MASTER THESIS IN BUSINESS ADMINISTRATION

EXPLORING THE POTENTIAL OF BLOCKCHAIN TECHNOLOGY IN THE ENTREPRENEURIAL ECOSYSTEM

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Contents

Abstract

Aim of the study

This Master's thesis explores the critical factors influencing the adoption and integration of blockchain technology within entrepreneurial ecosystems. It focuses on identifying the barriers and challenges organizations face in adopting blockchain and how they can overcome these obstacles to drive innovation and competitiveness.

Methodology

The study employs a qualitative research approach, conducting 9 semi-structured interviews with blockchain experts, consultants and professionals in IT and strategy consulting firms. These individuals have significant experience with blockchain technology and its applications in various industries.

Results

The research reveals that blockchain adoption is influenced by factors such as perceived usefulness, ease of use, technical complexity, organizational resistance, and regulatory challenges. Blockchain's potential to automate processes, enhance security, and reduce costs is widely recognized. However, adoption is hindered by system integration difficulties and unclear regulations. The study shows that blockchain adoption is more successful when organizations align the technology with their strategic goals and demonstrate flexibility in adapting to new systems.

Implications

This study contributes to the literature on blockchain adoption by offering a framework for understanding the factors influencing its integration. It provides practical insights for organizations looking to integrate blockchain into their strategic and operational processes, emphasizing the need to address technical, organizational, and regulatory barriers to fully leverage blockchain's potential.

Limitations and future research

The study's limitations include a small sample size and a focus on the Netherlands, limiting generalizability. Future research should include a larger, more diverse sample, as well as long-term studies to better understand blockchain adoption dynamics. Additionally, further research could explore the relationship between blockchain and complementary technologies for a more integrated view of digital transformation.

1. Introduction

Blockchain is essentially a data structure that is immutable, transparent and decentralized. It ensures that once information is added to the blockchain, it cannot be altered, and creates thereby a tamper-proof record of activities (Bauer et al., 2020). The technology has gained significant attention due to its unique features such as decentralization, transparency and immutability (Kuo et al., 2017). These features have led to increasing relevance and adoption of blockchain across various industries such as banking, education, healthcare, and financial markets. Recent applications, such as in accounting education and financial transactions, highlight blockchain's practical value (Novak et al., 2022). The technology has evolved beyond its initial introduction with Bitcoin in 2008, to features such as smart contracts, decentralized finance, and Web3 (Buldas et al., 2022).

A key economic development driven by blockchain is the rise of decentralized financial systems and tokenization. These advancements allow businesses to create new economic models, particularly through asset tokenization and decentralized finance, which open opportunities for companies to access capital and reduce dependency on traditional financial institutions. The evolution of blockchain technology is essential for transforming business processes and unlocking new economic opportunities (Pineda et al., 2024). Also, research trends show a growing interest in blockchain technology, with attention from both business and academic circles (Buldas et al., 2022). The technology is being recognized for providing a foundation for decentralized and transparent transaction mechanisms (Alahmadi & Lin, 2019) . These days, blockchain is also seen as a technology that directly impacts social organization, with its consensus mechanism, such as Proof of Work and Proof of Stake, forming the core of its functionality (Jun, 2018). The use of blockchain has also shown promise in enhancing security in the Internet of Things (Balaji et al., 2020)

Given its significance, blockchain technology has emerged as a transformative force with the potential to revolutionize diverse fields. However, despite promising features, the full-scale adoption of blockchain faces significant challenges. Blockchain is currently already integrating into exisiting systems, however, at a slow pace. One major reason for this slow adoption is that many business managers and entrepreneurs lack awareness of how blockchain can be strategically applied within their industries. The uncertainty about its practical benefits and implementation often prevents them from taking action (Queiroz et al., 2020). Next to business managers and entrepreneurs, blockchain research often emphasizes technological advancements over real-world applications. It lacks practical frameworks that businesses can apply. As a result, organizations struggle to translate academic insights into actionable strategies (Hughes et al., 2019).

Other barriers that hinder the effective implementation of blockchain technology range from technical complexities to regulatory constraints (Mathivathanan et al., 2021). While various strategies have been proposed to facilitate blockchain adoption, many remain fragmented, addressing isolated issues rather

than offering an integrated approach that aligns with organizational and strategic needs. The research by Mohanty et al. illustrates this issue, highlighting that a significant challenge in blockchain adoption is the absence of comprehensive strategies that span technical, organizational, and operational aspects (Mohanty et al., 2022). This underscores the need to move beyond a purely technological focus and incorporate entrepreneurial and strategic perspectives.

Integration of blockchain into existing systems is happening, but at a gradual pace, hindered by scalability issues, interoperability concerns, and data privacy risks (Wang et al., 2019) . So even though blockchain holds loads of promises, its implementation in real-world scenarios is often hindered by practical challenges such as system complexity and the need for specialized expertise (Saberi et al.). The potential impact of blockchain on traditional systems also raises questions about how organisations can effectively integrate this technology into their strategic plans while managing the transition from conventional systems (Saberi et al.).

There are a lot of potential applications of blockchain technology, for example identity management, contract management and supply chain management (Agbo et al., 2019). These applications are mainly covering business management, but blockchain technology is not limited to business management applications. In fact, the technology is expected to disrupt multiple aspects of our lives, ranging from finance to more general societal applications. Singh et al. (2019) emphasize the potential societal implications of blockchain for corporate governance particularly in providing transparency and combating corruption within regulatory bodies and listed companies (Singh et al., 2019). In finance, examples of blockchain applications are cryptocurrencies and financial services. Since blockchain enables the finalization of payments without the need for banks or intermediaries, it can be used in diverse financial services like digital assets and online payments (Tijan et al., 2019). In complete different sectors than business, for instance the biomedical and healthcare domains, blockchain technologies have also shown to offer significant benefits. Benefits include decentralized management, data provenance, security and privacy (Kuo et al., 2017).

Among these applications, the entrepreneurial ecosystem stands out as a domain where blockchain can address ongoing inefficiencies. The entrepreneurial ecosystem is often inefficient, with high transaction costs and financial access disparities, particularly in regions lacking strong investor networks. Blockchain's distributed and cost-efficient characteristics can reduce inefficiencies in the entrepreneurial ecosystem by lowering transaction costs, reducing search costs, and eliminating third-party intermediaries. This enables a system where trust and security are high, while the probability of opportunism and uncertainty remains low, fostering a more inclusive and efficient entrepreneurial environment (Ahluwalia et al., 2020). However, they also face unique challenges, such as limited technical expertise, difficulties in scaling blockchain solutions, and handling changes in regulations (Kumar Bhardwaj et al., 2021). So entrepreneurs who successfully integrate blockchain can gain an

advantage by optimizing processes, reducing costs, and accessing decentralized funding mechanisms such as tokenization and decentralized finance. This ability to leverage blockchain not only enhances operational efficiency but also creates new business opportunities, allowing innovative entrepreneurs to outperform traditional competitors in emerging digital markets (Hughes et al., 2019).

Integration of blockchain technology presents challenges that hinder adoption and utilization, particularly in addressing issues related to growth and scalability. While blockchain technology offers various advantages such as decentralization and enhanced security, organisations often face hurdles due to limited resources and the need for financing (Paternoster et al., 2014). Organisations may also face challenges in integrating blockchain technology due to the complexity of developing new systems and the requirement for specialized expertise (Giardino et al., 2014).

While blockchain technology holds the potential to transform multiple domains, its practical implementation is often hindered by technical, regulatory, and organizational barriers (Gupta et al., 2020). Addressing these challenges such as resource limitations, system development complexities, and financial constraints, is crucial for organizations seeking to leverage blockchain effectively. Understanding these barriers and developing strategic frameworks to facilitate blockchain adoption are key steps in unlocking its full potential (Mathivathanan et al., 2021). This research, therefore, aims to explore these challenges and opportunities, offering insights into how organizations can navigate blockchain integration to foster innovation, efficiency, and competitiveness. Accordingly, the following research questions will be addressed:

RQ1: *What are the critical factors influencing the adoption of blockchain technology for organisations within the entrepreneurial ecosystem?*

RQ2: *How can entrepreneurs effectively integrate blockchain into their future strategic plans while managing the potential impact on the traditionally based systems?*

By exploring blockchain adoption trends, organizational readiness, and the practical challenges of implementation, this study aims to provide actionable insights for businesses navigating blockchain integration. Beyond its practical implications, this study also contributes to the theoretical understanding of blockchain adoption by extending the Technology Acceptance Model (TAM) framework. While prior research has primarily focused on technological barriers, this study integrates an entrepreneurial and strategic perspective, addressing gaps in the literature regarding the role of organizational readiness and strategic alignment in blockchain adoption.

2. Literature background

From a technical perspective, blockchain consists of distributed data storage, peer-to-peer transmission, a consensus mechanism, encryption algorithms and smart contracts (Wu & Tran, 2018). These elements contribute to the secure and transparent nature of blockchain technology, allowing for the decentralized and verifiable recording of transactions. Furthermore, this section provides a comprehensive literature background on the development of blockchain technology, its technical compenontens, the critical success factors of blockchain adoption and the implementation process of blockchain technology.

2.1 Development of Blockchain technology

Introduced in the context of digital currency with the creation of Bitcoin in 2008 by Nakamoto, blockchain technology was primarily associated with cryptocurrencies (Zhida, 2021). However, as the technology progressed, it expanded beyond its initial application and diversified into various sectors due to its fundamental characteristics of decentralization, transparency, immutability and smart contract capabilities (Zhida, 2021).

As blockchain technology advanced, it underwent a series of transformations and innovations. Various consensus algorithms, such as Proof of Work (PoW), Proof of Stake (PoS), Delegated Proof of Stake (DPoS), and others, were introduced to enhance computational efficiency and sustainability (Yang et al., 2019). These algorithms significantly contributed to shaping the operational efficiency and security of blockchain networks. The application of blockchain technology has further extended into diverse sectors such as supply chain finance, smart cities, healthcare, and education, utilizing its features of security, traceability, transparency, and decentralization (Sebastião et al., 2021).This continuous evolution of blockchain technology has also led to the development of smart contracts and the emergence of Blockchain 2.0 and 3.0, which indicates a shift towards more advanced and adaptable applications (Pereira et al., 2019).

These advancements positioned blockchain technology as a crucial tool for digital innovation, a provider of solutions and opens up new possibilities in the digital world. Blockchain not only enhanced the efficiency of database systems but also posed challenges to traditional financial intermediaries. This way, the integration of blockchain technology in financial institutions brought substantial changes in business models and financial services, which potentially reshapes the landscape of financial transactions and consumer behavior (Ji & Tia, 2022).

To fully understand how blockchain enables these changes, it is essential to examine the underlying technical components that make its decentralized, transparent and secure nature possible. These components are the foundation upon which blockchain applications are built, enabling a wide range of innovations. The key technical elements include distributed data storage, peer-to-peer transmission,

consensus mechanisms, smart contracts and encryption algorithms. A summary of these components is presented in Table 1 below.

