Offerings), and IEOs (Initial Exchange Offerings), as well as liquidity pools and private token sales to venture capitalists (VCs) and other early investors, represent a crucial aspect of the funding landscape for blockchain projects. Having blockchain technology-based, reputable investors significantly enhances the success of blockchain projects, as their managerial capabilities and past experiences in the space contribute to this success (Hackober and Bock, 2021). These private sales are typically conducted before public offerings and involve selling tokens to select investors under negotiated terms and conditions.

Private token sales, often called pre-sales or private placements, involve offering tokens to a limited group of investors, usually institutional investors, VCs, accredited investors, and high-net-worth individuals, before making them available to the general public. These sales are attractive to projects because they allow for the raising of substantial capital from a small number of committed investors. They also appeal to investors who can buy large amounts of tokens at a lower price, reflecting the early risk they take by investing before the broader market (Wandmacher, 2019). Supplementary Table S12 describes the advantages and inconveniences of private token sales.

Numerous high-profile blockchain projects have utilized private token sales, such as BNB from Binance or Ethereum. For example, EOS conducted one of the most significant private token sales, raising over \$4 billion through a year-long ICO that included substantial private placements. Similarly, Filecoin raised substantial amounts from institutional investors prior to its public ICO. More recently, StartkNet and EigenLayer IDOs have sparked much controversy for the same reasons.

Private token sales to venture capitalists and other early investors are pivotal in the token funding ecosystem, providing essential capital and support to blockchain projects. These sales help projects mitigate the financial and operational risks of launching new technological platforms. However, the importance of structuring these sales to ensure long-term project stability and compliance with regulatory frameworks cannot be overstated. Despite their benefits, the challenges of managing investor expectations and providing a fair and stable post-public sale environment remain significant. As the blockchain industry

matures, private sales strategies will likely evolve to balance these various concerns better.

Key partners

Partnering with existing ecosystems, Layer 1, and Layer 2 projects is crucial in the blockchain industry due to several strategic, technical, and operational advantages (Schwarzer et al., 2022). These partnerships enable projects to leverage established networks and technologies, reducing the time and resources required to build them from scratch. Moreover, collaboration with other blockchain projects can enhance scalability, interoperability, and innovation, thereby improving the project's overall value proposition.

Entrepreneurs and ventures choose ecosystems and communities based on several factors, including technological compatibility, the reputation of the ecosystem, the regulatory environment, and the specific business needs of the project. Decision-makers use frameworks to evaluate potential consortia or ecosystems by considering strategic, organizational, social, and technical impacts. The decision to join an existing consortium *versus* building a new one is often influenced by the potential for quicker and more efficient market penetration and resource utilization. Supplementary Table S10 below summarizes the advantages and limitations of joining an existing blockchain ecosystem.

Schwarzer et al. (2022) emphasize the importance of joining consortia or existing ecosystems, highlighting that such strategic decisions can significantly expedite development and enhance market penetration due to established network effects. For instance, enterprise blockchain consortia such as Hyperledger (an open-source blockchain project) and TradeLens (a blockchain-based global supply chain platform) are highlighted, demonstrating how they provide frameworks for collaboration across various industries, thereby enabling more efficient supply chain solutions and other enterprise applications.

However, challenges such as integration difficulties, potential loss of autonomy, and risks of dependency remain. This nuanced view enables stakeholders to understand the critical factors in deciding between developing a new blockchain consortium and joining an existing one, ensuring that strategic alignments are met while navigating the complex landscape of blockchain technology and governance.

Channels

Token-based ventures in the blockchain space thrive on robust community engagement and widespread token adoption (Wandmacher, 2019). A channel strategy is essential as it facilitates the dissemination of information and engages potential and existing community members (Allen et al., 2023). Channels like crypto X/Twitter, Discord, and Telegram provide real-time, dynamic interaction platforms that are vital for nurturing a community's trust and commitment.

