

The Metaverse: Financial Assurance Procedures in Smart Contracts and NFTs

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Abstract

Results and contributions: Specific financial assurance procedures adapted to the context of the Metaverse are presented, addressing the particular challenges of virtual assets and smart contracts, where a risk assessment and the appropriate implementation of audit procedures are carried out. Contributing to the adequate preservation of these digital elements to guarantee security and lay the foundation for the future of the digital economy. Purpose: The objective is to describe the financial assurance procedures applicable to virtual assets and smart contracts generated in the metaverse, taking into account their financial, economic, legal and accounting characterization. Gap: The financial, accounting and legal characterization of digital assets in the Metaverse, I contribute to presenting audit procedures in accordance with international financial assurance standards that allow the integrity and reliability of transactions in this rapidly evolving virtual environment. Relevance: It is relevant to accountants and auditors who need to evaluate the integrity and reliability of financial operations in the Metaverse, as well as to any person or entity participating in this environment. Impact: The study will provide a solid foundation to address financial challenges in the metaverse, in the face of adequate procedures to audit and financially support virtual assets, thus contributing to the legality and reliability of operations. Methodology: the methodology is qualitative and descriptive, with a non-experimental transactional design. It begins with a review of the existing standard on financial assurance, virtual assets and smart contracts. It is then characterized by examining the applicable financial principles and regulations, as well as the legal and accounting aspects that influence their management and assurance, and the procedures and their applicability in the context of the Metaverse are evaluated.

Keywords: Metaverse, Financial assurance, Smart contracts, non-fungible tokens (NFTs)

INTRODUCTION

The metaverse is a concept that is becoming increasingly important in the digital world, it has become an integral part of our daily lives online. It incorporates a virtual space that simulates real-life experiences and is considered an eye-opening transformation in the way we live and relate to each other, combining elements of reality and digital. (Bayo & Calderón, 2022)

Technological advances, such as augmented virtual reality, 5G connectivity, and the cloud, are leading to the creation of three-dimensional virtual worlds where humans can interact, work, socialize, and be entertained.

The term "metaverse" comes from the combination of "meta" and "universe," which involves a reality beyond our own. Neal Stephenson, in his work Snow Crash, was one of the first to conceptualize this idea, which has materialized over the years. Today, companies like Facebook (now Meta) are investing heavily in building a metaverse.

The Continuum Metaverse, as described by Jefferson Wang, encompasses a wide range of digital experiences and business models. From online gaming environments and social media to virtual workspaces and educational experiences, the metaverse is changing the way we live, work, and connect (elEconomista.es, n.d.).

On the other hand, Park and Kim's vision underscores how the metaverse is a space where the real and the unreal intertwine. Here, avatars represent people and participate in varied activities, from political and economic affairs to cultural events. This highlights the versatility and breadth of the concept (Park & Kim, 2022).

This ever-evolving phenomenon is transforming human interaction and the way we perceive the digital world. As well as its impact on culture, society and the economy, it will continue to expand as long as technology

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continues to advance, generating a new model where revealing challenges are outlined in terms of financial protection and legality of the operations carried out in this constantly developing space (Johnson, 2022).

The assurance of financial information has proven to be a primary tool for companies in decision-making and the achievement of their objectives in different environments, considering social, economic and environmental aspects that are fundamental today for business sustainability (Smith, 2018). However, the emergence of the metaverse has set new challenges for accounting and auditing professionals, who are facing uncharted territory in improving financial assurance functions in this ever-evolving virtual environment.

In this environment, there is a need to recognize and understand the financial management of business activities and operations created in virtual environments, specifically in relation to virtual assets and smart contracts. These assets and contracts, such as non-fungible tokens (NFTs) and other goods agreed upon in the metaverse, represent real economic value and require appropriate financial assurance guidance to ensure their integrity and reliability (Brown, 2019).

The main objective of this article is to describe the financial assurance procedures applicable to virtual assets and smart contracts generated in the metaverse. To achieve this, a financial, economic, legal and accounting characterization of these assets and contracts will be carried out, as well as an evaluation of their impact on operational processes and transactions in virtual reality.