TABLE 1

Technical Components

Component	Description
Decentralized Storage	Blockchain enables data storage across a decentralized network, allowing entities that do not trust each other to securely store and process information without relying on a central authority (Deirmentzoglou et al., 2019).
Peer-to-Peer Transactions	In blockchain, transactions occur directly between participants without intermediaries. By combining peer-to-peer networks with cryptography, blockchain ensures secure, immutable, and time-stamped record-keeping (Davidson et al., 2018).
Consensus Mechanisms	An algorithm that enables blockchain participants to collectively determine the validity of a transaction. Consensus nodes verify and confirm data, and once enough nodes agree, the data is permanently recorded on the blockchain. The most common mechanisms include Proof of Work, Proof of Stake, and Delegated Proof of Stake (Yang et al., 2019).
Proof of Work (PoW)	A consensus mechanism where participants compete to solve complex cryptographic puzzles to validate transactions and add new blocks. It ensures security but requires high computational power (Yang et al., 2019).
Proof of Stake (PoS)	An energy-efficient alternative to PoW, where block generation depends on the amount of cryptocurrency a participant holds. The more stakes a user owns, the higher their chance of validating transactions (Yang et al., 2019).
Delegated Proof of Stake (DPoS)	A faster and more scalable version of PoS, where network participants vote for a small group of core nodes, responsible for validating transactions and generating blocks. These nodes, elected through resource voting by all participants, enhance scalability and reduce energy consumption but increase centralization risks (Yang et al., 2019).

Smart Contracts	Self-executing agreements stored on the blockchain that automatically enforce contract terms. They process transactions without intermediaries, ensuring transparency and security. Smart contracts can handle payments, store data, and execute predefined actions, but they must be predictable and may require external data sources to function properly (Yaga et al., 2019).
Cryptographic Security	Blockchain uses cryptography to securely link data blocks, each containing a unique identifier and a timestamp. This ensures data integrity, prevents tampering, and maintains a secure chain from the first block to the latest (Su & Wang, 2022).

These technological advancements are important to consider, however successful blockchain adoption depends on more than just technical capabilities. Organizations must overcome multiple challenges, from scalability issues to regulatory constraints, to fully integrate blockchain into their business models. The next subsection explores the critical success factors that influence blockchain adoption and the barriers that organizations must overcome.

2.2 Critical Success Factors of Blockchain Adoption

Grida et al. (2022) conducted a comprehensive evaluation of critical success factors for blockchain adoption and implementation and categorized them into technological, organizational and environmental dimensions (Grida et al., 2022). This classification provides a structured framework for understanding the key factors that drive successful blockchain adoption within organisations, which is displayed in Table 2.

TABLE 2

Critical Success Factors

Categories	Critical Factors
Technology	Scalability
	Infrastructural facility
	Complexity
	Compatibility
	Immaturity of technology
	Distributed design
Organization	Experience
	Knowledge
	Training facilities
	Top management support
	Organization culture
	Financial Constraints
	Adequate resource
Environment	Laws and Policy
	Competitive pressure

Batubara et al. (2018) further identified the role of legal and regulatory support as a crucial environmental factor influencing the adoption of blockchain technology (Batubara et al., 2018). This study highlights the importance of a supportive legal framework for successful implementation. It underscores the need for regulatory alignment to facilitate blockchain adoption in various domains.

Moreover, Norbu (2024) conducted a systematic review on factors affecting trust and acceptance for blockchain adoption in digital payment systems (Norbu et al., 2024). The study highlighted the importance of trust-building mechanisms, user acceptance and regulatory frameworks in supporting blockchain adoption in digital payment systems. The findings underscore the significance of user trust and regulatory support in driving successful blockchain adoption in the digital payment domain.

Understanding these success factors provides a foundation for blockchain adoption, but translating these insights into real-world implementation presents its own set of challenges. They highlight that successful adoption depends not only on technological readiness but also on organizational and environmental factors. By recognizing these dynamics, we gain insight into the complexities organizations face when adopting blockchain and the strategies needed to overcome them. Exploring these challenges in greater depth allows us to uncover not only the barriers but also the key drivers that influence blockchain adoption. To build on this understanding, this study takes a structured approach

to examining how blockchain adoption unfolds in entrepreneurial ecosystems, focusing on both the factors that enable adoption and those that hinder it. This requires a research approach that captures these complexities in practice, ensuring a comprehensive understanding of the factors shaping blockchain adoption.

2.3 The Implementation Process of Blockchain Technology

The implementation process of blockchain technology is multifaceted and requires a strategic approach to address various critical aspects. Effective blockchain adoption not only hinges on the technology itself but also involves organizational readiness, stakeholder engagement, and regulatory compliance.

One of the concerns in the implementation of blockchain technology, is the security of smart contracts. Liu and Liu (2019) conducted a comprehensive survey on the security verification of blockchain smart contracts, which emphasizes the importance of strict methods in ensuring the credibility and accuracy of smart contracts (Liu & Liu, 2019). Smart contracts must be thoroughly tested to prevent vulnerabilities that could be exploited by hostile actors. The authors highlight various verification techniques, including formal verification and testing frameworks, which are essential for maintaining the integrity of smart contract operations. This focus on security is crucial, as any flaws in smart contracts can lead to significant financial losses and undermine trust in blockchain applications.

Pillai et al. (2022) explored the integration framework and security assumptions of cross-blockchain technology, which provides insights into the essential components and modes of integration for seamless connection and function (Pillai et al., 2022). Understanding the integration characteristics and security considerations is crucial for successful implementation and utilization of blockchain technology across different blockchain networks. In addition to security verification and integration frameworks, the implementation process of blockchain technology in accounting and auditing practices plays a vital role in enhancing transparency and accountability. Pimentel & Boulianne (2020) discussed the current trends and future opportunities of blockchain in accounting research and practice, which highlights its impact on financial reporting, auditing considerations and governance aspects (Pimentel & Boulianne, 2020). This underscores the transformative potential of blockchain technology in revolutionizing traditional accounting practices.

While security and integration challenges are crucial technical aspects of blockchain implementation, successful adoption is ultimately dependent on user acceptance. The Technology Acceptance Model (TAM) provides a structured framework to understand how organizations and individuals perceive blockchain technology, highlighting the key psychological and behavioral factors influencing adoption (Venkatesh & Davis, 2000). However, while TAM identifies general adoption factors, they do not fully capture the unique challenges of blockchain adoption. Unlike traditional technologies, blockchain operates in decentralized environments, requires regulatory clarity, and often lacks a clear

business case for organizations. Therefore, further research is needed to explore how these distinct factors influence blockchain adoption and to refine existing models for this specific technological context.

2.4 Technology Acceptance Model

The Technology Acceptance Model (TAM) is a widely recognized framework that explains how users come to accept and use new technologies. Originally proposed by Davis in 1989, the model posits that two primary factors, namely perceived usefulness (PU) and perceived ease of use (PEOU), significantly influence the intention of users to adopt technology. The original TAM has been validated through numerous empirical studies, which demonstrates its reliability in predicting technology usage intentions (Venkatesh & Davis, 2000). The model has undergone several extensions, including TAM2 and TAM3, which incorporate additional constructs such as social influence and cognitive instrumental processes to provide a more comprehensive understanding of technology acceptance (Çelik & Uslu, 2023).

The model has been extensively applied across several industries to assess user acceptance of technologies. For instance, Wang et al. (2022) have utilized TAM to explore the acceptance of wearable technology in sports (Wang et al., 2022). Another example is the study by Gangwar et al. (2015), who explored the adoption of cloud computing solutions in businesses (Gangwar et al., 2015). Despite its widespread application, there is a notable gap in the literature regarding the use of TAM in the context of blockchain technology. While blockchain has been recognized for its potential to revolutionize various sectors, the factors influencing its acceptance remain underexplored.

In this context, the relevance of TAM to blockchain technology lies in its ability to explain the factors of user acceptance in a domain characterized by complexity and novelty. Given the decentralized nature of blockchain and its reliance on user trust and perceived benefits, integrating TAM into blockchain research could provide valuable insights into how organizations and individuals perceive and adopt this technology. For instance, understanding how perceived usefulness and ease of use influence the acceptance of blockchain-based solutions in several industries, could help address the barriers to adoption. Given the evolving nature of blockchain adoption and the need for an in-depth exploration of organizational perspectives, a qualitative research approach was chosen over a quantitative hypothesis-testing design. While hypothesis-driven studies can validate adoption factors, this study aims to capture the nuanced experiences, perceptions, and emerging trends that structured testing may overlook. This approach allows for a broader understanding of how blockchain adoption unfolds in entrepreneurial ecosystems.

2.5 Literature Matrix

To provide a comprehensive overview of the current state of research on blockchain technology, this study presents a structured literature matrix. This matrix categorizes studies based on their focus, methodology, main findings, and limitations, highlighting the extent of research conducted in the field and identifying gaps that require further exploration.

TABLE 3

Literature Matrix

Article	Focus	Methodology	Main Findings	Limitations
"A comprehensive survey on blockchain-based healthcare industry: applications and challenges" (Bennacer et al., 2023)	Healthcare applications of blockchain	Systematic Literature Review	Identifies various applications and challenges of blockchain in healthcare, emphasizing the need for regulatory frameworks.	Limited to healthcare, so it may not generalize to other sectors.
"Blockchain technology challenge in the future" (Iskamto & Juariyah, 2023)	Challenges in blockchain technology	Systematic Literature Review	Discusses future challenges and potential solutions for blockchain adoption across various sectors.	General challenges without specific case studies.
"Where is current research on blockchain technology? — a systematic review" (Yli-Huumo et al., 2016)	Overview of blockchain research	Systematic Literature Review	Provides insights into current research topics, challenges, and future directions in blockchain technology.	Focuses on research gaps without empirical data.
"Toward an ontology-driven blockchain design for supply-chain provenance"	Ontology-driven blockchain traceability	Conceptual analysis	Proposes an ontology-driven approach to enhance traceability in supply chains using blockchain.	Theoretical framework, so it lacks empirical validation.

(Kim & Laskowski, 2018)				
"Blockchain adoption in academia: Promises and challenges" (Kosmarski, 2020)	Blockchain adoption in academia	Qualitative research	Explores the experiences of blockchain adoption in academic settings, highlighting both promises and challenges.	Limited to specific academic contexts, which may not apply to other sectors.
"Security and privacy on blockchain" (Zhang et al., 2019)	Security and privacy issues	Literature review	Reviews various security and privacy techniques in blockchain systems, providing a comprehensive overview of existing challenges.	Focuses on technical aspects and not user acceptance for instance.
"Challenges and solutions in the development of blockchain applications: Extraction from SLR and empirical study" (Nabi et al., 2024)	Challenges in blockchain application development	Systematic literature review	Identifies key challenges in blockchain application development, including the inadequacy of traditional modeling tools and the need for better debugging practices.	The findings may not be universally applicable across all blockchain applications, as they are based on specific case studies.
"Strategic Introduction of the Blockchain Technology under Retailing Competition from New Entrants" (Jing et al., 2022)	Retail competition and blockchain	Conceptual analysis	Discusses how blockchain can enhance transparency in retail, affecting competition among retailers.	Theoretical insights, therefore lacks empirical case studies.
"Blockchain technology implementation on medical records data management: a review	Medical records management	Literature review	Reviews the implementation of blockchain for managing medical records, highlighting its potential	Focused on medical records, which cannot be generalized to other applications.

of recent studies" (Santoso et al., 2020)			for data integration and privacy.	
"A review on blockchain applications in the agri-food sector" (Antonucci et al., 2019)	Blockchain applications in agri-food	Literature review	Explores how blockchain can enhance transparency and efficiency in the agri-food supply chain.	Limited to agri-food sector, so the results may not apply to other industries.

