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Success and Failure of Blockchain Technology Providers: Founders' Power, Beyond-Blockchain Exploration and Centralized Decision-Making

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ABSTRACT

Despite a growing focus on blockchain adoption within operations and supply chains, these initiatives exhibit an exceedingly high failure rate, with many failing to achieve sustainable success. Why are enterprise blockchain adoptions highly susceptible to failure? In our inductive case study of five technology providers offering blockchain services for operations and supply chains, we examine how founders' power (i.e., expert, prestige, and ownership) shapes management behaviors that build blockchain perceptions and influence stakeholders toward strategic adoption. Our findings reveal that high-performing cases actively seek inspiration beyond the blockchain ecosystem for service designs and adopt a centralized decision-making approach where key strategic decisions are made internally. In contrast, low-performing cases struggle due to within-blockchain exploration and decentralized decision-making, leading to slower implementation and limited scalability. Furthermore, we find that founders' behaviors in blockchain adoption are embraced by firm members through performance evaluation and interactions, shaping organizational practices and culture, ultimately determining the success or failure of blockchain technology providers. This study extends previous research at the intersection of founders' power and blockchain literature by developing propositions about how different sources of founders' power lead to distinct management behaviors, influencing the success or failure of blockchain adoption outcomes.

1 | Introduction

In recent years, a plethora of collaborative projects and startups have been established to harvest blockchain's value for operations and supply chain innovations, aiming to reduce costs, improve efficiency, and enable the design of ground-breaking business models (Babich and Hilary 2020; Murray et al. 2021; Zhao et al. 2022). Despite the potential of the technology, the success of blockchain in practice to generate actual business value remains very limited (Klöckner et al. 2022). A frequently cited example in operations management (OM) studies is the Maersk-IBM blockchain project in the shipping industry (Choi et al. 2022; Lee et al. 2023; Wolf

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et al. 2024). In 2018, Maersk, the world's largest container shipping company, and IBM launched a smart contract-based global trade platform named TradeLens. Although the platform reduced paperwork costs by 70%–90% and decreased shipping times by 40%—it was discontinued in 2022 as it failed to achieve sufficient enterprise adoption (Maersk 2022). The failure is not limited to TradeLens; Table 1 presents examples of blockchain startups studied by researchers in OM, which were initially heralded for their significant potential but have ultimately failed or become dormant today. These cases raise a critical question: Why are enterprise blockchain adoptions highly susceptible to failure?

Existing literature has extensively examined the high failure rate of blockchain adoptions, identifying several critical success factors (CSFs) contributing to these outcomes. Key CSFs frequently cited include top management support, organizational readiness, technology maturity, company resources, social influence, environmental pressure, IT alignment, effective governance strategies, and the presence of a project champion (Hastig and Sodhi 2020; Choi and Siqin 2022; Shahzad et al. 2024; Liu et al. 2024). However, despite the comprehensive exploration of these factors, they cannot fully explain the persistently high failure rate of blockchain adoptions because CSFs are conceptualized as key areas where 'things must go right' (Rockart 1979) for businesses to succeed. In contrast, the blockchain market is characterized by rapid evolution, fast-paced changes, and significant uncertainty regarding the adoption of blockchain initiatives. Consequently, things often do not go as planned, and new or unexpected situations emerge without a clear course of action. This suggests that additional studies need to be explored to understand and address the underlying causes of these failures.

The literature on entrepreneurship consistently emphasizes that the experience and skills of leaders are crucial for the success of technology startups (Colombo and Grilli 2010; Jung et al. 2017; Tzabbar and Margolis 2017). Given the key role founders play in setting the vision and steering successful technology implementation, this study investigates their power on blockchain adoption within startups. Focusing on founders' power is important because, in blockchain projects, founders often hold significant influence due to their control over financial resources and strategic decision-making processes, particularly as the blockchain ecosystem is populated by high-tech startups. Their decisions can shape project priorities, governance structures, and stakeholder engagement, all of which are critical components of blockchain initiatives. For example, founders can use power in shaping their response to challenges that emerge, and guide the development and selection of blockchain features, and communicate changes to stakeholders, thereby facilitating appropriate actions. By investigating how specifically founders' power influences blockchain startup success and failure, we aim to shed light on an often-overlooked dimension beyond CSFs that may contribute to the high failure rates of blockchain adoptions.

Moreover, the entrepreneurial-based explanation suggests that founders' power can significantly contribute to startup success by enabling swift strategic decisions and adaptability to market changes (Eisenhardt and Schoonhoven 1990; Wasserman 2017). Particularly, powerful founders can provide strong vision and leadership that aligns organizational goals, fosters innovation, and builds cohesive cultures that drive performance (Colombo and Grilli 2010). Also, they can leverage their networks to secure resources, attract top talent, and establish strategic partnerships essential for growth (Shane and Stuart 2002). Notably, there remains a gap in understanding how founders use different sources of power to navigate and shape processes in uncertain environments, driving successful outcomes for blockchain startups. We contend that these processes do not occur in a vacuum but are driven by specific management behaviors and mechanisms. Exploring this is important for understanding how to create a conducive environment for successful blockchain adoption and innovation. To fill this knowledge gap, this research addresses the following question: *How do founders, through their exercise of power, influence blockchain adoption, leading to the success or failure of blockchain startups?*

Given the scarcity of theoretical and empirical evidence, this study applies a multicase research design and explores the

TABLE 1 | Examples of blockchain projects studied by OM researchers.

References	Blockchain projects studied in OM journals	Status
Gan et al. 2021	Sirin Labs—a blockchain startup aiming to bridge the gap between blockchain users and the mass market by providing a secure mobile platform for accessing blockchain applications and services.	Failed (in 2019)
Martinez et al. 2019; Choi et al. 2022	Everledger—a blockchain startup that was often cited in operations management studies as a pioneering example of using blockchain for provenance tracking and ethical sourcing.	Failed (went out of business in 2023)
Schneider et al. 2020; Culot et al. 2024	B3i Services AG—a blockchain startup aiming to leverage blockchain technology to streamline insurance and reinsurance processes.	Failed (filed for insolvency in 2022)
Kim et al. 2020	Insolar—a blockchain startup using a hybrid solution to help businesses work together more efficiently and transparently.	Failed (ceased operations in 2021)
Choi et al. 2019; Ghadge et al. 2023	ShipChain—a blockchain-based logistics startup aiming to provide end-to-end shipping solutions to improve transparency and efficiency.	Failed (halted operations entirely in 2021)

development and subsequent outcomes (i.e., success and failure) of five blockchain startups operating as technology providers. We pay particular attention to technology providers as they hold a crucial position in the blockchain ecosystem by offering various services related to the deployment, management, and integration of blockchain technology (Carson et al. 2018; IBM 2023). In response to recent calls for insights into the high failure rate of blockchain adoption in operations and supply chains (Omale 2019; Sternberg et al. 2021; Sodhi et al. 2022) and to better understand the role of founders' power in technology startup success and failure (Colombo and Grilli 2010; Wasserman 2017), this study tracks how effectively the five technology providers adopt and develop their blockchain solutions over almost 5 years.

Our study is driven by a twofold objective in addressing the research question. Theoretically, although there has been a growing focus on blockchain adoption in operations and supply chains (Cole et al. 2019; Choi et al. 2022; Lumineau et al. 2023), few studies have investigated the success and failure of these blockchain adoption efforts, particularly among technology providers. Thus, our study fills an important gap in the literature by exploring how founders' power influences the success and failure of blockchain adoption outcomes—an aspect that has been largely overlooked in previous research focusing on CSFs (Hastig and Sodhi 2020; Liu et al. 2024). We extend prior research at the intersection of founders' power, technology adoption, and startup performance by illustrating how different sources of power lead to distinct management behaviors (i.e., beyond-blockchain versus within-blockchain exploration and centralized versus decentralized management). By examining the specific behaviors founders employ to navigate uncertain environments and shape strategic decisions, governance structures, and stakeholder engagement, the study contributes to the founders' power literature (Finkelstein 1992; Nakauchi and Wiersema 2015). It explores how founders, working with novel technologies, leverage various power sources to create a more conducive environment for successful adoption. Practically, our study offers insights on how to make sense of the contextual challenges within and around organizations that affect blockchain adoption and, more importantly, how blockchain services can be developed and implemented effectively. By understanding how founders' power influences blockchain adoption in technology providers, practitioners can better navigate changes and manage uncertainties inherent in blockchain initiatives, thereby enhancing the likelihood of successful blockchain adoption and addressing the high failure rates observed in the industry.

2 | Literature Review

While the potential of blockchain to create significant value for operations and supply chains is well documented (Cole et al. 2019; Babich and Hilary 2020; Sodhi et al. 2022), Gartner predicts that 90% of blockchain-based supply chain initiatives will suffer 'blockchain fatigue' (Omale 2019). Such failures can lead to catastrophic outcomes, including significant financial losses, erosion of competitive advantage, decreased organizational performance, and even bankruptcy (Lacity 2018; Toufaily et al. 2021). The severity of the consequences of failed blockchain adoptions, coupled with the extensive resources, commitment, and organizational transformations required, highlights the urgent need to understand the reasons for these failures and develop strategies to mitigate the uncertainty in blockchain adoption.

2.1 | Drivers and CSFs for Blockchain Adoption

The existing literature on blockchain studies predominantly focuses on identifying the drivers and CSFs for blockchain adoption rather than the determinants of successful implementation. On the one hand, studies have explored various factors driving the adoption of blockchain technology across different sectors (Danese et al. 2021; Klöckner et al. 2023; Ghadge et al. 2023; Vazquez Melendez et al. 2024). For instance, research has highlighted the importance of environmental factors, such as macroeconomics, regulations, and competitive pressure, as critical for blockchain adoption (Agi and Jha 2022; Vu et al. 2023). Organizational factors, including management commitment, technological capabilities, and knowledge and expertise, have also been identified as significant enablers for blockchain adoption (Van Hoek 2019; Vu et al. 2023). Technological factors, such as blockchain security, traceability, enhanced efficiency, and data transparency, are frequently discussed as essential for adoption (Ahmed et al. 2022; Klöckner et al. 2023). However, while these studies provide a comprehensive understanding of what drives organizations to adopt blockchain, they often fall short of addressing what determines the successful implementation and sustained use of blockchain technology for competitiveness.

On the other hand, researchers have studied CSFs as key factors in the decision to adopt blockchain technology (Hastig and Sodhi 2020; Choi and Siqin 2022; Pandey et al. 2024). For instance, Hastig and Sodhi (2020) identify CSFs—including companies' capabilities, collaboration, technology maturity, supply chain practices, leadership, and governance—that are essential for successfully implementing blockchain-based supply chain traceability systems. Choi and Siqin (2022) identify critical factors for successful blockchain adoption in production and logistics systems by developing an intra- and inter-organizational operational framework, highlighting the importance of both internal and inter-organizational considerations. Pandey et al. (2024) identify 21 blockchain technology-enabled CSFs for enhancing supply chain resilience and sustainability and use a Gray-DEMATEL approach to prioritize these factors and analyze the causal relationships among them.

While these studies provide organizations with a structured framework to identify and prioritize key areas essential for blockchain adoption, they tend to highlight pre-adoption considerations and static organizational attributes, potentially overlooking the challenges that arise during the adoption phase, such as scalability issues, integration with legacy systems, regulatory compliance, and evolving user requirements (Janssen et al. 2020; Wang et al. 2019). In particular, CSFs may not adequately capture the complex and dynamic nature of blockchain technology. For instance, while factors such as top management support and leadership are identified, they are typically presented in broad terms and lack detailed insights into how they contribute to blockchain's characteristics and the critical need for collaboration among multiple stakeholders (Lumineau

et al. 2021). As a result, focusing on drivers and CSFs may only provide an incomplete picture, failing to explain why many blockchain adoptions struggle or fail despite meeting these identified factors.

Furthermore, blockchain adoption differs from other emerging technologies due to its decentralized nature and reliance on inter-organizational collaboration, making it difficult to manage solely through internal IT implementation. Its disruptive potential forces startups to venture into previously uncharted territories concerning market readiness, regulatory compliance, and stakeholder coordination (Cole et al. 2019; Babich and Hilary 2020). However, existing literature offers limited guidance on how firms can effectively address these complexities. Meanwhile, blockchain fosters decentralization, shared control, and inter-organizational collaboration (Hastig and Sodhi 2020; Lumineau et al. 2021). Yet, firms often default to centralized governance structures, creating an inherent tension between blockchain's decentralized architecture and traditional centralized management models. These misalignments introduce unique adoption challenges that require further exploration of organizational processes and mechanisms to navigate uncertainties and shape blockchain adoption trajectories.

