THE DIGITAL ECONOMIST

Date of Publication | December 29, 2025

Research Paper

Dr. Nikhil Varma et al.

Perspectives: Why Is Blockchain Not Successful (Yet)?

A Multi-Stakeholder Analysis of Barriers, Paradoxes, and Pathways Forward

BLOCKCHAIN TAXONOMY | DIGITAL INFRASTRUCTURE | INNOVATION ECOSYSTEMS

Disclaimer

This research paper has originated from weekly discussions in The Digital Economist's Digital Assets and Blockchain workgroup. The conceptualization, formal analysis, and writing of the article were primarily undertaken by **Dr. Nikhil Varma**, who synthesized the collective discourse into a cohesive narrative. The substantial number of co-authors accurately represents the collaborative and multi-vocal nature of the knowledge production process, with each contributor providing critical insights and validating the representation of the discussion's themes.

Table of Contents

Abstract

This research paper examines the persistent challenges in blockchain technology adoption through a comprehensive analysis of expert perspectives and academic literature. Based on a detailed group discussion among blockchain practitioners, investors, academics, and industry experts, combined with an extensive literature review, this study identifies seven critical barriers to blockchain success: the decentralization paradox, the blockchain trilemma trade-offs, enterprise adoption challenges, investment model misalignment, the “blockchain company” misnomer, infrastructure-versus-application layer confusion, and regulatory uncertainty.

The paper introduces a novel taxonomy that distinguishes between companies that merely use blockchain as an enabling tool and those whose business models depend entirely on the technology. Through a synthesis of practitioner insights and academic research, this study argues that blockchain’s current challenges arise not primarily from technological limitations but from deep misalignments between the technology’s decentralized ethos and traditional business models. The paper concludes with recommendations for mitigating these challenges and highlights areas for further research to unlock blockchain’s transformative potential.

1.

Introduction

Blockchain technology, first introduced through Bitcoin in 2008, promised to revolutionize how we think about trust, intermediation, and value exchange.[1] More than fifteen years later, despite billions of dollars in investment and thousands of projects, the technology has yet to achieve the widespread adoption many predicted. Recent studies suggest that up to 90 percent of blockchain technology initiatives within startups ultimately fail,[2] raising fundamental questions about the technology's viability and the approaches being used to implement it.

This study emerges from a unique opportunity to capture and analyze the perspectives of a diverse group of blockchain experts, including venture capitalists, academic researchers, enterprise implementation specialists, policy experts, and entrepreneurs actively working on blockchain projects across different continents. Through a combined analysis of their group discussion and an extensive literature review, the paper examines why blockchain technology has not yet achieved its promised success and what factors might shape its future adoption.

The central research question guiding this investigation is: What are the fundamental barriers preventing blockchain technology from achieving widespread success, and how do different stakeholder perspectives illuminate potential pathways forward? This question is particularly relevant given the current market dynamics, with venture capitalists investing $4.8 billion in Q1 2025 alone into crypto- and blockchain-focused startups,[3] yet persistent concerns remain about the sustainability and real-world impact of these investments.

The significance of this research lies in its multi-stakeholder approach, combining practitioner insights with academic rigor to provide a comprehensive understanding of blockchain's challenges. Unlike previous studies that focus on technical barriers or single-industry adoption patterns, this research examines broader ecosystem dynamics that shape blockchain success or failure. The findings have implications for entrepreneurs, investors, policymakers, and researchers seeking to unlock blockchain's potential.

The paper is structured as follows: section 2 provides a comprehensive literature review of blockchain adoption challenges; section 3 presents the methodology and participant perspectives; section 4 introduces a novel taxonomy of blockchain entities; section 5 analyzes seven critical barriers to blockchain success; section 6 discusses the implications and proposes solutions; section 7 identifies unresolved questions and future research directions; and section 8 concludes with recommendations for key stakeholders.

2.

Literature Review

2.1 Blockchain Adoption Barriers in Academic Literature

Academic research on blockchain adoption barriers has expanded over the past five years, identifying multiple categories of challenges that hinder successful implementation. Prewett and Prescott[4] conducted one of the most comprehensive studies on this subject, surveying enterprise decision-makers and identifying that while blockchain adoption is "inevitable," significant barriers and risks remain that slow widespread implementation.

The barriers identified in academic literature can be broadly grouped into technological, organizational, and environmental factors. Bag et al.,[5] focusing on green supply chain management, identified seven critical barriers: blockchain system complexity, huge investment requirements, change resistance, lack of awareness among partners, regulatory uncertainty, integration challenges, and scalability issues. Their research—cited 176 times—provides empirical support for many of the challenges practitioners continue to report.

Xu, Chong, and Chi[6] developed a comprehensive framework for modeling blockchain adoption barriers in the architecture, engineering, and construction (AEC) industry. Their study found that organizational factors often outweigh technological barriers, with lack of in-house skills and understanding representing the most significant challenge—affecting 28 percent of organizations according to 2019 Statistica data.[7] This aligns with broader industry observations that blockchain adoption is often constrained more by knowledge and capability gaps than by technology itself.

2.2 The Blockchain Trilemma and Technical Challenges

The concept of the blockchain trilemma, first articulated by Ethereum founder Vitalik Buterin, has become central to academic discussions of blockchain's technical limitations. The trilemma posits that blockchain systems cannot simultaneously achieve optimal levels of decentralization, security, and scalability.[8] Werth et al.[9] conducted a comparative review of blockchain platforms based on these three properties, finding that different platforms must inevitably make trade-offs among them.

Recent research has begun to challenge the trilemma's inevitability. Monte et al.[10] proposed architectural innovations for "scaling blockchains without giving up decentralization and security," arguing that novel consensus mechanisms can overcome traditional trade-offs. Similarly, Shafin and Reno[11] developed what they describe as a "comprehensive consensus mechanism" capable of ensuring security, scalability, and decentralization, suggesting that the trilemma may be addressable through technological innovation.

However, the trilemma's implications extend beyond technical design. As this study later demonstrates, the trilemma imposes strategic constraints on blockchain companies, forcing trade-offs that often misalign with business objectives or market realities.

2.3 Investment Patterns and Venture Capital Challenges

The relationship between blockchain technology and venture capital has been both dynamic and problematic. Friedlmaier et al.[12] conducted one of the earliest comprehensive analyses of blockchain venture capital funding, revealing allocation patterns that suggest misalignment between investor expectations and the intrinsic characteristics of blockchain technologies.

Lin and Nestarcova[13] examined the specific challenges that crypto-assets introduce into the venture capital ecosystem, noting that traditional VC models are often poorly suited to blockchain ventures. They identified several key issues: the tension between decentralization and corporate governance, the volatility of token-based funding models, and the regulatory uncertainty influencing investment decisions.

More recent data shows continued volatility in blockchain investment patterns. Galaxy Research[14] reported that venture capitalists invested $4.8 billion in Q1 2025 across 446 crypto- and blockchain-related deals—a 54 percent quarter-over-quarter increase. However, this momentum waned in Q2 2025, with investment failing to $1.97 billion across 378 deals,[15] illustrating the cyclical uncertainty that continues to define the blockchain investment landscape.

2.4 The Decentralization Paradox

A growing body of academic literature explores what Gazi[16] terms "blockchain's decentralization paradox"—the tension between the technology's ideological promise of decentralization and the practical realities of building and governing blockchain systems. This paradox manifests in multiple dimensions: centralized development teams constructing decentralized protocols, concentration of mining power in proof-of-work systems, and governance bottlenecks within ostensibly autonomous networks.

Hanisch et al.[17] examined this paradox through a large blockchain-based logistics platform, finding that organizations operate within "semi-rigid limits" when attempting to balance centralization and decentralization. Their findings suggest that the paradox is not merely conceptual but introduces real operational and governance challenges for blockchain-based businesses.

2.5 Private versus Public Blockchain Implementation

The debate between private and public blockchain implementations has significant implications for enterprise adoption. Strehle[18] conducted a detailed comparison of both models, concluding that enterprises have "mostly moved on to private blockchains" due to concerns about confidentiality, performance, and regulatory compliance.

Hamida et al.[19] provided an early overview of enterprise blockchain applications, outlining key distinctions between public and private frameworks. Their research—cited 179 times—laid the foundation for evaluating enterprise blockchain strategies. Building on this, Yang et al[20]. examined hybrid approaches, demonstrating how public and private blockchains can be integrated within construction industry workflows to balance transparency with control.