One major gap in existing research lies in understanding how organizations perceive blockchain adoption beyond its technical benefits. While much of the literature focuses on blockchain's security, efficiency, and transparency, there is limited research on its strategic and managerial implications for organizations. Studies often emphasize technical aspects such as security (Zhang et al., 2019), system traceability (Kim & Laskowski, 2018), and regulatory frameworks (Bennacer et al., 2023), yet less attention is given to how firms integrate blockchain within their operational and business models.

The literature matrix further underscores this gap, as most studies primarily address technical challenges and theoretical models rather than practical organizational adoption. For instance, research on blockchain in academia highlights implementation challenges (Kosmarski, 2020), while studies on blockchain in supply chains focus on traceability rather than decision-making processes within firms (Kim & Laskowski, 2018). To address this gap, this study explores blockchain adoption from an organizational perspective. By analyzing how companies navigate blockchain integration beyond its technical feasibility, this research contributes to a broader understanding of blockchain adoption in entrepreneurial ecosystems.

3. Methodology

3.1 Reseach design

This research employs a qualitative research design to gain comprehensive insights into the perceptions, challenges and potential benefits of blockchain technology within entrepreneurial ecosystems.

Qualitative research is particularly well-suited for studying blockchain technology because it is still an emerging field, making it difficult to obtain comprehensive and standardized quantitative data (Batta et al., 2021). Unlike quantitative methods that rely on numerical data and statistical analysis, qualitative approaches facilitate deeper insights through direct engagement with industry professionals and experts, capturing evolving perceptions and challenges that structured surveys may overlook (Agrifoglio & de Gennaro, 2022).

It enables researchers to delve into the experiences and insights of individuals directly engaged with or affected by blockchain developments. Therefore, the qualitative lens allows for the exploration of evolving attitudes, emerging challenges and unexpected opportunities, that structured quantitative methods might overlook. Thus, a qualitative design is not only appropriate, but essential for navigating the uncertainties and complexities inherent in studying an emergent technology like blockchain.

3.2 Research setting

This study focuses on the adoption of blockchain technology within the Netherlands, a country recognized for its advanced digital infrastructure and high level of digitalization of the economy. The Netherlands stands out as one of the leading digital economies in Europe, with a 4th place in the Digital Economy and Society Index ranking among European Union member states. This shows that the country has a high level of ability and readiness to research and implement digital technologies such as blockchain technology (Bezrukov et al., 2022).

Furthermore, this study specifically examines blockchain adoption within the entrepreneurial ecosystem. Unlike established corporations, which often face legacy system constraints and regulatory inertia, entrepreneurial ventures operate with greater flexibility but limited resources (Colombo et al., 2021). This makes them ideal for studying the real-world challenges and opportunities associated with blockchain adoption. The Dutch entrepreneurial ecosystem, known for its collaborative business culture, provides an excellent setting to explore how blockchain can foster innovation, disrupt traditional business models, and drive new economic opportunities (van den Candelo et al., 2023).

Faria (2021) thereby emphasizes that the interplay between local governance, regulatory frameworks and market dynamics creates an environment favorable to blockchain innovation, distinguishing the

Netherlands from other regions within the European Union. This ecosystem is characterized by collaborative relationships among businesses, which are essential for the successful implementation of blockchain technologies (Faria, 2021).

3.3 Sampling

The sampling strategy involved purposive sampling of key stakeholders in the entrepreneurial ecosystem, including blockchain experts and industry professionals with experience in blockchain technology integration. The selection criteria prioritized individuals with in-depth knowledge and practical experience in blockchain implementation.

Purposive sampling is a deliberate strategy used to target specific individuals who are most likely to provide valuable insights relevant to the research objectives. This approach is particularly appropriate for studying complex and emerging fields like blockchain technology, where there is a significant degree of novelty and uncertainty (Palinkas et al., 2015). Since blockchain is still in the early stages of adoption, with limited standardized practices and empirical data available, it is logical to focus on experts who have experience in the space. By selectively including these participants who possess specialized expertise or practical experience, the sampling approach ensures that the research captures detailed and nuanced perspectives (Palinkas et al., 2015).

TABLE 2

Overview of informants

Pseudonym	Position	Expertise	Sector	Date	Length interview
P1	CEO	Software development	Blockchain Finance	30-10	1:02:52
P2	Blockchain Lead	Blockchain	Higher Eduaction	06-11	41:55
P3	Lector	Blockchain	Higher Education	8-11	51:44
P4	CEO	Software developer	Software	13-11	58:03
P5	Lawyer	Blockchain	Law	18-11	43:15
P6	Webdeveloper	IT	Information & Communication Technology	19-11	54:36
P7	CTO	IT	Energy Sector	26-11	1:03:13

P8	Consultant	Blockchain	Innovation & Consultancy	27-11	1:17:55
P9	CEO	Software development	Blockchain	28-11	1:01:05

3.4 Research instrument

This research will collect qualitative data through semi-structured interviews with blockchain experts and industry professionals. The choice of semi-structured interviews is particularly useful as it allows for flexibility in exploring participants' insights, while ensuring that essential topics related to blockchain technology adoption are systematically covered (Qu & Dumay, 2011). This method is well-suited for capturing detailed and nuanced perspectives from individuals with varying experiences and expertise in the field of blockchain technology (Kiu et al., 2024).

The semi-structured interviews will be guided by a set of pre-determined open-ended questions that align with the research objectives. However, this flexible approach allows for exploring and discussing new ideas that may emerge during the conversation (Afzal et al., 2024). Interviews will be conducted either in-person or via video conferencing, depending on participants' preferences and availability. Each interview is expected to last between 45 to 60 minutes, allowing for sufficient time and in-depth discussion.

All interviews will be audio-recorded with the participants' consent and subsequently transcribed for analysis. The data will be securely stored and any identifying information will be anonymized to protect the confidentiality of the participants. The transcriptions will then be coded using the Gioia Method, beginning with open coding to identify first-order concepts, followed by axial coding to identify second-order themes and ultimately grouping these into overarching theoretical dimensions (Gioia, 2021). This structured yet flexible approach to data collection and analysis can provide a lot of insights into the challenges and opportunities associated with blockchain adoption in the Netherlands' entrepreneurial ecosystem.

3.5 Data analysis

The data collected from the semi-structured interviews will be analyzed using the Technology Acceptance Model (TAM), a widely recognized framework for understanding the adoption and acceptance of new technologies (Davis et al., 1989). The TAM is particularly suitable for this study as it emphasizes key factors such as Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance, and Perceived Ease of Use as the degree to which a person

believes that using a particular system would be free of effort (Wang et al., 2022). These aspects are critical in assessing how stakeholders perceive blockchain technology.

Although the interview questions are guided by the Technology Acceptance Model (TAM), the semi-structured format allows for participants to offer alternative explanations, insights, or suggestions that may introduce new variables or factors. This flexibility enriches the original TAM model by capturing additional aspects of blockchain adoption that might not be covered solely by the established constructs of Perceived Usefulness and Perceived Ease of Use (Ruslin et al., 2022). To structure and analyze the interviews, this study will employ the Gioia Method. The Gioia Method is a systematic approach to qualitative research that helps identifying and categorizing the main concepts emerging from the data. This method is especially effective in studies aiming to develop a deep understanding of complex phenomena, such as the adoption of blockchain technology (Gioia, 2021). By utilizing this method, the research aims to balance between staying close to the participants' language and developing theoretical insights, which is crucial for understanding the details of blockchain adoption.

In addition to Perceived Usefulness and Perceived Ease of Use, the analysis will explore how these constructs influence stakeholders' attitude towards using blockchain technology, behavioral intention to use, and ultimately the actual use of the technology. By applying the TAM model to the qualitative data, this study aims to uncover deeper insights into the factors that drive or hinder the acceptance of blockchain within the entrepreneurial ecosystem (Venkatesh & Bala, 2008). This approach enhances the understanding of technology adoption in this context and contributes to the broader discussion on digital transformation in entrepreneurial settings.

4. Findings

The findings of this study address RQ1 and RQ2. The findings are organized around key themes that emerged from qualitative data analysis, using the Technology Acceptance Model (TAM) and the Gioia Method to identify patterns in participants' views on blockchain adoption.

TABLE 4

Data Structure

1st order concepts	*2nd-order themes*	*Aggegrated dimensions*	*Relevant RQ*
Blockchain can automate complex, multi-step processes.	**Automation**	**Perceived Usefulness**	**RQ 1**
Smart contracts enable automatic execution of agreements, reducing human error.			
Blockchain reduces the need for intermediaries in decentralized financial transactions			
Public blockchains provide an immutable and transparent record that can prevent fraud in financial transactions.	**Security**		
Using blockchain, organizations can ensure data traceability or product authenticity.			
Blockchain can prove ownership of data.			
Blockchain can reduce transaction costs in financial services.			

Using public blockchain helps avoid the high costs associated with maintaining legacy systems.	**Cost Reduction**		
Consortium blockchains can be cost-effective as multiple organizations share resources.			
Blockchain is not easy, but there are services like smart contract repositories that simplify its use.	**User-Friendliness**	**Perceived Ease of Use**	**RQ 2**
Blockchain applications currently lack the ease of use needed for mass adoption but are improving over time			
Blockchain is like setting up an email server in 1991—it's not easily accessible.			
Blockchain has a steep learning curve and is difficult for non-technical users.	**Complexity**		
The technical challenges of blockchain make it hard for people without specialized knowledge to use it effectively.			
Setting up blockchain-based systems requires significant technical			

understanding and governance planning.			
Integrating blockchain with traditional systems often requires custom-built solutions, which can be complex and resource-intensive.	**Technical Barriers**	**Barriers to Adoption**	**RQ 1**
Escalation channels in blockchain are not well-established compared to traditional systems			
New technologies like blockchain put more responsibilities on the end-user, making it harder to manage.			
The complexity of blockchain requires significant restructuring of existing processes, which organizations are reluctant to do.	**Organizational Barriers**		
The lack of established best practices for blockchain development makes it hard to ensure system reliability.			
Decision-makers in organizations are often not fully convinced of blockchain's practical value			
Lack of clear regulations hinders the use of			

blockchain in the financial sector.	**Regulatory Barriers**		
Intellectual property rights create a barrier for storing copyrighted content on blockchain.			
Data privacy laws pose challenges when dealing with immutable blockchain records.			
The fluctuating costs of blockchain infrastructure make it hard for organizations to predict the total cost of ownership.	**Financial Uncertainty**	**Perceived Uncertainty**	**RQ 2**
Building and maintaining your own blockchain is costly and vulnerable to technical staff leaving			
Blockchain projects require a lot of manual effort and governance which is not easily automated.	**Operational Uncertainty**		
Integration of blockchain with existing infrastructures is complex and shown to be not always beneficial.			
Blockchain adoption often depends on the company's flexibility and willingness to adapt to new technologies			

Blockchain works best in new, innovative applications where the ecosystem is not already locked into traditional systems.	**Organizational fit**	**Strategic Alignment**	**RQ 1**
The challenges of integrating blockchain into existing systems require careful planning and understanding of the organization's processes.			
Blockchain enables decentralized ownership and control, making it more suitable for applications in various industries.	**Value proposition**		
Blockchain offers transparency, which is a unique value proposition for companies looking to build trust and accountability.			
The use of blockchain allows for the tokenization of assets, which can democratize access to investments and shares.			