Entrepreneurs and ventures choose channels based on their target audience's preferences and the specific interaction style of each platform. For instance, Discord and Telegram are preferred for ongoing community engagement due to their functionalities that support continuous and multifaceted communications (Li and

Chen, 2023). Crypto events and influencer partnerships strategically reach broader audiences and lend credibility through association. [Supplementary Table S11](#) summarizes the advantages and limitations of the main Web3 channels (see [Supplementary Material](#)).

Authors argue that a well-designed token channel strategy is crucial for sparking network effects and is essential for the viral growth of the token's adoption (Allen et al., 2023). The channels not only facilitate the distribution and decentralization of the token but also empower the community by aligning incentives across the board, thereby enhancing the token's utility and value. For instance, the Ethereum Name Service's significant airdrop substantially increased user engagement and token adoption (Allen et al., 2023). Bored Ape Yacht Club's use of NFTs for membership and community benefits illustrates how unique digital assets can drive exclusivity and community solidarity (Li and Chen, 2023).

However, issues such as regulatory uncertainty and the scalability of engagement methods remain challenges that must be addressed to sustain long-term growth and community involvement.

Customer relationship

A robust customer relationship strategy in the blockchain space is crucial because it transcends traditional interaction frameworks, enabling businesses to engage with their audience more quickly (Li and Chen, 2023; Van de Vyver, 2023). In token-based ventures, this relationship is not merely transactional but involves creating a community around the token, which enhances trust and loyalty. The intrinsic transparency of blockchain ensures that customers can verify the authenticity and fairness of transactions, fostering a deeper connection between the project and its users (Fairfield, 2022).

In the tokenomics ecosystem, several vital players include investors, users, miners/validators, developers, L1/L2 partners, and other ecosystem players. Successful ventures navigate these relationships by providing investors and users with clear, frequent communication and updates. This includes transparency regarding token utility, rewards, and governance rights, which fosters a sense of ownership and belonging (Li and Chen, 2023). Miners/validators should appropriately recognize and reward their contributions (Han et al., 2022). This involves equitable token distribution and incentives to maintain the network's integrity and security (Van de Vyver, 2023). Then, developers collaborate on continuous improvement and innovation. Token-based ventures often open-source their code or offer bounties for development, encouraging a vibrant developer community (Fairfield, 2022). Finally, for the L2 partners and ecosystem players, the token venture establishes strategic alliances and integration. The token venture establishes strategic partnerships and integrations for L1/L2 partners and ecosystem players to enhance the token's utility and reach. This includes cross-chain collaborations and partnerships with other platforms and services (Van de Vyver, 2023). The authors mention some token-related community, relationship, and PR advantages and limitations, as shown in [Supplementary Table S13](#) (see [Supplementary Material](#)).

The authors argue that maintaining robust token customer relationship management is vital for fostering network effects,

flywheels, and community adoption. This relationship management helps scale the user base and enhance the token's utility and value over time (Li and Chen, 2023; Van de Vyver, 2023). However, issues such as regulatory compliance, market volatility, and the complexity of managing decentralized communities persist, posing challenges that require strategic responses (Fairfield, 2022).

Customer segments

The five primary customer segments identified for token-based projects include developers who build on the platform and contribute to its functionality and growth. They are essential for evolving the platform's capabilities, attracting more users, and enhancing the utility of the token. Secondly, users are individuals or entities that utilize the platform for its intended services and benefit from the ecosystem's offerings. They are instrumental in driving the network effect by increasing the platform's value as more individuals join and use the services. Then, the investors and stakeholders who purchase or yield farm the tokens often speculate on future growth or participate in governance. This segment provides initial and ongoing capital, helping to bootstrap the network and sustain liquidity. In addition, miners (PoW) or Validators (PoS) help maintain the blockchain epoch's security, integrity, and functionality by validating, securing, and propagating transactions across the network. They ensure trust and security, keeping the platform's decentralized nature. Lastly, some contributors, such as content creators or marketers, may not fit neatly into the other categories but provide value. They help amplify the platform's reach and appeal, fostering a broader community and enhancing user experience. The authors (Cong et al., 2020) discuss some advantages and limitations of pursuing these segments, as presented in [Supplementary Table S14](#) (see [Supplementary Material](#)).