2.6 Critical Success Factors for Blockchain Implementation

Recent research has focused on identifying the factors that contribute to successful blockchain implementation. Sunmola and Lawrence[21] conducted a systematic literature review of blockchain and ERP system integration, categorizing success factors within technological, organizational, and regulatory domains.

Kayikci et al.[22] examined blockchain implementation within circular supply chains, concluding that environmental factors—particularly laws, policies, and competitive pressures—often outweigh technological considerations. Their findings suggest that institutional and market contexts play a decisive role in shaping adoption outcomes.

2.7 Infrastructure versus Application Layer Debates

The blockchain ecosystem continues to wrestle with fundamental strategic questions: whether to prioritize infrastructure development or focus on building end-user applications. Industry analyses suggest an overconcentration of investment in infrastructure relative to applications that deliver tangible user value.[23]

This debate finds academic parallels in platform economics and network theory. The challenge for blockchain enterprises lies in balancing ecosystem enablement with immediate market utility—deciding whether to create foundational infrastructure or develop problem-specific applications.

2.8 Gaps in Current Literature

While academic research provides valuable insight into blockchain adoption challenges, several gaps remain. First, most studies examine specific industries or use cases rather than the broader ecosystem dynamics that influence blockchain success. Second, longitudinal analyses tracking the evolution of blockchain companies remain scarce. Third, few frameworks integrate technical, organizational, and market-level factors into a single coherent model.

This research addresses these gaps by integrating multi-stakeholder perspectives—drawing on insights from practitioners across roles, sectors, and geographies—and combining them with academic synthesis to produce a more holistic understanding of blockchain's persistent adoption barriers.

3.

Methodology and Participant Perspectives

3.1 Research Approach

This study adopts a mixed-methods approach, combining qualitative analysis of expert discussions with a comprehensive literature review. The primary data source is a detailed transcript of a group discussion among blockchain experts, practitioners, and researchers. Conducted as part of a regular meeting of The Digital Economist' Digital Assets & Blockchain workgroup, the session provided a natural setting for open and candid exchange of perspectives.

The group discussion method was selected for several reasons. First, it enables the capture of diverse perspectives in a single session, fostering real-time interaction and debate among participants with different backgrounds and experiences. Second, the informal nature of the dialogue encourages participants to share insights and concerns they might not express in formal interviews or surveys. Third, the group dynamic allows for emergent ideas that would be less likely to surface in individual interviews.

3.2 Participant Profiles

The discussion included nine participants, each contributing distinct insights by their professional backgrounds and expertise:

- **Nick Ntigrintakis and Dr. Nikhil Varma (Investment and Enterprise Perspective):** A senior fellow and an enterprise consultant with extensive experience in blockchain implementation and investment advisory. Their perspectives centered on the practical challenges of enterprise adoption and the investment dynamics that drive or hinder blockchain initiatives.
- **Shyam Nagarajan (Market and Technical Perspective):** A blockchain practitioner with deep experience in both private and public blockchain implementations, including work on Hyperledger Fabric. His expertise bridges technical architecture and market trends, particularly in stablecoin development.
- **Prof. George Samakovitis (Academic and Platform Perspective):** An academic researcher who contributes theoretical and analytical frameworks, focusing on blockchain as infrastructure and on platform economics that parallel earlier technological adoption models.
- **Mickie Chandra (Educational and Privacy Perspective):** A researcher specializing in blockchain applications in education, with an emphasis on student privacy and data protection. His perspective highlights the regulatory and ethical challenges of implementing blockchain in high-compliance sectors.
- **Mohammad Mudassir (Developer Ecosystem Perspective):** A practitioner embedded in the Indian blockchain developer community, with experience organizing hackathons and supporting blockchain startups. His contribution illuminates developer ecosystem dynamics and innovation bottlenecks in emerging markets.
- **Tristan Thoma (Real-World Implementation Perspective):** An entrepreneur leading blockchain solutions in Bolivia, particularly in stablecoin projects and government partnerships. His experience provides grounded insights into operational realities and regulatory hurdles in developing economies.
- **Arvinder Singh Kang (Policy and Governance Perspective):** The session moderator with expertise in blockchain policy and governance. His perspective emphasizes regulatory, institutional, and governance factors shaping blockchain adoption.

- **Paul Murphy (Strategic Foresight):** Drawing on nearly two decades of interdisciplinary experience in food, energy, and information geopolitics, he focuses on mobilizing sustainability within municipalities through the Open Movement, leveraging blockchain and decentralized practitioner networks.
- **Jean Criss (Tech & Media Innovation Perspectives):** "With vast expertise spanning technology, media, and fashion innovation, Jean believes that convergence is key to creating purposeful impact—transforming ideas into solutions that empower people, elevate brands, and drive sustainable change across industries."

3.3 Discussion Context and Themes

The discussion took place in preparation for a roundtable event titled "Why Blockchain Projects Fail," which provided a natural framework for exploring success factors and persistent barriers. The conversation evolved organically across several recurring themes:

- Current market dynamics and investment patterns
- The distinction between different types of blockchain entities
- Technical challenges and the blockchain trilemma
- Enterprise adoption barriers and private versus public blockchain debates
- The role of regulation and policy in blockchain success
- Investment models and the decentralization paradox
- The evolution of blockchain from experimental technology to infrastructure

3.4 Data Analysis Approach

The transcript was analyzed using a thematic analysis framework to identify recurring concepts, tensions, and perspectives. Key ideas were coded and categorized, with particular attention to points of agreement, divergence, and cumulative reasoning among participants. Specific examples and case studies mentioned during the discussion were cross-referenced with academic literature and industry reports to ensure validity and triangulation.

The analysis process comprised five main steps:

- **Initial Coding:** Identification of key concepts, challenges, and perspectives raised by participants.
- **Theme Development:** Grouping related codes into broader themes and categories.
- **Cross-Validation:** Comparison of participant insights with existing academic literature and industry data.
- **Synthesis:** Integration of practitioner insights and scholarly findings into cohesive frameworks.
- **Gap Identification:** Recognition of areas where participant perspectives diverge from or expanded upon existing literature

3.5 Limitations and Considerations

Several limitations should be acknowledged when interpreting these findings. First, while the participant group is diverse in expertise, it represents a relatively small sample size and may not capture the full range of perspectives across the global blockchain ecosystem. Second, the discussion took place in summer 2025 during a specific market cycle, which may have influenced participant views.

Third, all participants are professionally engaged in blockchain-related work, introducing potential bias toward optimism about the technology's future despite its current challenges. Fourth, the informal discussion format, though conducive to candid exchange, may not provide the systematic coverage achievable through structured interviews or surveys.

Despite these constraints, the depth, diversity, and interdisciplinary nature of the perspectives captured—when combined with the literature review—offer valuable insights into the persistent challenges and opportunities shaping blockchain adoption.

4.

A Novel Taxonomy of Blockchain Entities

4.1 The Need for Clearer Categorization

One of the most significant insights to emerge from the expert discussion was the recognition that the term “blockchain company” is fundamentally problematic and contributes to persistent confusion about what drives blockchain success and failure. As George noted during the session, referring to an entity as a “blockchain company” is akin to calling firms “internet companies” in the 1990s—a useful distinction in the technology’s infancy, but one that becomes increasingly meaningless as it matures and integrates into mainstream systems.

This realization led to the development of a novel taxonomy that differentiates among types of blockchain entities based on their relationship to the technology and the nature of their business models. This taxonomy is crucial for understanding why some blockchain initiatives thrive while others collapse. It reveals that entities positioned differently in relation to blockchain face fundamentally distinct challenges, risks, and success criteria.

4.2 Taxonomy Framework

Drawing from discussion analysis and supporting literature, we propose a two-tier taxonomy of blockchain entities:

4.2.1 Tier 1: Companies That Use Blockchain

These are traditional companies that incorporate blockchain technology to enhance existing business models or solve specific operational challenges. For these entities, blockchain functions as a tool rather than a core identity.

Key characteristics include the following:

- **Technology Integration Approach:** Blockchain is embedded as backend infrastructure, comparable to databases, APIs, or other infrastructure components. As Muddasir observed, “users should not see that”—the blockchain layer should remain invisible to end users, who interact primarily with the application interface.
- **Business Model Independence:** The company’s value proposition does not depend on blockchain technology. These same goals could be achieved through other technologies, though blockchain may add advantages such as transparency, immutability, or decentralization.
- **Success Metrics:** Evaluated through traditional business indicators—revenue growth, market share, customer satisfaction, and operational efficiency. Blockchain is assessed based on how it contributes to these broader objectives.
- **Examples from Discussion:** Supply chain firms verifying product authenticity, financial institutions using blockchain for cross-border settlements, or educational institutions adopting blockchain for credential verification.
- **Risk Profile:** Comparatively lower, as the company’s operations are not structurally dependent on blockchain. Should the technology prove inefficient or unsuitable, alternative solutions can be adopted without altering the core business model.