4.1 Perceived Usefulness

Three main dimensions **automation**, **security**, and **cost reduction** consistently came up during the interviews as pivotal in shaping perceptions of blockchain's value. These aspects highlight

blockchain's potential to address inefficiencies, enhance operational effectiveness, and deliver measurable benefits in diverse applications.

One of blockchain's most celebrated features is its ability to **automate** complex, multi-step processes, reducing reliance on human intervention and minimizing errors. This is largely achieved through the use of smart contracts, which automatically execute agreements when predefined conditions are met, ensuring precision and efficiency. P7 shared an example from the energy sector, where blockchain was used to manage energy consumption dynamically: *"Blockchain enabled transparent recording of energy fluctuations, allowing consumers to engage in market transactions without requiring manual adjustments."* Thereby, P1 illustrated blockchain's automation potential in content verification and ownership of his company: *"Imagine a social media platform where every post is recorded on the blockchain. With blockchain, the data is stored across thousands of computers worldwide, so it becomes nearly impossible to censor or manipulate. This ensures both transparency and content authenticity."*

Beyond **automation**, blockchain's ability to enhance security was frequently highlighted as a critical advantage. The technology's inherent immutability and transparency protects against fraud while fostering trust in data integrity. P1 reinforced this by emphasizing blockchain's role in securing content ownership: *"By hashing a document and storing that hash on the blockchain, you create an immutable proof of authorship. Even if the content itself is stored elsewhere, no one can alter the original claim without detection."* P8 also shared how blockchain was applied to verify claims of product authenticity, in supply chain management: *"We used blockchain to anchor claims, ensuring that changes in product data were verifiable and transparent."* This application was particularly effective in preventing fake goods and ensuring the traceability of goods.

The diamond industry provides another compelling case for blockchain's security capabilities. P8 explained how QR codes engraved on diamonds were linked to blockchain records to establish provenance and ownership: *"This system prevented fraud and ensured authenticity by providing a reliable and tamper-proof chain of custody."* The same respondent emphasized how blockchain's immutable nature can also enhance governance by maintaining transparency in ecosystems where multiple stakeholders interact. P2 agreed with this sentiment, noting that blockchain's decentralized structure promotes transparency.

The potential for **cost reductions** was another recurring theme in the interviews. Blockchain simplifies transactions by eliminating intermediaries, leading to significant savings, particularly in sectors with high intermediary costs, such as financial services. P8 observed: *"Blockchain enables organizations to bypass outdated processes, especially in industries like agriculture and logistics where manual verification and certifications are still common."* By replacing these labor-intensive processes with automated and verifiable systems, blockchain drives efficiency and lowers operating expenses.

Furthermore, consortium blockchains represent an innovative approach to cost savings, particularly in collaborative settings where multiple parties share resources. As highlighted by P7, blockchain-based solutions in the energy sector have shown that joint ventures can distribute costs effectively: *"By sharing infrastructure, consortium blockchains allow multiple organizations to operate efficiently while minimizing individual investment."* However, P7 also emphasized that implementing consortium blockchains requires careful governance planning and long-term commitment. In several projects, the initial blockchain system proved too complex for end-users, leading to its eventual replacement by a traditional database model: *"The technology became too complex for the people working with it. A simpler, non-blockchain solution was later adopted, which made it easier to manage."*

4.2 Perceived Ease of Use

User-friendliness and **complexity** emerged as pivotal themes shaping the perceived ease of use. While blockchain holds transformative potential, its usability remains a significant challenge, often limiting accessibility to those with advanced technical expertise.

Respondents frequently compared blockchain's current state to the early days of the internet, when setting up basic services required substantial technical knowledge. P2 captured this sentiment, stating: *"Blockchain applications today are like setting up an email server in 1991—technically possible, but far from simple."* This comparison underscores the steep learning curve that blockchain still presents, making it challenging for non-technical users and organizations with limited expertise to deploy and manage.

Efforts to enhance **user-friendliness** are in progress, as evidenced by the emergence of tools like smart contract repositories and pre-configured frameworks that simplify blockchain adoption. These solutions allow users to bypass the complexity of building systems from scratch. However, as P2 noted, these advancements do not fully bridge the accessibility gap: *"Even with these tools, a baseline level of technical proficiency is still required, which limits broader accessibility."* This observation highlights that while the technology is evolving, it is not yet at a stage where it can be adopted without significant training or expertise.

The **complexity** of blockchain was another dominant theme. Many respondents agreed that blockchain involves a steep learning curve, particularly for individuals and organizations outside the technology sector. P2 emphasized: *"Blockchain's technical challenges make it hard for anyone outside the field to use it effectively."* P6 confirmed the complexity of blockchain, by stating: *"I found it quite complex myself. I tried to recreate the basics of blockchain in a simple form, and while it's not rocket science, it's definitely more complicated than building a regular application."* Furthermore, setting up blockchain systems often goes beyond technical implementation and requires extensive governance planning. P9 explained: *"You are not just deploying technology, you are building a system that needs*

to function within complex organizational structures, and that requires careful oversight." These challenges make blockchain adoption particularly daunting for organizations without dedicated resources to manage its complexities, as P4 also highlighted.

Integration with existing systems further compounds the issue of complexity. Blockchain projects frequently demand significant adjustments to traditional infrastructures, creating friction during implementation. P7 shared an example from their industry: *"We had to rethink how existing processes would interface with blockchain, and that effort alone took months of planning."* This reconfiguration often results in inefficiencies, particularly when blockchain solutions feel more like add-ons than integrated tools.

Despite these obstacles, most respondents expressed optimism about blockchain's evolution toward greater accessibility. P1 highlighted the parallels between blockchain adoption and the development of web tools, stating: *"In the early days of the internet, building a website required coding knowledge. Today, platforms like WordPress make it accessible to anyone. Blockchain will follow the same path."*

4.3 Barriers to Adoption

The adoption of blockchain technology is hindered by significant barriers, which can be grouped into three primary categories: **technical**, **organizational**, and **regulatory** challenges. These obstacles illustrate the complexities of transitioning from blockchain's theoretical potential to its practical application.

Technical barriers are among the most prominent challenges, particularly the difficulty of integrating blockchain with existing systems. Many respondents noted that such integration often requires custom-built solutions that are both resource-intensive and complex. P7 shared an example from the energy sector where blockchain initially seemed promising: *"We thought blockchain could streamline energy tracking, but the technical workarounds required to align it with our legacy systems made the project unsustainable."*

P4 thereby highlighted a challenge from the supply chain domain: *"We attempted to use blockchain to improve traceability, but the technical requirements for integrating it with our existing ERP systems were overwhelming. The need for custom APIs and continuous synchronization with legacy databases turned the project into a resource-heavy endeavor."* This illustrates how technical compatibility issues can pose significant hurdles when attempting to implement blockchain in established operational environments.

Another technical limitation associated with blockchain adoption is the absence of clear governance mechanisms for dispute resolution. Unlike traditional systems that have clear governance structures for resolving disputes, blockchain leaves much of this responsibility to the end-user. P8 explained:

"Traditional systems offer clear governance structures for resolving issues, whereas in blockchain-based systems, users must often take full responsibility for managing disputes, which can be challenging for organizations." P6 further explained: *"With regular software, you fix a bug and release a new version. But with smart contracts, whatever is on the blockchain is final. If money is tied to a smart contract, you can't simply publish a new version and expect it to work smoothly. The responsibility falls primarily on the contract developer."* This decentralized nature, while foundational to blockchain's design, creates a responsibility shift that many organizations find difficult to manage.

Organizational barriers add another layer of complexity. Successful blockchain adoption often requires a fundamental restructuring of processes, which organizations may resist due to the disruptive nature of such changes. P1 pointed out the organizational resistance to change that large institutions face when considering blockchain integration: *"For big banks like Rabobank or ABN Amro, change is difficult. These are massive institutions with deeply embedded systems. Even if blockchain offers benefits, internal resistance and bureaucratic hurdles slow adoption."* P9 pointed something similar out: *"For many companies, blockchain feels like an uphill battle because it challenges long-established workflows."* Even when organizations are open to innovation, the absence of standardized best practices complicates the implementation process. P7 shared a project that failed due to governance issues: *"We underestimated how crucial governance would be. Without clear structures in place, progress slowed significantly."*

P2, P4, and P8 all highlighted skepticism among decision-makers as a significant organizational hurdle to blockchain adoption. P2 noted that many leaders adopt a cautious, wait-and-see approach, hesitating to invest without seeing tangible results: *"Decision makers want to move forward, but they are reluctant without concrete outcomes."* P4 emphasized the disconnect between management enthusiasm and the technical realities, stating, *"The idea to implement blockchain often comes from management, but they do not fully understand the technical implications, which makes it difficult to build broader organizational support."* Similarly, P8 observed, *"Many companies are intrigued by blockchain, but decision-makers often struggle to identify clear benefits for multiple reasons, partly due to skepticism."*

Regulatory barriers were frequently mentioned as a significant constraint as well, particularly in regions where blockchain-related laws remain unclear. While respondents expressed optimism about upcoming regulations, such as the European MiCA framework, the current lack of clarity poses challenges. P9 explained: *"MiCA will finally give us a framework to operate within, but until it's in effect, we're navigating a legal gray area."* P6 confirmed this, by stating: "*The absence of clear legal frameworks is one of the biggest obstacles. Until these rules are clarified, many companies are hesitant to move forward."*

The immutable nature of blockchain also raises intellectual property concerns. P8 elaborated on this: "*Organizations dealing with sensitive data must think twice before using blockchain, as mistakes or outdated information become permanent, potentially creating compliance risks."* Even smart contracts, which are often praised for automating agreements, face legal ambiguities. P5 raised concerns about contract validity: *"Traditional contract law requires clear intent and agreement between parties. But in smart contracts, decisions are executed automatically without human oversight. What happens if an unintended variation occurs? That could legally invalidate the entire contract."* These unresolved issues make organizations hesitant to use blockchain for storing sensitive or regulated information.

