CryptoAudit: Nature, requirements and challenges of Blockchain transactions audit

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Abstract

CryptoAudit, the process of auditing cryptocurrencies and blockchain-based transactions, is essential in ensuring the accuracy, security, and compliance of activities within the emerging digital asset landscape. This paper explores the unique challenges faced in CryptoAudit, including the absence of a comprehensive regulatory framework, the complexities of blockchain technology, security concerns, valuation difficulties, and the global nature of cryptocurrencies. It also highlights the differences between CryptoAudit and traditional financial audit, emphasizing the need for specialized expertise and adaptability in this evolving field. The study employs a literature review approach and AI-based data analysis to provide insights into existing research and publications related to CryptoAudit. Key findings reveal the importance of staying updated on regulatory developments, collaborating with experts, and developing specialized audit procedures to address these challenges effectively. While CryptoAudit presents significant obstacles, it also offers opportunities for enhancing transparency, efficiency, and trust in the digital financial ecosystem. Auditors play a critical role in ensuring the reliability of cryptocurrency audits, fostering confidence, and facilitating the integration of blockchain technology into accounting and auditing practices. As the cryptocurrency industry continues to evolve, auditors must remain proactive and adaptable to navigate this complex landscape successfully.

Keywords: CryptoAudit, Blockchain technology, Audit challenges, Audit trail, Crypto transaction

1. Introduction

CryptoAudit refers to the process of auditing cryptocurrencies and blockchain-based transactions. As digital assets, cryptocurrencies have gained significant popularity and adoption, resulting in a growing need for assurance and accountability in this emerging space. However, auditing cryptocurrencies presents unique challenges that require specialized knowledge and expertise. Whenever there are significant developments, such as advances in technology, the auditing profession usually comes under more scrutiny, which raises questions about the efficiency of auditing (Kamau, Kavure & Lokuta, 2023). Unlike traditional financial systems, cryptocurrencies operate in a decentralized and relatively unregulated
environment. The absence of established accounting standards and guidelines specific to cryptocurrencies makes it difficult for auditors to determine appropriate auditing procedures and principles.

Cryptocurrency is believed to have developed in the early 1980s as an attempt to develop a decentralized currency for online trading. Online currency was frequently known as "cyber currency" in the 1980s. The concept of online currency was refined further in the 1990s. However, the main worries back then were security and double spending. The term "double spending" refers to the practice of copying and reusing cash for subsequent transactions. This cryptocurrency company was spurred by the events of the 2007–2009 economic slump, which gave rise to the global financial crisis. Several people lost faith in actual currency during this time period. The first cryptocurrency, known as Bitcoin, was created in 2008 (Kamau, 2022). Cryptocurrencies offer several potential advantages over traditional financial systems. They enable peer-to-peer transactions without intermediaries, reducing transaction costs and increasing efficiency. They can also provide greater financial inclusion by allowing individuals without access to traditional banking services to participate in the global economy.

The challenges in CryptoAudit are multifaceted, ranging from the lack of a comprehensive regulatory framework and the complexities of blockchain technology to issues related to security, valuation, and cross-border transactions. Auditors must navigate these challenges to effectively assess the risks associated with cryptocurrencies and provide reliable and accurate audit opinions. Understanding and addressing these challenges is crucial for auditors and stakeholders alike, as it helps foster confidence, mitigate risks, and enhance the overall trustworthiness of the cryptocurrency ecosystem. In the following sections, we will delve into the specific challenges faced in CryptoAudit, exploring their implications and discussing potential strategies and best practices to overcome them.

2. Methodology

This paper has utilized the methodology of conducting a thorough and in-depth analysis of existing scholarly works and publications in the field, which is commonly known as a literature review approach. Furthermore, in order to further enhance the accuracy and comprehensiveness of the findings and facilitate the extraction of relevant information, the study has also employed advanced artificial intelligence techniques specifically designed for the purpose of extracting and analyzing data. The integration of these AI information extraction methods has significantly contributed to the process of generating the results and subsequently facilitating the discussions and interpretations of the obtained findings.

