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Blockchain: Trend in the Digital Transformation of Accounting and Auditing

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Abstract: Blockchain technology is emerging as a disruptive innovation, especially in the context of digital transformation. In the accounting and auditing sectors, blockchain presents opportunities to restructure the processes of recording, validating, and verifying financial information toward greater transparency, automation, and security. However, alongside these potentials come technical, legal, and professional ethical challenges. This paper aims to analyze both the opportunities and challenges associated with the application of blockchain in accounting and auditing in Vietnam and globally, while also proposing recommendations to effectively leverage this technology.

Keywords: blockchain, accounting, auditing, digital technology, information transparency

I. Introduction

In the context of the Fourth Industrial Revolution, digital transformation has become an inevitable trend across all industries, particularly in accounting and auditing. The adoption of advanced technologies such as Artificial Intelligence (AI), Big Data, Cloud Computing, and especially Blockchain, is transforming traditional operational models-paving the way for more transparent, efficient, and accurate handling of financial data.

Blockchain, with its decentralized, immutable, and transparent nature, is considered a breakthrough technology capable of reshaping accounting and auditing processes. Rather than relying on centralized systems, which are prone to tampering and fraud, blockchain provides a secure and trustworthy platform for recording and validating financial transactions. This not only reduces risk but also enhances the reliability of financial data, meeting the increasingly stringent requirements of stakeholders.

This study aims to analyze and assess the role of blockchain technology in the digital transformation of the accounting and auditing profession. Specifically, the paper focuses on examining the technical characteristics of blockchain and their implications for accounting and auditing processes; evaluating real-world applications of blockchain in accounting and auditing, including triple-entry accounting, smart contracts, and continuous auditing; identifying the opportunities and challenges of blockchain adoption—particularly in the Vietnamese context; and proposing future research directions and applications to maximize blockchain's potential in the digital transformation of the accounting and auditing industry. By synthesizing and analyzing existing research, the paper seeks to provide a comprehensive view of the role of blockchain in accounting and auditing, thereby assisting managers, businesses, and researchers in developing effective digital transformation strategies.

II. Theoretical Foundations of Blockchain Technology

2.1. Concept and Operating Principles

Blockchain is a type of distributed database that operates on a decentralized mechanism, where information is recorded in sequential data blocks and linked together via cryptographic hash functions. Each block contains not only transactional data but also a timestamp and the hash of the preceding block. As a result, any change in one block would alter the entire chain, creating a robust data protection mechanism.

According to Nakamoto (2008), the creator of blockchain through the cryptocurrency Bitcoin, transactions are validated and added to the chain via consensus mechanisms such as Proof of Work (PoW) or Proof of Stake (PoS). These

consensus protocols ensure that all nodes in the network agree on the new state of the ledger, eliminating the need for a trusted third party such as a bank or traditional auditor.

In summary, blockchain is a decentralized information system where data integrity and transparency are guaranteed through cryptographic techniques and automated consensus processes, minimizing the risk of data falsification or unauthorized alteration.

2.2. Characteristics of Blockchain

Immutability

Once information is recorded on the blockchain and the block is added to the chain, it becomes virtually impossible to alter the content. This is because each block contains a hash that links to the previous one. If the data in any block is modified, its hash changes, disrupting the entire chain. This immutability is particularly important in accounting and auditing, where data accuracy and integrity are paramount.

Transparency and Auditability

Blockchain enables every transaction to be recorded in a public and immutable manner. This allows stakeholders to access and verify data easily, facilitating auditing, reconciliation, and cross-validation processes. In public blockchains, anyone can access the data, whereas private or consortium blockchains allow access to be controlled according to organizational needs.

Decentralization

Blockchain is not controlled by a central server but maintained by a network of independent nodes, each holding a complete copy of the blockchain. This architecture increases resilience against cyberattacks and system failures. In auditing, this eliminates the risk of data being manipulated or dominated by a single party.

Data Security

Information on the blockchain is encrypted using strong cryptographic algorithms such as SHA-256, protecting it from unauthorized access. Moreover, thanks to the consensus mechanism, transactions are only added to the chain once confirmed by a majority of nodes, increasing trustworthiness.

Automation with Smart Contracts

Smart contracts are self-executing computer programs that automatically fulfill contract terms when predefined conditions are met. These contracts eliminate the need for manual intervention, reduce errors, and save time.