Data privacy regulations such as the General Data Protection Regulation (GDPR), which governs data protection and privacy in the European Union, add further complications. On of blockchain's core feature, its immutability, conflicts with requirements for data deletion or modification. P5 highlighted this tension: *"The right to be forgotten is a fundamental principle in European data protection law. But with blockchain, once data is recorded, it cannot simply be erased. This creates a direct legal conflict that cannot be easily resolved under current regulations."* P3 highlighted this tension as well: *"Private blockchains give more control because you can still adjust or delete data, unlike public ones. But this control comes at the cost of decentralization, which makes GDPR compliance tricky."*

Respondents also pointed out that the fragmented regulatory landscape across different jurisdictions creates additional uncertainty. P8 emphasized: *"Blockchain operates globally, but regulations are localized. This mismatch makes it difficult to create systems that comply universally."* As a result, many blockchain projects are either delayed or restricted to regions with clearer legal frameworks. Despite these challenges, P5 acknowledged that blockchain has potential in sectors where regulatory barriers are lower, such as AI-driven logging systems: *"Blockchain could be useful for logging activities in AI applications, especially under new EU regulations like the AI Act. But even then, there needs to be a mechanism for making corrections if required by law."*

4.4 Perceived Uncertainty

While blockchain is often praised for its potential, it also introduces substantial **financial** and **operational uncertainties** that stop organizations from fully committing to its adoption. These uncertainties were a frequent theme across interviews, highlighting the challenges organizations face in making informed decisions about blockchain integration.

Financial uncertainty emerged as a prominent concern, primarily arising from the unpredictability of blockchain-related costs. The fluctuating expenses of infrastructure, coupled with the rapidly evolving nature of blockchain technology, make it difficult for organizations to forecast the total cost of ownership. P8 commented on the challenges of justifying blockchain investments, noting that while the technology may seem promising, the costs and complexity often outweigh the practical benefits. *"Many companies explore blockchain because it sounds innovative, but the reality is that implementing it requires significant time and effort. In many cases, it makes more sense to wait until a ready-made solution becomes available rather than investing heavily in developing a custom blockchain system,"* he explained. This issue is compounded in industries where profit margins are slim, making large-scale investments in experimental technologies such as blockchain a significant financial risk.

A notable issue linked to financial uncertainty is the reliance on a specialized workforce. Blockchain systems require skilled professionals to design, implement, and maintain them, but these experts are often scarce and in high demand. P7 shared an example of a blockchain initiative that was abandoned when the technical team responsible for its upkeep departed: *"As the project evolved, the complexity of maintaining the blockchain system became a challenge. The new managing party found it technically difficult to work with and ultimately replaced it with a traditional database solution."* This workforce dependency adds another layer of financial risk, particularly for smaller organizations with limited resources to hire or train specialized personnel.

In addition to financial concerns, **operational uncertainty** is a significant barrier to blockchain adoption. Despite the promise of automation and efficiency, blockchain projects often require extensive manual oversight and governance, particularly in their early stages. As P7 remarked, *"Governance was a critical factor that was often realized too late, yet it remains one of the most difficult aspects to get right. Blockchain doesn't eliminate that complexity, instead it requires careful design and management."* The challenges of establishing clear governance structures and maintaining them over time make operationalizing blockchain systems resource-intensive.

Integrating blockchain with existing infrastructures further adds to operational uncertainty. Many respondents noted that while blockchain solutions can complement traditional systems, their implementation often demands significant reconfiguration of existing workflows. As P8 observed, many businesses exploring blockchain found that the effort required to implement and restructure

processes often outweighed its potential benefits, making it more practical to wait for mature solutions rather than undergoing costly overhauls.

Another layer of operational uncertainty lies in blockchain's evolving ecosystem. With no universal standards in place, organizations face a unstructured and often inconsistent landscape of platforms and protocols. This lack of structure complicates the selection process for blockchain solutions and raises concerns about long-term viability. P7 noted, *"It is hard to invest in a system when you do not know if it will be obsolete in a few years or if the ecosystem around it will continue to support your needs."* P6 agrees and makes an statement about the future of blockchain*: "Blockchain as an investment will likely persist because of the speculative interest in crypto. But for practical business applications, I expect other technologies to take over, ones that are easier to implement and maintain."* This lack of stability discourages organizations from committing to blockchain projects, particularly in industries that prioritize longevity and reliability in their technological investments.

Finally, respondents raised concerns about whether blockchain's capabilities truly align with the operational needs of certain industries. This strategic alignment is further explored in the following section.

4.5 Strategic Alignment

The alignment of blockchain technology with an organization's strategic goals is a pivotal factor in determining its adoption and integration success. This alignment is shaped by two primary dimensions, **organizational fit** and **value proposition**, which together define how well blockchain matches a company's objectives, culture, and operational environment.

Organizational fit is essential in assessing whether blockchain adoption is both feasible and beneficial for a company. Respondents consistently noted that organizations with a high degree of flexibility and a culture of innovation are better positioned to leverage blockchain's potential. P8 highlighted that blockchain adoption often requires a shift in mindset rather than just a technological upgrade: *"Companies often explore blockchain without a clearly defined problem it needs to solve. In many cases, existing technologies were simply more practical, cost-effective, and easier to implement,"* he observed. Similarly, P7 noted that integrating blockchain is not as straightforward as some companies expect, as mentioned earlier, he stated that the rethinking of interaction with other processes alone took months of planning. Such adaptability is crucial, particularly in industries with deeply embedded legacy systems. P7 also observed: *"For organizations heavily dependent on traditional infrastructures, adopting blockchain is more than a technical shift, it requires a fundamental process redesign."*

This transformation often involves overcoming resistance to change, as decision-makers may struggle to justify the disruption caused by blockchain adoption. P3 highlighted how financial institutions are

cautious about integrating public blockchains due to transparency concerns, whereas decentralized finance (DeFi) operates under a different paradigm where transparency is embraced rather than feared: *"Companies hesitate to adopt blockchain because everything is visible. But in DeFi, blockchain is integrated by default, eliminating the need for intermediaries."* Similarly, P1 emphasized how blockchain challenges traditional structures, noting that its adoption requires a shift in mindset: *"Blockchain isn't just a technology; it forces you to think differently about data, control, and trust."* In more adaptable and forward-thinking ecosystems, blockchain's flexibility aligns naturally with innovation. However, in traditional industries, successful integration often demands significant restructuring and a reassessment of governance models.

The degree of organizational fit also depends on the ecosystem within which a company operates. Blockchain is most effective in scenarios where centralized intermediaries are a obstacle, or where trust between parties is difficult to establish. P8 highlighted examples from supply chains, explaining: *I worked on several proof-of-concept projects for sectors like agriculture and local governments. These organizations saw blockchain as a way to improve bureaucratic processes and make data verification more transparent."* In such cases, blockchain not only integrates with existing systems but also addresses fundamental inefficiencies, creating a more streamlined and verifiable flow of information that benefits all stakeholders involved. Furthermore, P5 stressed the importance of adapting blockchain solutions to existing laws rather than expecting laws to change: *"If companies want blockchain to be legally viable, they need to adjust the technology rather than waiting for laws to be rewritten. That means finding ways to allow controlled modifications in special cases."*

The **Value proposition** of blockchain emerged as another critical element in strategic alignment. Many respondents highlighted its ability to enhance transparency and accountability, which are becoming increasingly important in today's competitive markets. P4 emphasized this aspect, stating: *"I believe that security and convenience can be achieved without blockchain, but transparency is an area where blockchain truly adds value. Instead of a closed system, you have a more open system in terms of record-keeping."* Similarly, P6, who worked on a blockchain implementation for a municipal healthcare system, illustrated how blockchain enhanced trust and streamlined processes: *"The process we replaced was highly cumbersome. It involved multiple departments, requiring approvals at every step, and all documents were manually processed. This was around 2018, and the entire workflow consisted of 49 steps. Eventually, we converted this process into a blockchain solution, allowing payments to be processed automatically via smart contracts."* This demonstrates how blockchain not only enhances transparency but also eliminates inefficiencies by reducing the need for intermediaries in transaction-heavy processes."

The ability to tokenize assets is another transformative aspect of blockchain's value proposition. Tokenization converts physical or digital assets into blockchain-based tokens, enabling fractional

ownership and democratizing access to investments. P3 illustrated this concept with an example from traditional finance: *"With tokenization, you could own a fraction of a Tesla share instead of needing to buy a whole one. This allows people to invest in assets that were previously out of reach due to high entry costs."* This principle extends beyond stocks to other asset classes, such as real estate or fine art, opening new opportunities for organizations to innovate in asset management and investment strategies."

However, respondents also emphasized the importance of clarity and focus when considering blockchain's strategic value. P6 warned against adopting blockchain simply for the sake of innovation, stating*:"Blockchain has advantages, but the use case must genuinely require it. Implementing blockchain just because it is trendy is a mistake. It must provide functional value, otherwise, the downsides outweigh the benefits."* P4 agreed with this idea, noting *that "Management often gets excited about blockchain, but they do not fully understand the technical implications, which makes it difficult to build broader organizational support."* Similarly, P7 emphasized that blockchain adoption should be carefully planned rather than driven by trends, stating: *"We underestimated how crucial governance would be. Without clear structures in place, progress slowed significantly."* This highlights the need for organizations to critically evaluate blockchain's alignment with their strategic goals and determine whether its implementation genuinely enhances processes or addresses inefficiencies.

Integration challenges also limit blockchain's perceived value proposition. P7 acknowledged that while blockchain offers benefits such as transparency and efficiency, its adoption is not without hurdles: *"Companies often underestimate the effort required to integrate blockchain. It is not just about the technology, it is about restructuring workflows, training employees, and ensuring compatibility with legacy systems."* These complexities can make adoption less appealing, particularly for organizations lacking the expertise or resources to address such transitions effectively.

5. Discussion and conclusion

This study aimed to explore the critical factors influencing the adoption of blockchain technology for organizations, and how organizations can effectively integrate blockchain into their strategic plans while managing the impact on traditional systems. By conducting expert interviews and analyzing qualitative data, the findings were structured around five key themes: Perceived Usefulness, Perceived Ease of Use, Barriers to Adoption, Perceived Uncertainty, and Strategic Alignment. These themes reveal the complexities organizations face in adopting blockchain technology, balancing its potential benefits with practical challenges.

The adoption of blockchain by organizations is influenced by both technical and organizational factors, including the technology's fit with existing processes, perceptions of blockchain's usefulness and accessibility, and alignment with strategic goals. While blockchain offers clear advantages such as transparency, automation, and cost efficiency, practical barriers remain, including technical complexity, organizational resistance, and unclear regulatory frameworks.

