

Blockchain auditing dilemma: Exploring hesitation among audit firms



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Abstract: Blockchain technology, initially developed for the cryptocurrency Bitcoin, has expanded its reach into various sectors, such as supply chain management, healthcare, and real estate. The technology's transparency, and security have led many to view it as self-auditing. On the other hand, as blockchain integrates into traditional business models, the necessity for formal auditing processes akin to those in the nonblockchain corporate (business) world becomes evident and highly important. The present research explores the hesitancy among audit firms (statutory auditors) to engage in blockchain auditing, delving into the technological, regulatory, and inherent risks that make blockchain a challenging terrain for auditors and their work. The present research outlines the evolution of the blockchain environment, detailing its historical progression and diverse platforms. This finding underscores the crucial role of auditing in ensuring transparency, trust, and corporate (business) sustainability. The challenges faced by audit firms in the blockchain space, including technical complexities, regulatory ambiguities, and inherent risks such as cryptocurrency market volatility/risk, are extensively discussed. Practical case studies such as those of DAO attack, QuadrigaCX's missing funds, and the scrutiny of Bitfinex and Tether illustrate the consequences of inadequate auditing in blockchain platforms. Potential solutions for these challenges have been put forth, with an emphasis on the following: collaborative learning and training, advocacy for regulatory clarity, technological advancements, and the development of auditing standards specific to blockchain. The study culminates by emphasising the consequences of audit firms' ongoing reluctance towards blockchain technology and the advantages that can be gained by surmounting these obstacles. The aforementioned discovery implies that a mutually beneficial association between auditors and the blockchain industry may usher in an unprecedented epoch characterised by enhanced market economy transparency, confidence, and ingenuity. A comparison of conventional and blockchain auditing methods is presented in the appendices, with an emphasis on the distinctions between the two approaches.

Keywords: blockchain auditing, regulatory challenges, technological risks, auditing standards

1. Introduction

Since its inception, blockchain has promised a revolution in various sectors of our economy, drawing attention from academics, professionals, and the general public alike. Originally conceptualized to support the cryptocurrency Bitcoin, it has now found applications far beyond just digital currency, including supply chain management, healthcare, and real estate, among others (Nakamoto, 2008). As decentralized ledgers, blockchains are inherently designed to be transparent, immutable, and secure, leading many to believe that they are naturally self-auditing (Tapscott & Tapscott, 2016). However, as the technology permeates traditional business models, the need for formal auditing processes, akin to those in the nonblockchain corporate world, becomes apparent.

For many years, the auditing profession, including here statutory auditors and audit firms, has adapted and evolved in the face of technological changes to provide assurance and increase public trust in businesses and their financial reporting (Byrnes et al., 2018; Neu, 1991). However, with blockchain, a unique set of challenges presents itself. Many statutory audit firms and statutory auditors are currently in a state of hesitancy, deliberating over the intricacies of auditing in the blockchain space and the risks and complexities that come with it. The present research, delves into this hesitation by exploring the technological, regulatory, and inherent risks that make blockchain a particularly challenging terrain for auditors and their firm. Also, by understanding the reluctance of audit firms, we can better comprehend the larger implications for businesses operating in the blockchain domain and the broader financial landscape.

2. Evolution of the Blockchain Landscape

The blockchain environment, characterized by its decentralized ledgers and cryptographic techniques, has undergone significant evolution and enhancement since its introduction. The section below outlines and summarizes the historical



progression of blockchain technology and highlights the various platforms, emphasizing their implications for modern corporations (businesses).

2.1. Brief History and Major Milestones in Blockchain Technology

The origins of blockchain can be traced back to the late 1970s and 1980s when cryptographic advances laid the groundwork for secure digital communication (Diffie & Hellman, 1976). However, it was not until 2008 that an entity or individual pseudonymously known as Satoshi Nakamoto presented Bitcoin (BTC)—a decentralized digital currency system built on top of the blockchain (Nakamoto, 2008). This groundbreaking paper by Mr. Nakamoto in 2008, not only introduced to the world Bitcoin but also elucidated the concept of a decentralized, trustless ledger.

Following Bitcoin's start, the next major milestone was the development of Ethereum (ETH) in 2015, which was introduced by Mr. Buterin and colleagues (Wood, 2014). Unlike Bitcoin (BTC), which was primarily a cryptocurrency, Ethereum (ETH) proposed the idea of "smart contracts", self-executing contracts in which the agreement was directly written into code lines.

In subsequent years, there was an explosion of both public and private blockchain platforms and applications, many of which were tailored to specific industry needs. For instance, Hyperledger Fabric, that was initiated in year 2016, provides modular and extensible architecture, catering to businesses desiring more control over their blockchain sets of configurations (Androulaki et al., 2018).