2.2 | Founders' Power and Startup Performance

Aligned with entrepreneurship literature, which emphasizes the importance of founders' experience and skills for the success of technology startups (Colombo and Grilli 2010; Tzabbar and Margolis 2017), studies in blockchain also affirm that the success or failure of blockchain adoptions is strongly influenced by the leadership and support of top managers (Hastig and Sodhi 2020; Liu et al. 2024). A review of the existing literature yielded further insights regarding the importance of management behaviors in the development of new technologies (Smith et al. 1994; Gagnon et al. 2000; Boone and Hendriks 2009; Loch 2017). However, it remains unclear how specific top management or executive behaviors can influence the success or failure of adopting new technologies like blockchain. Understanding these behaviors is critical as it helps illustrate how leaders interpret, communicate, and implement technological innovations, influencing organizational and technological outcomes.

Our study aims to fill the gap in understanding how specific management behaviors, rooted in founders' power, influence the success or failure of blockchain adoptions. In the context of top management, power refers to an actor's capacity to exert his or her will on organizational actions and decisions (Finkelstein 1992; Clegg et al. 2006; Souitaris et al. 2020). We argue that focusing on founders' power in blockchain adoption is important for two reasons. First, blockchain adoption is inherently complex and necessitates substantial organizational changes (Wang et al. 2019; Babich and Hilary 2020). These changes frequently disrupt established roles and routines, compelling organizational members to abandon their existing practices and develop new approaches. As a result, founders, through their exercise of power, play a pivotal role in guiding the organization through these disruptions. Second, founders' power is integral to blockchain adoption, significantly influencing all aspects of the process. Their influence critically affects decisions such as blockchain protocol selection, stakeholder engagement, system assimilation, and the integration of knowledge among participants (Lacity 2018; Ziolkowski et al. 2020; Hsieh et al. 2021). Since these factors are central to all phases of the blockchain adoption lifecycle and align with many prescriptions for successful adoption identified in the literature, the impact of founders' power on blockchain adoption is not only far-reaching but overarching in nature.

The relationship between founders' power and startup performance has been explored, mainly in traditional industries (Eisenhardt and Schoonhoven 1990; Wasserman 2003, 2017; Souitaris et al. 2020). For example, Eisenhardt and Schoonhoven (1990) examined the role of founding team composition and found that founders with greater power and network ties contribute to enhanced organizational growth. Wasserman (2017) explored the paradox of founder control, showing that while founders' power can drive early success, it may also impede long-term performance if not managed appropriately. Souitaris et al. (2020) suggested that founders' power significantly influences startup performance, as greater founder power can limit the likelihood of strategic exits, impacting the firm's adaptability and long-term growth potential. However, the unique characteristics of blockchain technology introduce new dynamics that are not fully addressed in the existing literature (Babich and Hilary 2020; Lumineau et al. 2021). Moreover, power has remained implicitly studied in literature, usually treated as one of many elements of the social context rather than as a central focus of analysis. While studies have identified and examined the impact of various power sources on firm performance (Finkelstein 1992; Daily and Johnson 1997), there is a lack of comprehensive frameworks that show how these power sources can effectively navigate the complexities of adopting blockchain technology, ultimately shaping organizational and technological outcomes.

3 | Research Method

To address the research question and bridge the knowledge gap, a multicase research design is applied in this study (Eisenhardt and Graebner 2007). This method enabled theory-building regarding founders' power in influencing the development pathways of blockchain startups, which have not been investigated in the literature. Compared to alternative methodologies like action research or design science, the multicase approach provides various depths (Coughlan and Coghlan 2002; Van Aken et al. 2016). This is particularly relevant in studying complex issues such as the high susceptibility of blockchain adoption to failure, where varied organizational structures and industry contexts play significant roles.

Since 2016, a pivotal year for blockchain technology, we have been closely monitoring the evolution of the blockchain industry. This study focuses on technology startups developing blockchain solutions for operations and supply chains from their inception to late 2021. During this period, enterprise blockchain was seen as a nascent market, characterized by startups venturing beyond cryptocurrency applications. This aligns with the definition of a nascent market (Navis

and Glynn 2010), as blockchain adoptions provide a novel economic exchange structure marked by complex interactions across organizational boundaries, lacking a clear business model, and facing uncertain customer bases. Following Eisenhardt's (1989) multiple case study approach, we used a 'racing' research design (see, e.g., Gehman et al. 2018; McDonald and Eisenhardt 2020) to track how effectively (or otherwise) five technology providers in the same nascent market adopt blockchain technology. This setting is ideal for our inductive research as it allows for the observation and understanding of phenomena without preconceived theories. Our coding process and the emergence of themes and concepts naturally arose from the data rather than being imposed externally. This embedded research design, with multiple degrees of analysis, enhanced the depth and comprehensiveness of theory development. Appendix A details the methodological approaches we employed to ensure the rigor of our research design, with further details provided as relevant in the subsequent parts of this section.

3.1 | Case Selection and Data Collection

Following Eisenhardt and Ott's (2017) recommendation, the study selected between 4 and 10 cases to develop theoretical categories of polar-type examples. Initially, the study considered 52 blockchain startups within a narrow geographical area in one European country to reduce the influence of environmental and geopolitical factors. These startups were identified through collaboration with a global innovation incubator, that is, a company that offers resources to startups in exchange for ownership (32 startups) and a local government-funded not-for-profit technology innovation and research center (20 startups). Data collection took place in 2017, with information gathered from business plans, investor and public agency filings, presentations, and official websites. Firms that were not acting as technology providers (e.g., focused on coin offerings instead of providing industrial blockchain solutions) were excluded (27 firms). The remaining firms were classified into nine business sectors (transportation, lodging, education, healthcare, financial services, mobile applications, supply chain logistics, retail, and social networks) and narrowed by retaining those relevant to the use of blockchain for operations and supply chains. Through this sampling process, nine cases were identified. The subsample was further reduced after the first round of interviews by excluding firms hesitant to offer the researchers further access to their business information, resulting in five cases remaining for the study.

Table 2 outlines the cases' main characteristics and data sources, and Greek alphabet pseudonyms are used to refer to the case companies throughout the study. The selected cases, founded between 2015 and 2016, were all in the process of exploring the potential business value of blockchain technology. This presents a unique opportunity to explore blockchain adoption from a power perspective to understand how founders can effectively navigate through the uncertainties introduced by blockchain and align organizational strategies toward new technological paradigms. This study relied on respondents who worked at various hierarchical levels (i.e., founders/CEOs, senior managers such as department heads/directors, and employees) and across functional areas. They were assured their anonymity would be preserved to encourage candid responses. Interviews ranged from 45 min to 2 h and were recorded and transcribed within a day. The interview guide is detailed in Appendix B. Coupled with real-time observation, this approach yielded rich narratives, reduced retrospective bias, and facilitated triangulation (Eisenhardt and Ott 2017). In total, 63 interviews were conducted in this study, 14 firm meetings were observed, and 844 pages of internal documents were analyzed. Although blockchain technology has continued to evolve, data collection ceased in late 2021 for two reasons: the analysis indicated that theoretical saturation had been reached, with codes sufficiently developed to explain the observed phenomena; and all firms had either attained a profitable situation or failed, offering a natural conclusion to the study.

3.2 | Data Analysis and Blockchain Adoption Measures

The data analysis involved an iterative process between the data, supplementary literature, and the emerging theoretical framework. The data analysis commenced by integrating archival data and interview information into a comprehensive background of the five cases (Eisenhardt and Graebner 2007). After our initial data collection provided an overview of the phenomenon, the analysis reveals that founders often initiate blockchain initiatives, and based on interviewees' confirmation, the founders in high-performing cases were crucial in driving blockchain adoptions. For example, we investigated reasons provided by interviewees (i.e., operations director, head of business development, and industry analyst) from Alpha for integrating blockchain into its platform. These stakeholders said that "[the founder] is the driving force behind our blockchain initiatives," "without [the founder], this project would not have succeeded," or "[the founder] held the vision and had the final say in decisions." This allowed us to determine the impact of founders' influence on blockchain adoption, encouraging us to further examine this influence by reviewing the literature on founder power.

Since all founders in our cases held chief executive positions, our conceptualization of founder power aligns with CEO power, referring specifically to the decision-making influence and authority a founder holds within an organization (Finkelstein 1992; Daily and Johnson 1997; Garg and Eisenhardt 2017). Following Finkelstein (1992), we identify three key sources of founder power: expertise, prestige, and ownership. Specifically, we considered founders' expert power as their professional experience and boundary-spanning role in bridging and developing internal and external contacts. Founders' ownership power was seen as their influence derived from owning stakes, representing both management and shareholders. It is distinguished from formal decision-making rights, which can be influenced by factors such as governance structures, external investors, and organizational culture. To evaluate founders' prestige power, we tracked the frequency and context of positive mentions about them online (as a proxy for reputation) and measured their number of LinkedIn connections (as a proxy for their professional network) (Arora and Nandkumar 2012), highlighting their influence derived from their recognized status or reputation in the industry. Table 3 summarizes the power characteristics of founders across

TABLE 2 | Case descriptions and data sources.

Case	Alpha	Beta	Gamma	Delta	Epsilon
Industry[a]	Supply chain logistics	Retail	Financial service	Supply chain logistics	Healthcare
Year of Blockchain adoption	2015	2015	2016	2016	2015
Type of blockchain[b]	Private	Private	Hybrid	Private	Hybrid
Blockchain-enabled services offered to clients (the business model)	Enhanced supply chain transparency, enabling customers to trace product origins and verify ethical sourcing.	Tracking and authenticating high-value items, such as fine wines, jewelry, and art.	Distributed ledger platform to facilitate secure and efficient automation of operations and transactions.	Monitoring the movement of goods from their origin to the point of consumption.	Secure storage and sharing of medical records among healthcare providers.
No. of interviews	14	13	12	11	13
Informants	CEO/founder, operations director, head of business development, employees, supply chain partners, angel investor, industry analyst	CEO/founder, chief information officer, chief economist, senior product managers, board members, company advisor, VC investor	CEO/founder, chief operations officer, web and app developers, lead blockchain engineer, product and innovation managers, technology consultant	CEO/founder, business development director, operations manager, blockchain engineers, supply chain partner, investor	CEO/founder, chief marketing officer, director of software development & blockchain, lead blockchain engineer, company advisor, VC investor
Data sources	Interviews, field observation, business strategy reports, internal and external documents, official websites, etc.	Interviews, internal documents, business plan reports, presentations to investors, official websites, etc.	Interviews, field observation, business strategy reports, internal and external documents, presentations, official websites, etc.	Interviews, field observation, internal and external documents, business reports and official websites, etc.	Interviews, field observation, internal and external documents, business plan reports, presentations, official websites, etc.

[a]Industries information was determined by evaluating primary data (from interviews) and secondary data sources.
[b]The hybrid model combines elements of both private and public blockchains, offering a balance of security, privacy, and broader network connectivity.

TABLE 3 | Founders' power characteristics.

Founder power	Alpha	Beta	Gamma	Delta	Epsilon
Expert power					
Previous startup experience?	Yes	Yes	Yes	No	No
Global experience?	Yes	Yes	Yes	Yes	Yes
Industry-specific experience?	Yes	No	Yes	No	No
Cross-industry experience?	Yes	Yes	Yes	Yes	No
Prestige power					
No. of times the founder is mentioned in the Google search results	52	48	61	15	9
No. of founder's LinkedIn connections	500+	500+	500+	461	157
Ownership power					
Founders' ownership stake	Majority shareholder (≥ 50%)	Majority shareholder (≥ 50%)	Moderate shareholder (between 20% and 50%)	Moderate shareholder (between 20% and 50%)	Low shareholder (< 20%)

each case. In brief, the founders of Alpha, Beta, and Gamma exhibit high expert, prestige, and ownership power, whereas the founders of Delta and Epsilon demonstrate moderate to low power across these dimensions.

A cross-case analysis was conducted to accumulate knowledge and compare cases for trends (Eisenhardt and Ott 2017). Preliminary constructs from individual cases (e.g., technological features, founders' power, and management behaviors) were developed and compared. By recursively iterating between the emergent model, existing theory, and data, our theory building was inductively derived and gradually shaped. As the theoretical insights solidified, they were compared to prior research for explanations (Maghazei et al. 2022). The data reduction involved cycling the coding scheme and quote interpretation among the authors until consensus was reached, narrowing down from descriptive subjects to conceptually distinct aspects. Only codes that could be triangulated with at least one other information source were retained to reduce retrospective bias.