The authors highlight that maintaining a vibrant customer segment community is pivotal for token-based ventures to harness network effects, create flywheels for adoption, and foster community engagement. This multifaceted approach catalyzes growth and stabilizes the ecosystem, leveraging each segment's unique contributions. However, challenges such as regulatory risks, market volatility, and the need for ongoing engagement with all segments remain persistent issues that require strategic management.

Revenue streams

Entrepreneurs must focus on on-chain and off-chain revenue streams to ensure a diversified income source that supports sustained growth and reduces dependence on market conditions (Y. Chen and Bellavitis, 2020). On-chain revenues are inherently scalable and align with the development of the blockchain network. In contrast, off-chain revenues provide stability and can support operations during periods of low network activity (Van de Vyver, M., 2023). [Supplementary Table S15](#) (see [Supplementary Material](#)) provides a description and summary of the main on-chain and off-chain revenues. [Supplementary Table S16](#) (see [Supplementary Material](#)) presents five real-world examples of token-based ventures that illustrate how they can diversify their revenue streams by combining token utility, platform fees, and strategic

services to create robust economic models that support their ecosystems.

The authors argue that maintaining and increasing diverse revenue streams is critical for ensuring the financial sustainability of a token-based venture. Effective revenue management helps balance growth, liquidity, and equitable fee distribution among validators and users, which is crucial for fostering network effects and community adoption. However, regulatory uncertainties, market volatility, and dependence on continuous user and developer engagement remain significant hurdles.

Cost structure

Entrepreneurs must meticulously manage both on-chain and off-chain costs to ensure long-term sustainability and prevent over-leveraging project resources (Y. Chen and Bellavitis, 2020). Effective cost management impacts the project's ability to scale, maintain security, and incentivize participants without eroding the token's value (Kim et al., 2021). [Supplementary Table S16](#) (see [Supplementary Material](#)) summarizes the on-chain and off-chain costs.

The analyzed literature emphasizes that a well-structured cost framework facilitates growth and liquidity, balancing validators' fees and user costs (Liu et al., 2021). This balance is crucial for fostering sustainability, network effects, flywheels, and community adoption, which are necessary for the long-term success of a token-based venture, as demonstrated by the authors' examples of Insolar and Steemit.

Firstly, Insolar demonstrates the balance of subsidizing users and developers to grow network effects despite the challenges in developer adoption due to technical complexities (Kim et al., 2021).

Secondly, Steemit uses token incentives to encourage content creation (Kim and Chung, 2018). A high token value did not equate to high-quality content, highlighting the limitations of incentives without adequate quality controls (Zhang et al., 2019).

However, challenges such as token value volatility and misaligned incentives remain pervasive issues needing strategic oversight (Chen et al., 2023).

Critique of the extant literature to identify the future of practice and policy

Token design often lacks a coherent framework and does not adequately consider the underlying business model. This issue is common across many token-based projects, which are frequently developed haphazardly with little regard for their integration into the broader business environment. Consequently, a significant challenge in token design is ensuring its utility and boosting its intrinsic value by aligning it with suitable functionalities while maintaining compatibility (Oliveira et al., 2018). This literature review highlights the issue of token design in the blockchain sector and emphasizes the need for a structured approach to promote long-term stakeholder engagement. The literature review of 53 articles is divided into four themes:

- Tokenomics business model innovation (TBMI): 31 articles.

- Governance token aspects (GTA): 12 articles.
- Blockchain innovative disruption aspect (BIDA): 6 articles.
- Token financing innovation (TFI): 4 articles.