2.2. Varieties of Blockchain Platforms and Their Relevance to Businesses

Blockchain platforms can be broadly categorized into public, private, and consortium chains.

Public blockchains such as Bitcoin (BTC) and Ethereum (ETH) are open to everyone and anyone, ensuring maximum decentralization. Their nature being very transparent and immutable does provide businesses with a trustless environment, which is particularly beneficial for activities such as fundraising through initial coin offerings (Catalini & Gans, 2016).

On the other hand, private blockchains, are restricted and are typically controlled by single organizations. These methods offer more streamlined consensus mechanisms, faster transaction speeds, and enhanced privacy. Such platforms, like the aforementioned Hyperledger Fabric, find their relevance in business environments where control and privacy outweigh the need for widespread decentralization (Androulaki et al., 2018).

Consortium blockchains lie somewhere between and are controlled by the group of entities rather than a single entity. They are typically employed in the industries where multiple organizations need to collaborate but still require a high level of privacy, such as the interbank transactions.

To summarize this section, the environment of blockchain systems has evolved remarkably over the past few decades. Its diverse range of platforms caters to various business and to the corporate needs, making it an indispensable tool in the modern digital and capital economy.

3. The Role and Importance of Auditing

As a professional discipline, auditing plays an indispensable role in upholding the principles of transparency, trust, and business sustainability. Serving as a bridge between businesses and their stakeholders, the audit process ensures financial credibility and strengthens corporate governance

3.1. Basic Understanding of What Auditing Entails

At its core, auditing is the systematic examination of financial statements, records, and related operations to determine their accuracy, completeness, and compliance with established standards, regulations, and procedures (Hayes et al., 2005). The primary objective is to provide an independent assessment and, consequently, assurance to stakeholders that a company's financial statements present a true and fair view of its financial position and operational results.

Auditors not only scrutinize numerical values but also evaluate internal controls, risk management practices, and governance structures to ensure that the organization's processes are robust and resistant to fraud (Power, 1997). This meticulous examination often culminates in the issuance of an audit report, which opines the reliability and accuracy of financial statements.

3.2. Importance of Auditing for Transparency, Trust, and Business Sustainability

Transparency: In a world where corporate financial scandals can significantly impact economies, auditing fosters transparency by ensuring that financial disclosures are accurate and adhere to requisite accounting standards (Sikka, 2009). It provides external stakeholders, such as investors, creditors, and regulators, with a clear window into the financial health and performance of an entity.

Trust: Trust is the bedrock of any financial system. By providing an independent and objective evaluation of financial statements, auditors enhance the credibility of information, thus fostering trust among stakeholders and maintaining the integrity of capital markets (DeAngelo, 1981).

Business Sustainability: Beyond ensuring regulatory compliance, effective auditing can identify operational inefficiencies and areas for improvement, guiding businesses toward sustainable growth (Dando & Swift, 2003). Furthermore, in a rapidly changing business environment, auditing helps companies stay attuned to risks and adapt accordingly, ensuring long-term viability.

In essence, the realm of auditing serves as a pillar of the modern financial ecosystem. Its rigorous processes ensure that businesses remain transparent, trustworthy, and primed for sustainable success.

4. Challenges Faced by Audit Firms in the Blockchain Space

The rapid acceptance of blockchain technology, while promising transformative change across different industries, presents a distinct set of challenges for the auditing profession. The section below delves into these obstacles, ranging from technical difficulties to regulatory ambiguities and inherent industry risks.

4.1. Technical Challenges

Complexity of Decentralized Systems: The decentralized nature of blockchain, a cornerstone feature, complicates the traditional audit methodologies and its process. Decentralized systems do not possess a single point of control, making the verification and auditing of transactions and data integrity more intricate than in the centralized systems (Cheng & Huang, 2019; Cao et al., 2019).

Lack of Standardized Tools and Procedures: The novelty of blockchain technology means that standardized audit tools, procedures and smart working papers are still in their infancy. Current audit softwares and practices might not be readily applicable as we write this research, necessitating the development of new techniques tailored to the unique architecture of blockchain (Liu, 2019; Sheldon, 2019).

4.1. Regulatory and Compliance Hurdles

Evolving Regulatory Landscape and Its Implications: The legal framework governing the blockchain and associated activities remains fluid. Frequent changes in regulations can make it challenging for auditors to stay up-to-date and ensure their clients compliance (Liu et al., 2019; Smith, 2018).