2.3. Common Types of Blockchain

There are currently three main types of blockchain deployed depending on the application purpose:

Public Blockchain

This is an open blockchain where anyone can participate, validate, and record data. Typical examples include Bitcoin and Ethereum. Public blockchains are suitable for applications requiring absolute transparency, such as financial transactions, but are not ideal for enterprises with high internal confidentiality needs.

Private Blockchain

Access is restricted to a specific group of individuals or organizations who can read and write data to the blockchain. Due to its controlled nature, private blockchain is suitable for organizations such as banks or auditing firms, where high security and clear procedures are essential.

Consortium Blockchain

Operated by a group of organizations rather than a single entity, this type is suitable for economic alliances, financial associations, or sectors involving multi-party coordination such as auditing, logistics, or supply chains.

2.4. Blockchain and Accounting–Auditing Theory

From a theoretical perspective, blockchain has the potential to shift accounting from the traditional double-entry system to a triple-entry accounting model, where transactions are immediately and reliably recorded among three parties: the buyer, the seller, and the blockchain system as an independent intermediary. This reduces the need for manual adjustments and increases the reliability of financial reporting.

Additionally, blockchain aligns well with auditing principles such as honesty, objectivity, and verifiability, enabling auditors to conduct continuous audits with stronger and more reliable evidence.

III. Applications of Blockchain in Accounting

The rapid development of blockchain technology is increasingly impacting the principles and practices within the accounting field. As a distributed and immutable system, blockchain has the potential to reshape how financial information is recorded, stored, and reported, while enhancing the transparency and reliability of accounting data. The following are prominent applications of blockchain in accounting:

3.1. Triple-entry Accounting

Triple-entry accounting is one of the most groundbreaking applications of blockchain. Initially proposed by Yuji Ijiri (1989) and later popularized by Ian Grigg in the context of blockchain, this model supplements the traditional double-entry accounting system—where each transaction is recorded as a debit and a credit—with a third entry: a cryptographically signed record of the transaction stored on the blockchain. This immutable and verifiable record enhances the ability to cross-check between parties, reduces the risk of intentional fraud or accidental errors, and facilitates the audit process by providing real-time, tamper-evident evidence.

3.2. Automation and Standardization of Accounting Processes

One of blockchain's most prominent features is its capacity to automate accounting processes through the use of smart contracts. These are programmable code snippets that automatically execute actions when predefined conditions are met. In accounting, smart contracts can automate revenue recognition upon delivery and invoice confirmation, accrue recurring expenses such as depreciation or prepaid costs, and perform automatic debt reconciliation between companies using consortium blockchains.

Automating accounting processes through blockchain reduces labor and processing time, increases data accuracy and consistency, and mitigates legal risks stemming from revenue and expense recognition errors.

3.3. Asset Management and Financial Transparency

Asset management is a core function of corporate accounting. Blockchain can support the transparent and efficient tracking of fixed assets, leased assets, and intangible assets (e.g., intellectual property). When assets are tagged with unique identifiers and integrated into a blockchain system, any changes (use, transfer, impairment, disposal) are recorded in real-time and cannot be altered.

Moreover, publicly listed companies can leverage blockchain to disclose key financial metrics in real time, establishing a transparent information channel that builds investor trust and reduces risks arising from information asymmetry.

This application is particularly useful in scenarios such as:

- **Fixed asset inventory:** Every movement or transfer of an asset is recorded immediately.
- **Collateral verification:** Credit institutions can access up-to-date asset data stored on the blockchain.
- **Management of software licenses and copyrights:** Using NFTs or tokens, blockchain clarifies ownership rights.

3.4. Advanced Accounting Analytics and Forecasting

By integrating blockchain with complementary technologies such as Artificial Intelligence (AI) and Big Data, accounting can shift from a "record-keeping" role to one of "analysis and forecasting." Blockchain provides accurate, real-time, and tamper-proof data—an ideal foundation for training machine learning models to forecast revenue, expenses, cash flow, and detect early signs of financial risk.

The application of blockchain in accounting offers tangible and comprehensive benefits—from improving transparency and accuracy of records, to automating processes and standardizing data. However, successful implementation also requires enterprises to invest in IT infrastructure, train personnel, and adapt to emerging models such as triple-entry accounting. If applied correctly, blockchain can become a pivotal driver in the digital transformation of the accounting profession in the era of Industry 4.0.