3. Literature Review

A multitude of scholarly articles have been published on the examination and evaluation of cryptographic assets as well as the scrutiny and assessment of blockchain systems. The condensed synopses and overviews of these papers shall be thoroughly examined and deliberated upon in the subsequent sections for comprehensive analysis and understanding.

3.1. Audit of crypto currency transactions

The unique nature, uncertainty, and absence of clear guidelines regarding cryptocurrency transactions introduce extra audit risks that must be taken into account when evaluating clients for acceptance and retention, as well as when planning audit procedures (Vincent & Wilkins, 2020). A study by Broby and Paul (2017) examines the impact of the internet and digital money transfers on financial audits. It focuses on auditing assets stored in distributed ledgers, transmitted through blockchain technology, or held in cryptocurrency. The paper acknowledges the self-verifying nature of financial data in these contexts, which challenges the necessity of traditional audit methods. However, it also highlights the existing weaknesses in blockchain technology that hinder verification processes. The authors specifically address the auditing challenges posed by distributed transaction and custody records. They propose the use of smart contracts as a solution, which can not only address these challenges but also provide arbitration and oversight. The paper's main contribution is the introduction of a protocol to enhance the auditability and robustness of blockchain-based fund movements.

Özgecan, and Umut (2022) discusses the need for auditors to adapt to blockchain technology and develop their skills to incorporate artificial intelligence in the audit process. They suggest that education and skills of professionals should be improved by adding these assets to the independent audit process. There is therefore a need for a single regulation at the international level regarding the related issues and this international regulation is expected here to increase the professional competence of independent auditors for the audit of crypto assets. Stanek (2002) discusses auditing cryptography and assessing system security, including a challenge to break a newly developed encryption algorithm.

The issue of how crypto assets should be accounted according to international accounting/financial reporting standards has been examined by scanning world-wide practices, and it is aimed to create an infrastructure for a legislative study to be carried out in the field of accounting in each country (Alici & Yaniik, 2022). Further, Pramana et al. (2023) conducted a study of accounting for Crypto-asset based on the applicable IAS and found that the most common treatment for Crypto asset is as Intangible Asset and Inventory since the used of Crypto-Asset until now mostly as investment and trading in contract futures. Crypto assets can be classified as intangible assets and inventory due
to the fact that they are intangible in nature and can also be held as inventory. The usage of crypto-assets, from their inception until the present time, has predominantly been focused on investment and trading activities, particularly in the realm of contract futures.

The challenges that arise from the transactions involving cryptocurrency necessitate auditors to adopt a proactive and adaptable approach, while also emphasizing the need for the formulation of international regulations and accounting standards. In order to effectively navigate the ever-changing cryptocurrency market, auditors must not only keep pace with technological advancements, but also stay informed about regulatory changes. This multifaceted environment demands auditors to maintain their position at the forefront, ensuring their ability to conduct accurate and reliable audits.

### 3.2. Audit of blockchain systems

Blockchain is defined as a digital ledger that records real-time transactions among multiple parties in a decentralized manner, with each participant having an identical copy of the ledger. The key appeal of blockchain lies in its peer-to-peer network structure and cryptographic capabilities, which enable secure transactions without the need for a trusted intermediary. The study by Bonyuet (2020) highlights the significant implications of blockchain in the field of accounting, specifically in the form of a triple-entry accounting system where transactions are immutable, timestamped, and encrypted. The main objective of the paper is to review existing research on blockchain and evaluate its impact on the audit profession, including potential risks, procedural changes, and additional opportunities.

Research by Abdennadher et al. (2022) examines the perceptions of accountants and auditors in the UAE regarding the implementation of blockchain technology. Through qualitative interviews with 19 professionals, including accountants, auditors, internal auditors, and risk managers, the study explores the potential opportunities and challenges of blockchain in accounting and auditing practices. The findings reveal that blockchain impacts the accounting profession by enhancing transaction recording, evidence storage, and providing a secure business environment. For auditors, the blockchain necessitates changes in audit processes and strategies. It offers the potential for a decentralized and cost-effective audit process, as well as automated audit evidence. While the fundamental accounting principles remain intact, blockchain and cryptocurrency developments facilitate automation. The study suggests that blockchain will evolve within assurance services through increased awareness and involvement of accountants and auditors.