4.2.2 Tier 2: Blockchain-Based Companies

These entities' core business models and value propositions depend entirely on blockchain technology. Their viability is inseparable from blockchain's defining properties—decentralization, immutability, and token-based coordination.

Key characteristics include the following:

- **Technology Dependence:** The business model is predicated on blockchain's foundational traits—decentralization, trustlessness, or tokenization. Without blockchain, the business will cease to exist.
- **Platform and Infrastructure Focus:** Many operate as infrastructure, platform, or protocol developers enabling broader ecosystems. As George noted, they "aspire to be infrastructure providers" or "platforms for peer networks that interact in a way that is fundamentally different from the one we are used to."
- **Token Economics:** Often utilize tokenized incentive systems—through native cryptocurrencies, governance tokens, or utility tokens integral to platform functionality.
- **Examples from Discussion:** Measured through blockchain-native indicators such as network adoption, transaction throughput, total value locked (TVL), decentralization ratios, and token performance.
- **Examples from Discussion:** Decentralized exchanges (DEXs), DeFi protocols, blockchain infrastructure providers, and decentralized autonomous organizations (DAOs).
- **Risk Profile:** Significantly higher, as success depends on sustained network adoption and blockchain market conditions. These entities face full exposure to technical, regulatory, and economic volatility, including the blockchain trilemma and decentralization paradox.

4.3 Implications of the Taxonomy

This taxonomy carries several important implications for understanding blockchain success and failure.

4.3.1 Different Success Criteria

The two tiers face fundamentally different success criteria and operational challenges. Tier 1 companies can succeed by demonstrating that blockchain provides incremental and measurable value over alternative technologies—improving transparency, efficiency, or trust within existing business models. Tier 2 companies, by contrast, must prove that blockchain enables entirely new business models, coordination mechanisms, or market structures that were previously unattainable through traditional systems.

4.3.2 Investment Considerations

The taxonomy suggests that investors should apply differentiated evaluation criteria to each tier. Tier 1 companies can be evaluated using traditional business metrics—such as profitability, scalability, and customer adoption—with blockchain treated as one factor among others. Tier 2 companies, however, demand alternative valuation frameworks that account for network effects, token economics, and the volatility inherent in blockchain-dependent ecosystems. This distinction helps clarify why traditional venture capital approaches often misprice blockchain-native projects or underestimate their risk profiles.

4.3.3 Regulatory Implications

Each tier encounters distinct regulatory dynamics. Tier 1 companies typically operate within established regulatory frameworks, leveraging blockchain to enhance compliance, data integrity, or auditability. Tier 2 companies may challenge existing regulatory frameworks and require new approaches to oversight and governance.

4.3.4 Market Evolution

The taxonomy suggests that as blockchain technology matures, we should expect to see growth in Tier 1 implementations as blockchain becomes “invisible infrastructure,” while Tier 2 companies either evolve into successful platforms or fail to achieve sustainable business models.

4.4 Validation Through Literature

This taxonomy aligns with emerging academic research on blockchain business models. Studies in platform economics indicate that infrastructure providers (Tier 2) encounter distinct challenges compared with application developers (Tier 1), particularly regarding network effects, interoperability, and adoption dynamics.[24] The taxonomy also reflects patterns observed in technology-adoption cycles, wherein early-stage technologies emphasize infrastructure development before transitioning toward application-layer innovation.[25]

The distinction between the two tiers helps explain why aggregate statistics about "blockchain company" failures can be misleading. High failure rates among Tier 2 companies may stem from the inherent complexities of creating new infrastructure and governance systems while Tier 1 companies tend to perform better because they operate within established business contexts and face more familiar market pressures.

5.

Seven Critical Barriers to Blockchain Success

Through analysis of the expert discussion and supporting literature, seven critical barriers emerge that explain why blockchain technology has not yet achieved widespread success. These barriers are interconnected and often reinforce one another, creating systemic challenges that individual companies or projects struggle to overcome.

5.1 Barrier 1: The Decentralization Paradox

5.1.1 The Fundamental Contradiction

The decentralization paradox represents one the most fundamental challenges facing blockchain technology. As articulated by Nikhil during the discussion: "The whole idea of decentralization is to not have a company, is to have a decentralized autonomous organization, right? So when we talk about a DAO–based construct, where does investment come into play and why are investors seeking to have a unicorn, a billion dollar company where they have whatever their 100X or 1000Xs of their investment. Is that even a fair expectation?"

This paradox manifests in multiple dimensions.

- **Governance Paradox:** Building truly decentralized systems requires centralized coordination during early development phases.
- **Investment Paradox:** Venture capital models depend on concentrated ownership and control, which conflicts with decentralized governance principles.
- **Operational Paradox:** Decentralized systems often rely on centralized infrastructure and maintenance to function reliably.

5.1.2 Academic Validation

Gazi's research on "Blockchain's Decentralization Paradox"[26] provides academic validation for these practitioner observations. The research identifies a fundamental tension between the promise of trustless, decentralized systems and the practical realities of governance and coordination. Hanisch et al.[27] extend this analysis by examining how organizations navigate "semirigid limits" when attempting to balance centralization and decentralization in real-world implementations.

5.1.3 Investment Model Misalignment

The decentralization paradox creates particular challenges for investment models. Traditional venture capital expects to invest in companies that can achieve "unicorn" status—billion-dollar valuations with concentrated ownership that enables significant returns. However, truly decentralized systems distribute ownership and control, potentially limiting the returns available to early investors.

As George observed during the discussion, this creates a "meta-problem," where "if you're trying to build something that is decentralized and you need for that to be yourself decentralized, then you have a conundrum. You're putting an additional obstacle to what you're trying to create."

5.1.4 Practical Manifestations

The decentralization paradox manifests in several practical ways:

- **Development Centralization:** Most blockchain projects begin with centralized development teams making key architectural and governance decisions. Even projects that later achieve partial decentralization often retain core centralized control during critical development phases.
- **Infrastructure Dependencies:** Many "decentralized" applications depend on centralized infrastructure such as cloud services, APIs, or development frameworks—creating single points of failure that undermine decentralization.
- **Governance Challenges:** Decentralized governance mechanisms often prove inefficient or ineffective, leading to the reemergence of informal centralized decision-making structures that contradict the system's stated principles.

5.2 Barrier 2: The Blockchain Trilemma and Technical Trade-Offs

5.2.1 Understanding the Trilemma

The blockchain trilemma, first articulated by Vitalik Buterin, posits that blockchain systems cannot simultaneously achieve optimal levels of decentralization, security, and scalability.[28] This technical constraint creates strategic challenges, forcing them to make trade-offs that may not align with their market or governance models.

During the discussion, Muddasir offered a nuanced view: “I think every use case does not have this trilemma. Maybe some use cases need decentralization, some need scalability, or some need security. If any company selects one of them and builds accordingly, I think that is sufficient.”

5.2.2 Strategic Implications

The trilemma extends beyond technical architecture into strategic decision-making. Companies must decide which property to prioritize based on their specific use cases, but these choices carry business implications that may not be immediately apparent:

- **Scalability vs. Decentralization:** Choosing scalability over decentralization improves performance but can erode blockchain’s differentiating value.
- **Security vs. Scalability:** Prioritizing security limits transaction throughput, constraining usability for high-volume contexts.
- **Decentralization vs. Security:** Maximizing decentralization may create security vulnerabilities or governance inefficiencies that reduce reliability.

5.2.3 Market Confusion

The trilemma contributes to persistent market confusion about blockchain capabilities and limitations. Many blockchain projects claim to “solve” all three dimensions, creating unrealistic expectations among investors and users. When trade-offs become visible, such projects are often perceived as failures, even if they successfully optimize for their intended use case.

5.3 Barrier 3: Enterprise Adoption Challenges and Private vs. Public Blockchain Debates

This chapter details the seven critical barriers to blockchain’s widespread adoption identified through this research. These are not isolated technical issues but deeply interconnected, systemic challenges that create a self-reinforcing cycle of constraints. The analysis begins with the most fundamental contradiction at the heart of many blockchain endeavors: the decentralization paradox.