Finally, the study assessed the effectiveness of blockchain adoption, indicating its success and failure outcomes through an analysis of various quantitative measures (i.e., customer registration, partnerships, web traffic), development time, financial resource use, and post-study performance (i.e., growth, survival, or failure) based on internal and third-party data. Appendix C details the measures used for blockchain adoption effectiveness, while Appendix D summarizes the results in a comparable table. In summary, Alpha, Beta, and Gamma were effective. Alpha's blockchain adoption was finalized in mid-2018; the company acquired more than $7.3 million through different funding rounds and was ranked among the top five market leaders by industry experts. Beta (whose blockchain adoption was finalized roughly 6 months before Alpha's) raised over $10.4 million in funding from diverse sources, and the company was ranked within the top 10 in the market. Gamma's blockchain adoption (developed in less than 3 years and offered in 2018) raised $22 million in funding. The company managed over 127,000 customer accounts and forged partnerships with over 200 organizations worldwide, including banks, exchanges, and regulators. Its website attracted more than 36,800 visitors per month, and the company was ranked among the top five market leaders. The media praised these three companies' services as "changing the landscape of supply chain management", "transforming supply chain services" by "revolutionizing" supply chain activities, and "a transformative force in the financial sector." All three companies continued to thrive in 2021, at the end of the study period, when they had expanded to provide new blockchain services.

In contrast, Delta's blockchain adoption was less effective. Although the company was profitable, its growth stagnated. The company executives put Delta into hibernation—allowing it to operate without supervision—and moved on in 2021. Besides, Epsilon's blockchain adoption was ineffective. The company spent over $8.1 million on funding (the third highest in this study) without establishing a functional system and eventually ran out of funds. The company collapsed in 2019, and a typical comment from a media report labeled it "a big failure."

4 | Findings

The findings reveal that while some technology providers successfully adopted blockchain and developed blockchain-enabled

services, others struggled to do so. The dominant characteristics of blockchain led us to identify two critical phases in the adoption process: (1) building perception about blockchain and (2) exposing the blockchain proposition. In the first phase, organizations strive to understand blockchain technology and assess its relevance and potential alternatives within their organizational contexts. In the second phase, organizations contextualize the use of blockchain technology, paving the way for external engagement facilitated through communication and action. Particularly, the investigation into blockchain adoption across the five cases reveals that the success of blockchain adoption heavily depends on the exercise of founders' power. This power shapes distinct management behaviors throughout the adoption process, influencing decisions between beyond-blockchain and within-blockchain exploration, as well as choices between centralized and decentralized decision-making. To showcase the findings, two of the cases—one that had adopted blockchain successfully (Alpha) and one that did not (Epsilon)—present the various components in our analysis. Appendix E summarizes the background information for each case, while Appendices F and G provide similar systematic evidence for Beta, Gamma, and Delta.

4.1 | Building Perception About Blockchain

The journey of blockchain adoption begins when organizational needs (e.g., to improve IT effectiveness) or external triggers (e.g., market demand) prompt managers to develop their understanding of blockchain technology. Upon encountering these triggers, founders expand their understanding of the market options available and explore how blockchain technology can be tailored to their organizational contexts. During this phase, expert power and prestige power influence firms' search behaviors, shaping their decisions to pursue either beyond-blockchain or within-blockchain exploration.

4.1.1 | Founders' Power and Beyond-Blockchain Exploration

Our findings indicate that the founders from high-performing cases were able to use their power sources (i.e., expert and prestige) to actively seek inspiration beyond the traditional confines of the blockchain industry for their service designs, a search behavior we refer to as beyond-blockchain exploration. They were conscious of companies in these adjacent markets offering products that could be replaced by blockchain adoptions. Viewing the established, non-blockchain firms as their competitors, the founders strategically borrowed some of their activities and terminology while also striving to differentiate themselves by capturing the unique features of blockchain technology. To assess founders' search in beyond-blockchain exploration, we supplemented interview quotes with the number of non-blockchain firms mentioned in interviews, business reports, and presentations.

In Alpha's case, the founder, drawing on extensive previous experience, effectively leveraged his expert power to conceptualize the company's blockchain infrastructure, aiming to enhance transparency within the consumer goods supply chain. The inspiration, however, did not come from a blockchain context: "...I thought about the SWIFT banking system, where shareholders and customers are financial institutions worldwide. The system allows for quick, secure, and accurate transmission and receipt of encrypted information. At that moment, I decided this company would be like SWIFT, demonstrating how blockchain can be used to engage supply chain participants." Since SWIFT is a non-blockchain company and Alpha does not compete with SWIFT, the inspiration from SWIFT was termed as beyond-blockchain exploration. Third parties (i.e., industry analysts and investors) corroborated the founder's boundary-spanning role in applying external insights, highlighting his outsider's perspective as crucial for Alpha's blockchain adoption. In total, the founder referenced 23 non-blockchain firms beyond the supply chain and logistics sector, describing how he had been inspired by the operation and structure of SWIFT, Apple, Tesla, Amazon, Facebook, and others to develop Alpha's blockchain infrastructure. Alpha's founder saw little reason to concern himself with other blockchain startups as competitors, as they are "just as small-scale and unimportant as we are." This strategic vision brought by the founder's experience and expertise not only directed the initial blockchain setup but also facilitated ongoing implementation, helping firm members understand and embrace blockchain technology within specific organizational contexts.

In addition to expert power, the strong prestige power of Alpha's founder was instrumental, as his recognized status and industry reputation reinforced his influence. Particularly, as an established innovator and thought leader, the founder's credibility and authority enabled him to navigate the complexities of blockchain adoption effectively. The founder's prominent roles, including the position as a senior member of a renowned supply chain association and the participation on advisory boards of other large organizations, enhanced his ability to manage inter-organizational dependencies and access critical information from different industrial perspectives. "Leveraging my positions in various affiliations has been key in clarifying our blockchain strategy and its significance within our operations... It has allowed us to address critical technical issues while ensuring alignment across stakeholders." the founder noted. This ability to shape perception and drive collective action indicates the significant impact of prestige power in fostering effective understanding of blockchain technology through searching beyond the blockchain ecosystem.

Conversely, in low-performing cases, founders lacking sufficient power—characterized by weaker expert power and limited prestige power—engaged in within-blockchain exploration, relying on IT departments and focusing mainly on existing blockchain infrastructure rather than leveraging their own influence in strategic adoption. This reliance causes IT departments to become the primary decision-makers, as they possess the technical expertise to understand and implement blockchain technology. Consequently, there is a focus on technical adoption without cross-departmental collaboration or innovative, market-oriented search approaches. Their primary objective was to ensure the technical success of the system implementation, aiming to minimize disruptions to existing processes as much as possible. In Epsilon's case, the company heavily relied on its IT department to understand

the technology. The founder described how the company's blockchain service was based on competitors' templates for blockchain adoption: "We integrated application services and process automation tools for hospitals and health providers. We did this on purpose. Since the firm's inception, existing blockchain adoptions from peers and competitors have served as a significant inspiration and model for organizing and structuring our blockchain activities." As highlighted in multiple interviews, the blockchain applications from peers and competitors served as significant industry reference points for Epsilon, supplying a steady stream of ideas for structuring the firm's own blockchain understanding and offerings. The company did not reference or consider any non-blockchain firms in its strategic discussions or decisions. During an interview, the founder consistently emphasized different components of blockchain technical architecture design from various existing blockchain applications. The IT department played an important role in deciphering and applying these components, focusing on technical aspects to ensure that the services provided enhanced security, privacy, and efficiency in healthcare operations.

Proposition 1a. *Stronger founders' power (expertise, prestige) is related to more beyond-blockchain exploration for blockchain technology providers.*

4.1.2 | Beyond-Blockchain Exploration and the Performance of Technology Providers

Our findings reveal that when founders' beyond-blockchain search behavior is embraced and supported by firm members, it shapes organizational practices and culture, contributing to the success of blockchain adoption. This occurs in two ways: through performance evaluations and interactions.

To facilitate exploration of the wider blockchain ecosystems, Alpha prioritizes creative problem-solving over specific industry experiences, focusing on long-term potential rather than past roles. The founder explained Alpha's employee evaluation criteria: "In a blockchain business, it's crucial to be innovative, and you need employees who can think creatively and come up with new solutions. To measure innovation, we look at things like the number of ideas generated, successful implementation, and feedback from colleagues and managers." An illustrative example is the selective appointment of the operations director, who possessed an engineering background instead of IT or supply chain and logistics expertise, yet displayed a strong commitment to the development of Alpha's blockchain infrastructure. Moreover, the founder's search behavior was internalized by employees through interactions, during which the founder imparted practices. Employees frequently highlighted these experiences during interviews, emphasizing the founder's expertise and critical role in exposing them to a variety of functional areas to come up with solutions. The head of business development recalled "During my first week in the company, I had a blast. [The founder] taught me a lot about different industries, and we even had a workshop on revamping supply chain logistics, which was super-impressive. The brainstorming techniques used were creative, and we came up with some amazing ideas that we ended up incorporating into our blockchain platform. Honestly, I never expected such a fun and innovative environment when I joined the company." Collectively, these practices cultivated a culture of exploration and creativity across the company, ensuring that employees feel both supported and inspired to pursue new ideas. Alpha's head of business development elaborated on how the founder's consistent interactions and feedback allowed the firm to achieve effectiveness through beyond-blockchain exploration: "Over time, we developed a culture where we regularly interact and provide feedback to one another. This helps us learn and come up with new ideas, even those outside of our industry. Our employees feel more confident in proposing new enhancements and working with blockchain technology. This has led to better performance and productivity."

In contrast, given the IT departments being the primary decision-makers, their search centered around within-blockchain exploration was communicated to and embraced by firm members. On the one hand, lacking the influence of founders' power, Epsilon's employee evaluations were more prescriptive, focusing on identifying specific skill sets—primarily dictated by the IT department—needed to address immediate and challenging tasks aligned with the firm's objectives. The founder provided an example: "We have expectations from each employee and evaluate their performance based on the best-fitting experience for their tasks. This way, we can make sure everyone is contributing to the success of the blockchain adoption." On the other hand, the search behavior at the firm, adopted by senior managers across various groups, has left an impact on the organizational practices and culture. Employees became highly concentrated on continuously benchmarking the blockchain applications offered by peers and competitors. These practices have been reinforced through daily interactions within the firm. For instance, a blockchain engineer responsible for architecture and design explained: "When adding new features, I simply consider other blockchain firms – would they implement this, or have similar features been proved effective? I learned this approach from my line manager when I joined the firm." This culture of imitation increased the complexity of integrating new blockchain features with existing systems, leading to technical inefficiencies. By relying solely on existing solutions within the blockchain industry, the company failed to address unique customer needs and adapt to emerging market trends.

Proposition 1b. *Beyond-blockchain exploration when embraced by firm members, is positively related to the success of blockchain technology providers.*

4.2 | Exposing the Blockchain Proposition

Once the organizations formulated a solid perception of blockchain and contextualized this perception to their organizational contexts and marketplace, they moved toward the phase of exposing the proposition to a wide array of stakeholders, including customers, partners, and industry groups. This involves broadening the scope of blockchain adoption to incorporate external inputs, ensuring that the blockchain solution is not only internally coherent but also externally viable and accepted. At this phase, ownership power becomes crucial, working alongside expert power and prestige power to influence the choice between centralized and decentralized decision-making.

4.2.1 | Founders' Power and Centralized Decision-Making

Aligned with the building perception about the blockchain phase, the findings show that founders possessing significant power (i.e., expert, prestige, and ownership) exhibited centralized decision-making behavior. This involved concentrating strategic authority in their hands, enabling swift and decisive actions. Their power allowed them to navigate diverse stakeholder inputs, make critical decisions, and provide clear strategic direction throughout the blockchain adoption process. While centralized decision-making ensures founders maintain control over blockchain application strategies, it does not necessarily limit the beyond-blockchain exploration. Instead, it can facilitate broader commercialization opportunities by enabling rapid decision-making and efficient resource allocation. To measure centralized decision-making, we supplemented interview quotes with two quantitative indicators: (1) founders' authority—calculated as the percentage of strategic meetings where the founder made the final decision; (2) decision-making speed—measured as the number of strategic decisions made per strategic meeting.