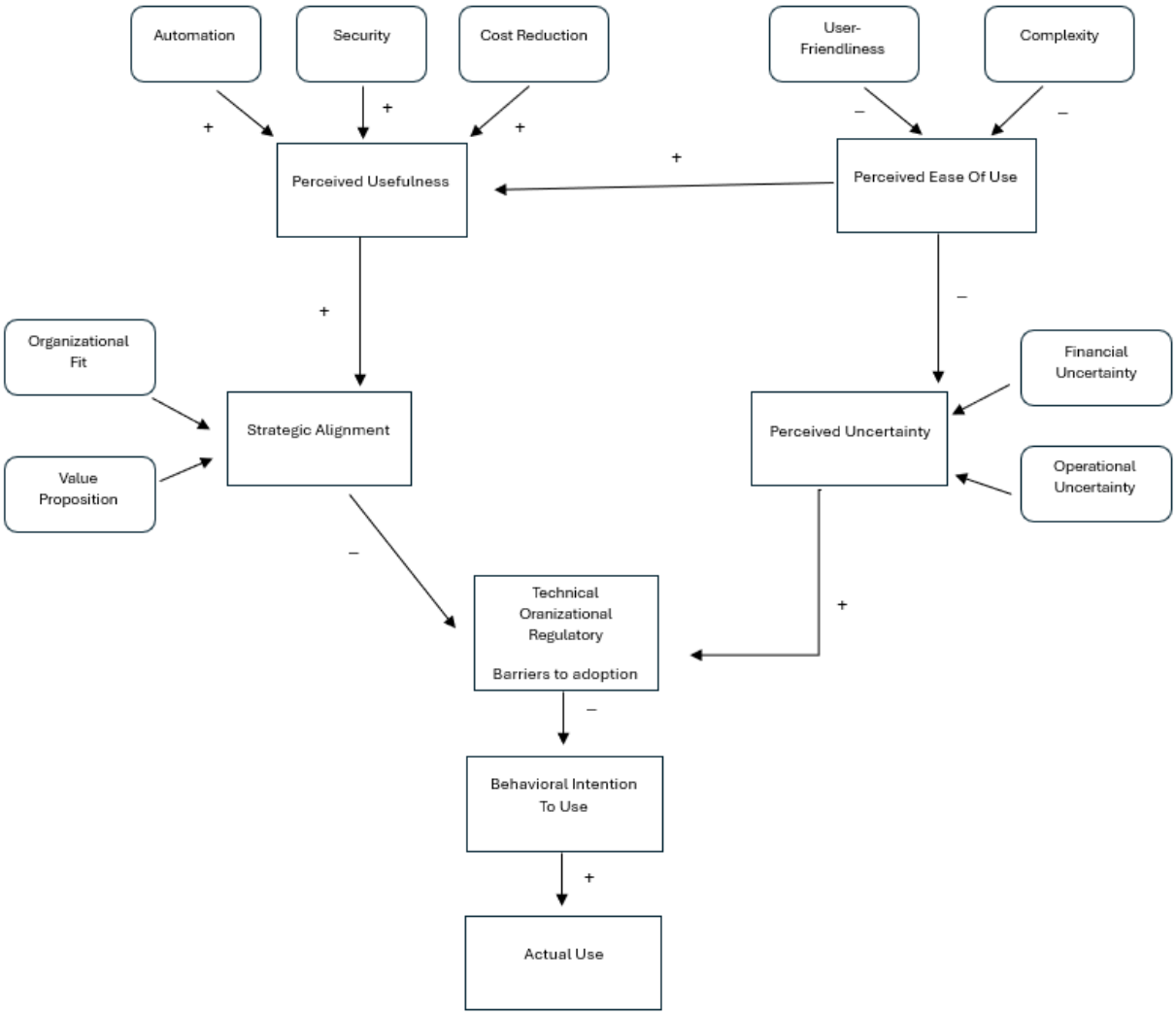
The findings further suggest that the successful adoption of blockchain relies on a strategic approach that addresses operational uncertainties, focuses on niche applications, and encourages collaboration within ecosystems. Despite these challenges, blockchain presents unique opportunities for innovation and competitive advantage, especially when organizations are committed to investing in governance and expertise.

This study underscores the importance of understanding blockchain adoption within the broader theoretical frameworks of technology acceptance and strategic management. While the Technology Acceptance Model was used as the primary lens for analyzing adoption factors, the research also uncovered additional factors that enrich the TAM framework. The study highlights that blockchain adoption cannot be understood in isolation from the organizational context, as it is deeply intertwined with strategic goals, operational processes, and external regulatory environments.

This insight contributes to the ongoing dialogue about the integration of emerging technologies into organizational strategies. The study provides a refined view of how organizations should approach blockchain adoption, namely not just as a technological decision, but as a strategic move that requires cross-functional collaboration, investment in governance, and careful consideration of operational impacts. Also, figure 1 is added, which illustrates the interplay between key factors influencing blockchain adoption in organizations. This model is derived directly from the results of this study, reflecting the key themes identified during the interviews.

FIGURE 1

Conceptual TAM Blockchain technology



"+" indicates a positive relationship between variables, where an increase in one variable leads to an increase in the related variable.

"-" indicates a negative relationship between variables, where an increase in one variable leads to a more negative outcome in the related variable.

5.1 Theoretical implications

The findings of this study contribute new insights to the existing literature on blockchain technology by revealing critical factors influencing its adoption and integration within organizations, especially within the context of the Dutch entrepreneurial ecosystem. The perceived usefulness of blockchain, particularly in terms of automation, security, and cost reduction, aligns with prior research that emphasizes its operational benefits sectors (Agbo et al., 2019; Tijan et al., 2019). However, this study goes beyond confirming these benefits by highlighting how blockchain's transformative potential is often hindered by the complexity of integration and the lack of clear business cases, particularly in industries that have not yet fully embraced decentralized technologies. For instance, while previous studies underscore blockchain's ability to automate complex processes through smart contracts (Agbo et al., 2019), this study reveals that the practical implementation of these contracts often falls short due to the technical expertise required, resulting in slower-than-expected adoption rates. This delay in adoption due to a lack of user readiness and organizational resistance to change, represents a novel contribution of this study.

Moreover, the emphasis on security and the immutable nature of blockchain reinforces the conclusions drawn by Alahmadi and Lin (2019), who suggest that blockchain can significantly enhance data integrity and trust among stakeholders (Alahmadi & Lin, 2019). The findings of this research indicate that organizations are increasingly aware of how blockchain can mitigate fraud and ensure authenticity, particularly in industries prone to counterfeiting, such as diamonds and pharmaceuticals. However, this research also reveals a more complex reality. While organizations recognize blockchain's ability to enhance trust and reduce fraud, they also express concerns about its implementation challenges, such as the difficulty of adapting existing infrastructures to the new technology. This finding introduces a layer of complexity not fully explored in earlier studies, suggesting that while blockchain is seen as a tool for securing data, its integration into legacy systems is far more challenging and costly than previously acknowledged.

Additionally, the potential for blockchain to provide a transparent audit trail, particularly in supply chain management, aligns with current literature (Tijan et al., 2019). However, this study contributes a unique insight. While transparency builds trust among consumers, it also presents challenges for organizations in terms of data privacy and regulatory compliance. These emerging concerns highlight the contrast between blockchain's potential and its practical challenges, which has been underexplored in the existing literature. Furthermore, in terms of improving service quality and customer satisfaction, the study confirms that blockchain can enhance operational efficiency, particularly in sectors like healthcare. However, it also introduces a counterpoint that is rarely discussed in previous literature. The integration of blockchain into service delivery models is often met with resistance, as it requires substantial restructuring of existing processes, as evidenced by responses from P7 and P1, who

highlighted the significant effort involved in adapting existing workflows and the challenge of rethinking traditional systems to accommodate blockchain technology. This operational uncertainty presents a challenge for organizations looking to adopt blockchain.

> *Proposition 1: The perceived usefulness of blockchain, particularly in automation, security, and cost reduction, positively influences its adoption across various industries, while the complexity and barriers to integration limit the broader application of these benefits*.

Furthermore, the study highlights the importance of perceived ease of use, a concept integral to the Technology Acceptance Model (TAM), which suggests that the complexity of blockchain implementation directly impacts its adoption (Davis et al., 1989; Venkatesh & Davis, 2000). While these previous studies have identified perceived ease of use as a key factor in technology adoption, our findings suggest that blockchain's current usability is still limited to a small subset of technically advanced users. This aligns with the literature (Novak et al., 2022), but adds the novel contribution that the perceived difficulty of blockchain can result in a major barrier for non-technical users, hindering widespread adoption, particularly in sectors like accounting and finance where ease of use is critical.

The comparison of blockchain's current usability to the early days of the internet, where technology adoption was initially slow due to technical barriers, further emphasizes the need for user-friendly tools and simplified processes to facilitate adoption. While this aligns with current literature (Agrifoglio & de Gennaro, 2022), this study uniquely identifies the gap between technological advancements and the human factor. In particularly, the ability to simplify complex systems for broader user adoption. This gap, where technology advances faster than users are ready for it, offers a new view on the challenges organizations face when trying to implement blockchain solutions.

Moreover, the findings suggest that enhancing the user experience through better design and training can significantly improve the acceptance of blockchain applications. This aspect of user education, while noted in prior research (Hughes et al., 2019), is given new emphasis here as organizations report that training programs and support systems play a critical role in overcoming the usability barriers to blockchain adoption.

> *Proposition 2: The perceived ease of use of blockchain technology significantly affects its adoption, with user-friendly tools and frameworks essential for overcoming barriers to adoption, particularly for non-technical users in industries where ease of use is crucial.*

The barriers to adoption identified in this study, namely technical, organizational, and regulatory, further contribute to the understanding of blockchain integration challenges by highlighting how each of these barriers uniquely affects the process of blockchain adoption. The technical barriers, particularly the difficulties in integrating blockchain with existing systems, reveal a more complex

reality than previously understood. While earlier studies emphasize the importance of clear governance structures and system compatibility (Batta et al., 2021; Mathivathanan et al., 2021), our findings demonstrate that these barriers are worsenend by the rapidly evolving nature of blockchain technology. Organizations often struggle to keep pace with these changes, resulting in delays in integration and added complexity.

The organizational resistance to change, particularly in large companies, also introduces a new layer of complexity not fully explored in existing literature. Previous research highlights the resistance organizations face when adopting disruptive technologies (Saberi et al.), but this research provides a more detailed understanding of how this resistance is influenced not only by fear of the unknown, as well as the costs and effort needed to change established systems and processes. This resistance often leads to a slower-than-expected pace of adoption, as organizations are hesitant to make significant investments without clear, immediate returns. Moreover, the research found that organizations may attempt to address these barriers through incremental changes rather than radical shifts, which prolongs the adoption process.