5.3.1 Enterprise Privacy and Control Requirements

Enterprise adoption faces fundamental challenges related to privacy, control, and regulatory compliance. As Shyam explained from his experience building Hyperledger Fabric: “Enterprises will not adopt public blockchain because they don’t want their information to be public—who they transact with, the amounts, the frequency. All this is private information. Why would any enterprise want to share it willingly in a public blockchain?”

This perspective highlights a tension between blockchain’s transparency ethos and enterprise needs for confidentiality. Enterprises need to protect competitive information, comply with privacy regulations, and maintain control over their data and processes.

5.3.2 Private Blockchain Limitations

While private blockchains address enterprise privacy concerns, they introduce new limitations. As Nick noted, “from a private blockchain perspective, scalability might be a challenge.” Private blockchains also dilute blockchain’s unique value proposition by eliminating the decentralization and transparency benefits that distinguish it from traditional databases.

The group debated whether private blockchains represent a necessary enterprise adaptation or a conceptual misinterpretation of blockchain’s purpose. Some participants argued that private blockchains are necessary for enterprise adoption while others suggested they miss the point of blockchain technology entirely.

5.3.3 Hybrid Approaches and Use Case Specificity

The discussion also surfaced hybrid approaches that combine public and private blockchain elements. Shyam described models where “the bridge between private and public is necessary for access to liquidity or for tokenizing liquid assets into a wider distribution and reach to an ecosystem that is non-native to where the origination of the asset is.”

This suggests that enterprise blockchain success depends on use case–specific design, not ideological purity.

5.4 Barrier 4: The "Blockchain Company" Misnomer and Market Positioning

5.4.1 Terminology Confusion

The widespread use of the term "blockchain company" creates confusion about what these entities actually do and how they should be evaluated. As George observed, "I think it is an oxymoron to use the term 'Blockchain Company' as this may conflate the tech means and the business purpose of an organization." This terminology confusion contributes to unrealistic expectations and inappropriate evaluation criteria.

Mickie extended this observation by comparing blockchain to other technologies: "We don't call ourselves a Java company or a Python company—so we shouldn't call ourselves a blockchain company either. It's just a technology meant to enhance the application." This linguistic confusion fosters misaligned expectations and misguided investor evaluations.

5.4.2 Technology vs. Business Focus

The "blockchain company" framing reflects a tendency to lead with technology rather than value creation. As Mickie remarked, startups often "lead with the technology," but investors "want returns, not just innovation."

This results in solutions looking for problems rather than technologies applied to solve market-validated needs.

5.4.3 Market Evolution and Maturity

The terminology also signals technological immaturity. As George compared: "If we set the clock back to the late '90s, speaking of 'blockchain companies' is like calling firms 'internet companies.' That made sense for pioneers but not for mature markets."

As blockchain matures, the terminology will likely shift toward function- and outcome-based identifiers—reflecting integration into mainstream business infrastructure rather than novelty.

5.5 Barrier 5: Investment Model Misalignment and Market Dynamics

5.5.1 Venture Capital Expectations vs. Blockchain Reality

Traditional venture capital models emphasize concentrated ownership, rapid scaling, and clear exit opportunities through acquisition or public offerings. However, blockchain technology's decentralized nature conflicts with these expectations in several ways.

The discussion revealed ongoing tension between VC expectations and blockchain principles. As noted in Y Combinator's stance: "We don't invest in companies that aspire to be under a billion dollars"—the growth-at-all-costs mindset common in venture funding may be incompatible with building sustainable, decentralized systems.

5.5.2 Market Volatility and Funding Cycles

The blockchain sector is marked by sharp volatility in both funding availability and market conditions. As Nick observed, "When the token prices are low, there is no funding, there is no innovation, but are we seeking innovation, or are we seeking to ride this bull wave?"

Such volatility disrupts long-term planning and institutional stability. Startups often secure excessive capital during bull markets, only to face severe liquidity constraints in downturns, regardless of their underlying technology or business fundamentals.

5.5.3 Speculation vs. Utility

The discussion underscored the persistent divide between speculative behavior and genuine utility creation in blockchain ecosystems. While speculation can inject much-needed capital into early development, it also fuels unrealistic valuations and short-term hype at the expense of sustainable innovation.

Shyam noted: "We're fully in the bull market" but cautioned against "treasury companies" that could become "the next FTX." His remark highlights how speculative excess continues to generate systemic risks rather than supporting responsible, value-driven development.

5.6 Barrier 6: Infrastructure vs. Application Layer Confusion

5.6.1 The Platform vs. Application Dilemma

Many blockchain projects remain uncertain about whether to focus on building infrastructure for others to use or use applications that solve particular problems. This strategic ambiguity often leads to misaligned objectives and inefficient resource use.

Georges observed that many blockchain firms "aspire to be infrastructure providers" or "platforms for peer networks that interact in a way fundamentally different from the one we are used to." This aspiration is often driven by the potential for greater scalability, ecosystem control, and investor preference for high-margin platform plays. However, creating a viable platform demands distinct growth strategies, success metrics, and time horizons compared to application development.

5.6.2 Network Effects and Adoption Challenges

Infrastructure and platform initiatives face structural adoption challenges rooted in network effects. They must simultaneously attract developers to build on their platform and users to engage with resulting applications. This "chicken-and-egg" dynamic means platforms need apps to draw users, yet developers need users to justify building apps.

5.6.3 Investment Allocation Imbalances

Industry analysis suggests disproportionate investment in blockchain infrastructure relative to end-user applications.[29] This reflects investor preference for high-potential platform models, but the resulting ecosystem that is heavy on foundational technology and light on usable solutions. This creates a "build it, they will come" dynamic that has thus far failed to catalyze mainstream adoption.

5.7 Barrier 7: Regulatory Uncertainty and Policy Challenges

5.7.1 Regulatory Fragmentation

Blockchain ventures operate amid regulatory uncertainty that varies widely across jurisdictions. Divergent national approaches to crypto assets and digital governance create fragmented compliance environments, constraining cross-border scalability.

The discussion noted such fragmentation affects project types differently. Tristan's experience implementing a stablecoin in Bolivia illustrates how regulatory frameworks can either enable or obstruct blockchain innovation, depending on local interpretation and political will.

5.7.2 Policy Volatility

Regulatory approaches to blockchain remain volatile and subject to political changes. As Nick observed, "What happens if there is a change in government? Not that technology should be, but there is a bit of policy that helps in governance helps in governance and diffusion of technology. But when something is tightly tied to one party—'this is ours, we're against that'—the other side tends to tear it down when they take power."

Such volatility discourages long-term planning and investment, as shifting political priorities can abruptly alter the regulatory landscape.

5.7.3 Compliance Costs and Complexity

Regulatory compliance creates significant costs and complexity for blockchain projects, particularly those operating across multiple jurisdictions. These costs can be prohibitive for smaller projects and may favor larger, well-funded initiatives that can afford comprehensive legal and compliance resources.

6.

Implications and Proposed Solutions

The systemic barriers identified in this research necessitate a fundamental rethinking of how success is defined and measured in the blockchain ecosystem. Relying on conventional business metrics alone fails to capture the unique value and challenges of decentralized systems, particularly for projects built upon the technology rather than merely using it. This section proposes a new framework for evaluating success, built on two core principles: the need for tier-specific criteria and the adoption of long-term perspectives.

6.1 Reframing Success Metrics

6.1.1 Tier-Specific Evaluation Criteria

The taxonomy presented in section 4 suggests that different types of blockchain entities require different success metrics and evaluation criteria. For Tier 1 companies (those that use blockchain), success should be measured by traditional business metrics, with blockchain implementation assessed as one factor contributing to broader organizational goals. For Tier 2 companies (those built on blockchain), evaluation should incorporate network effects, decentralization objectives, and the unique value propositions that blockchain enables.

This reframing has important implications for investors, entrepreneurs, and researchers. Rather than applying uniform success criteria to all “blockchain companies,” stakeholders should design tier-specific frameworks that account for the distinct challenges and opportunities each category faces. As Jean notes, companies leveraging blockchain to enhance operations should be evaluated on growth, efficiency, and customer outcomes, while companies built on blockchain must demonstrate scalability, network resilience, and community trust—ensuring that success reflects real impact and value creation rather than adoption alone.