Gray Areas in Blockchain-Related Laws and Guidelines: Given blockchains relative newness, many jurisdictions lack clear, definitive laws or they have ambiguous positions towards blockchain systems. This uncertainty poses a challenge for auditors and audit firms in interpreting and applying the correct standards (Hileman & Rauchs, 2017).

4.2. Technical Challenges

Volatility of Cryptocurrency Markets: The considerable price fluctuations in cryptocurrencies can introduce significant valuation complexities during audits of financial statements and during other assurance services provided by auditors and statutory firms. Determining the correct valuation for financial reporting purposes, given volatility, requires advanced methodologies and tools in the audit profession (Burniske & White, 2017).

Historical Precedents of Security Breaches and Fraud: The blockchain space has witnessed a several high-profile security breaches and fraud incidents. While the technology is inherently secure, vulnerabilities in the software interfaces and external applications pose risks, complicating the auditing process (Atzori, 2015).

4.3. Lack of Sufficient Expertise

Skill Gap among Auditors Regarding Blockchain Technology: The intersection of finance and technology in the blockchain space demands for a new set of skills by auditors and audit firms. Many audit professionals might not yet possess the deep technological knowledge and advanced skills required to effectively audit blockchain-based operations (Liu, 2020; Silva et al., 2022).

Need for Continuous Learning and Adaptation: The dynamic nature of blockchain technology necessitates that the auditors engage in continuous professional development (CPD) to stay abreast of new developments and ensure the relevance and effectiveness of their audit approaches and audit methodologies (Tapscott & Tapscott, 2017).

In conclusion, while blockchain offers transformative potential, it in addition introduces multifaceted challenges for auditors and their firms. Addressing these challenges will be pivotal in ensuring the professions relevance in the era of decentralization.

5. Case Studies

Real-world case studies, help explain blockchain auditings complexities and their limitations. The section below highlights a few key real world cases when audit firms encountered blockchain businesses and faced difficulty or where the lack of comprehensive audits caused industry concerns.

5.1. The DAO attack

In 2016, the Decentralized Autonomous Organization (DAO), built on the Ethereum platform, was envisioned as the venture capital fund. DAO raised more than \$150 million in its token sale. However, shortly thereafter, a flaw in its code was exploited by the unidentified entity, leading to a diversion of 1/3 of its funds (Bissias et al., 2017).

While the DAOs incident primarily stemmed from a coding vulnerability, it highlighted a broader issue of the need for comprehensive audits, not only of financial transactions but also of the underlying code of the blockchain-based businesses. An exhaustive audit might have identified the vulnerabilities in The DAO's smart contract, potentially averting the attack.

5.2. QuadrigaCX's Missing Funds

During 2019, the Canadian cryptocurrency exchange named 'QuadrigaCX' declared its bankruptcy, claiming that it could not access its digital wallets following the sudden death of its CEO, Mr. Gerald Cotten. Subsequent investigations revealed significant irregularities in its operations, including the absence of cold wallets and potential misappropriation of its funds (Fulbright, 2019; Appleby, 2019).

This episode highlights the challenges audit firms face when assessing the internal controls of blockchain entities. Traditional audit procedures and audit methodologies, might not be sufficient to verify the existence and ownership assertions of digital assets, emphasizing the need for specialized approaches tailored to the cryptospace

5.3. Bitfinex and Tether Scrutiny

Bitfinex, one of the largest cryptocurrency exchanges, and Tether, a stablecoin pegged to the US dollar, have faced controversies over the adequacy of their reserves. Concerns were raised about whether Tether (Stablecoin) was genuinely backed by US dollar reserves, as claimed by them. Comprehensive audits are needed by the community to verify these assertions, reflecting the critical role of auditing in ensuring public trust in decentralized systems (Nejadmalayeri, 2022; Zhang, 2021).

This case highlights the importance of robust audit mechanisms for cryptoprocessing entities, especially those dealing with the stablecoins. It emphasizes the role of auditors in ensuring transparency and maintaining the integrity of blockchain-based financial systems.

In conclusion, these case studies highlight the evolving nature of challenges that auditors and audit firms encounter in the blockchain arena. They also highlight the dire consequences of oversight or absence, reinforcing the importance of CPD and adaptation in audit methodologies tailored to this domain.

6. Potential Solutions and Moving Forward

As the blockchain sector grows and matures, it is critical for the auditing profession to stay current and adapt. Addressing these multiple difficulties necessitates comprehensive initiatives that include training, regulatory lobbying, technical acceptance, and the development of audit standards customised to the blockchain context.

6.1. Collaborative Learning and Training

Importance of training existing staff: Continuous education is essential. To ensure that audit companies remain effective and relevant, it is critical to engage in training programmes that educate current employees on the complexities of blockchain, its implications for financial reporting, and the related dangers (Tapscott & Tapscott, 2017; Sheldon, 2019; Albitar, 2020).