Despite the challenges that lie ahead, it is important to recognize the significant impact that blockchain technology can have on the fields of accounting and auditing. One area where this transformative potential is evident is in the concept of continuous accounting, auditing, and reporting.

The introduction of blockchain has enabled the development of innovative approaches such as distributed consensual accounting records (DCAR), smart audit procedures, and blockchain-based triple-entry bookkeeping. These advancements have expanded the possibilities for continuous accounting and auditing, bringing us closer to their practical implementation (Bonsón & Bednárová, 2019).

The blockchains referred to in the study by Appelbaum and Nehmer (2020), typically encompass business-to-business or business-to-consumer interactions and are of a private or semi-private nature, residing in private, semi-private, or public cloud environments. Each of these blockchains has its own unique design and operational procedures, which include validation mechanisms performed by miners. The study further investigates the audit considerations pertaining to data reliability, data security, and transaction transparency in accounting transactions that are well-suited for permissioned blockchains, as well as other contextual factors.

The findings of the study by Lombardi et al. (2022) highlighted important implications for both practice and theory. In terms of practical implications, the study highlights that the disruption caused by blockchain in auditing is still in its early stages, calling for more empirical studies and involvement of practitioners. There is a need to reconsider audit procedures in light of digitalization and blockchain technology adoption. Additionally, standards, guidelines, and training should be developed to address the challenges that blockchain will pose to auditing. The study also emphasizes the dual nature of blockchain in auditing, with enthusiasm for its potential benefits and recognition of the risks associated with implementation. These practical implications provide a foundation for future research and help bridge the gap between theory and practice.

The study by Schnitz and Leoni (2019), examines the implications of blockchain technology on the accounting and auditing profession through a literature review. The research focuses on identifying major themes emerging from academic research and professional reports related to blockchain in the accounting and auditing context. The identified themes include governance, transparency, and trust in the blockchain ecosystem, continuous audits enabled by blockchain, applications of smart contracts, and the changing roles of accountants and auditors. The study provides practical implications for accountants and auditors in navigating blockchain development based on these themes. Additionally, suggestions for future research in accounting and auditing in the blockchain era are offered.

### 4. Discussion

#### 4.1. Differences between CryptoAudit and Traditional financial audit

Cryptocurrency audits manifest significant differences
from traditional financial audits as a result of the distinctive characteristics inherent in digital assets and blockchain technology. Although both categories of audits are united by a shared dedication to guaranteeing precision and dependability, auditors must modify their methodologies and harness their expertise in order to conduct thorough audits of cryptocurrency-related activities that yield effective results. Given the ever-evolving nature of the cryptocurrency industry, the requirement for specialized auditors with an acute understanding of crypto becomes increasingly crucial in order to preserve and uphold trust and transparency within this burgeoning financial sphere. The differences can be summarized in Table 1.

<table>
<thead>
<tr>
<th>Difference</th>
<th>Traditional Financial Audit</th>
<th>Crypto Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of Assets</td>
<td>tangible and more conventional financial assets, such as cash, physical inventory, etc</td>
<td>digital assets stored on a blockchain</td>
</tr>
<tr>
<td>Regulation and Standards</td>
<td>follow established accounting standards and regulations</td>
<td>relatively new and lack standardized regulations and accounting standards globally</td>
</tr>
<tr>
<td>Fraud Detection</td>
<td>Auditors often rely on patterns, internal controls, and historical data for detection</td>
<td>Auditors must be vigilant in detecting suspicious activities and potential security breaches</td>
</tr>
<tr>
<td>Technology and Expertise</td>
<td>Auditors require to have expertise in financial accounting and auditing standards</td>
<td>Auditors may need specialized expertise in blockchain technology and cryptography</td>
</tr>
<tr>
<td>Reporting and Disclosure</td>
<td>follow standardized reporting formats and disclosures</td>
<td>involve additional disclosures related to the unique risks and uncertainties associated with cryptocurrencies</td>
</tr>
</tbody>
</table>

4.2. CryptoAudit Requirements

Conducting a comprehensive audit of cryptocurrency involves adopting a comprehensive and all-encompassing strategy that incorporates a thorough analysis of the technical, regulatory, and security dimensions of cryptocurrency transactions and assets. Those responsible for performing the audit must modify their methodologies and harness their expertise to effectively tackle the distinctive obstacles presented by the complex and ever-evolving crypto ecosystem.