The reasonable security of activities in the metaverse is essential to ensure the legality of the registration of legal and commercial acts of companies that have adopted this new form of globalization in their activities (Virtual Economy Institute, 2021).

In this sense, it is intended to determine the financial assurance procedures that provide confidence and certainty in the operations related to these transactions in this virtual world.

To achieve these objectives, an identification and review of financial assurance standards will be carried out, in order to establish appropriate procedures for auditing, evaluating and financially supporting virtual assets.

This research provides valuable insights into financial assurance in the metaverse, providing a solid foundation for addressing the challenges that arise in this ever-evolving virtual environment. Likewise, companies will have an input to make informed decisions and establish appropriate measures to safeguard their financial interests in this new digital frontier.

International Standards on Auditing

The audit is a process that has been implemented in companies due to the application system and the procedure that is carried out for the collection of information and the subsequent analysis and evaluation that is carried out to determine the correct functioning of the areas involved in said diagnosis, where an opinion is issued about the current state of the same by the auditor and his work team according to the case.

Because of this, and as mentioned by María Paulina Brito Ochoa, management obtains solid foundations by increasing control mechanisms where they can know the current economic reality of their company and the reasonableness of the information that is being presented, so they can determine the efficiency and effectiveness in the execution of the strategies for the fulfillment of the planned objectives and as the case may be, take the necessary measures to ensure that these are carried out in the best possible way, taking into account the focus and objectives planned in the entity (Ochoa, 2016).

Today, auditing has become a fundamental process for entities, as it drives business success by allowing them to improve and achieve their objectives more efficiently in their internal processes. As you define it (Ganchozo-Mendoza, 2023) where auditing, which initially focused on reviewing and preventing errors in the financial information of small and medium-sized businesses, has evolved over time. Now, in addition to verifying a company's financial condition and profits, its scope has been expanded to include fraud detection and prevention, as well as effectiveness evaluation.

The implementation of a solid audit not only guarantees the fulfillment of goals, but also a more effective operation in the various areas they manage.

In the context of the relevant auditing standards, the following are highlighted:

ISA 200 - Global Objectives of the Independent Auditor and Conduct of an Audit in Accordance with Auditing Standards

Overall objectives of the independent auditor and conduct of the audit, where it is mentioned that the purpose of an audit is to obtain sufficient information of certainty about each detail of the financial statements as a whole, to determine that they are free from any material misstatement such as fraud or error. (*Standards & Pronouncements* | IAASB, n.d.) This statement clearly defines the essential purpose of the audit, which is to provide reasonable assurance as to the accuracy of the financial statements. In addition, ISA 200 emphasizes that the auditor must conduct the audit in accordance with auditing standards, which include both ISAs and any applicable legal or regulatory requirements.

In addition, paragraph 11 of ISA 200 states that "The independent auditor shall plan and conduct an audit with a high-level approach that incorporates the independent auditor with an attitude of professional skepticism and that is based on the assessment of the risks of material misstatement, and obtains sufficient and adequate audit evidence to support the basis of his or her opinion." (ISA 200, paragraph 2) This guidance underlines the importance of a comprehensive and critical approach by the auditor, focusing on assessing the risks of material misstatement and obtaining sufficient audit evidence.

ISA 500 - Audit Evidence

The main purpose of this standard is to establish precise guidelines and requirements for obtaining sufficient and adequate audit evidence. Such evidence supports the auditor's conclusion on the reasonableness of the statements in the financial statements. ISA 500 guides the auditor in the projection and compliance with audit procedures specifically designed to collect evidence that is relevant, reliable and useful in the revalidation of its opinions and judgments related to the audited entity. In line with this, the standard emphasizes the fact that "the greater the risk and, therefore, the greater the uncertainty in a line item, the greater the amount of audit evidence will be needed to reduce uncertainty to acceptable levels." (ISA 500, paragraph 5). This quote highlights the relevance of the interrelationship between risk and the amount of evidence needed for the audit. This indicates that, as risk and uncertainty grow in a line item, an increase in the amount of evidence is required to decrease those levels of uncertainty. According to (Herrera, 2023) The auditor must be closely associated with the collection of evidence, if he does not have this he cannot ensure any finding, either for the investigation or against that of the investigated, if the procedures established by the international standards of auditing in relation to the collection of evidence are not followed, the result may be that an innocent person is wrongly accused of fraud or error. This highlights the importance of an accurate risk assessment and proper implementation of audit procedures.