Alpha's head of business development illustrated how the founder's expert power, rooted in extensive industry experience and expertise, facilitated the integration of diverse perspectives from external stakeholders and achieved consensus on blockchain adoption: "A key advantage [the founder] has in this company is knowledge. He knows stuff, and he's always learning new things and bridging the gap between external insights and our strategic objectives. That's why we listen to him when he talks about Alpha's future – he's a total pro." The founder of Alpha also leveraged his strong prestige power, stemming from his recognized industry status and reputation, to make sense of the technology and convince stakeholders of the benefits. A supply chain partner discussed why he believed the founder could succeed with blockchain: "This guy is the middleman between business and supply chain logistics tech. He's a big name in the industry, with lots of successful projects under his belt. Not many people can bridge those two worlds like he can, you know? He gets their struggles and knows how to get them talking. I really like the blockchain thing he's working on - it's super-cool, and [the founder] can definitely take it places." In the case of Alpha, the founder serves as the principal shareholder (i.e., ownership stakes higher than 50%) of the company. This further strengthened his formal authority with firm members and external stakeholders and facilitated the rapid and unopposed adoption of blockchain features. For example, the company's operations director noted: "We changed things up around here, going from software to blockchain stuff. I try to help out the founder as much as I can, but it's his company, so he's the one in charge. He's the boss for a reason - to make the big decisions and bring about the changes he wants." Consistent with this quote, the observations indicate that decision-making was highly centralized in Alpha. While the founder engaged in discussions with the stakeholders, he maintained a clear strategic vision and made all final decisions. Across the 4 strategic meetings we attended, the founder made the final call in 100% of cases, with a decision-making speed of 1.5 decisions per meeting (6 key strategic decisions in total).

Conversely, in cases where founders lack sufficient power - characterized by limited expertise, prestige, and ownership - a decentralized decision-making approach is prevalent to handle diverse perceptions. This involves individuals within the firm jointly exercising control concerning important decisions in cross-functional teams. For instance, Epsilon favored consensus for critical decisions regarding blockchain adoption and gave every key member the right to a veto, as this approach minimized conflict and promoted buy-in. The founder said: "We don't prioritize fancy tech stuff around here. Blockchain is still a new and changing technology and agreeing on untested features is tough. We usually stick to what we know works because it's easier to understand and agree on." In turn, Epsilon's employees also began to prefer this decentralized approach within their teams. The director of software development & blockchain explained a typical meeting: "So, we had this meeting with the product and marketing managers, the brand director, and me. Everyone's got an equal say, and there are always new ideas flying around. We talked about building a digital wallet for our blockchain app to protect patient information and make payments easier. It was a totally different business model than what we're doing now, but after thinking it over, we decided not to go for it since the marketing manager didn't think it had much potential."

The authors witnessed numerous instances of decentralized decision-making during the on-site visits to Epsilon's premises and while attending operational and strategic meetings. The founder often lacked a clear strategic direction, frequently deferred decisions, and relied on extensive discussions with stakeholders. As a result, across the three meetings attended, no effective strategic decisions were made (0 decisions per meeting). Although this decentralized approach encouraged collaborative input from various stakeholders, it led to prolonged deliberations and hindered the adoption of innovative blockchain solutions.

Proposition 2a. *Stronger founders' power (ownership, prestige, expertise) is related to more centralized decision-making for blockchain technology providers.*

4.2.2 | Centralized Decision-Making and the Performance of Technology Providers

Our findings reveal that when founders' centralized decision-making behavior is actively embraced and internalized by firm members through interactions, it shapes organizational practices and culture, ultimately contributing to the success of blockchain technology providers.

At Alpha, new hires who successfully navigated the selection process were introduced to the centralization ethos during their routine meetings and training sessions as part of interactions with the founder. According to the head of business development, "During our initial sessions, the founder emphasized the importance of a centralized management approach. He shared the vision and the strategic reasons behind this..." Senior managers and employees generally engaged in centralized decision-making, as it was perceived to accelerate work processes by swiftly adopting to technological changes and making decisive actions without the delays of consensus-building. The options director stated: "The decision-making process is indeed highly centralized. Basically, [the founder]

calls the shots around here. It's probably because he knows exactly what he wants, and we just make it happen. Fortunately, he's always right, so we trust him to lead the way. He's kind of like the gatekeeper of the company in a lot of ways." Firm members beyond the founder also embraced centralized approach within their respective domains. It was highlighted by an employee, who noted the role of their line manager in promoting centralization: "...centralization allows us to act and implement the best ideas quickly. In my situation, it's my manager who decides when I propose a blockchain idea; he's responsible for determining which ideas we advance." As a result, the founder's centralized decision-making contributes to overall success by reducing internal conflicts, fostering a culture of trust and alignment, and streamlining the adoption process.

In contrast, in low-performing cases, decentralized decision-making was communicated and employed by firm members. The lead blockchain engineer of Epsilon described how he learned this approach through an impactful early experience: "When I started at Epsilon, I quickly figured out that we need to agree on things and that everyone's opinions count. This principle now guides my work." Another engineer echoed this: "Based on what I've learned here, we need to agree on things before we can move forward. I picked this up from the founder during our regular chats. If people aren't on board with something, I don't keep pushing it. I remember when one of my ideas got shot down, and it was tough, but I learned a lot from it." Observations indicate that Epsilon's decentralized approach resulted in diverse members and stakeholders actively voicing their opinions during meetings. This often complicated the decision-making process, leading to meetings that concluded with more questions than resolved issues. The interview findings, secondary data, and on-site observations indicate that when diverse members (including partners, investors, and advisors) actively engage in discussing and designing blockchain services, the effectiveness and novelty tend to decrease. These indicate that Epsilon's continued low performance was not necessarily due to a lack of creative ideas from individuals, but rather stemmed from a lack of consensus on the utility of blockchain features.

Proposition 2b. *Centralized decision-making when embraced by firm members, is positively related to the success of blockchain technology providers.*

5 | Discussion

Our study demonstrates the critical role of founders' power in influencing the blockchain success of technology providers. Echoing Finkelstein (1992) and Daily and Johnson (1997), our findings emphasize the importance of founders using their expert, prestige, and ownership power to build blockchain perceptions and influence stakeholders through different management behaviors. This aligns with and extends Bingham and Eisenhardt's (2011) study by illustrating how organizational learning through heuristics, driven by founders' power, specifically impacts the strategy adoption and effectiveness of emerging technologies in high-tech startups. Our findings suggest that while technical capabilities are crucial for startups in designing blockchain services, their success often relies on the founders' influence. Adequate involvement of founders with relevant power sources is critical for aligning technical infrastructure with organizational strategy, stakeholder expectations, and market needs, which are essential for successful blockchain adoption.

The findings add insights into two critical phases of blockchain adoption—building perception about blockchain and exposing the blockchain proposition. On the one hand, building perception about blockchain links founders' power to search behaviors (i.e., beyond-blockchain vs. within-blockchain exploration), focusing on the understanding and development of effective blockchain value propositions within organizational contexts. On the other hand, exposing the blockchain proposition ties the influence of founders' power to decision-making behaviors (i.e., centralized vs. decentralized decision-making), concentrating on harmonizing the stakeholders' understanding and actions toward the strategic adoption of blockchain technology. In high-performing cases like Alpha, Beta, and Gamma, founders strategically leveraged their power to enable successful blockchain adoption. By seeking inspiration beyond the blockchain ecosystem, these firms facilitated swift decision-making and innovative blockchain-enabled service design. Also, firm members in these firms embrace the founders' behaviors, shaping the organizational practices and culture through performance evaluations and interactions. In contrast, low-performing cases like Delta and Epsilon, hindered by insufficient founders' power, struggled with decentralized approaches and a heavy reliance on existing blockchain applications. This led to slower decision-making processes, difficulties in scaling, and challenges in maintaining operational efficiency. Figure 1 summarizes the key findings and demonstrates our emergent framework for blockchain adoption success.

5.1 | Theoretical Implications

While it is well established that founders' power can play a key role in influencing business performance and shaping strategic decisions within organizations (Daily and Johnson 1997; Clegg et al. 2006), existing literature does not adequately explain whether some success or failure cases of technology startups can be directly attributed to the power of their founders, nor does it address why some management behaviors (caused by different sources of power) are particularly detrimental in technology adoption. Our study enriches founders' power and blockchain literature by revealing that founders' power can significantly influence management behaviors during the two critical phases of blockchain adoption (Finkelstein 1992; Nakauchi and Wiersema 2015; Hastig and Sodhi 2020; Lumineau et al. 2021). While these two phases contribute to the development of blockchain services, effective execution relies on the founders' power. In other words, while the two phases are essential, these efforts may not be sufficient without the robust support of founders' power to implement effective solutions. For example, in the case of Delta, the founder's focus on designing less innovative blockchain services (stemming from investor pressure) highlighted a lack of power derived from prestige and expertise, which impeded

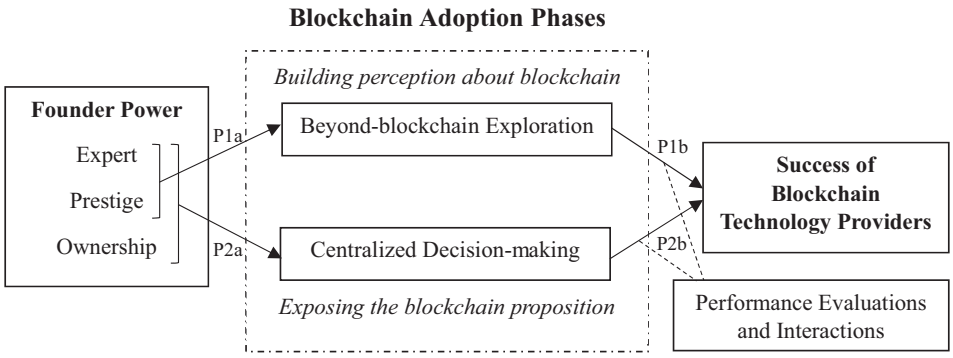

FIGURE 1 | Emergent framework for blockchain adoption success.

the adoption of more innovative service designs. Also, the founder of Epsilon was unable to leverage power sources and consequently depended heavily on the IT department to drive blockchain adoption.

The scarce empirical evidence on the successful adoption of emerging technologies often attributes success to founders' ability to envision and pursue unique technological innovations. For example, Maamoun (2021) illustrates how Tesla's success is largely due to Elon Musk's vision of combining electric vehicles, renewable energy, and advanced technology into a cohesive business model. Similarly, Davenport and Harris (2017) explain how Reed Hastings, the founder of Netflix, envisioned a business model based on digital platforms, moving away from physical rentals of DVDs and Blu-ray discs. In our cases, it is suggested that founders imagined several potential uses of blockchain in operations and supply chains, but how were these initial ideas successfully pursued and transformed into effective adoptions? While previous research assumes that visions in emerging technologies are constructed rather than discovered (Mesgari and Okoli 2019), our findings challenge this view. We demonstrate that firms, influenced by founders' power, engage in behaviors that uncover preexisting meanings in their environments during blockchain adoption.

Moreover, while existing blockchain literature focuses on identifying drivers and CSFs for successful adoption (Hastig and Sodhi 2020; Danese et al. 2021; Klöckner et al. 2023), it often overlooks the challenges that arise during the adoption phases and the internal dynamics that influence success. By integrating founders' power with blockchain adoption literature, we address this gap and demonstrate that founders' different power sources can shape management behaviors—such as beyond-blockchain exploration and centralized decision-making—that are essential for successful blockchain adoption across different phases. This highlights the crucial role of organizational and behavioral dynamics, particularly the influence of founders' power, in navigating the complexities of adopting disruptive technologies like blockchain.

Additionally, our research aligns with OM's focus on power dynamics and management behaviors, which are crucial in shaping business processes and outcomes (Lovell 1993; Bendoly et al. 2006; Crook and Combs 2007; Loch 2017; Bendoly and Oliva 2024). Particularly, OM literature has extensively explored how different sources of power can influence buyer–supplier relationships and impact inter-organizational performance (see e.g., Benton and Maloni 2005; Zhao et al. 2008; Handley and Benton Jr 2012; Skowronski et al. 2022). Other OM scholars also stress the importance of power in shaping operational outcomes. For example, Li et al. (2022) investigate how the power of chief risk officers (CROs) affects the effectiveness of CRO appointments, risk reduction, and operational efficiency. In addition, blockchain is essentially a modern operations and supply chain technology and its successful development as a business is a central concern of OM scholars (Babich and Hilary 2020; Pun et al. 2021; Wang and Xu 2023; Lumineau et al. 2023). Our study provides valuable perspectives on how founders' different sources of power and management behaviors drive the adoption and effectiveness of emerging supply chain technologies. This bridges theoretical contributions to practical applications within OM, highlighting the strategic importance of leadership roles in technological transitions.