4.3. Challenges faced by CryptoAudit

The audit of cryptocurrencies presents several unique challenges compared to traditional financial audits. Auditing cryptocurrencies poses several unique challenges compared to traditional financial audits. One of the key challenges is the lack of a well-established regulatory framework. Cryptocurrencies operate in a relatively new and evolving regulatory environment, where clear guidelines and standards for auditing crypto assets are often lacking. This means auditors must constantly stay up to date with the latest regulatory developments and interpret how they apply to cryptocurrency audits. Here are some key challenges faced in the audit of cryptocurrencies:

1. Lack of Regulatory Framework: Cryptocurrencies operate in a relatively new and rapidly evolving regulatory environment. The lack of established accounting standards and guidelines specific to cryptocurrencies makes it difficult for auditors to determine appropriate auditing procedures and principles. Ensuring compliance with anti-money laundering (AML) and know your customer (KYC) regulations is crucial in crypto audits. Cryptocurrencies have been associated with money laundering and illicit activities. Auditors need to assess whether proper AML and KYC
procedures are in place and whether the transactions comply with relevant regulations.

2. Complex and Evolving Technology: The underlying technology behind cryptocurrencies, such as blockchain, can be complex and difficult to understand for auditors who may not have extensive experience in this field. Additionally, the technology is constantly evolving, requiring auditors to stay updated on the latest developments to effectively audit cryptocurrency transactions. These transactions can involve multiple parties, smart contracts, decentralized exchanges, and unique cryptographic protocols. Auditors need to have a deep understanding of these technical aspects and possess the necessary expertise to analyse and validate the accuracy of transactions.

3. Lack of Physical Evidence: Cryptocurrencies are digital assets that exist only in the form of electronic records. Unlike traditional financial assets, there is no physical evidence, such as bank statements or physical currency, to support the existence and ownership of cryptocurrencies. Auditors must rely on blockchain records, digital wallets, and other electronic evidence to verify the ownership and existence of cryptocurrencies.

4. Security and Custody Risks: Cryptocurrencies are susceptible to security risks, including hacking, fraud, and theft. Auditors must assess the effectiveness of security controls and custody arrangements implemented by the audited entity to ensure the integrity and safeguarding of cryptocurrency assets. Cryptocurrencies are also prone to security breaches, hacks, and theft. Auditors need to consider the effectiveness of security measures implemented by cryptocurrency exchanges and wallets. They must assess the custody arrangements and verify the existence and ownership of crypto assets, which can be quite challenging.

5. Limited Audit Trail: While blockchain technology provides a transparent and immutable record of cryptocurrency transactions, it may not capture all relevant information needed for auditing purposes. Auditors may face challenges in tracing transactions, identifying the parties involved, and obtaining supporting documentation for certain cryptocurrency activities. Cryptocurrency issuers and exchanges may not provide sufficient information or disclosures required for a comprehensive audit. This lack of transparency makes it challenging for auditors to assess the fair value, ownership, and completeness of crypto assets.

6. Valuation and Price Volatility: Cryptocurrencies can experience significant price volatility, which poses challenges in determining the fair value of cryptocurrency assets for financial reporting purposes. Auditors must carefully consider the valuation methodologies and assess the reasonableness of the assumptions used by the entity in valuing their cryptocurrency holdings.

7. Global Nature and Cross-Border Transactions: Cryptocurrencies operate across borders, and transactions can occur between parties located in different jurisdictions. This introduces additional complexity in terms of legal and regulatory compliance, tax implications, and the need for auditors to have a deep understanding of international accounting and auditing standards.