6.1.2 Long-Term vs. Short-Term Perspectives

The discussion revealed persistent tension between short-term market pressures and long-term technological development needs. Successful blockchain adoption often requires longer timelines than traditional software projects, particularly for Tier 2 companies building new infrastructure or decentralized platforms.

Investors and entrepreneurs should adopt patient, long-term perspectives that recognize time needed to build network effects, achieve decentralization, and develop sustainable token economies. This shift may require new funding models that offer patient capital and flexible return expectations.

6.2 Addressing the Decentralization Paradox

The decentralization paradox creates a fundamental tension between the ideological goal of a trustless system and the practical necessities of early-stage development and funding. Navigating this paradox requires pragmatic models that acknowledge the need for initial centralization while maintaining a credible path toward a decentralized future. The following approaches offer a framework for managing this critical transition.

6.2.1 Progressive Decentralization Models

One practical approach to the decentralization paradox is progressive decentralization, in which projects begin with centralized development and governance but gradually transfer control to decentralized mechanisms as the ecosystem matures. This approach recognizes that a degree of centralization is often necessary during early stages while preserving the long-term goal of full decentralization.

Successful progressive decentralization depends on clear roadmaps, transparent governance, and credible commitments to transferring control. Projects should establish measurable milestones for decentralization and provide stakeholders with visibility into progress toward these goals.

6.2.2 Hybrid Governance Models

The discussion suggested that successful blockchain projects may require hybrid governance systems combining centralized efficiency with decentralized legitimacy. Such models could include elected representatives, technical committees, or other structures that balance efficient decision-making with community input and oversight.

6.2.3 Alternative Investment Models

Resolving the investment paradox may also demand alternative funding structures that align with decentralization principles. Examples include community funding mechanisms, token-based investment models, or grant-based programs that avoid traditional equity ownership and control.

6.3 Optimizing for the Blockchain Trilemma

Given that the blockchain trilemma presents a persistent set of trade-offs rather than a problem with a single solution, the most effective approach for projects is strategic optimization. The following recommendations outline how developers and entrepreneurs can navigate these inherent compromises to build viable and effective systems.

6.3.1 Use Case–Specific Optimization

Rather than seeking a universal solution to the blockchain trilemma, projects should optimize for their specific use cases. As Muddasir observed during the discussion, different applications may prioritize particular dimensions—security, scalability, or decentralization—based on their specific needs and user requirements.

This approach requires careful analysis of use-case demands and transparent communication of trade-offs. Projects should explicitly state how their design choices align with intended applications and acknowledge the compromises involved.

6.3.2 Layered Solutions

Technical responses to the trilemma may involve layered architectures that assign different priorities to different protocol layers. For instance, base layers may prioritize security and decentralization while upper layers focus on scalability and user experience.

6.3.3 Interoperability and Specialization

Instead of attempting to build monolithic solutions that optimize all aspects of the trilemma, the ecosystem may benefit from specialized blockchains that excel in one area and rely on interoperability to collaborate with others. This specialization encourages diversity while maintaining overall system cohesion.

6.4 Improving Enterprise Adoption

The challenges identified for enterprise adoption point to several strategic priorities that can facilitate smoother integration. By focusing on the following areas, the ecosystem can significantly lower the barriers for corporate entities.

6.4.1 Hybrid Public-Private Architectures

The discussion highlighted promising examples of hybrid architectures that blend public and private blockchain elements. Such configurations enable enterprises to maintain data privacy and control while leveraging public blockchain networks for specific functions such as settlement, verification, or liquidity access.

Developing standardized frameworks for hybrid implementation could reduce complexity and provide enterprises with proven adoption blueprints.

6.4.2 Regulatory Compliance Frameworks

Enterprise adoption would accelerate with standardized compliance frameworks that clarify how to implement blockchain solutions within existing legal regimes. Such frameworks should address privacy, data protection, financial regulations, and industry-specific standards, giving enterprises predictable pathways to adoption.

6.4.3 Education and Training Programs

A major barrier to enterprise adoption is limited organizational understanding of blockchain technology. Targeted education and training programs could equip decision-makers with the knowledge to evaluate blockchain's capabilities and limitations, supporting more informed implementation choices.

6.5 Clarifying Market Positioning

Widespread confusion and speculative hype in the blockchain market often obscure the technology's genuine value proposition. To overcome this, the industry must shift its focus from technological evangelism to clear, pragmatic communication that resonates with mainstream businesses and users. The following strategies are essential for cutting through the noise and establishing credible market positioning.

6.5.1 Business-First Messaging

Companies should lead with business value propositions rather than technological claims. Instead of branding themselves as "blockchain companies," organizations should articulate the problems they solve and the value delivered, positioning blockchain as the enabling layer rather than the focal product.

6.5.2 Use Case Education

The blockchain industry would benefit from clearer education on appropriate use cases—both positive examples where blockchain creates genuine value and negative examples where conventional technologies are more efficient.

6.5.3 Maturity Indicators

Developing transparent maturity indicators could help stakeholders identify when blockchain technologies are production-ready versus experimental. Such indicators might include technical metrics, adoption statistics, and ecosystem development measures.

6.6 Aligning Investment Models

The fundamental misalignment between blockchain's decentralized ethos and traditional investment models necessitates the development of new funding approaches. The following strategies can help better align capital with the unique needs of blockchain projects.

6.6.1 Patient Capital

Blockchain development, particularly for Tier 2 companies, often requires patient capital that supports longer development timelines and alternative success metrics than traditional venture capital. Potential sources include government funding, foundation grants, or specialized blockchain investment funds with extended time horizons.

6.6.2 Community Investment Models

Token-based and community-driven investment mechanisms may align more closely with blockchain's participatory principles than traditional equity models. However, these mechanisms require careful design to avoid regulatory pitfalls and ensure sustainable financial governance.

6.6.3 Impact Measurement

Investment strategies should also account for broader ecosystem impacts beyond financial returns. Metrics might include decentralization levels, network activity, ecosystem diversity, and social or environmental contributions.

6.7 Balancing Infrastructure and Applications

The fragmentation between infrastructure and application development hinders the entire ecosystem's progress. By adopting a more collaborative model, stakeholders can accelerate innovation and resource allocation. Essential steps toward this include the following:

6.7.1 Coordinated Development

The blockchain ecosystem would benefit from closer coordination between infrastructure and application development. This could involve industry consortia, standardization efforts, or co-funding mechanisms that encourage complementary progress across layers.

6.7.2 Application-Driven Infrastructure

Infrastructure design should be driven by real application needs, not theoretical capabilities. This requires close collaboration between infrastructure providers and application developers to ensure that infrastructure development addresses real-world requirements.

6.7.3 Interoperability Standards

Developing interoperability standards could reduce infrastructure investment risk by ensuring cross-chain compatibility. Standardized protocols would also weaken winner-take-all dynamics, fostering a more resilient and collaborative blockchain ecosystem.

7.

Unresolved Questions and Future Research Directions

7.1 Fundamental Questions About Blockchain's Future

To overcome the systemic barriers outlined in this paper, the blockchain research community must focus its efforts on a set of pivotal, unanswered questions. The following agenda prioritizes areas where new knowledge is most needed to resolve fundamental trade-offs, align economic incentives, and guide effective policy. Answering these questions is a prerequisite for blockchain technology to achieve its long-term potential.

The analysis reveals several fundamental questions that remain unresolved and require further research:

7.1.1 The Sustainability Question

Can the current bull market dynamics support sustainable blockchain development, or are we experiencing another bubble?

The discussion highlighted concerns that market volatility and speculation may overwhelm genuine utility development. Future research should examine the relationship between market cycles and technology development, identifying conditions that support sustainable innovation versus speculative bubbles.

7.1.2 The Decentralization Viability Question

Is true decentralization compatible with commercial success, or will successful blockchain projects inevitably tend toward centralization?

This question strikes at the core of blockchain's value proposition. Longitudinal studies tracking the evolution of blockchain projects could reveal over time whether decentralization goals are achievable in practice.

7.1.3 The Enterprise Integration Question

What is the optimal path for enterprise blockchain adoption—private blockchains, public blockchain integration, or hybrid approaches?

Current evidence is mixed, with successful examples of each approach. Comparative studies examining long-term outcomes of these strategies could provide clearer guidance.

7.2 Technical and Architectural Questions

7.2.1 Trilemma Resolution

Can the blockchain trilemma be definitively solved, or will it remain a fundamental constraint requiring trade-offs?