5.2 | Practical Implications

Many startups dive into blockchain projects without fully understanding how the technology can benefit their operations or solve specific problems, leading to a high failure rate as misapplications of the technology occur when simpler solutions could be more effective (Omale 2019). For example, Sirin Labs, founded in 2014, launched the Finney blockchain smartphone in July 2018 after raising $255 million. The phone featured an embedded cold storage wallet and a decentralized application center, aiming to bridge the gap between blockchain users and the mass market. However, sales were significantly lower than expected, leading to workforce reductions and a strategic shift toward software development. As Blockchain Land (2019) commented, "There is no point in offering a product that might provide an attractive value proposition in a utopian decentralized world; because that's not the world we live in." Our findings suggest that Sirin Labs' failure can be attributed to its narrow focus on the technical aspects of its blockchain-enabled smartphone, exemplifying a within-blockchain exploration approach that struggled to scale and align with market needs. In contrast, beyond-blockchain exploration has proven effective. High-performing cases like Alpha, Beta and Gamma identified significant improvements over existing systems by promoting a comprehensive understanding across the business ecosystem. This approach prevents firms from adopting blockchain merely for innovation's sake—a common pitfall in the rapidly evolving landscape—and encourages a

holistic view that avoids unnecessary competition and resource misallocation. Moreover, beyond-blockchain exploration addresses key challenges such as interoperability and the need for legitimacy, which are crucial for gaining stakeholder trust and market acceptance (Hastig et al. 2020; Ziolkowski et al. 2020). By aligning blockchain initiatives with established industry practices, firms can not only enhance the comprehensibility and appeal of technology but also ensure their initiatives are adaptable to market demands and regulatory changes, thereby facilitating wider adoption and success.

The study also suggests the practical benefits of centralized decision-making in blockchain adoption, emphasizing its role in providing a clear, unified strategic direction crucial in the fast-evolving blockchain industry. Our findings show that the centralized approach not only expedited the adoption process but also ensured that blockchain solutions were effectively integrated into their business models, demonstrating a strong alignment with strategic business objectives and market demands. By centralizing decision-making, founders can effectively communicate the strategic importance of blockchain, align resources, and address stakeholder concerns, thereby facilitating a smoother transition from legacy systems and reducing resistance to new technologies. However, while decentralized decision-making promotes inclusivity and collaboration, it presents significant drawbacks that can impede blockchain adoption. For example, we found that the cases employing this approach face complications and slowdowns in decision-making. This decentralized approach leads to delays in adopting new technologies and scaling operations effectively. While beneficial for generating diverse ideas and input, decentralized decision-making may contribute to a higher blockchain failure rate by hindering quick adaptation to market changes and scaling blockchain solutions, highlighting the pitfalls of lacking a unified strategic direction.

For practitioners implementing or contemplating blockchain technology, our research suggests that founders should consolidate their authority, seek inspiration beyond the traditional blockchain ecosystem, and make decisive, centralized decisions while encouraging their teams to embrace innovation and adaptability. Also, it is imperative for them to be aware of the beliefs that become institutionalized within their organizations to ensure these beliefs support adaptive and innovative behaviors. While our findings highlight a consistent pattern (where founder power → {beyond-blockchain exploration, centralized decision-making} → performance) contributes to successful blockchain adoption, failure does not necessarily stem from the absence of these factors alone. Instead, external and internal challenges can hinder adoption even when founders possess power. For instance, external market dynamics, such as shifts in customer demand, competition from non-blockchain firms, and evolving regulations, can limit commercialization opportunities. Regulatory challenges, including legal uncertainties and compliance barriers, may further constrain scalability, particularly in industries requiring strict data security and governance. Additionally, execution misalignment, such as poor resource allocation, technological integration issues, or stakeholder resistance, can undermine the benefits of beyond-blockchain exploration and centralized decision-making. These suggest that while founder power and strategic behaviors are critical, blockchain adoption success depends on a broader set of organizational and environmental factors. It highlights the multifaceted nature of failure beyond leadership dynamics in blockchain adoption.

5.3 | Limitations and Suggestions for Future Research

Both the primary strength and weakness of this research lie in the selection of all sample firms, which are startups operating as blockchain technology providers within a limited number of industries in a single country, observed over approximately 5 years. While this facilitated the selection of cases to gain a comprehensive understanding of the successes and failures of technology providers in developing blockchain services for operations and supply chains, it also restricts the generalizability of the findings. This approach was pursued due to the lack of empirical evidence explaining the failures of blockchain startups in the existing literature, despite their significant implications for both practice and theory. Although concentrating on a single country could be considered a limitation, it also allows for a more detailed and profound comprehension of the elements of competitive heterogeneity while maintaining various contextual conditions relatively consistent, which would be difficult in a multi-country study.

Nonetheless, future studies should be conducted across diverse contexts to account for environmental differences in blockchain adoption. Also, future research can be conducted to empirically examine the interactions among the different power sources and their impact on blockchain startup performance, particularly how these impacts vary in different phases of the adoption process. Furthermore, there is an opportunity for researchers to investigate the connection between effective technology providers' blockchain development and their customers' willingness to adopt the technology for their operations and supply chain innovations. These directions represent a starting point for a broader exploration of blockchain technology's transformative effects, encouraging diverse theoretical perspectives and methodological approaches to capture the complexity of blockchain in operations and supply chain management. Drawing on the high failure rate of blockchain adoption and incorporating the perspective of founders' power, this study represents an initial step toward understanding how startups navigate these emerging domains either successfully or unsuccessfully. It is hoped that this study will offer a unique approach to consolidating the diverse research on blockchain adoption and inspire future efforts from others in this field.

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Conflicts of Interest

The authors declare no conflicts of interest.

References

Agi, M. A., and A. K. Jha. 2022. "Blockchain Technology in the Supply Chain: An Integrated Theoretical Perspective of Organizational Adoption." *International Journal of Production Economics* 247: 108458.

Ahmed, W. A., B. L. MacCarthy, and H. Treiblmaier. 2022. "Why, Where and How Are Organizations Using Blockchain in Their Supply Chains? Motivations, Application Areas and Contingency Factors." *International Journal of Operations & Production Management* 42, no. 12: 1995–2028.

Ariño, A., and P. S. Ring. 2010. "The Role of Fairness in Alliance Formation." *Strategic Management Journal* 31, no. 10: 1054–1087.

Arora, A., and A. Nandkumar. 2012. "Insecure Advantage? Markets for Technology and the Value of Resources for Entrepreneurial Ventures." *Strategic Management Journal* 33, no. 3: 231–251.

Babich, V., and G. Hilary. 2020. "OM Forum—Distributed Ledgers and Operations: What Operations Management Researchers Should Know About Blockchain Technology." *Manufacturing & Service Operations Management* 22, no. 2: 223–240.

Bendoly, E., K. Donohue, and K. L. Schultz. 2006. "Behavior in Operations Management: Assessing Recent Findings and Revisiting Old Assumptions." *Journal of Operations Management* 24, no. 6: 737–752.

Bendoly, E., and R. Oliva. 2024. "Holding North: Recognizing Identity and Advancing Contribution in Operations Management." *Journal of Operations Management* 70, no. 4: 518–522. https://doi.org/10.1002/joom.1306.

Benton, W. C., and M. Maloni. 2005. "The Influence of Power Driven Buyer/Seller Relationships on Supply Chain Satisfaction." *Journal of Operations Management* 23, no. 1: 1–22.

Bingham, C. B., and K. M. Eisenhardt. 2011. "Rational Heuristics: The 'Simple Rules' That Strategists Learn From Process Experience." *Strategic Management Journal* 32, no. 13: 1437–1464.

Blockchain Land. 2019. "What a Failed Blockchain Phone Says About the Industry." https://theblockchainland.com/2019/04/25/failed-sirin-labs-blockchain-phone/.

Boone, C., and W. Hendriks. 2009. "Top Management Team Diversity and Firm Performance: Moderators of Functional-Background and Locus-of-Control Diversity." *Management Science* 55, no. 2: 165–180.

Carson, B., G. Romanelli, P. Walsh, and A. Zhumaev. 2018. *Blockchain Beyond the Hype: What Is the Strategic Business Value?* McKinsey & Company. https://www.mckinsey.com/capabilities/mckinseydigital/our-insights/blockchain-beyond-the-hype-what-is-the-strategic-business-value#/.

Choi, T. M., S. Kumar, X. Yue, and H. L. Chan. 2022. "Disruptive Technologies and Operations Management in the Industry 4.0 Era and Beyond." *Production and Operations Management* 31, no. 1: 9–31.

Choi, T. M., and T. Siqin. 2022. "Blockchain in Logistics and Production From Blockchain 1.0 to Blockchain 5.0: An Intra-Inter-Organizational Framework." *Transportation Research Part E: Logistics and Transportation Review* 160: 102653.

Choi, T. M., X. Wen, X. Sun, and S. H. Chung. 2019. "The Mean-Variance Approach for Global Supply Chain Risk Analysis With Air Logistics in the Blockchain Technology Era." *Transportation Research Part E: Logistics and Transportation Review* 127: 178–191.

Clegg, S., D. Courpasson, and N. Phillips. 2006. *Power and Organizations*. SAGE Publications.

Cole, R., M. Stevenson, and J. Aitken. 2019. "Blockchain Technology: Implications for Operations and Supply Chain Management." *Supply Chain Management: An International Journal* 24, no. 4: 469–483.

Colombo, M. G., and L. Grilli. 2010. "On Growth Drivers of High-Tech Start-Ups: Exploring the Role of Founders' Human Capital and Venture Capital." *Journal of Business Venturing* 25, no. 6: 610–626.

Coughlan, P., and D. Coghlan. 2002. "Action Research for Operations Management." *International Journal of Operations & Production Management* 22, no. 2: 220–240.

Crook, T. R., and J. G. Combs. 2007. "Sources and Consequences of Bargaining Power in Supply Chains." *Journal of Operations Management* 25, no. 2: 546–555.

Culot, G., M. Podrecca, and G. Nassimbeni. 2024. "Blockchain Adoption and Operational Performance: A Secondary Data Analysis on Effects and Contingencies." *International Journal of Operations & Production Management* 44, no. 13: 69–99.

Daily, C. M., and J. L. Johnson. 1997. "Sources of CEO Power and Firm Financial Performance: A Longitudinal Assessment." *Journal of Management* 23, no. 2: 97–117.

Danese, P., R. Mocellin, and P. Romano. 2021. "Designing Blockchain Systems to Prevent Counterfeiting in Wine Supply Chains: A Multiple-Case Study." *International Journal of Operations & Production Management* 41, no. 13: 1–33.

Davenport, T., and J. Harris. 2017. *Competing on Analytics: Updated, With a New Introduction: The New Science of Winning*. Harvard Business Press.

Eisenhardt, K. M., and M. E. Graebner. 2007. "Theory Building From Cases: Opportunities and Challenges." *Academy of Management Journal* 50, no. 1: 25–32.

Eisenhardt, K. M., and T. E. Ott. 2017. "Rigor in Theory Building From Multiple Cases." In *The Routledge Companion to Qualitative Research in Organization Studies*, 79–91. Routledge.

Eisenhardt, K. M., and C. B. Schoonhoven. 1990. "Organizational Growth: Linking Founding Team, Strategy, Environment, and Growth Among U.S. Semiconductor Ventures, 1978–1988." *Administrative Science Quarterly* 35, no. 3: 504–529.

Finkelstein, S. 1992. "Power in Top Management Teams: Dimensions, Measurement, and Validation." *Academy of Management Journal* 35, no. 3: 505–538.

Gagnon, Y. C., H. Sicotte, and E. Posada. 2000. "Impact of SME Manager's Behavior on the Adoption of Technology." *Entrepreneurship Theory and Practice* 25, no. 2: 43–58.

Gan, J., G. Tsoukalas, and S. Netessine. 2021. "Initial Coin Offerings, Speculation, and Asset Tokenization." *Management Science* 67, no. 2: 914–931.

Garg, S., and K. M. Eisenhardt. 2017. "Unpacking the CEO–Board Relationship: How Strategy Making Happens in Entrepreneurial Firms." *Academy of Management Journal* 60, no. 5: 1828–1858.