IV. Applications of Blockchain in Auditing

Auditing, which plays a critical role in ensuring the reliability of financial information, is under growing pressure to innovate in order to meet demands for greater transparency, timeliness, and efficiency in the digital era. With its immutable, transparent, and decentralized nature, blockchain is regarded as one of the foundational technologies with the potential to fundamentally transform traditional auditing procedures and methodologies. Its application not only enhances audit quality but also enables continuous and real-time auditing.

4.1. Continuous Auditing

In traditional auditing, auditors typically collect evidence, examine documents, and assess risk at periodic intervals—often at the end of the fiscal year. This reactive approach has significant time lags and carries the risk of missing issues that occur between audit periods.

Blockchain facilitates continuous auditing, whereby auditing activities are conducted in parallel with business transactions. As accounting systems are connected to the blockchain where transactions are recorded almost instantaneously, auditors can access and evaluate transactions as they happen, allowing for quicker detection of anomalies or violations.

4.2. Enhanced Audit Evidence Quality

A major challenge in auditing lies in verifying the origin and integrity of audit evidence. When data is stored on the blockchain, its immutability and traceability provide the following advantages:

- **Authenticity:** Transactions are validated by the network and cannot be altered once recorded.
- **Completeness:** The entire transaction chain can be traced from origin to endpoint, enabling auditors to assess the full process without omissions.
- **Reliability:** Data cannot be modified at will by enterprises or third parties, increasing trustworthiness for both auditors and users of financial reports.

According to Deloitte (2021), blockchain can reduce the time required to gather audit evidence by more than 50%, and lower auditing costs through automated data retrieval and verification.

4.3. Automation of Audit Procedures

Blockchain, in combination with smart contracts, can automate several routine audit procedures, including:

- **Accounts reconciliation:** Transaction data recorded simultaneously by both parties on the blockchain enables highly accurate automated reconciliation of balances between companies and their customers or suppliers.
- **Fixed asset verification:** Uniquely identified assets tracked on the blockchain allow auditors to verify asset status and history rapidly.
- **Anomaly detection:** The comprehensive and transparent nature of blockchain data supports AI tools in identifying unusual transactions for targeted inspection.

Audit automation not only saves time and costs but also enhances the effectiveness of risk detection.

4.4. Fraud Mitigation and Early Error Detection

Financial fraud often involves data manipulation, concealed transactions, or falsified information. However, with blockchain, data is verified at the source and stored immutably. This greatly limits the possibility of forging documents such as invoices, payment vouchers, or contracts.

Additionally, blockchain-based data empowers risk analysis systems to function more effectively. Risk-based auditing models can be optimized using continuous, detailed, and accurate data, allowing auditors to focus on high-risk areas.

4.5. Challenges in Applying Blockchain to Auditing

Despite its potential, blockchain adoption in auditing faces several key challenges:

- **Lack of legal and auditing standards framework:** Current auditing standards (e.g., ISA, VSA) do not yet fully reflect the technological changes introduced by blockchain. Auditors need specific guidance on how to assess the reliability of blockchain-based data and clarify legal responsibilities when using blockchain as audit evidence.
- **Limited technological expertise:** Traditional auditors often lack in-depth training in blockchain, making it difficult to interpret or leverage blockchain data. Collaboration between IT experts and auditors is necessary to ensure accurate data assessment.
- **Implementation and integration costs:** Connecting existing accounting systems with blockchain requires significant investment in IT infrastructure and personnel training. Small and medium-sized enterprises (SMEs) in particular may struggle due to resource constraints.

Blockchain offers substantial improvements to the auditing profession by enabling real-time, tamper-proof, and transparent data recording. It supports auditors in evidence collection, facilitates continuous auditing, automates procedures, and enhances risk assessment. However, to maximize its effectiveness, legal, technological, and human resource barriers must be addressed to integrate blockchain effectively into current audit practices.

V. Current State of Blockchain Adoption in Accounting and Auditing in Vietnam

5.1. Level of Awareness and Practical Implementation

In Vietnam, blockchain technology began to receive attention and experimental application in the fields of finance, accounting, and auditing around 2018. However, its practical implementation remains limited. Most enterprises are still at the stage of exploration or pilot testing, with large-scale deployment hindered by technological capacity and legal framework constraints.