ISA 330 - Auditor's Responses to Assessed Risks

This ISA sets forth instructions to be followed by the auditor for the purpose of designing and executing appropriate responses to the risks assessed during the audit of the financial statements. Its scope is to provide detailed guidance that enables the auditor to confidently identify and address material risks in the financial statements.

Paragraph 11 of ISA 330 clearly emphasizes this approach, stating that "The auditor shall design and conduct additional audit operations the environment, timing and scope of which depend on the auditor's assessment of the risk of material misstatement at the assertion level and the auditor's response to those assessed risks." (ISA 330, Paragraph 11) This emphasizes that the design and implementation of additional audit procedures should be based on the assessment of the risk of material misstatement and the auditor's response to these risks. This underscores the importance of an accurate and proportionate response to the risks identified during the planning stage of the audit.

To achieve this, the auditor must acquire a solid understanding of the particularities inherent in the entity and its environment. This includes assessing both the inherent risks and the risks associated with the control. With this understanding in mind, the auditor is in a position to design and carry out audit procedures that are appropriate in terms of the nature, magnitude, and complexity of the risks identified.

ISA 520 - Analytical Procedures

This standard plays an undeniable role in the audit process by establishing guidelines and guidelines for the application of analytical procedures during the audit of financial statements. In order to carry out a reliable audit, the professional must take into account the necessary tools that facilitate and allow him to obtain support for the work he is doing.

Full Population

Table 1. Substantive procedures

Procedimientos analíticos	Detail tests
Predictive analysis	Complete population
Analysis of data	Sampling
Coefficient analysis	Specific games
Trend analysis	

Source: Authors' own creation

As can be seen, ISA 520 is a guide for the auditor in the effective use of analytical procedures as a tool to obtain sufficient and adequate audit evidence. According to paragraph 5 of ISA 520, "Analytical procedures consist of evaluating the relevant financial and non-financial relationships that exist between different data sets." These operations allow the auditor to compare and contrast financial and non-financial data in order to identify patterns, trends and possible anomalies.

With this set of analyses, it is possible to obtain more accurate and concrete evidence about individual transactions or account balances and the reasonableness of the financial statements as a whole.

It is important to note that analytical procedures are not a substitute for other substantive tests and compliance tests. Instead, they complement these procedures by providing a more complete and detailed view of financial transactions and balances.

METHODOLOGY

The methodology proposed for this research is qualitative and descriptive, with a non-experimental cross-sectional design, starting with a review of the existing standard on financial assurance, literature review on virtual environments, metaverse, virtual assets and smart contracts, then it is characterized by examining the applicable financial principles and regulations, as well as the legal and accounting aspects that influence their management and management. Assurance, continuing with the evaluation of procedures and their applicability in the context of the metaverse under the established financial assurance standards and adapting them, if necessary, to address the particularities of the research, finally a series of specific financial assurance procedures adapted to the context of the virtual world addressing the particular challenges of virtual assets and smart contracts is generated. guaranteeing legality and confidence in the operations carried out.

RESULT AND FINDINGS

This section is divided into three parts, as follows: 3.1) characterization of assets and contracts from financial, legal and accounting aspects; 3.2) General Audit Procedures on Smart Contracts and Non-Fungible Tokens; and 3.3) Audit procedures for obtaining audit evidence in smart contracts and Non-Fungible Tokens.

Characterization of assets and contracts from financial, legal and accounting aspects

Non-Fungible Tokens (NFTs)

Non-Fungible Tokens (NFTs) are unique and indivisible digital assets that are created and recorded on a blockchain. Unlike cryptocurrencies like Bitcoin, which are interchangeable and have an identical value to each other, NFTs represent a digital work of art, a virtual game, a piece of music, a video, among other unique assets.