To address these challenges, auditors specializing in cryptocurrency audits must possess a strong understanding of blockchain technology, stay updated on the evolving regulatory landscape, collaborate with experts in the field, and develop specialized procedures to effectively audit cryptocurrency transactions and assets.

The process of overcoming challenges in cryptocurrency audits necessitates the possession of technical expertise, adaptability, and proactivity. In order to effectively tackle these challenges, auditors must employ key strategies that encompass various aspects. These strategies include making investments in ongoing training programs to continuously update one’s knowledge and skills, acquiring a thorough understanding of blockchain technology to grasp the intricacies of cryptocurrency transactions, staying up-to-date with relevant regulations to ensure compliance, utilizing specialized audit tools designed specifically for cryptocurrency audits, implementing enhanced security measures to safeguard against potential security breaches, collaborating with experts in the field to leverage their knowledge and insights, tailoring audit procedures to each individual cryptocurrency to account for their unique characteristics, adapting to the ever-evolving technological landscape to remain relevant, addressing concerns related to the custody of cryptocurrencies to ensure their safekeeping, conducting comprehensive risk assessments to identify and mitigate potential risks, verifying the transaction history of cryptocurrencies to ensure accuracy and transparency, prioritizing independence to maintain objectivity and impartiality throughout the audit process, meticulously documenting findings to provide a clear and comprehensive record, educating clients on the intricacies of cryptocurrency audits to foster understanding and cooperation, adopting a risk-based approach to prioritize areas that require the most attention, seeking external verification to validate the accuracy and reliability of the audit findings, and engaging in continuous learning to stay ahead of emerging trends and developments. By employing these strategies, auditors can effectively ensure the accuracy, security, and compliance of cryptocurrency audits, thereby playing a crucial role in maintaining trust and confidence in crypto-related activities.

5. Conclusion

The audit of cryptocurrencies and the adoption of blockchain technology present both challenges and opportunities for the accounting and auditing profession. The unique nature and uncertainty surrounding cryptocurrency transactions require auditors to consider additional risks and adapt their audit procedures accordingly. The absence of clear guidelines and the evolving
regulatory landscape further complicate the audit process. However, research highlights the potential benefits of blockchain technology in enhancing auditability, transparency, and the efficiency of financial transactions. Smart contracts, distributed ledgers, and triple-entry accounting systems have the potential to revolutionize traditional audit methods. While challenges such as data reliability, security, and transaction transparency exist, efforts are being made to address these concerns and develop appropriate standards and guidelines. It is essential for auditors to stay informed about the latest developments in blockchain and cryptocurrencies, collaborate with experts, and adapt their skills and procedures to effectively audit these emerging assets. The increasing awareness and involvement of accountants and auditors in blockchain technology will shape the future of the accounting and auditing profession, opening up new opportunities for continuous accounting, smart audit procedures, and improved assurance services.

In conclusion, the audit of cryptocurrencies presents a multitude of challenges that auditors must navigate to ensure accurate and reliable financial reporting. The lack of a well-established regulatory framework, complex and evolving technology, the absence of physical evidence, security and custody risks, limited audit trails, valuation difficulties, and the global nature of cryptocurrencies all contribute to the unique challenges faced in conducting crypto audits. To overcome these challenges, auditors must stay updated on regulatory developments, deepen their understanding of blockchain technology, collaborate with experts, and develop specialized procedures to effectively audit cryptocurrency transactions and assets. With the right expertise and adaptability, auditors can provide valuable assurance in an increasingly digital and decentralized financial landscape.

Overall, the crypto audit landscape is evolving rapidly, and auditors must remain at the forefront of these changes to provide accurate and reliable assessments of cryptocurrency assets and transactions. Despite the challenges, the transformative potential of blockchain technology in accounting and auditing is evident, offering opportunities for more efficient and transparent financial processes. As the industry matures, the role of auditors in ensuring trust and compliance in the crypto sector becomes increasingly crucial.

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