While some recent research claims to have solved the trilemma, these solutions require validation through real-world implementation and testing. Future research should focus on empirical testing of proposed solutions under realistic conditions.

7.2.2 Scalability Limits

What are the practical limits of blockchain scalability, and how do these limits affect different use cases?

Current scalability solutions often involve trade-offs that become apparent only at a scale. Research should evaluate real-world performance of scaling solutions across various conditions.

7.2.3 Interoperability Challenges

How can different blockchain systems effectively interoperate, and what are the security and governance implications of interoperability?

As the blockchain ecosystem becomes more diverse, interoperability grows increasingly important but also more complex.

7.3 Economic and Investment Questions

Beyond technical hurdles, blockchain faces profound economic challenges rooted in the misalignment between its decentralized ethos and traditional, centralized business and investment models. These are not merely questions of financing but of designing entirely new economic systems that can sustainably support development while preserving core principles. Key unresolved questions include:

7.3.1 Sustainable Token Economics

What token economic models can support long-term project sustainability without driving unsustainable speculation?

Many blockchain projects struggle to design tokenomics that align stakeholder incentives while avoiding speculative bubbles.

7.3.2 Investment Model Evolution

How should investment models evolve to better support blockchain development while respecting decentralization principles?

Traditional VC models may be poorly suited to blockchain projects while alternative models remain largely experimental.

7.3.3 Value Capture Mechanisms

How can blockchain projects capture sufficient value to sustain development while maintaining decentralization and open access?

This question is particularly challenging for infrastructure projects that provide public goods.

7.4 Regulatory and Policy Questions

7.4.1 Regulatory Framework Evolution

How will regulatory frameworks evolve to address blockchain technology, and what impact will this have on different types of blockchain projects?

Regulatory uncertainty remains a major challenge, and its direction will significantly shape blockchain adoption.

7.4.2 Global Coordination

Can global coordination on blockchain regulation be achieved, or will regulatory fragmentation continue to constrain blockchain development?

Different regulatory approaches across jurisdictions create compliance challenges and limit the potential for global blockchain solutions.

7.4.3 Innovation vs. Protection

How can regulators balance innovation encouragement with consumer and investor protection?

This balance is particularly challenging for blockchain technology, which often challenges existing regulatory frameworks.

7.5 Social and Adoption Questions

7.5.1 User Experience Evolution

How can blockchain user experience evolve to support mainstream adoption while maintaining the technology's unique benefits?

Current blockchain interfaces often require technical knowledge that limits mainstream adoption.

7.5.2 Trust and Adoption

What factors drive user trust and adoption of blockchain systems, and how do these factors vary across different user segments and use cases?

Understanding adoption drivers is crucial for designing successful blockchain applications.

7.5.3 Network Effects

How do network effects operate in blockchain systems, and what strategies can projects use to achieve critical mass?

While network effects are often cited as key to blockchain success, the mechanisms remain poorly understood.

7.6 Methodological Questions for Future Research

7.6.1 Longitudinal Studies

Future research should include longitudinal studies tracking blockchain projects over extended periods to identify factors contributing to long-term success or failure. Most current studies provide snapshots rather than dynamic evolution analyses.

7.6.2 Comparative Analysis

Systematic comparative analysis of successful versus failed blockchain projects could uncover patterns and success factors that are not evident in isolated cases. Such research should control for market conditions, funding levels, and external shocks.

7.6.3 Interdisciplinary Approaches

Blockchain research would benefit from interdisciplinary approaches combining technical, economic, social, and policy perspectives. The challenges facing blockchain technology are not purely technical and demand multi-faceted inquiry.

7.6.4 Empirical Validation

Many claims about blockchain's benefits and limitations remain theoretical or anecdotal. Future research should emphasize empirical validation through real-world testing and measurement.

8.

Conclusions and Recommendations

8.1 Key Findings Summary

This research identified seven critical barriers hindering blockchain's widespread success: the decentralization paradox, the blockchain trilemma and technical trade-offs, enterprise adoption challenges, the "blockchain company" misnomer, investment model misalignment, infrastructure versus application layer confusion, and regulatory uncertainty. These barriers are interconnected and mutually reinforcing, creating systemic challenges individual projects struggle to overcome.

The study also introduces a novel taxonomy distinguishing between companies that use blockchain as a tool (Tier 1) and those built upon blockchain (Tier 2). This distinction highlights that different types of entities face fundamentally different challenges and require different evaluation criteria.

Most importantly, the findings suggest that blockchain's current challenges stem not primarily from technological limitations but from fundamental misalignments between its decentralized ethos and traditional business models, investment approaches, and organizational structures.

The identification of these systemic barriers and the proposed taxonomy leads to distinct implications for the key stakeholders driving and shaping the blockchain ecosystem. Rather than one-size-fits-all solutions, addressing these challenges requires targeted strategies based on each group's role and objectives. The following sections outline actionable recommendations for entrepreneurs, investors, enterprises, policymakers, and researchers before concluding with a consolidated path forward for the technology.

8.2 Implications for Different Stakeholders

8.2.1 For Entrepreneurs and Project Leaders

Entrepreneurs should carefully consider whether their projects require blockchain technology or whether traditional technologies could achieve the same objectives more efficiently. For blockchain-reliant projects, leaders should do the following:

- Clearly articulate which aspects of the blockchain trilemma they are optimizing for and why
- Develop realistic timelines reflecting the complexity of building decentralized systems
- Focus on business value propositions rather than technology features in their messaging
- Consider progressive decentralization models that acknowledge the need for initial centralization

8.2.2 For Investors

Investors should adopt tier-specific evaluation criteria reflecting the different challenges and opportunities of blockchain-using versus blockchain-based companies. Investment decisions should consider the following:

- Longer development timelines for blockchain projects, particularly infrastructure and platform plays
- Different success metrics that account for network effects and decentralization goals
- The regulatory environment and its potential impact on project viability
- The sustainability of token economic models and community incentives

8.2.3 For Enterprises

Enterprises considering blockchain adoption should focus on specific use cases where blockchain provides clear advantages over traditional technologies. Enterprise blockchain strategies should do the following:

- Start with pilot projects that demonstrate clear business value
- Consider hybrid architectures that combine public and private blockchain elements
- Invest in education and training to build internal blockchain expertise
- Develop compliance frameworks that address regulatory requirements

8.2.4 For Policymakers

Policymakers should craft regulatory frameworks that balance innovation encouragement with consumer protection. Regulatory approaches should do the following:

- Distinguish between different types of blockchain applications and their associated risks
- Provide clear guidance on compliance requirements to reduce uncertainty
- Coordinate with other jurisdictions to avoid regulatory fragmentation
- Support research and education initiatives that build blockchain understanding

8.2.5 For Researchers

Researchers should prioritize empirical and comparative studies that validate or challenge theoretical claims about blockchain benefits and limitations. Priority research areas include the following:

- Longitudinal studies tracking blockchain project evolution over time
- Comparative analysis of successful versus failed blockchain implementations
- Interdisciplinary research combining technical, economic, and social perspectives
- Development of frameworks for evaluating blockchain project success

8.3 The Path Forward

Advancing blockchain technology requires coordinated, cross-sector efforts to address the systemic challenges identified in this research. Success will likely require the following:

- **Realistic Expectations:** Stakeholders must develop realistic expectations about blockchain capabilities and limitations, avoiding both excessive hype and premature dismissal.
- **Appropriate Use Cases:** Focus should shift toward identifying and developing use cases where blockchain provides clear advantages over traditional technologies.
- **Sustainable Development Models:** The industry needs to develop funding and governance models that support long-term development while respecting decentralization principles.
- **Regulatory Clarity:** Policymakers must provide clear, consistent innovation-friendly guidance while protecting consumers and investors.
- **Education and Understanding:** Continued investment in education and research is needed to build understanding of blockchain technology across all stakeholder groups.
- **Purpose-Driven Innovation:** Align blockchain development with real-world impact—focusing on trust, transparency, inclusion, and sustainability across industries such as fashion, media, and digital health, ensuring technology serves people and society, not just progress for its own sake.

8.4 Final Thoughts

Blockchain technology holds immense potential to transform trust, intermediation, and value exchange. Realizing this potential requires honest assessment of current challenges and collaborative problem-solving.