Gehman, J., V. L. Glaser, K. M. Eisenhardt, D. Gioia, A. Langley, and K. G. Corley. 2018. "Finding Theory–Method Fit: A Comparison of Three Qualitative Approaches to Theory Building." *Journal of Management Inquiry* 27, no. 3: 284–300.

Ghadge, A., M. Bourlakis, S. Kamble, and S. Seuring. 2023. "Blockchain Implementation in Pharmaceutical Supply Chains: A Review and Conceptual Framework." *International Journal of Production Research* 61, no. 19: 6633–6651.

Handley, S. M., and W. C. Benton Jr. 2012. "Mediated Power and Outsourcing Relationships." *Journal of Operations Management* 30, no. 3: 253–267.

Hastig, G. M., and M. S. Sodhi. 2020. "Blockchain for Supply Chain Traceability: Business Requirements and Critical Success Factors." *Production and Operations Management* 29, no. 4: 935–954.

Hsieh, Y. Y., J. P. J. Vergne, and S. Wang. 2021. "The Internal and External Governance of Blockchain-Based Organizations." *Bitcoin and Beyond* 1: 48.

IBM. 2023. "IBM Blockchain Services and Consulting." https://www.ibm.com/blockchain/services.

Janssen, M., V. Weerakkody, E. Ismagilova, U. Sivarajah, and Z. Irani. 2020. "A Framework for Analyzing Blockchain Technology Adoption: Integrating Institutional, Market, and Technical Factors." *International Journal of Information Management* 50: 302–309.

Jung, H., B. Vissa, and M. Pich. 2017. "How Do Entrepreneurial Founding Teams Allocate Task Positions?" *Academy of Management Journal* 60, no. 1: 264–294.

Keller, A., F. Lumineau, T. Mellewigt, and A. M. Ariño. 2021. "Alliance Governance Mechanisms in the Face of Disruption." *Organization Science* 32, no. 6: 1542–1570.

Kim, H. M., H. Turesson, M. Laskowski, and A. F. Bahreini. 2020. "Permissionless and Permissioned, Technology-Focused and Business Needs-Driven: Understanding the Hybrid Opportunity in Blockchain Through a Case Study of Insolar." *IEEE Transactions on Engineering Management* 69, no. 3: 776–791.

Klöckner, M., C. G. Schmidt, A. Fink, L. Flückiger, and S. M. Wagner. 2023. "Exploring the Physical–Digital Interface in Blockchain Applications: Insights From the Luxury Watch Industry." *Transportation Research Part E: Logistics and Transportation Review* 179: 103300.

Klöckner, M., C. G. Schmidt, and S. M. Wagner. 2022. "When Blockchain Creates Shareholder Value: Empirical Evidence From International Firm Announcements." *Production and Operations Management* 31, no. 1: 46–64.

Lacity, M. C. 2018. "Addressing Key Challenges to Making Enterprise Blockchain Applications a Reality." *MIS Quarterly Executive* 17, no. 3: 201–222.

Lee, H., C. Tang, S. A. Yang, and Y. Zhang. 2023. "Dynamic Trade Finance in the Presence of Information Frictions and Fintech." *Manufacturing & Service Operations Management* 25, no. 6: 2038–2055.

Li, H., H. K. Lam, W. Ho, and A. C. Yeung. 2022. "The Impact of Chief Risk Officer Appointments on Firm Risk and Operational Efficiency." *Journal of Operations Management* 68, no. 3: 241–269.

Liu, Y., W. Fang, T. Feng, and M. Xi. 2024. "Blockchain Technology Adoption and Supply Chain Resilience: Exploring the Role of Transformational Supply Chain Leadership." *Supply Chain Management* 29, no. 2: 371–387.

Loch, C. H. 2017. "Creativity and Risk Taking Aren't Rational: Behavioral Operations in MOT." *Production and Operations Management* 26, no. 4: 591–604.

Lovell, R. J. 1993. "Power and the Project Manager." *International Journal of Project Management* 11, no. 2: 73–78.

Lumineau, F., G. Shang, J. M. Swaminathan, G. Tsoukalas, S. Wagner, and J. L. Zhao. 2023. "Call for Papers: Special Issue on Operational Perspectives on Blockchain Applications." *Journal of Operations Management*. https://onlinelibrary.wiley.com/pb-assets/assets/18731317/JOM+CFP+-+Operational+Perspectives+on+Blockchain+Applications-1696625530783.pdf.

Lumineau, F., W. Wang, and O. Schilke. 2021. "Blockchain Governance—A New Way of Organizing Collaborations?" *Organization Science* 32, no. 2: 500–521.

Maamoun, A. 2021. *SAGE Business Cases*. SAGE Publications.

Maghazei, O., M. A. Lewis, and T. H. Netland. 2022. "Emerging Technologies and the Use Case: A Multi-Year Study of Drone Adoption." *Journal of Operations Management* 68, no. 6–7: 560–591.

Martinez, V., M. Zhao, C. Blujdea, X. Han, A. Neely, and P. Albores. 2019. "Blockchain-Driven Customer Order Management." *International Journal of Operations & Production Management* 39, no. 6/7/8: 993–1022.

Massa, L., C. L. Tucci, and A. Afuah. 2017. "A Critical Assessment of Business Model Research." *Academy of Management Annals* 11, no. 1: 73–104.

McDonald, R. M., and K. M. Eisenhardt. 2020. "Parallel Play: Startups, Nascent Markets, and Effective Business-Model Design." *Administrative Science Quarterly* 65, no. 2: 483–523.

Mesgari, M., and C. Okoli. 2019. "Critical Review of Organisation-Technology Sensemaking: Towards Technology Materiality, Discovery, and Action." *European Journal of Information Systems* 28, no. 2: 205–232.

Murray, A., S. Kuban, M. Josefy, and J. Anderson. 2021. "Contracting in the Smart Era: The Implications of Blockchain and Decentralized Autonomous Organizations for Contracting and Corporate Governance." *Academy of Management Perspectives* 35, no. 4: 622–641.

Nakauchi, M., and M. F. Wiersema. 2015. "Executive Succession and Strategic Change in Japan." *Strategic Management Journal* 36, no. 2: 298–306.

Navis, C., and M. A. Glynn. 2010. "How New Market Categories Emerge: Temporal Dynamics of Legitimacy, Identity, and Entrepreneurship in Satellite Radio, 1990–2005." *Administrative Science Quarterly* 55, no. 3: 439–471.

Omale, G. 2019. "Gartner Predicts 90% of Blockchain-Based Supply Chain Initiatives Will Suffer 'Blockchain Fatigue' by 2023." https://www.gartner.com/en/newsroom/press-releases/2019-05-07-gartnerpredicts-90--of-blockchain-based-supply-chain.

Pandey, A. K., Y. Daultani, and S. Pratap. 2024. "Blockchain Technology Enabled Critical Success Factors for Supply Chain Resilience and Sustainability." *Business Strategy and the Environment* 33, no. 2: 1533–1554.

Pun, H., J. M. Swaminathan, and P. Hou. 2021. "Blockchain Adoption for Combating Deceptive Counterfeits." *Production and Operations Management* 30, no. 4: 864–882.

Rockart, J. F. 1979. "Chief Executives Define Their Own Data Needs." *Harvard Business Review* 57, no. 2: 81–93.

Schneider, S., M. Leyer, and M. Tate. 2020. "The Transformational Impact of Blockchain Technology on Business Models and Ecosystems: A Symbiosis of Human and Technology Agents." *IEEE Transactions on Engineering Management* 67, no. 4: 1184–1195.

Shahzad, K., Q. Zhang, M. Ashfaq, A. U. Zafar, and B. Ahmad. 2024. "Pre-to Post-Adoption of Blockchain Technology in Supply Chain Management: Influencing Factors and the Role of Firm Size." *Technological Forecasting and Social Change* 198: 122989.

Shane, S., and T. Stuart. 2002. "Organizational Endowments and the Performance of University Start-Ups." *Management Science* 48, no. 1: 154–170.

Skowronski, K., W. C. Benton Jr., and S. Handley. 2022. "The Moderating Influence of Supplier Culture on the Relationship Between Buyer Power and Supplier Shirking." *Journal of Operations Management* 68, no. 3: 270–301.

Smith, K. G., K. A. Smith, J. D. Olian, H. P. Sims Jr., D. P. O'Bannon, and J. A. Scully. 1994. "Top Management Team Demography and Process: The Role of Social Integration and Communication." *Administrative Science Quarterly* 39, no. 3: 412–438. https://doi.org/10.2307/2393297.

Sodhi, M. S., Z. Seyedghorban, H. Tahernejad, and D. Samson. 2022. "Why Emerging Supply Chain Technologies Initially Disappoint: Blockchain, IoT, and AI." *Production and Operations Management* 31, no. 6: 2517–2537.

Souitaris, V., S. Zerbinati, B. Peng, and D. Shepherd. 2020. "Should I Stay or Should I Go? Founder Power and Exit via Initial Public Offering." *Academy of Management Journal* 63, no. 1: 64–95.

Sternberg, H. S., E. Hofmann, and D. Roeck. 2021. "The Struggle Is Real: Insights From a Supply Chain Blockchain Case." *Journal of Business Logistics* 42, no. 1: 71–87.

Toufaily, E., T. Zalan, and S. B. Dhaou. 2021. "A Framework of Blockchain Technology Adoption: An Investigation of Challenges and Expected Value." *Information & Management* 58, no. 3: 103444.

Tzabbar, D., and J. Margolis. 2017. "Beyond the Startup Stage: The Founding Team's Human Capital, New venture's Stage of Life, Founder–CEO Duality, and Breakthrough Innovation." *Organization Science* 28, no. 5: 857–872.

Van Aken, J., A. Chandrasekaran, and J. Halman. 2016. "Conducting and Publishing Design Science Research: Inaugural Essay of the Design Science Department of the Journal of Operations Management." *Journal of Operations Management* 47: 1–8.

Van Hoek, R. 2019. "Exploring Blockchain Implementation in the Supply Chain: Learning From Pioneers and RFID Research." *International Journal of Operations & Production Management* 39, no. 6/7/8: 829–859.

Vazquez Melendez, E. I., P. Bergey, and B. Smith. 2024. "Blockchain Technology for Supply Chain Provenance: Increasing Supply Chain Efficiency and Consumer Trust." *Supply Chain Management* 29, no. 4: 706–730.

Vu, N., A. Ghadge, and M. Bourlakis. 2023. "Evidence-Driven Model for Implementing Blockchain in Food Supply Chains." *International Journal of Logistics Research and Applications* 26, no. 5: 568–588.

Wang, X., and F. Xu. 2023. "The Value of Smart Contract in Trade Finance." *Manufacturing & Service Operations Management* 25, no. 6: 2056–2073.

Wang, Y., M. Singgih, J. Wang, and M. Rit. 2019. "Making Sense of Blockchain Technology: How Will It Transform Supply Chains?" *International Journal of Production Economics* 211: 221–236.

Wasserman, N. 2003. "Founder-CEO Succession and the Paradox of Entrepreneurial Success." *Organization Science* 14, no. 2: 149–172.

Wasserman, N. 2017. "The Throne vs. the Kingdom: Founder Control and Value Creation in Startups." *Strategic Management Journal* 38, no. 2: 255–277.

Wolf, D. E., L. Louw, and D. Palm. 2024. "An Analysis of Blockchain Versus Relational Databases for Digitalising Information Flows in Global Supply Chains Using the Analytic Network Process." *International Journal of Production Research* 62, no. 14: 5016–5035.

Zhao, X., P. Ai, F. Lai, X. Luo, and J. Benitez. 2022. "Task Management in Decentralized Autonomous Organization." *Journal of Operations Management* 68, no. 6–7: 649–674.

Zhao, X., B. Huo, B. B. Flynn, and J. H. Y. Yeung. 2008. "The Impact of Power and Relationship Commitment on the Integration Between Manufacturers and Customers in a Supply Chain." *Journal of Operations Management* 26, no. 3: 368–388.

Ziolkowski, R., G. Miscione, and G. Schwabe. 2020. "Decision Problems in Blockchain Governance: Old Wine in New Bottles or Walking in Someone Else's Shoes?" *Journal of Management Information Systems* 37, no. 2: 316–348.