These NFTs allow you to prove the reality and ownership of your digital asset, since they are registered on a public blockchain and cannot be duplicated or replicated without the owner's consent. Additionally, NFTs can

include additional information, such as the history of the digital asset and its creator, which adds value and authenticity to the piece.

NFTs also allow content authors to value their digital artwork or unique asset, set a sale price, and receive a commission each time the NFT is sold on the secondary market. This has led to an expansion in the popularity of NFTs in the artistic and creative community, as well as in the world of art and digital goods collectors.

However, it is important to note that regulations around NFTs vary across regions and are constantly evolving due to the development of this technology. Therefore, it is critical that both businesses and individuals who engage in NFT-related transactions have a solid understanding and comply with the laws and regulations in place in their respective geographical locations. Next, its characterization is defined from financial, economic, legal and accounting perspectives, considering its particularities and applications.

Financial Characterization

Uniqueness and uniqueness: Its financial value may vary due to its unique specifications and its difference from other digital assets.

Valuation: Its quantification depends on factors such as market demand and the uniqueness of the asset.

Investment and speculation: Price volatility can be generated and they are acquired as an investment or with speculative fines.

Economic Characterization

Digital Art Marketplace: Allows artists to sell digital works with authenticity and particularity.

Applications in games: In the video game industry, NFTs are handled to represent objects and assets within the game, which can generate virtual economies.

Legal Characterization

Proprietary Rights: Represent property rights, such as in the case of digital artwork or virtual real estate.

Smart contracts: NFTs are backed by smart contracts that define their features and terms of use, which has legal implications.

Accounting Characterization

Accounting recognition: They are recorded in a company's books as intangible assets or investments, depending on their purpose.

Depreciation: In some cases, they may be subject to depreciation if their value decreases over time.

Revenue recognition: The sale of NFTs should follow proper revenue recognition standards as they can generate significant revenue.

Smart Contract

A smart contract is a type of software that runs on a blockchain and is used to provide for the execution of a transaction. Instead of relying on intermediaries, such as lawyers or notaries, smart contracts use programmed computer codes to execute the terms of the agreement automatically and ensure compliance (Soto, 2023). In essence, they are technology-based contract calculation systems that ensure automatic compliance with the terms of the agreement without human intervention.

Smart contracts, according to Cárdenas and Molano (2022), are modular and autonomous scripts that run on blockchain or distributed ledgers, representing offers to perform certain computing tasks. These contracts offer a declaration of the principle of autonomy of will, allowing the parties to freely establish the means to express their agreement, as long as the legal requirements are met.

The concept of a smart contract, according to (Nava González et al., 2021) It refers to a set of computer codes that operate automatically on a blockchain platform. These codes have the ability to carry out the automatic

execution of an established agreement, bringing exceptional levels of reliability and transparency to the transaction. This contribution highlights the importance of calculation and technology to ensure integrity and veracity in the fulfillment of contractual agreements.

In this regard, automation is the key feature of smart contracts, as they eliminate the need for human intervention to enforce the terms of the agreement. Rather than relying on intermediaries or third parties, the programming logic and specific conditions built into the contract guide its execution. This not only increases efficiency, but also significantly reduces the risk of non-compliance and ensures a high level of reliability in contractual transactions. Smart innovation contracts, therefore, represent an important one in agreement management and promise to transform the way contractual obligations are carried out and executed. As mentioned by Rubiano (2023). This resembles the operation of a vending machine, where the different computer codes that make up the contract are only activated if the conditions previously established in its programming are satisfied.

The characterization of these contracts covers financial, economic, legal and accounting aspects. Their adoption, like NFTs, is constantly evolving and requires a complete understanding of local regulations and standards, as well as accounting best practices to ensure proper and legal use of this emerging technology.

Financial Characterization

Systematization of financial transactions: To decrease operating expenses and improve efficiency, smart contracts are used to automate financial operations, including payments, benefits, and investment agreements.

Transparency and tracking: Contracts make it easy to conduct financial audits, given that the built-in blockchain technology allows for clear tracking and complete recording of all smart contract-related transactions.

Reduction of intermediaries: There is a reduction in costs related to commissions due to the cancellation of intermediaries in financial transactions.