To frame the 53 articles with the four main themes within a systemic structural approach, we proposed using the Business Model Canvas by Osterwalder and Pigneur (2010) as a conceptual framework. This method provides a systematic approach to designing and comprehending business models, is widely recognized, thoroughly tested across various industries, and is well-understood by practitioners and entrepreneurs alike.

We have classified the articles by business model elements' relevance as follows (please note that 1 article can address more than one business model element):

- Key partners: 12
- Key activities: 24
- Key resources: 13
- Value proposition: 30
- Customer relationship: 13
- Channels: 15
- Customer segments: 7
- Cost structure: 9
- Revenue streams: 9

Looking at the article distribution result, as shown in [Supplementary Table S3](#) in the appendices, one can argue that most articles address the TBMI themes by 58%, to a lesser extent, Governance by 23%, the innovative disruption aspect of blockchain by 11%, and token financing innovation by roughly 8%.

Looking from the BMC perspective and taking a higher-level view, we can regroup the nine elements into three:

- Feasibility: regrouping all activities referring to the how or capacity needed to create, produce, and launch a product, service, or venture project, tangible or intangible
- Desirability: regrouping the activities relating to the attractiveness of the product, service, and venture project for direct or indirect participants
- Viability: regrouping activities regarding the financial, profitability, and monetization aspects of the product, service, and venture projects.

One can observe that the three BMC domain coverages are unequal. Desirability is more covered than viability and feasibility. There are significant discrepancies among the nine elements, where the value proposition is overrepresented (roughly ~23%) compared to revenue and cost at 6.8% respectively, customer segments (5.3%), and key partners (9.1%).

The literature review classification analysis reveals that some token design areas (token utility, functions, and consensus) are well covered and discussed in academic circles, while others are under-addressed.

- Token ecosystem dynamics: How does design help attract and foster a vibrant ecosystem?
- Ecosystem players dynamics: How does the token design consideration help build, maintain, and grow?

- Security through token design: how token design addresses network security and integrity?
- Funding consideration in token design: How does tokenomics help attract, maintain, and grow liquidity pools, LTV (loan-to-value), and FDV (fully diluted value)?
- Token governance: How can token design enhance coordination and decision-making among token holders reasonably and efficiently?
- On-chain and off-chain costs: What costs bring more token value to the network and when?
- On-chain and off-chain revenue streams: Which revenue streams increase token value and should be looked for in time and space?

There is a lack of emphasis on the user experience and adoption aspects of crypto projects. While not explicitly mentioned in the data, the ease of use and accessibility of dApps and decentralized ledgers are critical as follows:

- User-friendly interfaces: Given the complex nature of blockchain technology, designing user-friendly interfaces is crucial for broader adoption. Interfaces must be intuitive and accessible to users without technical expertise.
- Simplifying complex concepts: The user experience (UX) should aim to simplify and effectively communicate complex blockchain concepts, like transactions, gas fees, wallets, and private keys.
- Seamless integration: For broader adoption, blockchain applications must integrate seamlessly with existing systems and platforms that users are already familiar with.
- Cross-platform usability: Ensuring that applications are cross-platform and function consistently across different devices and operating systems is essential for user convenience.

While some improvements are being made, like the account abstraction EIP-4337 in

Ethereum and other layer one networks, such as Sui or Solana, have seen timid adoption.

Discussion and implications of the integrative literature review

The findings of this integrative literature review on designing successful tokens for cryptocurrency ventures *via* strategies for entrepreneurial success support most of the prior literature's findings concerning the significance of structured tokenomics, the importance of alignment among stakeholders, and the need to achieve equilibrium between short-term and long-term incentives. Previous studies have stressed the importance of straightforward token utility, governance, and security as being necessary elements for successful blockchain ventures (Oliveira et al., 2018; Schubert et al., 2021), however there were some divergent findings, notably, the lack of representation of comprehensive frameworks that include business models to guide the development of token design, indicating a disparity between

theoretical approaches to developing tokenomics and practical implementations.