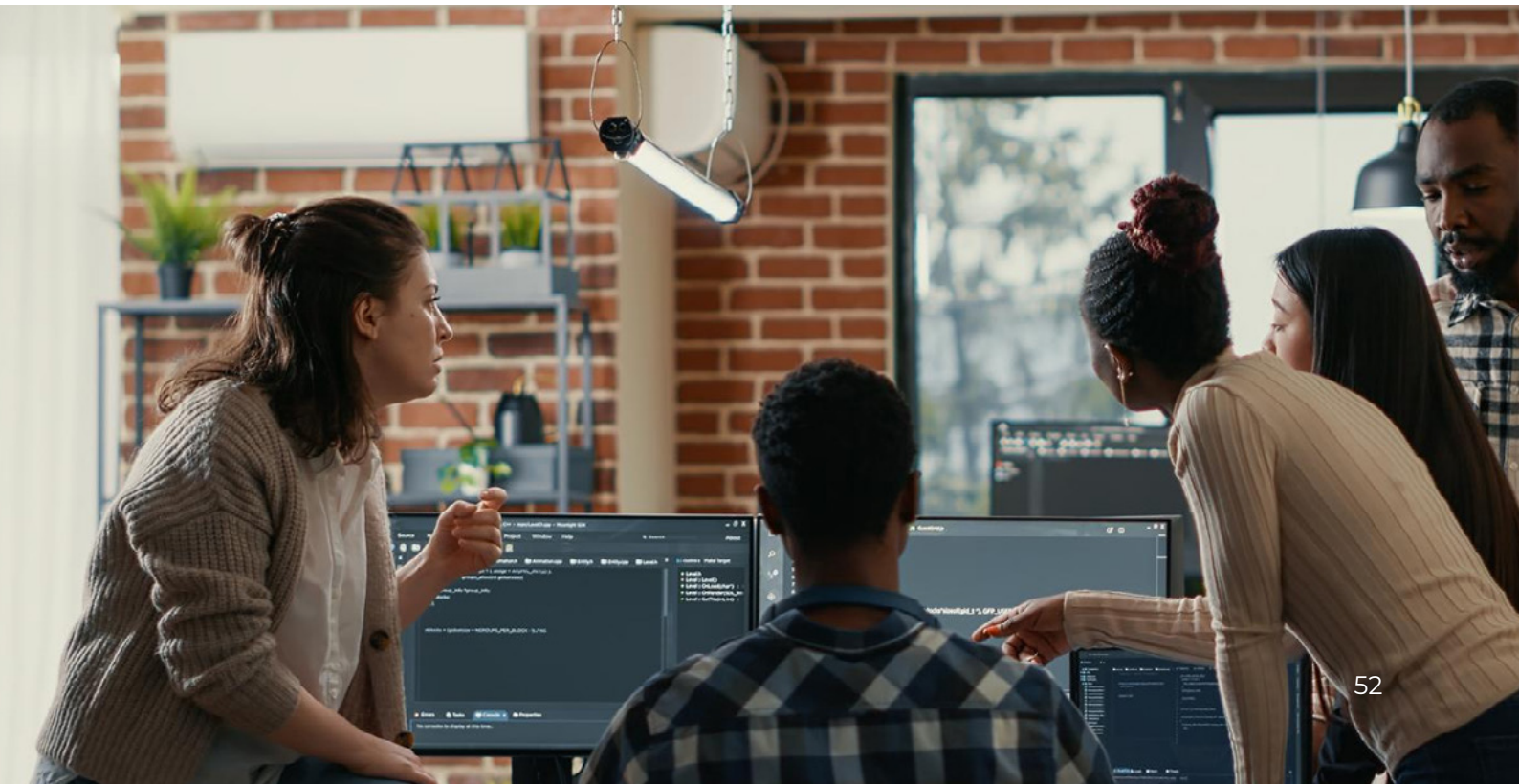
The high failure rate of blockchain projects should not be interpreted as evidence that the technology is fundamentally flawed. Instead, it reflects the difficulty of building new types of systems that challenge existing business models, organizational structures, and regulatory frameworks. Many transformative technologies have experienced similar challenges during their early adoption phases.

The key to blockchain's future success lies not in solving all challenges simultaneously but in making steady progress on each of the barriers identified in this research. This requires patience, persistence, and willingness to learn from both successes and failures.

As George observed, the current phase may resemble the internet in the 1990s—characterized by experimentation, high failure rates, and gradual learning that eventually led to transformative applications. The question is not whether blockchain will succeed but how long it will take and what forms that success will take.

The perspectives captured in this research suggest that blockchain's ultimate success will likely look different from current expectations. Rather than revolutionary disruption, we may see gradual integration of blockchain capabilities into existing systems and the emergence of new applications that leverage blockchain's unique properties in ways we cannot yet fully anticipate.

True success will require continued collaboration between technologists, business leaders, investors, policymakers, and researchers to navigate the complex challenges that blockchain technology presents. The insights and frameworks presented here provide a foundation for that collaboration, but much work still lies ahead.



Endnotes

1. Nakamoto, S. 2008. “Bitcoin: A Peer-to-Peer Electronic Cash System.” Retrieved from https://bitcoin.org/bitcoin.pdf.
2. University of Surrey. 2025. “Blockchain Startups Are Failing—and It’s Not Because of the Technology.” Retrieved from https://www.surrey.ac.uk/news/blockchain-startups-are-failing-and-its-not-because-technology.
3. Galaxy Research. 2025. “Crypto & Blockchain Venture Capital—Q1 2025.” Retrieved from https://www.galaxy.com/insights/research/crypto-venture-capital-q1-2025.
4. Prewett, K. W., and Prescott, G. L. 2020. “Blockchain Adoption Is Inevitable—Barriers and Risks Remain.” Journal of Corporate Accounting & Finance 31 (2): 21–28.
5. Bag, S., Viktorovich, D. A., Sahu, A. K., and Sahu, A. K. 2021. “Barriers to Adoption of Blockchain Technology in Green Supply Chain Management.” Journal of Global Operations and Strategic Sourcing 14 (1): 104–133.
6. Xu, Y., Chong, H. Y., and Chi, M. 2023. “Modelling the Blockchain Adoption Barriers in the AEC Industry.” Engineering, Construction and Architectural Management 30 (1): 125–148.
7. Protokol. 2019. “Overcoming Enterprise Blockchain Challenges.” Retrieved from https://www.protokol.com/insights/overcoming-enterprise-blockchain-challenges/.
8. Buterin, V. 2017. “The Blockchain Trilemma.” Retrieved from https://medium.com/@VitalikButerin.
9. Werth, J., Berenjestanaki, M. H., Barzegar, H. R., and Pahl, C. 2023. “A Review of Blockchain Platforms Based on the Scalability, Security and Decentralization Trilemma.” ICEIS (1): 385–392.
10. Monte, G. D., Pennino, D., and Pizzonia, M. 2020. “Scaling Blockchains Without Giving Up Decentralization and Security: A Solution to the Blockchain Scalability Trilemma.” In Proceedings of the 2nd ACM Conference on Advances in Financial Technologies (pp. 233–243).
11. Shafin, K. Md., and Reno, S. 2024. “Breaking the Blockchain Trilemma: A Comprehensive Consensus Mechanism for Ensuring Security, Scalability, and Decentralization.” IET Software 18 (3): 234–251.