Appendix A

Methodological Approaches Used for Ensuring the Scientific Rigor of Research Design

Validity tests	Suggested strategies and rationale	Implementation of case study strategies
Construct validity: establishing accurate operational definitions for the researched concepts.	*Employ various evidence sources* to enable triangulation and foster converging lines of inquiry.	We used multiple sources of evidence, including: (1) Semi-structured interviews with key representatives involved in the adoption of blockchain technology; (2) Direct observations of internal meetings and interactions between firm executives and their teams; (3) Analysis of publicly available documents, such as press releases, white papers, and industry reports, alongside private documents including business strategy reports, progress reviews, and minutes of meetings.
	Develop a clear evidence trail, enabling observers to trace the progression of evidence from the research questions to the conclusions of the study.	The case description is enriched with raw data extracted from the case database, including interview quotes and excerpts from archival documents. It also provides context by detailing the specific circumstances under which the information was captured.
	Invite informants to review the case study report, ensuring the accuracy of key facts and evidence, and minimizing the risk of inaccuracies in the reporting.	Six informants involved in our study reviewed the case report. They provided clarifications on specific aspects and offered additional insights regarding the circumstances detailed in the report.
Internal validity: confirming causality, demonstrating that certain conditions directly cause other conditions, distinct from coincidental associations.	*Utilize a theoretical foundation* to assist researchers in strategizing their analysis and selecting from various analytical methods.	Our case analysis utilized a power lens to comprehensively explore how founders influenced the success or failure of blockchain adoptions. We investigated the relationship between their use of power sources and their ability to effectively engage in organizational processes. This theoretical perspective informed both the presentation and the analysis of our case evidence.
	Adopt a primary analytical method to facilitate the systematic organization of data and guarantee the accuracy of conclusions derived from case evidence, thereby excluding alternative interpretations.	First, we constructed a detailed narrative that was chronologically structured, providing a historical perspective of each case. Second, we utilized temporal bracketing to segment the data into distinct phases, enabling a focused examination of changes and patterns. Third, we assessed the influence of founder power and management behavior on blockchain adoption within each phase and connected these impacts to the developmental trajectory of blockchain startups.
External validity: defining the domain for generalizing a study's findings, with the objective of extending results to theoretical frameworks rather than broader populations.	*Employ replication logic across multiple case studies* to enable researchers to identify the circumstances in which a phenomenon is expected to occur and those in which it is not.	We selected cases of technology providers that are expected to show similar results. We paid particular attention to consistent patterns across different cases, such as similar power sources or comparable management behaviors in overcoming technical and social challenges. We compared the findings to prior research for explanations.
Reliability: illustrating that a study's methodological procedures can be consistently replicated to yield the same outcomes.	*Create a case study database* to facilitate direct evidence retrieval by other researchers.	Our case database comprises a comprehensive collection of materials: case study notes, which consist of electronic files with transcripts from observed meetings and interviews, and case documents, encompassing a complete set of letters and other communications, organized in chronological order.
	Intercoder reliability consistency was evaluated to ensure consistency.	Two postgraduate researchers were trained to code blockchain adoption dynamics, with intercoder reliability assessed through agreement ratios.

Note: The format of the table is inspired by Ariño and Ring (2010) and Keller et al. (2021).

Appendix B

Interview Guide for the Case Study

The interviews were divided into three parts. The first part asked about the respondents' backgrounds, the firms' strategic goals, market information, and performance. In the second part, respondents were asked to provide a narrative of the firm's timeline, from the adoption of blockchain technology until the interview. In the third part, additional details about some activities previously mentioned in the interviews and the interviewees' perspectives were discussed.

Informant Background and Company Information

Can you please briefly introduce yourself (e.g., position, experience, and responsibilities) and your company (e.g., target market information, products, vision, and objectives)?

- Please briefly describe the business model of your company. For example, how does your blockchain-enabled business model generate revenue as well as create value for your customers?
- Can you describe the blockchain-enabled activities that your firm or partners undertake?
- Any specific examples or practices of blockchain-enabled business model design within your firm?
- Can you describe any challenges or obstacles you faced when designing your blockchain-enabled business model?
- How does your blockchain-enabled business model differentiate itself from competitors in the industry? Please describe any unique or innovative features of your blockchain-enabled business model.

Activities and Rationale Behind Blockchain Adoption Decisions

- How did you go about designing your blockchain-enabled business model in the first place?
- Please briefly describe the journey of your firm from its inception until the development of the business model. For instance, can you describe any specific actions or decisions your firm took during the design of your blockchain-enabled business model?
- What motivated the connections between these activities?
- How did the inspiration for different blockchain features come about, and how have they evolved over time?
- What were some of the key considerations when designing your blockchain-enabled business model?
- How have you iterated and improved your blockchain-enabled business model over time, and what was the rationale behind these actions or decisions?

Additional Information Regarding Performance, Operations Processes, Technological Factors, and Industry Prospects

- How does your firm measure the success of blockchain adoption?
- Can you describe any key performance indicators (KPIs) or metrics your firm uses to evaluate the effectiveness of your blockchain-enabled business model?
- How has the design of a blockchain-enabled business model impacted your firm's operations and processes?
- How does your firm ensure that your blockchain-enabled business model remains relevant and competitive in a rapidly changing business environment?
- At the end of the interview, ideas generated from existing literature and findings from previous interviews are shared and discussed.

Appendix C

Blockchain Adoption Measures

The effectiveness of blockchain adoption was evaluated differently after the study concluded in 2021. Firstly, it was determined whether the company had gained customer traction (i.e., it had a convincing value proposition) and the service offered was functioning (i.e., the blockchain platform was active) (Massa et al. 2017). Quantitative measures that firm executives and analysts considered most pertinent to the business performance were employed: (a) the number of registered customers the technology provider had, (b) the number of partnerships it had with other organizations, and (c) web traffic, as indicated by the number of visitors to the firm's webpage. These measures were sourced from internal documents and third-party reports.

Secondly, the effectiveness of blockchain adoption was assessed by examining the duration of the process and the financial resources utilized. Development time was determined as the period from the commencement of a blockchain project until the establishment of a functional system (if achieved at all). The respondents also corroborated the significance of development duration. Financial resources were roughly calculated by the total funds raised and whether the company exhausted those funds. In this study, one case company depleted its resources before realizing a profitable and functional business model.

Thirdly, the effectiveness of blockchain adoption was evaluated by whether it resulted in robust overall post-study performance on the part of the case study firms. Several objective measures of survival and growth were employed: three case companies were still operational and experienced growth after 2021, one failed, and one had entered a state of hibernation (a going concern that was neither actively managed nor expanding).

Appendix D

Measures of Blockchain Adoption Success and Failure Across Cases

Case	Alpha	Beta	Gamma	Delta	Epsilon
Revenue generation	Offers a blockchain-as-a-service platform for consumer-oriented companies, levying fees for its supply chain tracking services while also generating revenue from consulting and data analysis.	Provides a blockchain platform tailored to luxury goods companies and organizations, enabling them to utilize its traceability and authentication services.	Delivers a blockchain-based platform for financial solutions, charging fees for businesses to access and use the platform, as well as offering professional services like consulting, training, and technical support.	Supplies a blockchain-based platform, with fees for the associated provision of traceability and fraud detection services among supply chain participants.	Presents a blockchain platform designed for secure storage and sharing of medical data, charging fees for businesses and healthcare providers to access and utilize its platform.
2021 indicators (visitors = average monthly no. of unique visitors to company website)	45K accounts; 100+ partnerships; 13,500 visitors	36K accounts; 60+ partnerships; 11,300 visitors	127K accounts; 200+ partnerships; 36,800 visitors	8K accounts; 30+ partnerships; 6000 visitors	0
Development time/funds acquired	3.5 years/Approx. $7.3 million	3 years/Approx. $10.4 million	2.8 years/Approx. $22 million	3.3 years/Approx. $2.9 million	N/A/Approx. $8.1 million
Post-study performance	Profitable and among top five market leaders	Profitable and among top ten market leaders	Profitable and among top five market leaders	Small margin of profit	Failed (in 2019)
Exemplary quotes	*Alpha is one of those blockchain providers the supply chain industry needs.*	*Beta has the potential to set the benchmark for blockchain applications in supply chain management.*	*Gamma represents a transformative force in the financial sector, leveraging blockchain technology.*	*Though we achieved profitability, our only option was to put the company into a state of hibernation.*	*It resulted in an asset sale, with no profits made by anyone involved.*

[a] Ranking in the sector is evaluated by industry analysts regarding the case companies' market standings and the efficacy of their business models.

Appendix E

Case Summary

Established in 2013, *Alpha* integrated blockchain into its platform in 2015 to address critical supply chain issues identified by its founder, a former software developer for a large buying company. Alpha's solution was a blockchain-enabled network to share information focused on customer-centric supply chains. It took Alpha 3.5 years to transition to this new business model. The model revolves around a private, permissioned blockchain allowing only authorized participants access. Features include secure product identification, real-time tracking, and digital authentication, targeting fraud reduction, sustainability, and enhanced consumer trust. Alpha's emphasis on transparency and traceability in supply chains has led to successful collaborations using blockchain to foster sustainability and ethical business practices.

Beta, established in 2015, developed a blockchain platform that allows users to securely track the lifecycle of individual assets from origin to current ownership. The company's innovative approach involved creating a private blockchain system for controlled access and management of sensitive data, which is crucial in industries that deal with valuable and often confidential asset information. Despite facing challenges in market acceptance and the complex integration with existing systems in the luxury goods sector, Beta established partnerships with various stakeholders across the supply chain. The company's ability to navigate these challenges and leverage blockchain technology for asset verification and certification has positioned it as a leader in its field, illustrating the potential of blockchain in enhancing the integrity of high-value supply chains.

Gamma began its blockchain implementation in 2016, adopting a hybrid blockchain approach to cater to the evolving needs of the financial services sector. This hybrid model combines elements of both private and public blockchains, offering a balance of security, privacy, and broader network connectivity. Gamma's pioneering platform was developed to enhance the transparency, efficiency, and security of financial transactions while simultaneously adhering to the stringent regulatory standards of the industry. Despite initial challenges related to integrating with established banking systems and navigating a complex regulatory environment, Gamma's hybrid blockchain approach proved effective. Gamma has established itself as a key player in the blockchain space, demonstrating the transformative potential of blockchain in the realm of supply chain finance.

Delta, established in 2016, initiated the integration of blockchain technology to transform asset management and smart contracts, focusing on the wine industry. The company developed a solution to enhance transparency and efficiency in managing the lifecycle of fine wines. Delta opted for a private blockchain model, prioritizing the security and controlled access necessary for tracking wine products securely from the vineyard to the consumer. However, it encountered significant challenges in market penetration and aligning its technology with the established practices of the industry. These challenges, coupled with only achieving a small margin of profit, led the company's management to decide to put Delta into a state of hibernation. While Delta's application of blockchain in the wine industry sets it apart as a pioneer, it also underscores the complexities and market realities faced by blockchain ventures in specialized sectors.

Epsilon, established in 2016, immediately began incorporating blockchain into its platform to enhance health information management. The founder collaborated with a hospital to create a secure, transparent blockchain platform for storing and sharing health data to improve patient care and offer patients a private way to manage their health information. However, developing a platform to integrate with existing healthcare systems proved difficult due to the heavily regulated healthcare sector and the complex technical and regulatory requirements. Additionally, the company struggled to identify viable use cases and monetize its platform. These challenges led to Epsilon's inability to establish a functional business model, resulting in its closure in 2019.