The organizational culture plays a critical role in addressing these barriers. The study contributes a new insight by suggesting that the degree of an organization's adaptability directly impacts how effectively it can integrate blockchain into its operations. Organizations that foster a culture of innovation and flexibility are more likely to overcome the challenges of blockchain adoption. However, our findings also indicate that this cultural shift requires more than just top-down support. It involves redefining roles, responsibilities, and processes, which can be particularly difficult for larger organizations with deeply rooted practices.

> *Proposition 3: The existence of significant barriers, such as technical, organizational, and regulatory challenges, substantially hinders the adoption of blockchain technology within organizations, with each barrier contributing uniquely to the complexity of integration and adoption.*

Additionally, the findings indicate that perceived uncertainty surrounding blockchain technology, particularly financial and operational uncertainties, plays a critical role in hindering its adoption. However, the research reveals a deeper level of complexity. Financial and operational uncertainties are not just barriers in themselves, but they are made worse by the evolving nature of blockchain technology and the lack of standardized practices in its implementation. This aligns with the literature that highlights the importance of risk assessment in technology adoption decisions (Ji & Tia, 2022). While prior studies suggest that financial uncertainties are driven primarily by unpredictable costs, these findings suggest that these uncertainties are increased by the long-term commitment organizations must make to blockchain infrastructure, maintenance, and the specialized workforce needed to support it. (Gupta et al., 2020).

The fluctuating costs of blockchain infrastructure and the need for ongoing support can create a significant financial burden for organizations considering adoption. However, this uncertainty is not solely financial in nature. This research also highlights how operational uncertainty, resulting from the unpredictable long-term viability of blockchain technology and the risks of underestimating the complexity of its integration, adds to organizations' hesitance. This uncertainty increases by the lack of awareness among practitioners regarding the disruptive potential of blockchain technology. Moreover, the study finds that organizations are often unsure about how to assess blockchain's potential, as the rapidly evolving technology creates uncertainty about immediate costs, the future developments and the stability of the technology in the long run.

The financial uncertainties associated with blockchain adoption can be mitigated through careful planning and resource allocation. This study adds to this by suggesting that a proactive approach should also involve forecasting potential regulatory changes and preparing for future technological evolutions, as these factors could influence both the operational and financial aspects of blockchain implementation. Organizations that approach blockchain implementation with a clear understanding of their financial capabilities and constraints are better positioned to make informed decisions. This proactive approach can help organizations avoid the risks of underestimating the costs associated with blockchain technology and ensure that they allocate sufficient resources for successful implementation.

> *Proposition 4: Perceived financial and operational uncertainties significantly hinder the adoption of blockchain technology within organizations, with both financial unpredictability and the evolving nature of blockchain contributing to heightened risk and decision-making complexity.*

The alignment of blockchain technology with an organization's strategic goals is crucial for its successful adoption. However, the findings of this study introduce novel insights into this process by emphasizing not only the strategic alignment but also how organizational culture and flexibility specifically influence the successful integration of blockchain. The study shows that organizations with a culture of innovation and flexibility are more than just better positioned to adopt blockchain technology, they are also better able to leverage the full potential of blockchain to transform business models and not just optimize existing ones. This insight highlights that, while prior research (Wang et al., 2019) underscores the importance of flexibility, it has not fully explored how organizations with a deeply embedded culture of experimentation and learning significantly outperform those with more rigid structures. This study provides new evidence that the cultural shift required for blockchain adoption extends beyond operational processes, reaching the mindset and behavior of individuals within organizations.

The literature background further indicates that organizations must consider the long-term implications of blockchain adoption on their strategic positioning within their respective industries. This study expands on this by showing that organizations need to also anticipate the disruptive impacts of blockchain on their market positioning, requiring proactive strategies rather than reactive adjustments. Blockchain adoption, therefore, requires organizations to rethink their strategies for competitive advantage, not just by viewing blockchain as a technological upgrade but by embracing it as a strategic tool for new business models and innovative revenue streams.

> *Proposition 5: A strong alignment between blockchain technology and organizational strategic goals, coupled with a culture of innovation and adaptability, positively influences its adoption and integration.*

In terms of security, the findings underscore the need for a sociotechnical approach to blockchain security, which considers not only the technical aspects but also the human and organizational factors involved. This aligns with existing literature (Zhang et al., 2019), but this study further emphasizes that blockchain security requires not only technical measures but also a strong organizational commitment to fostering a culture of security awareness. While the importance of combining technical and human factors is well-established, this study highlights that without a shift in organizational behavior, such as prioritizing security awareness and training across all levels, technical measures alone will not be sufficient to mitigate risks associated with human error.

Organizations must not only implement technical measures but also educate their employees on the importance of security practices in a blockchain environment. This shift from focusing exclusively on technology to incorporating organizational culture into the security framework provides a more holistic understanding of blockchain security. The findings of this research indicate that organizations with a culture that promotes security as a core value can significantly reduce the risks related to human mistakes and enhance trust in blockchain systems.

> *Proposition 6: A sociotechnical approach to blockchain security, which integrates human and organizational factors, is essential for strengthening the overall security posture of blockchain implementations and reducing risks associated with human error.*

This study further suggest that organizations must critically evaluate their existing processes and identify areas where blockchain can provide tangible benefits, rather than adopting the technology for its own sake. This strategic alignment is essential for ensuring that blockchain initiatives deliver real value. This study indicates that organizations that take a step back and assess how blockchain specifically addresses inefficiencies, whether through better data integrity, faster transactions, or cost reductions, are more likely to realize the true benefits of the technology.

Furthermore, organizations that proactively seek to innovate their business models in light of blockchain technology are likely to gain a competitive edge. By identifying specific use cases where blockchain can enhance their operations, organizations can position themselves as forward-thinking leaders in their industries. This proactive approach not only supports innovation but also encourages a culture of continuous improvement. This study suggests that organizations that foster this culture of continuous improvement are better positioned to adapt to technological disruptions and remain competitive.

> *Proposition 7: Organizations that critically evaluate their existing processes and identify specific use cases for blockchain technology are more likely to achieve successful adoption and integration.*

The regulatory landscape surrounding blockchain technology presents another significant barrier to its adoption. The findings of this study suggest that organizations must not only engage with policymakers but also take a proactive role in shaping regulatory frameworks that foster blockchain initiatives, particularly in sectors where compliance is critical. While previous research (Faria, 2021) indicates the importance of engaging with regulators, this study goes further by identifying that organizations can play an active role in defining the rules that will govern blockchain technology, not just passively waiting for regulatory clarity. This proactive stance empowers organizations to influence the legal landscape, reducing perceived risks and enabling them to integrate blockchain more effectively.

This study adds the novel insight that organizations should consider forming coalitions with other stakeholders in their industry to collectively address regulatory challenges. This collaborative approach, which has not been fully explored in previous research, enables organizations to present a unified voice in regulatory discussions. By working together with industry peers, organizations can help establish industry-wide standards that not only facilitate blockchain adoption but also reduce the fragmentation of regulations across regions or sectors. Such collaboration can lead to more favorable regulatory outcomes, ensuring a supportive environment for blockchain innovation and fostering a broader adoption across industries.

> *Proposition 8: Active engagement with policymakers to advocate for clear regulatory frameworks and collaboration with industry stakeholders positively impacts the adoption of blockchain technology within organizations.*

While the literature (Kosmarski, 2020) already recognizes the need for partnerships, this study goes further by demonstrating that these partnerships must extend beyond just regulatory alignment to include knowledge sharing, resource allocation, and strategic planning. This collaborative approach facilitates not only compliance but also drives innovation by leveraging the unique expertise and

resources each stakeholder brings to the table. So organizations must engage in partnerships to ensure alignment with industry standards, as these collaborations can help address the complexities of blockchain implementation. By pooling expertise, organizations can reduce duplication of effort, increase operational efficiency, and ultimately enhance the overall effectiveness of blockchain solutions.

In this regard, this study shows that organizations that actively seek partnerships within their ecosystems, whether with other organizations, technology providers, or regulatory bodies, are better positioned to tackle the challenges of blockchain implementation. This collaborative mindset allows them to leverage collective expertise, stay ahead of technological developments, and continuously adapt to the evolving blockchain landscape.

> *Proposition 9: Collaborative partnerships among stakeholders in the blockchain ecosystem that facilitate knowledge sharing, resource allocation, and strategic planning enhance the effectiveness and adoption of blockchain technology.*

> *Proposition 10: Organizations that foster a culture of innovation and adaptability are better positioned to leverage the transformative potential of blockchain technology, particularly through collaborative efforts with key ecosystem players.*

5.2 Practical implications

The practical implications of this research are numerous, particularly for organizations considering blockchain adoption. First, organizations must recognize the transformative potential of blockchain and strategically align its implementation with their operational goals. The findings suggest that organizations with a culture of innovation and flexibility are better positioned to leverage blockchain's capabilities, as they can more readily adapt their processes to integrate this technology. This insight is crucial for decision-makers who must evaluate whether their organizational culture supports the necessary shifts in mindset and operations.

Organizations must thereby take practical steps to actively promote this culture of innovation. This includes integrating innovation into their organizational values, establishing dedicated innovation teams, and providing clear incentives for experimentation and risk-taking. Additionally, organizations can incorporate innovation into performance metrics to ensure that it is actively pursued at all levels. Practical actions like these can help foster an environment that encourages experimentation and creativity, making it easier for organizations to adopt new technologies like blockchain. This approach to cultural change is not just theoretical but must be actively developed in day-to-day operations.

The literature indicates that organizations that embrace change and foster a supportive environment are more likely to succeed in implementing disruptive technologies like blockchain (Faria, 2021). Furthermore, organizations should prioritize investments in training and development to enhance their workforce's technical proficiency regarding blockchain technology. This can be done through internal workshops, certification programs, or strategic partnerships with blockchain experts. The complexity of blockchain can hinder adoption, particularly among non-technical users, but by fostering a knowledgeable workforce, organizations can mitigate the perceived ease of use barriers and enhance overall acceptance of blockchain solutions.

Training programs that focus on both the technical aspects of blockchain and its practical applications can empower employees to engage with the technology confidently. This investment in human capital is essential for ensuring that organizations are not only able to overcome resistance to blockchain but are fully equipped to maximize its benefits. Moreover, organizations should consider establishing mentorship programs where experienced employees can guide newer staff in understanding and utilizing blockchain effectively.

Additionally, the study highlights the importance of addressing regulatory uncertainties that may hinder blockchain adoption. Organizations must engage with policymakers to push for clearer regulatory frameworks that support blockchain initiatives, particularly in sectors where compliance is critical. This proactive approach can help organizations manage the legal landscape and reduce the perceived risks associated with blockchain implementation. By fostering relationships with regulatory bodies, organizations can stay informed about upcoming regulations and be prepared to act quickly to ensure compliance while embracing blockchain’s disruptive potential.

5.3 Limitations and future research

Despite the valuable insights generated by this study, several limitations must be acknowledged, as they provide opportunities for further exploration and refinement. First, the reliance on semi-structured interviews as the primary data source introduces the possibility of confirmation bias, where the analysis may have emphasized themes that align with pre-existing assumptions about blockchain adoption (Kallio et al., 2016). While this approach allowed for in-depth exploration of key topics with knowledgeable participants, it also meant that the analysis could have been influenced by the assumptions of both the researcher and the participants.