According to a 2023 survey by the Vietnam Association of Certified Public Accountants (VACPA), only about 7% of accounting and auditing firms reported having had any exposure to blockchain technology in any form, and fewer than 3% had conducted internal pilot projects. Early adopters are primarily large corporations in sectors such as finance, banking, e-commerce, and technology.

- Viettel Group piloted blockchain in its internal e-invoice system to ensure authenticity and prevent unauthorized modifications.
- BIDV Bank collaborated with international partners to research the use of blockchain for cross-border transaction verification and fraud risk control.
- The General Department of Taxation has developed a long-term strategy to incorporate blockchain into electronic invoicing and tax declaration systems, though it is still in the survey and legal infrastructure development phase.

In the auditing field, no independent audit firm in Vietnam has officially announced the integration of blockchain into their audit process. Some Big Four firms (PwC, EY, KPMG) offer blockchain-related advisory services or apply it to international clients, but have yet to adopt it widely in financial audits within the Vietnamese market.

5.2. Challenges

Limited Technological Infrastructure and Internal Capacity

The majority of Vietnamese enterprises—over 90% of which are small and medium-sized—lack the capacity to invest in the technological infrastructure necessary to integrate blockchain into their accounting and management systems. Existing accounting software platforms (e.g., MISA, FAST, Bravo) are generally not yet compatible with blockchain, posing a significant barrier to implementation.

Lack of Expertise and Accurate Understanding

The current accounting and auditing workforce is largely trained in traditional methods and has limited knowledge of technology, particularly distributed ledger systems. The lack of professionals who can bridge the gap between accounting/auditing expertise and blockchain technology makes it difficult for enterprises to move from idea to execution.

Furthermore, many business leaders still associate blockchain solely with cryptocurrencies, leading to hesitation and reluctance to invest.

Absence of Clear Legal Frameworks and Guidelines

Vietnam currently lacks specific legal provisions for the use of blockchain in accounting and auditing. Vietnamese Accounting Standards (VAS) and Auditing Standards (VSA) have not yet been updated to provide guidance on recording, evaluating, and auditing blockchain-based transactions and evidence. This regulatory ambiguity causes companies and auditors to hesitate in adopting blockchain for fear of legal risks.

High Implementation Costs

Deploying a blockchain-integrated accounting or auditing system requires significant investment in IT infrastructure, personnel training, software licensing, and consulting services. Given current economic challenges, many Vietnamese businesses—especially SMEs—prioritize short-term returns over long-term technological investments.

5.3. Opportunities and Driving Forces

Despite these challenges, Vietnam possesses several favorable conditions that could support future blockchain adoption in accounting and auditing:

National Digital Transformation Strategy

The Vietnamese government has introduced numerous policies to promote digital transformation, including Decision No. 942/QĐ-TTg approving the Digital Government Development Strategy through 2025 with a vision to 2030, in which blockchain is designated as a key priority technology.

Additionally, the Ministry of Finance is actively developing digital finance and digital accounting strategies to encourage the application of emerging technologies to improve transparency and efficiency in public and private financial management.

Participation of Technology Corporations

Major domestic tech firms such as FPT, Viettel, VNG, and CMC are actively researching and providing blockchain solutions across finance, banking, logistics, and insurance. This opens up opportunities for accounting and auditing firms to collaborate and leverage pre-developed platforms, minimizing initial implementation costs.

Demand for Transparency and International Integration

As Vietnam becomes more deeply integrated into the global economy, businesses face increasing pressure to comply with International Financial Reporting Standards (IFRS) and meet foreign investor expectations for transparency and traceability. Blockchain, with its real-time and tamper-proof data capabilities, is well-suited to meet these requirements.

Vietnam is in the early stages of exploring and implementing blockchain technology in accounting and auditing. While some initial pilot programs have emerged, the overall scale and maturity of adoption remain limited due to barriers in technology, expertise, legal clarity, and cost. However, with strong government direction, the involvement of the domestic tech sector, and growing demands for international compliance, blockchain is poised to become a key component of Vietnam's digital transformation in accounting and auditing in the near future.