Unforeseen results indicated an inadequate inclusion of user experience and adoption measures within previous token design literature. These differences may result from the relatively newness of the blockchain field, where technical and economic issues have historically been given precedence over user-centered concerns. Future research will need to incorporate these aspects to provide a more comprehensive perspective on tokenomics, encompassing both user engagement and accessibility.

Several factors influenced the interpretation of the results of this ILR, including the rapidly evolving technological landscape of blockchain, regulatory changes, and the diverse environments in which tokens are utilized. As a result of the rapidly changing environment in the crypto market, findings from even 1 year ago may already be obsolete. Additionally, the diverse regulatory environments found in numerous jurisdictions worldwide can significantly impact the design of tokens and their implementation, potentially limiting the generalizability of specific results.

The results of this ILR study directly address the study problem by identifying the key elements of token design that foster long-term commitment among stakeholders and the viability of a project. Furthermore, by integrating prior literature, this review provides new insights into the integration of business model frameworks, such as the BMC, into token design, thereby offering a structured method for designing tokens that align with the objectives of entrepreneurs and the needs of markets. This review presents an integrative approach to developing tokenomics, bridging theoretical gaps and providing practical guidance for entrepreneurs navigating the complexities of tokenomics.

The findings of this ILR study have significant implications for business and managerial practices in the blockchain space. Entrepreneurially minded individuals can utilize the insights on structured tokenomics to develop tokens that generate early investment and promote sustained growth and engagement. The incorporation of the BMC framework ensures that the token design aligns with broader business strategies, thereby increasing the potential for creating value. The necessity of managing the balance between the structure of incentives, compliance with regulatory requirements, and user engagement is important for all managers. Effective token design can lead to improved resource allocation, better relationships with stakeholders, and increased project sustainability. Managers should continually innovate in terms of token utility to keep users engaged and interested, thereby creating value in the long term.

This ILR study offers new insights, providing a comprehensive framework for token design that can be applied across various blockchain projects. The study emphasizes the use of structured methods and the alignment of stakeholders' interests to enhance transparency, fairness, and sustainability in the cryptocurrency space.

The findings of this ILR study offer tangible benefits for entrepreneurially minded individuals and managers in the blockchain industry. By utilizing the proposed structured method of designing tokens, projects can align their token

designs with market needs, regulatory requirements, and stakeholder expectations. Increased investment, adoption of products or services, and overall project success can occur when projects are aligned with market needs, regulatory requirements, and stakeholder expectations.

Future research should focus on improving and refining token design frameworks to incorporate evolving user behavior and market dynamics. In addition, investigating the impact of emerging technologies, such as artificial intelligence and DeFi, on tokenomics will provide greater insight into the future of digital assets.

It is important to avoid overstating the applicability of the study's findings. The study's recommendations and insights were based on current literature and market conditions, which are subject to rapid change. Although the structured approach to designing tokens provides a solid foundation of knowledge, it must be adapted to fit the specific needs of each project context and the evolving regulatory environments of each jurisdiction.

In conclusion, this integrative literature review has provided valuable insights and practical recommendations for entrepreneurs and managers in the blockchain sector. By addressing the study's problem and purpose, contributing new knowledge, and achieving alignment with broader social goals, the study has contributed to the understanding of the design of successful tokens and their implications for entrepreneurial success. Continuous adaptation and innovation are necessary to remain relevant in the rapidly evolving cryptocurrency market.

Future recommendations

Building on the above-stated strengths and weaknesses of this ILR, several proposals were made for future research. To begin with, one needs to consider token design based on the users themselves, as there has been little to no work done on user experience and the adoption of tokenomics. Future research should therefore explore user-centric approaches to creating and using tokens. Examples of potential user-centric studies include examining the types of user behavior that affect token usage and long-term engagement. The recommendation to research user-centric token design stems from the finding that a significant gap currently exists between integrating user-centric views into token design models (Oliveira et al., 2018).