Economic Characterization

Systematization of business processes: An increase in the economic efficiency of companies is generated by the automation of business processes, such as supply chain management, inventory management, and distribution, among others.

Transfer and trading: With the generation of tokens representing physical or digital assets, the transfer of ownership and the trading of assets online is allowed.

Legal Characterization

Legal enforceability: The validity of smart contracts may depend on the geographic location and whether they comply with the laws in place in that area. Assessing legal characterization involves determining whether a smart contract is legitimate and complies with local regulations.

Auto-execution: The automated activation of smart contracts raises legal questions about who bears responsibility in situations of non-compliance or dispute.

Accounting Characterization

Accounting recognition: Smart contracts can generate transactions of assets and liabilities according to the executed transaction. This includes the tokens or digital assets created by the smart contract.

Revenue and Expense Recognition: According to the operations associated with smart contracts, they must follow the applicable accounting standards under the IFRS standard.

3.2 General Audit Procedures on Smart Contracts and Non-Fungible Tokens

The general audit procedures in smart contracts and Non-Fungible Tokens in the metaverse are similar to traditional audit procedures, but focus on assessing the context of the metaverse.

Here are some audit procedures that can be applied in the metaverse:

Evaluation of the structure of the smart contract: The auditor should evaluate the structure of the smart contract in terms of its design and functionality, ensuring that it meets the technical requirements and required specifications.

Source code review: The source code should be reviewed to identify potential vulnerabilities or bugs in the code, and ensure that it meets security and quality standards.

Functional tests: It is essential to verify with functional tests that the contract has been planned and that the results are produced correctly and consistently.

Transaction review: Examining the transactions recorded in the smart contract is critical to verify that they have been processed properly and that the results are reflected in the account balances.

Associated risk analysis: Analyze the associated risks, including exposure to potential vulnerabilities, regulatory compliance, and fraud risk.

Security testing: Conducting security testing is critical to verify that the contract is protected against potential security threats, such as hacks and malicious attacks.

Transparency Assessment: Assess transparency by ensuring that relevant information is disclosed in a clear and accurate manner.

Use of the NFT: Understand the business model and evaluate the issuance of the token.

Identify risks in NFTs: verify authenticity, ownership, and valuation.

NFT Regulatory Compliance: Making sure the entity complies with tax and accounting regulations.

Ownership and transparency: Review of transactions and procurement process.

3.3) Audit procedures for obtaining evidence in smart contracts and Non-Fungible Tokens.

Analyzing this information against smart contracts and non-fungible tokens (NFTs) involves considering how these audit procedures apply and adapt to the unique characteristics of these technologies.

In the realm of smart contract and NFT auditing, they must have sufficient and adequate audit evidence, which is critical to support the audit opinion and report. This research explores the importance of audit evidence in the context of these contracts, as well as the procedures used to obtain it and its influence on the auditor's opinion.

Audit evidence as a basis for opinion and report:

Inspection

Table 2. Elements of audit procedures to obtain and evaluate evidence

<ul style="list-style-type: none"> • Inspection • Observation • Confirmation • Recalculation • Reexecution • Analytical procedures

Source: Authors' own creation

These procedures are critical to financial auditing, inspection and observation verify documents and processes, while confirmation elicits responses from third parties to corroborate information. Recalculation ensures arithmetic accuracy, and reexecution repeats tests to confirm consistency, finally analytical procedures provide

an overview. These procedures help auditors assess the completeness of financial statements, identify risks, and detect potential errors or fraud.

Quality over quantity in audit evidence:

It is important to note that, as with other audits, the quality of the evidence is more relevant than the quantity. The auditor must provide sufficient evidence of the risks identified, but must also consider the quality of the evidence. A smaller amount of high-quality evidence is preferable to a large amount of low-quality evidence.

Relevance and reliability of the evidence:

The opinion of the professional in the audit is based on the relevance and reliability of the evidence. However, it is significant to note that the form, nature, and circumstances in which evidence is obtained may affect its validity and reliability. The auditor should make a critical assessment of the evidence collected and consider these factors.