However, the choice of semi-structured interviews was intentional, as it allowed for a flexible exploration of the complex issues surrounding blockchain adoption. The interviews provided rich, relevant data from experts in the field, and despite the potential for bias, the depth and quality of insights made them highly valuable in answering the research questions. Additionally, the high level of

expertise of the participants ensured that the findings were grounded in relevant, real-world experience, even if the sample size was limited.

The study's sample size and composition present another constraint. The nine participants were purposively selected from blockchain experts and industry professionals within the Netherlands. While this relatively small sample size limits the generalizability of the findings, it is important to note that the depth of the data collected from these highly knowledgeable and experienced individuals ensured that the study could generate valuable and insightful conclusions. Moreover, the Dutch context with its advanced digital infrastructure and growing blockchain ecosystem, made the data even more relevant for understanding the current state of blockchain adoption (van den Candelo et al., 2023). Despite the small sample size, the quality and relevance of the data obtained were exceptional, allowing for the identification of key themes that answer the research questions comprehensively. However, future research could broaden its scope to include participants from diverse geographic regions and industries to capture a more comprehensive understanding of blockchain adoption dynamics. Additionally, including the perspectives of end-users and non-technical stakeholders could provide a fuller picture of the practical challenges and perceptions that influence blockchain implementation.

This research offers some insights into blockchain adoption at a particular moment, but it does not capture how adoption processes and attitudes evolve over time. Blockchain technology is in a state of rapid development, with frequent advancements in scalability, interoperability, and usability. The absence of a long-term perspective limits the ability to assess how organizations adapt to changes in the technology and its ecosystem. Long-term studies are needed to track the trajectory of blockchain projects, from initial implementation to eventual stabilization or abandonment, to uncover patterns in overcoming barriers and realizing benefits. Also regulatory and environmental contexts also need deeper investigation. This study primarily examined blockchain adoption within the Netherlands, but the findings may not fully apply to regions with less developed infrastructures, stricter regulations, or differing cultural attitudes toward technology. Comparative studies across regions with varying levels of digital maturity and regulatory environments could offer valuable insights into how these external factors shape blockchain adoption.

Finally, while this research focused on identifying and categorizing key factors influencing blockchain adoption, it did not quantify their relative importance or investigate causal relationships. Future studies could apply quantitative methodologies to test the strength and direction of these relationships. For example, examining how perceived ease of use and strategic alignment quantitatively impact adoption rates would provide actionable insights for organizations. So future research should aim to provide a more holistic understanding of blockchain adoption by incorporating diverse methodologies, broader geographic and sectoral scopes, long-term perspectives, and an emphasis on technological and regulatory ecosystems. Such efforts will not only enhance academic knowledge but also offer practical

guidance for organizations seeking to overcome the complexities of integrating blockchain into their strategic plans.

5.4 Conclusion

Blockchain technology has evolved significantly, however its adoption remains uneven across industries, primarily hindered by technical, organizational, and regulatory barriers. This study addressed two key research questions: *What are the critical factors influencing the adoption of blockchain technology for organizations?* and *How can organizations effectively integrate blockchain into their strategic plans while managing the impact on traditional systems?*

Through a comprehensive qualitative analysis of expert interviews, this research identified five key themes influencing blockchain adoption: Perceived Usefulness, Perceived Ease of Use, Barriers to Adoption, Perceived Uncertainty, and Strategic Alignment. These themes cover both the potential benefits and the significant challenges associated with integrating blockchain technology into organizational systems.

Blockchain's perceived usefulness, highlighted through its potential to automate processes, enhance security, and reduce costs, demonstrates its ability to address inefficiencies and deliver measurable benefits across sectors. However, the complexity of blockchain, particularly its steep learning curve and technical intricacies, remains a significant barrier, limiting accessibility for non-technical users. The study emphasizes that, while blockchain's potential is clear, its current usability is still restricted to a subset of users with technical expertise, which limits its broader application, especially in sectors like accounting and finance.

The study also uncovered significant barriers to adoption, including challenges related to integrating blockchain with legacy systems, regulatory uncertainties, and organizational resistance to change. While previous literature has highlighted the importance of governance structures and technical compatibility, this study identifies that these barriers are worsened by the rapidly evolving nature of blockchain technology, which further complicates adoption efforts. The findings suggest that organizations often struggle to keep pace with these changes, resulting in delays and increased integration complexity.

Additionally, financial and operational uncertainties are critical factors hindering blockchain adoption. These uncertainties are related to unpredictable infrastructure costs and the long-term commitment needed for blockchain maintenance, including specialized expertise. The evolving nature of blockchain, coupled with a lack of standardized practices, makes it difficult for organizations to confidently assess the long-term viability of blockchain investments. Organizations must adopt a proactive approach, conducting thorough cost-benefit analyses and factoring in potential regulatory changes to minimize risks.

Strategic alignment emerged as a critical enabler of blockchain adoption as well. Organizations with a culture of innovation and adaptability were found to be more likely to successfully integrate blockchain technology into their strategic objectives. This aligns with existing research but extends the discussion by suggesting that a strong organizational culture that embraces experimentation, learning, and change, is crucial for effectively leveraging blockchain's potential. Furthermore, organizations that proactively align blockchain with new business models and revenue streams are better positioned to maintain a competitive edge in an increasingly digital world.

In terms of security, this study underscores the need for a sociotechnical approach to blockchain security. It highlights the importance of not only implementing technical measures but also fostering a culture of security awareness throughout the organization. Organizations that integrate security into their organizational culture, rather than focusing solely on technology, are better able to mitigate risks associated with human error and enhance overall trust in blockchain systems.

Finally, collaboration within the blockchain ecosystem is crucial for overcoming the inherent complexities of blockchain adoption. The findings suggest that successful blockchain initiatives often require partnerships between organizations, technology providers, and regulatory bodies. This study extends previous research by showing that these partnerships must go beyond regulatory alignment, incorporating knowledge sharing, resource allocation, and strategic planning. Organizations that actively seek partnerships within their ecosystems are better positioned to navigate the challenges of blockchain implementation and drive innovation.

In conclusion, blockchain technology offers significant opportunities for transformation. However, its successful adoption depends on organizations addressing the technical, organizational, and regulatory barriers identified in this study. By aligning blockchain with their strategic goals, fostering a culture of innovation and security awareness, and engaging in collaborative efforts, organizations can better position themselves to harness blockchain's full potential. Despite the challenges, organizations that effectively manage these barriers are more likely to achieve greater operational efficiency, transparency, and competitiveness in the evolving digital landscape.

Appendix

A.1 Semi-structured Interview Guideline

Background information

- To start off, could you briefly describe your professional journey with blockchain technology and the key milestones you have experienced?

Perceived usefulness

- In what ways have you experienced blockchain directly supporting an organization's core objectives? (such as growth, customer satisfaction, or innovation)
- Can you provide examples of how blockchain has created measurable value in any of the projects you have worked on?
    - Can you also provide examples of intangible value, such fostering trust and/or improving collaboration among teams?
- And how do you communicate blockchain's value to stakeholders, especially those unfamiliar with its potential?
    - What challenges do you encounter in explaining blockchain's usefulness to non-technical or skeptical stakeholders?
- From a more strategic perspective, what long-term advantages do you foresee blockchain offering to organizations?
    - Are there particular blockchain features, such as decentralization, transparency, or security, that you believe are essential to achieving these advantages?

Challenges in adoption

- From your experience, are the barriers to blockchain adoption more rooted in technical challenges (e.g., scalability, interoperability) or organizational issues (e.g., lack of awareness, financial constraints)? Can you elaborate a bit more one this?
    - How do these challenges differ based on the size or type of organization (e.g., startup vs. enterprise)?
- What role do you believe regulatory issues play in hindering blockchain adoption?

    - Have you encountered specific regulatory hurdles in your work? For example legal requirements or compliance issues?
        - If yes, how were they addressed?

- How significant is the need for specialized expertise in blockchain adoption?
    - What small steps can organizations take to start overcoming the resource limitations which is often associated with blockchain integration?

Perceived ease of use

- What are some common misconceptions or mistakes organizations make during blockchain implementation?
    - In what ways can these misconceptions or challenges be proactively addressed to facilitate smoother adoption?
- Are there emerging solutions or tools of some kind that are making blockchain easier to learn, adopt, and integrate into organizational processes?
    - If so, what specific technical skills or organizational knowledge are necessary for a successful blockchain implementation?
        - How easily can these skills be transferred or taught within the organization?
        - What challenges do you foresee regarding the ease of learning, adjusting and implementing blockchain solutions in an organizational environment?

Actual use of technology

- When blockchain is implemented, how frequently is it really used in daily operations?
    - Are there in your expierence specific tasks or processes where blockchain is used regularly?
        - If so, can you elaborate a bit why?
        - If not, why is that the case? In what ways is it being used?
- Has blockchain technology integrated into your existing workflow, or that of your clients?
    - If so, can you describe how it changed routine tasks or simplified certain processes?
- What types of training or adjustments were necessary for teams to start using blockchain effectively?

    - Which challenges did they encounter?

- Have there been any unexpected challenges or benefits in the actual day-to-day use of blockchain?

Strategy

We talked about barriers within blockchain adoption, but now I want to focus a bit more on the step by step transition from traditional systems to blockchain.

- What do you believe are the key steps for organizations transitioning from traditional systems (e.g., centralized supply chain management) to blockchain-based systems?
    - How should companies prepare for this shift?
- Can you share examples of successful blockchain implementations in organizations that faced significant barriers?
    - How did they overcame these challenges?
    - Are there any industry-specific best practices that you've found to be successful in overcoming these transition challenges?
- What would you say that other organizations can learn from these examples?

Attitudes towards blockchain adoption

- How would you describe the general attitude towards blockchain technology in your experience?
- Have you noticed attitudes shifting over time? Positive, or negative?
    - Can you elaborate on the factors driving these changes?
- How do you approach skepticism towards blockchain among key decision-makers?
- Given your experience, do the long-term benefits of blockchain outweigh the initial barriers to adoption, and why?
    - Can you elaborate on this believe? Why or why not?

Behavioral intention to use

- How likely are you to recommend blockchain adoption to organizations unfamiliar with the technology?

    - What concerns or hesitations would you address first when discussing blockchain with organizations?

- What factors, technical, organizational, or external, do you see as the biggest drivers or barriers to blockchain adoption?

Future outlook

- In the next 5-10 years, what major developments do you anticipate in blockchain technology?
    - How will these changes impact its adoption across different industries?

Ending

- Is there anything else you would like to share about your experience with or perspective on blockchain technology?
- What advice would you offer organizations that are just beginning their journey with blockchain?
- Do you have any advice for me and my research after this interview?
- Do you have any recommadations to speak to afterwards?

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