Appendix F

Founders' Power for Blockchain Perception Building (Representative Data for Cases Beta, Gamma, and Delta)

Building perception about blockchain - organizations strive to understand blockchain technology and assess its relevance and potential alternatives within their organizational contexts.		
Founders' power and search behaviors (beyond-blockchain vs. within-blockchain exploration)	Beta	Expert: "When I was thinking about our platform, I got inspired by Uber's on-demand and real-time tracking services... Real-time tracking allows customers to track the progress of their shipments in real-time, which provides greater visibility and transparency in the supply chain. On-demand service, on the other hand, allows supply chain companies to be more responsive and flexible in meeting customer needs. By offering on-demand services like transportation or warehousing, companies can quickly respond to sudden or unexpected demand, which can help improve customer satisfaction and loyalty. Our platform is focused on creating secure digital records for high-value assets, which helps to promote trust, transparency, and sustainability throughout the supply chain." (Founder) Beta does not compete with Uber but uses blockchain technology to track and authenticate luxury goods such as diamonds, art, and fine wines. The founder's industry experience and expertise significantly influenced the design of Beta's blockchain services. For example, 13 samples of non-blockchain exploration were mentioned in interviews, business reports, and presentations. Prestige: "(My) industry connections provide a platform to show the distinctive of blockchain technology and its integration into traditional industries. This insight helps to tailor our blockchain solutions to meet the unique challenges faced by our clients... It's all about demonstrating real applications and convincing key players of our technology's impact." (Founder) At Beta, the founder's prestigious standing derived from recognized industry status plays a key role, guiding the organization to understand and implement blockchain solutions tailored to enhance transparency and efficiency in supply chains.
	Gamma	Expert: "I used to work in the telecommunications industry and learned a great deal from it. This became important for Gamma's blockchain-enabled business model design. We started with a blockchain-based platform that aims to build on a unique architecture that allows businesses to create secure and private networks that are specifically designed to meet their needs. Just like telecommunications companies, we invested heavily in building robust, secure, and scalable infrastructure to support our blockchain solutions. Also, we prioritized security and implemented strong security protocols to protect it." (Founder) The founder's previous experience in the telecommunication industry greatly shaped the design of Gamma's blockchain platform. For example, 11 samples of non-blockchain exploration were introduced in interviews, business reports, and presentations. Prestige: "Being a member of [a highly renowned business association] is incredibly valuable. With a career dedicated to transforming financial systems, my position enables me to effectively evaluate the business value of blockchain technology, ensuring that our company continues to develop cutting-edge solutions that are precisely aligned with the needs of our partners and clients." (Founder) With the position and reputation in the financial industry, Gamma's founder is important in leading the organization to comprehend and strategically deploy blockchain technology to meet the needs of diverse partners and clients.
	Delta	"[a few blockchain-enabled firm names] have been a major source of inspiration for us, as their infrastructures and customers share many similarities with ours. We are particularly impressed by [a blockchain firm name] to develop decentralized ecosystems that enable multiple participants to directly interact with one another, without the involvement of intermediaries. Also, we have implemented data security measures using blockchain technology. We have closely examined their operations and have chosen to participate in activities that align best with our own goals." (Founder) Delta's blockchain adoption is akin to other blockchain-enabled supply chain firms. Due to the founder's weaker expert and prestige power, the adoption process prioritized technical aspects and drew inspiration primarily from a few competitors located in proximity, rather than leveraging the founder's unique expertise and prestige. For example, only 1 sample of non-blockchain exploration was mentioned in interviews, business reports, and presentations.

Building perception about blockchain - organizations strive to understand blockchain technology and assess its relevance and potential alternatives within their organizational contexts.		
Search behaviors and technology provider performance (through evaluations and interactions)	Beta	Performance evaluation: "I understand what qualities we need in our team... Our staff evaluation is flexible and focused on long-term potential. We determine good employees based on their openness to new ideas and their eagerness to leverage technology more than the previous generation for value creation." (Founder) Beta's recruitment and employee performance metrics emphasize less rigid background requirements and more on the perceived long-term potential of individuals. This indirectly supports the founder's vision for beyond-blockchain exploration. Interactions: "[The founder] discussed Amazon's delivery drone system Prime Air, Alphabet's self-driving car subsidiary Waymo. [The founder] encouraged us to think about how our blockchain-enabled platform could function like other successful firms and how their digital strategies could be applied to our own platform. Exploring these ideas is enjoyable, but we also learned to develop our own ideas independently." (Chief economist). "When I first joined the company, I didn't have much experience in retail. But now, I'm always thinking about how the retail industry might change in the future and how it relates to other industries. [The founder] does this a lot too, and it's really interesting to think about what the future might look like by combining different industries. It's something that I enjoy doing on my own now." (Senior product manager) The founder's behavior has been internalized by employees through performance evaluations and interactions, fostering innovation and adaptability, and enabling successful blockchain adoption.
	Gamma	Performance evaluation: "Our evaluation criteria are not based on rigid metrics but are shaped by my experience in the rapidly evolving blockchain sector. I continuously monitor market trends, which can shift dramatically and quickly, to ensure our strategies remain relevant and effective." (Founder) Gamma's approach to employee evaluation was less metric driven, favoring employees who were open to new ideas and adaptable to the company's needs. Interactions: "[The founder] has had a great impact on our learning style. His approach involves seeking inspiration from different industries, such as the telecommunications industry or software companies. As an example, we have adopted his approach of considering what we can learn from Netflix's premium membership features and Dropbox's freemium model to improve our offerings to customers." (Chief operations officer) "We frequently identify new developments from various places and other industries that we can potentially transfer to our own platform. These observations are discussed during routine meetings. Sometimes, we generate the ideas independently, without direct prompting from the founder." (Product and innovation manager) The founder fosters a culture of innovation through evaluations and interactions, encouraging firm members to draw inspiration from diverse industries and generate novel ideas, driving successful blockchain adoption.
	Delta	Performance evaluation: "The performance evaluation is very specific such as quality of code regarding Python or C++ programming, as well as successful deployment of blockchain solutions. We create a detailed 'to-do list' and evaluate employees based on their performance." (Operations manager) During a meeting with the founder, we observed the implementation of quantitative incentives to adopt the blockchain platform efficiently. We noted that two competitors were mentioned over 10 times within a 30-min meeting. The incentives were also discussed by another manager during a meeting with engineers, focusing on specific tasks. (Observation) Delta's employee evaluations were more prescriptive, focusing on operational readiness for immediate challenging tasks and frequently drawing from successful existing blockchain adoptions. Interactions: "As request by them (IT technicians), we always keep ourselves updated with the latest blockchain technological advancements by monitoring new features and ideas from our peers. While this may not make us the most innovative company, we use our peers' new blockchain features as potential use cases and brainstorm ways to improve them further. This is how we often proceed." (Business development director) Firm members concentrated on benchmarking blockchain applications from peers and competitors, implementing the most sensible options as new developments emerged in the industry. However, this prescriptive, task-focused approach, which emphasized immediate operational readiness and drew heavily from existing solutions, stifled creativity and innovation. By relying on competitors' proven methods rather than fostering original ideas or long-term strategies, the firm failed to adapt to the rapidly evolving blockchain landscape, ultimately resulting in the failure of blockchain adoption.

Appendix G

Founders' Power for Exposing the Blockchain Proposition (Representative Data for Cases Beta, Gamma, and Delta)

Exposing the blockchain proposition—organizations contextualize the use of blockchain technology, paving the way for external engagement facilitated through communication and action.		
Founders' power and decision-making behaviors (centralized vs. decentralized decision-making)	Beta	Founder's previous experience contributed to effective blockchain adoption: "[The founder] has extensive experience in developing technology-driven businesses as well as relevant managerial experience in West Europe. He is always the primary force driving this project. His decision to concentrate on developing blockchain-enabled supply chain technology sounds like a great idea to me." (VC investor) Founder's strong prestige power allowed him to drive the adoption of blockchain technology: "The founder reports to a global incubator center and a government innovation center. He keeps connections with these organizations and other relevant institutes. This boosted his reputation as people value his opinion on blockchain solutions and are keen to learn how it could maximize the values to the company." (Company advisor) Founder's majority ownership contributed to the design of blockchain services: "The founder owns the majority of shares and ultimately makes the decisions as it is part of his company and vision. Taking a new approach to blockchain technology involves risks, but the potential returns will benefit the founder and the entire team." (Board member) Beta's founder maintained direct control over key strategic choices. Across 3 meetings, the founder made 4 strategic decisions, averaging 1.3 decisions per meeting. Discussions were held with stakeholders, but the founder retained ultimate authority, ensuring decisions were made efficiently and aligned with the company's vision.
	Gamma	Founder's extensive industry experience offered knowledge to implement the ideas for blockchain adoption: "With years of experience in the communications industry, the founder possesses valuable knowledge and skills in building and operating complex systems, navigating regulatory environments, managing large-scale projects, and data management and security. Also, the founder brings diverse perspectives and ideas from other industries that can be applied to developing innovative blockchain solutions for the financial services industry. In general, the founder's ideas have a significant influence and help drive the success of the company." (Lead blockchain engineer) Founder's strong prestige derived from his recognized status and reputation in the industry enabled him to raise more funds for blockchain adoption: "I have been aware of the founder for quite some time, and he has gained an impressive reputation, starting in the telecommunications industry and now expanding into blockchain-enabled Fintech. He is widely recognized and admired, and when he expresses interest in pursuing something new, I trust that it is a worthwhile endeavor. I may even be willing to invest in his ideas." (Technology consultant) Founder's substantial ownership contributed to the design of blockchain services: "As a key shareholder, the founder consistently strives to take the business to the next level by implementing new initiatives and driving progress forward." (Product and innovation manager) Across 2 meetings, the founder of Gamma made 2 strategic decisions, averaging 1 decision per meeting. While engaging key stakeholders in discussions, the founder ultimately dictated the preferred strategy, ensuring swift and decisive actions without prolonged deliberation.
	Delta	The founder explained that a decentralized decision-making approach emerged within the team, driven by a lack of sufficient power. This preference for unanimity resulted in compromises being made rather than fully implementing the novel blockchain features in service design: "Since the beginning, our team has taken on diverse roles, including IT developer, marketing, operations, and supply chain managers. A majority of our staff members are young, and I encourage everyone to participate in discussions and decision-making processes. While this approach promotes inclusivity and participation, it may also be considered a weakness for our company, as we have limited experience in this emerging field. I came across the idea of blockchain while serving as the Special Adviser of [a government-funded project] for green economy initiatives. Then, we started developing a blockchain-based solution to create immutable records of transactions and events in supply chains, which could increase efficiency and reduce fraud. It was important for everyone to come to an agreement, and I did not force any decisions onto the team." (Founder) Although the founder of Delta was a key shareholder, pressure from investors and the board led the company to shift its focus toward enhancing internal efficiency and developing less innovative blockchain services. During the 2 strategic meetings observed, the founder did not assert a dominant role, opting instead for extensive discussions. As a result, only 1 decision was made collaboratively and concluded by a director, averaging 0.5 decisions per meeting, highlighting the slow and consensus-driven nature of the process.

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Decision-making behaviors and technology provider performance (through interactions)	Beta	"The founder discusses the past successes and the network that has been built over the years... This really shows why he is in a unique position to guide our projects, and it's clear his reputation is not just for show but deeply ingrained in how the company operates." (Board member) "In our company, I am in charge of managing the implementation of new blockchain technology, but when it comes to making decisions about the overall business direction, that falls under the founder's responsibility. This is how it has been set up since the beginning." (Chief information officer) "The founder keeps a close relationship with us, sometimes just like a friend. I aspire to follow their leadership style." (Senior product manager) Beta's founder held decisive authority in determining the business direction, a structure established at the company's inception. Through interactions, the founder implemented and consistently maintained a centralized decision-making approach, fostering trust and alignment within the organization. This centralized management approach has been critical in the successful adoption of blockchain technology.
	Gamma	"... the founder took me under his wing and served as a mentor, inspiring me with his bravery in launching a company at such a young age and his unwavering determination to drive the company forward." (Lead blockchain engineer) "Since my time with the company, the founder has always maintained a highly centralized decision-making approach. Despite the company being smaller at that time, this structure remained in place." (Chief operations officer) "The key founder has been the driving force behind the company for many years, consistently working to develop and advance his idea. This approach has remained relatively unchanged over the past few years." (Product and innovation manager) Gamma's management structure was characterized by centralization, with the founder maintaining power in decision-making through regular interactions with stakeholders. This approach, rooted in mentorship and a clear vision for the company's growth, inspired employees and provided consistent direction, leading to the successful adoption of blockchain technology.
	Delta	"In one of my initial meetings, [the founder] clearly outlined our decision-making framework. He emphasized that everyone's opinions are vital in defining the company's direction, ensuring that we all feel included in the journey." (Blockchain engineer) "[The founder] is very compassionate and makes a concerted effort to understand everyone's needs. I can still recall some of our conversations clearly, and one of the key takeaways for me was the importance of being able to understand the diverse needs of different parties." (Blockchain engineer) "The founder encourages everyone to get involved in decision-making, but we all have to come to an agreement. As a result, I tend to prepare for meetings by identifying common ground that my colleagues are likely to agree with. While this may result in less innovative results, it helps meetings proceed more efficiently." (Operations manager) "It's part of our organizational culture as we have placed a lot of trust in each other. When it comes to important decisions, we make sure to come to an agreement in order to maintain a culture of respect and transparency. This is how we operate within our company." (Business development director) Delta's emphasis on decentralized management, characterized by shared decision-making and consensus-building, shaped its approach to blockchain adoption. While this approach fostered cross-functional collaboration and a culture of respect and transparency, it also prioritized agreement over novel innovation. As a result, the implementation of more advanced blockchain features was limited, ultimately leading to the failure of blockchain adoption.