Issuing an appropriate opinion:

ISA 330 allows the auditor to conclude whether the assessment made in the audit is adequate, so the auditor must be absolutely certain about the validity and sufficiency of the evidence collected. In the event that the evidence is insufficient or invalid, the auditor should make every effort to obtain further evidence. If this is not possible, you may issue a cautionary opinion or refrain from issuing an opinion.

Sufficient and adequate audit evidence plays a critical role in supporting the audit opinion and report. Through the application of specific audit procedures and consideration of the quality of the evidence, the auditor can examine smart contracts and NFTs in detail to assess their validity and trustworthiness. By following the guidelines set forth in ISA 200 and conducting a critical evaluation of the evidence collected, the auditor can build confidence in the users of the financial information regarding the completeness and accuracy of the auditees. In case the evidence is insufficient or invalid, every effort should be made to obtain further evidence, thus ensuring an adequate and informed opinion.

Paragraph 27 shows that audit evidence must have a logical connection to the audit procedure and the assertion being tested. In the case of smart contracts and NFTs, it is important that the evidence is directly related to the execution and compliance of the smart contracts, as well as the authenticity and ownership of the NFTs.

Paragraph 31 highlights that the reliability of audit evidence may be affected by its origin and nature, as well as by the circumstances in which it is obtained. In the context of the investigation, auditors should consider the reliability of the information recorded on the blockchain and evaluate the controls used to prepare and retain such information.

Section 33 refers to the importance of identifying and assessing the risks of errors or fraud related to smart contracts and NFTs. Sufficient and appropriate evidence must be obtained to design and implement procedures that address these specific risks.

Paragraph 49 highlights the need for reliable audit evidence. This implies that the information provided by the entity must allow for the implementation of complete and timely audit procedures. In the case of smart contracts and NFTs, this implies that records and transactions on the blockchain must be complete and accurate to support audit evidence.

Paragraph 52 mentions that a test will be effective if it provides adequate audit evidence. Auditors have different options for selecting the items to be tested, either by selecting all items or using audit sampling. In the context of smart contracts and NFTs, auditors can select specific items, such as individual contracts or specific transactions on the blockchain, to obtain the necessary audit evidence.

It is important for auditors to be familiar with how smart contracts work and have the ability to review and evaluate their logic and compliance.

As for non-fungible tokens (NFTs), which are unique and non-interchangeable digital assets. The audit of NFTs may require specific procedures to confirm their authenticity and ownership, as mentioned in section 15.

Auditors can examine transaction records on the blockchain and look for external confirmations to support the existence and ownership of NFTs.

In addition, paragraph 13 highlights the importance of having backup copies of electronic information. In the case of smart contracts and NFTs, it is crucial to ensure the integrity and availability of records on the blockchain. Auditors should evaluate the security controls and risk management related to the technology used.

Audit procedures such as inspection, external confirmation, analytical procedures, and inquiry need to be tailored to the specific aspects of smart contracts and NFTs. For example, document inspection may involve reviewing smart contract codes or verifying recorded transactions to support the existence of NFTs. External confirmation can be done by verifying transactions with the parties involved in smart contracts.

Adapting procedures and understanding the underlying technology are critical to obtaining reliable audit evidence in the context of smart contracts and NFTs.

CONCLUSION

Audit procedures on smart contracts and non-fungible tokens in the metaverse are similar to traditional audit procedures, but require a more detailed assessment of technical and security aspects in the context of the metaverse. Implementing these audit procedures can help ensure integrity and reliability.

Obtaining sufficient and adequate evidence in the audit is essential to support the opinion and report. By following the principles set out in ISA 500 and making use of appropriate procedures, the auditor can build confidence in the users of the information

Auditing smart contracts and Non-Fungible Tokens (NFTs) in the context of the metaverse is critical to ensuring the integrity and accuracy of digital transactions. The unique characteristics of these assets and the ever-evolving local regulations must be considered. The audit evidence supports the auditor's opinion and should be related to the execution of contracts and the authenticity of the NFTs. Audit procedures should be tailored to these digital assets, and quality of evidence should be prioritized over quantity. Compliance with international auditing standards is essential to maintaining reliability.

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