VI. Development Orientation and Recommendations

In the context of a rapidly evolving digital economy, implementing blockchain technology in accounting and auditing is not merely a technological trend, but a practical necessity to enhance efficiency, reliability, and transparency in financial management. However, for blockchain to be effectively deployed and fully harnessed, a synchronized development strategy is needed across enterprises, government authorities, professional organizations, and educational institutions.

The development and application of blockchain in accounting and auditing cannot be the responsibility of individual enterprises alone. It requires a comprehensive, interdisciplinary, and long-term strategy. Enterprises must proactively invest in technology and human resources; the government must establish legal frameworks and create implementation incentives; professional bodies and academic institutions must modernize their curricula to keep pace with the

technological shift. If these directions and recommendations are followed, blockchain could become a key technological pillar in the digital transformation of Vietnam's accounting and auditing sector.

6.1. Development Orientation for Accounting and Auditing Enterprises

*** Investment in IT Infrastructure and System Integration**

Accounting and auditing firms—particularly large ones—should proactively invest in upgrading their IT infrastructure to enable integration of blockchain into their operations. Building data platforms capable of connecting and synchronizing with blockchain systems (e.g., ERP systems, accounting software, internal audit tools) is a crucial preparatory step.

Additionally, firms may consider partnerships with domestic and international tech companies to implement consortium blockchain models—where multiple organizations securely share data under mutually agreed protocols.

*** Training and Developing Digital Human Resources**

A fundamental condition for successful technology implementation is a high-quality workforce with a strong grasp of both accounting–auditing practices and blockchain technology. Companies should adopt regular internal training policies, send staff to specialized blockchain, smart contracts, data security, and big data analytics courses.

Furthermore, adding positions such as "Technology Auditor," "Blockchain Analyst," or "Data Accountant" into the organizational structure is a necessary move to prepare for the upcoming digital transition.

*** Pilot Projects and Effectiveness Assessment**

Rather than full-scale deployment, firms should begin with small-scale pilot projects, such as storing e-invoices on blockchain, automating internal transactions, or tracking fixed assets. After the pilot phase, organizations must rigorously evaluate the cost-effectiveness, security, integration potential, and benefits before scaling up implementation.

6.2. Development Orientation from Government Authorities

*** Establishing Legal Frameworks and Updated Accounting–Auditing Standards**

Currently, the Vietnamese Accounting Standards (VAS) and Auditing Standards (VSA) lack specific guidance for handling blockchain-based transactions and evidence. The Ministry of Finance and related agencies should:

- Issue detailed guidelines on recognizing blockchain transactions, valuing tokens, and auditing blockchain data.
- Update accounting and auditing standards to reflect the characteristics of decentralized data and smart contracts.
- Develop regulations for risk management and IT system evaluation in blockchain environments for accounting and auditing.

Timely issuance of legal frameworks not only facilitates enterprise confidence in applying blockchain but also ensures legality, transparency, and security in blockchain-based financial and auditing activities.

*** Promoting National Digital Transformation and Enterprise Support**

The government should continue investing in national digital transformation programs, including initiatives to assist enterprises in implementing blockchain. Potential measures include:

- Funding or co-funding pilot blockchain projects in accounting, public finance, or tax management.
- Subsidizing training costs for professional associations and universities to introduce digital accounting–auditing courses.
- Establishing open data centers for research, testing, and blockchain application development.

6.3. Role of Professional Organizations and Educational Institutions

*** Professional Associations (VACPA, VAA, ACCA...)**

These organizations should serve as intermediaries linking businesses, regulators, and academia to drive technological innovation. Suggested actions include:

- Integrating blockchain into professional development and continuing education programs.
- Organizing conferences and scientific seminars on blockchain applications in finance and accounting.
- Developing a Blockchain Audit Toolkit to serve as practical guidance for members.

*** Universities and Postgraduate Institutions**

Universities should promptly update their curricula to an interdisciplinary model combining accounting–auditing with IT, big data, and blockchain. Recommended content for integration includes:

- Triple-entry accounting models.
- Smart contract applications for transaction recognition.
- Blockchain data analysis and auditing techniques.
- Auditing blockchain systems and ensuring data security.

Early and systematic training will help develop a generation of accountants and auditors with technological acumen, ready to meet the demands of digital transformation and global integration.

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