To follow, one needs to explore the effect of regulatory changes on token design. Since regulatory landscapes are likely to continue evolving, it is essential to assess how regulatory changes may impact the creation of tokens and the overall viability of a project, such as a stablecoin. One area for research could be to determine the effects of varying regulatory environments on the tokenomics and to recommend adaptable strategies for entrepreneurs.

This recommendation is based on the study's findings that regulatory compliance is a challenging yet essential component of successfully designing tokens (Schubert et al., 2021).

Following this, one needs to find a way to incorporate emerging technologies with tokenomics. Emerging technologies, such as AI and DeFi, as well as other similar innovations, could offer new

opportunities for enhancing both the functionality and security of tokens. Research could be conducted to see if these technologies can enhance aspects of token design, such as scalability, interoperability, and user engagement. This recommendation comes from the study's emphasis on the importance of ongoing innovation in token usage (Conley, 2017).

Additionally, longitudinal studies on token performance are necessary. Recent longitudinal studies have been conducted, but they have not explicitly addressed token design (Alexander, 2025; Cerner et al., 2024). By conducting longitudinal studies, researchers can gain valuable knowledge about the long-term viability and success factors of token-based projects by tracking the performance of tokens over time. This type of research would also enable the validation of the findings of this ILR by evaluating real-world uses and results over extended periods.

Furthermore, one needs to research tokenomics in multiple contexts. By researching and incorporating a broader range of contexts (such as diverse industries and geographic locations), researchers can gain a deeper understanding of tokenomics. This recommendation was made due to the limited scope of this study, which primarily focused on a single industry segment within the blockchain ecosystem.

Future researchers can build upon this study by selecting a more varied and inclusive literature base to provide greater diversity and inclusion for geographic regions and blockchain applications. In addition, future researchers can benefit from using primary data collection techniques, such as surveys and interviews with blockchain entrepreneurs and users, to provide a richer set of insights and validate the findings of this ILR.

As mentioned previously, the most natural continuation of this research is to establish and empirically test a token design model that includes user-centric metrics, adaptability to regulatory changes, and emerging technology. A key component of establishing a token design model is validating the model through case studies and testing it in real-world settings to ensure that the model is both relevant and practical.

Conclusion

The results of this study demonstrate the importance of having a solid, structured tokenomics to ensure the success of a blockchain project. This study has demonstrated the importance of having the right tokens designed to align with a business's operational framework, ensuring compliance with regulations, and maintaining user engagement over time, thereby creating a viable and long-term project that stakeholders are committed to. For example, one way to help ensure strategic alignment for blockchain projects is to use the Business Model Canvas when designing tokens, thereby ensuring the long-term sustainability of blockchain projects (Osterwalder and Pigneur, 2010).

In summary, this integrative literature review provides a solid foundation for different token design strategies and their impact on entrepreneurs' success in the blockchain sector. The study offers

valuable insights and practical guidance to researchers and practitioners by addressing current gaps and providing a structured approach to tokenomics.

In conclusion, the study confirms again that an effective token design is not only a technical challenge but also a strategic imperative that needs a comprehensive and flexible approach. By employing structured approaches, regulatory knowledge, and user-oriented measures, entrepreneurs can develop robust and stable token-based ecosystems that encourage innovation and sustainably stimulate users in the long term. Therefore, the integrative literature review provides the necessary foundation for further studies, enabling the field of tokenomics to develop and supporting the sustainable growth of the blockchain sector.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary Material](#), further inquiries can be directed to the corresponding author.

Author contributions

ZM: Writing – review and editing, Writing – original draft. JB: Supervision, Writing – review and editing.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fbloc.2026.1741756/full#supplementary-material>

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