12. Friedlmaier, M., Tumasjan, A., and Welpe, I. M. 2018. “Disrupting Industries with Blockchain: The Industry, Venture Capital Funding, and Regional Distribution of Blockchain Ventures.” SSRN Electronic Journal.
13. Lin, L., and Nestarcova, D. 2019. “Venture Capital in the Rise of Crypto Economy: Problems and Prospects.” Berkeley Business Law Journal 16, 519–571.
14. Galaxy Research. 2025. “Crypto and Blockchain Venture Capital—Q1 2025.” Retrieved from https://www.galaxy.com/insights/research/crypto-venture-capital-q1-2025.
15. Galaxy Research. 2025. “Crypto and Blockchain Venture Capital—Q2 2025.” Retrieved from https://www.galaxy.com/insights/research/crypto-blockchain-venture-capital-q2-2025.
16. Gazi, S. F. 2024. “In Code We Trust: Blockchain’s Decentralization Paradox.” Vanderbilt Journal of Entertainment & Technology Law 27 (1): 123–178.
17. Hanisch, M., Goldsby, C., Fortin, M., and Craighead, C. W. 2025. “Governing Within Semirigid Limits: Navigating the Centralization–Decentralization Paradox in Blockchain-Based Platforms.” Journal of Operations Management 71 (1): 45–67.
18. Strehle, E. 2020. “Public versus Private Blockchains”. Blockchain Research Lab Working Paper No. 14.
19. Hamida, E. B., Brousmiche, K. L., Levard, H., and Thea, E. 2017. “Blockchain for Enterprise: Overview, Opportunities and Challenges.” In Proceedings of the 13th International Wireless Communications and Mobile Computing Conference (pp. 1827–1834).
20. Yang, R., Wakefield, R., Lyu, S., Jayasuriya, S., Han, F., Yi, X., ... and Chen, S. 2020. “Public and Private Blockchain in Construction Business Process and Information Integration.” Automation in Construction 118, 103276.
21. Sunmola, F., and Lawrence, G. L. 2024. “Key Success Factors for Integration of Blockchain and ERP systems: A Systematic Literature Review.” Procedia Computer Science 231, 456–463.
22. Kayikci, Y., Gozacan-Chase, N., Rejeb, A., and Mathiyazhagan, K. 2022. “Critical Success Factors for Implementing Blockchain-Based Circular Supply Chain.” Business Strategy and the Environment 31 (8): 3595–3612.
23. Messari. 2024. “The Infrastructure vs. Application Debate.” Retrieved from https://messari.io/report/the-infrastructure-vs-application-debate.
24. Parker, G. G., Van Alstyne, M. W., and Choudary, S. P. 2016. Platform Revolution: How Networked Markets Are Transforming the Economy and How to Make Them Work for You. W. W. Norton & Company.

25. Carlsson, B. 2004. “The Digital Economy: What Is New and What Is Not?” Structural Change and Economic Dynamics 15 (3): 245–264.
26. Gazi, S. F. 2024. “In Code We Trust: Blockchain’s Decentralization Paradox.” Vanderbilt Journal of Entertainment & Technology Law 27 (1): 123–178.
27. Hanisch, M., Goldsby, C., Fortin, M., and Craighead, C. W. 2025. “Governing Within Semirigid Limits: Navigating the Centralization–Decentralization Paradox in Blockchain-Based Platforms.” Journal of Operations Management 71 (1): 45–67.
28. Buterin, V. 2017. “The Blockchain Trilemma.” Retrieved from https://medium.com/@VitalikButerin.
29. Messari. 2024. “The Infrastructure vs Application Debate.” Retrieved from https://messari.io/report/the-infrastructure-vs-application-debate.

Author

Dr. Nikhil Varma

Dr. Nikhil Varma is Non-Executive Chair and Senior Fellow in Digital Assets & Blockchain Tech at The Digital Economist, and an Associate Professor of Management at Ramapo College of New Jersey. With over 20 years of academic and industry experience, his expertise spans operations and supply chain management, blockchain, data analytics, artificial intelligence, and sustainability. He has worked with blockchain startups to design decentralized business models, served as technical lead at the Algorand Foundation to expand blockchain adoption in India, and held visiting professorships at institutions such as IIT Delhi and Molde University, Norway. His forthcoming book, Blockchain Capitalism, explores how blockchain can reshape capitalism into a more inclusive, accountable, and sustainable model for the twenty-first century.

Co-Authors

Nick Ntigrintakis

Nikolaos “Nick” Ntigrintakis is a Greek-Swedish entrepreneur and Senior Fellow at The Digital Economist, with over three decades of experience in blockchain, fintech, digital assets, and internet innovation. A founder, investor, and strategist, he has built and exited multiple ventures across Europe, the Middle East, and North America, transforming emerging technologies into trusted financial infrastructure. As chief of partnerships at the Dubai Blockchain Center and founder of ASPRO SFO, Nick focuses on regulated Web3 infrastructure, institutional crypto tooling, and applied AI—bridging innovators, investors, and institutions to design compliant, human-centered financial systems for the future.

Shyam Nagarajan

Shyam Nagarajan is the chief operating officer of Hedera and a former IBM executive, recognized globally for his leadership in responsible AI, blockchain, and digital trust. With a career spanning enterprise strategy and technology transformation, he drives operational excellence and ecosystem growth across the Hedera network. Shyam also serves on the Board of LF Decentralized Trust, advancing governance, community engagement, and the responsible evolution of decentralized technologies through platforms such as the World Economic Forum and Consensus.

Prof. George Samakovitis

Prof. George Samakovitis is a professor of fintech at the University of Greenwich with over two decades of research and advisory experience in anti–money laundering, blockchain, and digital assets. He has served as a member of the Bank of England's CBDC Technology Forum and the UK Data Standards Expert Panel, and has advised the UK Cabinet Office and national working groups on financial crime, data strategy, and fraud prevention. A Senior Fellow of the UK Higher Education Academy and a certified enterprise architect, George continues to bridge academic research with applied innovation in financial systems and regulatory technology.

Mickie Chandra

Mickie Chandra is the technology committee chair at the Montgomery County Council of Parent Teacher Associations (MCCPTA), where she champions digital safety and family empowerment through responsible data practices. With over a decade of experience in economics and policy at the U.S. federal level, she brings a systems perspective to how technology, education, and community governance intersect to shape equitable digital futures.

Mohammad Mudassir

Mohammad Mudassir is a support engineer at the Algorand Foundation, where he ensures seamless operations and delivers technical expertise across the Algorand ecosystem. Formerly a Regional Ambassador at AlgoBharat, he has been instrumental in advancing blockchain education and community engagement in India. With a research background from the Trust Lab at IIT Bombay, his work on the security and scalability of consensus protocols reflects his deep interest in decentralized systems and smart contract innovation.

Tristan Thoma

Tristan Thoma is a global expert in digital currency and national digital infrastructure, known for leading the re-implementation of the world's first operating national cryptocurrency system in El Salvador. With extensive experience designing blockchain and financial systems for governments, Fortune 500 companies, and major banks across Latin America, he focuses on building responsible, human-centered digital ecosystems that advance financial inclusion and economic resilience. Trained in organizational psychology and IT systems management, Tristan bridges technology and design to create systems that empower people through innovation.

Arvinder Singh Kang

Arvinder Singh Kang is a TEDx speaker, AI/ML researcher, and technology entrepreneur with over 15 years of global experience driving ventures at the intersection of digital infrastructure and social impact. Combining expertise in technology, management, product design, and systems thinking, he has led teams from ideation to enterprise-scale innovation. Arvinder's multidisciplinary background across tech, media, and higher education reflects his commitment to creating solutions that merge technological advancement with human-centered design.

Paul Murphy

Paul Murphy works at the intersection of digital technologies, political economy, and transparent systems, advancing blockchain applications across sectors such as health, education, finance, and agriculture. Formerly a Research Affiliate at the University of California, Berkeley, he brings nearly two decades of interdisciplinary experience linking global food and energy security with regional sustainability planning. Fluent in French, English, and Spanish, Paul's international journey—from Canada to Europe and Latin America—reflects his commitment to building decentralized, post-carbon systems that strengthen community resilience and drive sustainable development.

Contributor

Jean Criss

Jean Criss is the founder and CEO of Jean Criss Media and CRISSCROSS Intimates, leading innovation at the nexus of media, fashion, technology, and healthcare. With a multifaceted career spanning global leadership, sustainable design, and digital production, she has launched high-impact campaigns for Fortune 500 companies and holds multiple USPTO patents across industries. An 18-year breast cancer survivor, Jean transformed her experience into purpose through patented post-surgical fashion and wearable tech that empower recovery and redefine comfort. As a Senior Executive Fellow at The Digital Economist, she advances research and thought leadership in blockchain, digital assets, and med-tech innovation—bridging creativity, technology, and human impact.

About

The Digital Economist, headquartered in Washington, D.C. with offices at One World Trade Center in New York City, is the world's foremost think tank on innovation advancing a human-centered global economy through technology, policy, and systems change. We are an ecosystem of 40,000+ executives and senior leaders dedicated to creating the future we want to see—where digital technologies serve humanity and life.

We work closely with governments and multi-stakeholder organizations to change the game: how we create and measure value. With a clear focus on high-impact projects, we serve as partners of key global players in co-building the future through scientific research, strategic advisory, and venture build out.

We engage a global network to drive transformation across climate, finance, governance, and global development. Our practice areas include applied AI, sustainability, blockchain and digital assets, policy, governance, and healthcare. Publishing 75+ in-depth research papers annually, we operate at the intersection of emerging technologies, policy, and economic systems—supported by an up-and-coming venture studio focused on applying scientific research to today's most pressing socio-economic challenges.

CONTACT: INFO@THEDIGITALECONOMIST.COM