Hiring Blockchain-Savvy Auditors: Given the technical nature of blockchain, recruiting experts with both auditing and blockchain experience can help bridge the present skill gap and create a better understanding of client operations (Pimentel, 2020; Liu, 2020; Dyball, 2021).

6.2. Regulatory Clarity and Advocacy

Working with Lawmakers and Regulatory Bodies: The development of more transparent and uniform standards can benefit from proactive cooperation with regulatory agencies. Audit firms and auditors may greatly contribute to the development of a strong and adaptable legal framework by sharing their knowledge and ideas (Yermack, 2017).

6.3. Technological Solutions

Adoption of Auditing Software Tailored for Blockchain: Embracing innovative audit tools designed specifically for blockchain can streamline processes, from transaction verification to risk assessment (Peters & Panayi, 2016; Thakker, 2023; Broby, 2017).

Partnerships with Blockchain Firms: By collaborating with blockchain firms, audit entities can develop and implement transparent auditing solutions that are both efficient and trusted by stakeholders (Catalini & Gans, 2016; Rozario, 2018).

6.4. Technological Solutions

Need for New Standards: The unique nature of blockchain necessitates the development of specific audit standards. Professional bodies, such as the International Auditing and Assurance Standards Board (IAASB) or the American Institute of Certified Public Accountants (AICPA), must consider these unique aspects when developing and refining audit methodologies for the blockchain space (Ponte, 2021; Gauthier, 2021).

In summary, while the task ahead is undoubtedly challenging, with the right strategies and a proactive approach, the audit profession can not only overcome these hurdles but also play a pivotal role in the sustainable growth and evolution of the blockchain industry.

7. Implications for the Future

The ever-changing relationship between the auditing profession and the rapidly growing blockchain business will have far-reaching consequences in the future. Thoroughly comprehending the potential drawbacks—such as audit firms' protracted reluctance to embrace blockchain technology—and the potential advantages—such as improved accuracy—is of paramount significance (Table 1).

Table 1 Comparison of Traditional Auditing and Blockchain Auditing Techniques.

| Criteria | Traditional Auditing | Blockchain Auditing |
|---------------------|----------------------------------|--|
| Verification Method | Sampling | Full-node validation |
| Time Span | Periodic (e.g., annually) | Continuous & real-time |
| Dependency | Centralized records | Decentralized ledgers |
| Tools & Software | Audit software (e.g., ACL, IDEA) | Blockchain explorers, Smart contract analyzers |

7.1. Consequences of Continued Hesitancy

Stagnation of Blockchain Integration: Given auditors' vital role in verifying financial integrity, reluctance to adapt to blockchain might slow industry adoption and integration (Dyball, 2021).

Reduced Investor Confidence: A lack of blockchain auditing clarity and standards may deter institutional investors from entering the crypto market, slowing mainstream adoption of blockchain technologies and assets (Yermack, 2017; Redchenko, 2018; Ponte, 2019).

Limited Growth and Innovation: Blockchain companies without reliable audits may face financial issues and operational hazards, limiting growth and innovation (Smith, 2019; Lombardi, 2021).

8. Final Considerations

Blockchain technology has revolutionised digital transactions, asset verification, and trust. At the intersection of this paradigm change, the auditing profession stands as a beacon of financial integrity, confronting great potential and complex problems.

We have examined the blockchain world from its genesis to its many platforms. Auditing, with its objectives of transparency, credibility, and company sustainability, was highlighted (Tapscott & Tapscott, 2017).

As with all revolutionary inventions, obstacles arise. Technical complexities, changing regulatory frameworks, cryptocurrency market volatility, and a talent deficit are all major obstacles for auditors entering the blockchain space (Yermack, 2017).

We provide real-world case studies to demonstrate the effects of poor blockchain auditing supervision and suggest solutions. Collaborative training, regulatory activism, technology advances, and changing auditing standards are viable future solutions (Catalini & Gans, 2016; Gauthier, 2021).

This story hinges on auditors and blockchain companies working together. A peaceful relationship may help both industries: auditors can use blockchain's openness and immutability, while blockchain companies can gain credibility and confidence via thorough audits (Chiu & Koeppl, 2017).

In conclusion, auditing and blockchain will shape the global financial environment. As auditors, technologists, regulators, or stakeholders, we must foster this connection to ensure a transparent, trustworthy, and innovative future.

Ethical considerations

The authors declare that they have no conflicts of interest, and all ethical issues, including human or animal participation, have been addressed. No such consent is applicable.

Conflict of Interest

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