ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26apr297

From Ledgers to Leaves: How Blockchain is Transforming the Accounting Industry for a Greener Future

Dr. Shantanu Shekhar[1]; Dr. Kumaresan Chandrasekaran[2]

[1]Senior Lecturer, Business Studies
College of Economics and Business Administration
University of Technology and Applied Sciences – Al Musannah, Sultanate of Oman.

[2]Lecturer, Business Studies
College of Economics and Business Administration
University of Technology and Applied Sciences – Al Musannah, Sultanate of Oman.

Publication Date: 2026/04/25

Abstract: Blockchain, a decentralized digital ledger system, has the potential to revolutionize the way accounting is done by providing a secure and tamper-proof way of recording transactions. By using blockchain, accounting firms can automate many of their processes, which can save time and reduce the need for paper-based records. This can result in a more efficient and cost-effective accounting process, while also reducing the environmental impact of the industry. This study aims to explore the potential of blockchain technology to transform the accounting industry for a greener future. The research methodology adopted in this study is a combination of literature review and case studies. Through literature review, the study gathered and reviewed existing research on the challenges facing the accounting industry, such as the need to consider environmental, social, and governance (ESG) factors, and the need to keep pace with the fast-changing business environment. Additionally, it examines the potential of blockchain technology to address these challenges and improve the sustainability of the accounting industry. Case studies were used to gather and analyze data from organizations that are currently using blockchain technology in their accounting processes. The data collected through online sources such as academic journals, industry reports, and government publications was analyzed using a variety of statistical and qualitative methods to identify trends, challenges, and opportunities in the field of blockchain technology in accounting. The study concludes by providing insights into the future of blockchain in accounting and how it could potentially revolutionize the industry for a greener future.

Keywords: *Accounting, Blockchain, Cost-effective, Environmental, Social, Governance, ESG, Paperless, Sustainability.*

How to Cite: Dr. Shantanu Shekhar; Dr. Kumaresan Chandrasekaran (2026) From Ledgers to Leaves: How Blockchain is Transforming the Accounting Industry for a Greener Future. *International Journal of Innovative Science and Research Technology*, 11(4), 1873-1879. https://doi.org/10.38124/ijisrt/26apr297

I. INTRODUCTION

- *Background of the Accounting Industry and its Current Challenges*

The accounting industry has traditionally relied on ledgers to keep track of financial transactions and ensure accuracy and transparency. However, with the advent of new technologies such as blockchain, the industry is undergoing significant changes.

One of the current challenges facing the accounting industry is the need to become more environmentally sustainable. With the increasing awareness of the impact of human activity on the environment, businesses are under pressure to reduce their carbon footprint and adopt greener practices. This has led to a growing demand for accounting services that consider environmental, social, and governance (ESG) factors.

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Another challenge facing the accounting industry is the need to keep pace with the fast-changing business environment. The rise of e-commerce and digital platforms has led to a significant increase in the volume and complexity of financial transactions. This has put pressure on accounting firms to develop new technologies and processes to keep up with the demands of their clients. Blockchain technology has the potential to address these challenges by providing a secure and transparent way of recording transactions while also reducing the environmental impact of the accounting industry. By using blockchain, accounting firms can automate many of their processes, which can save time and reduce the need for paper-based records. This can result in a more efficient and cost-effective accounting process, while also reducing the environmental impact of the industry.

The accounting industry is currently facing significant challenges in its efforts to become more environmentally sustainable and keep pace with the fast-changing business environment. Blockchain technology has the potential to address these challenges by providing a secure and transparent way of recording transactions while also reducing the environmental impact of the accounting industry.

➢ *Overview of the Potential for Blockchain Technology to Transform the Industry.*

Blockchain technology has the capacity to transform the accounting sector by offering a safe and impenetrable method of transaction recording. As a result, the accounting process could be made more productive and economical while simultaneously reducing the industry's environmental impact. In their study "Blockchain in Accounting Research and Practice: Current Trends and Future Opportunities," Pimentel and Boulianne (2020) emphasized how blockchain technology has the potential to enhance the security and transparency of financial transactions. They also discussed how it can automate many processes, which can save time and lessen the need for paper-based records.

Adelowotan and Coetsee (2021) in their research "Blockchain Technology and Implications for Accounting Practice" analyzed the various applications of blockchain technology in accounting and finance, such as smart contracts, digital identity, and digital asset management. They also discussed the challenges facing the adoption of blockchain technology in accounting and suggested potential solutions. Bellucci, Cesa Bianchi and Manetti (2022) in their research "Blockchain in accounting practice and research: systematic literature review" conducted a comprehensive literature review of the current state of blockchain in accounting practice and research. They found that blockchain technology has the potential to improve the transparency and security of financial transactions, as well as to automate many processes, which can save time and reduce the need for paper-based records. They also found that there is a lack of understanding and awareness of blockchain among accounting practitioners and that more research is needed to understand its potential applications in the accounting industry. At the end blockchain technology transform the accounting industry by providing a secure and tamper-proof way of recording transactions, improving transparency and security, and automating many processes. However, more research and understanding are needed to fully realize its potential in the accounting industry.

➢ *Objectives of this Study:*

- To analyze the environmental impact of current accounting practices and identify areas for improvement.
- To examine how blockchain technology can be utilized to reduce paper usage and increase transparency in accounting processes.
- To explore the potential for blockchain to streamline and automate accounting processes, leading to reduced energy consumption and a decrease in carbon footprint.
- To identify challenges and barriers to the adoption of blockchain technology in the accounting industry and provide recommendations for overcoming them.

II. RELEVANT PAST STUDIES

➢ *Blockchain Technology and Accounting*

The paper "A Bibliometric Analysis of Blockchain Technology Research Using VOS viewer" by Kuzior and Sira (2022) provides a comprehensive analysis of the literature on blockchain technology from 2016 to 2021. The authors use bibliometric analysis and visualization mapping to gain insights into the trends, topics, authors, and other aspects related to this field.

According to the study, the number of publications on blockchain technology has been steadily increasing over the past five years. The authors also found that most of these publications were in the form of journal articles and conference papers. Furthermore, the study revealed that the most common sources of these publications were universities and research institutions.

One of the key contributions of the paper is the use of VOS viewer to map out keywords related to blockchain technology, such as "blockchain," "blockchain technology," and "blockchain application." This helped the authors gain a better understanding of how different fields relate to the use of blockchain technology. They found that the areas most impacted by blockchain technology so far include finance, computer science, and engineering.

The authors also noted that there are several studies that have been referenced when discussing blockchain technology, including research on blockchain's use in supply chain management, digital identity, and smart contracts. This paper provides valuable insights into the state of blockchain technology research. It offers an overview of the number and types of publications on this topic from 2016-2021, as well as which other studies have been referenced when discussing it.

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Additionally, the use of VOS viewer to map out keywords related to blockchain technology provides a unique perspective on how different fields relate to its use. These findings could be useful for businesses looking to implement or expand their usage of blockchain technologies to stay competitive within their industry.

According to a recent research paper by Garanina, Tatiana, Ranta, Mikko, and Dumay (2021), blockchain technology is not yet a mainstream topic in the accounting field and most of the current literature is normative. They found that the use of blockchain technology in accounting may shift the role of accountants and auditors into higher-profile advisory roles. They also emphasized the need for educating individuals in this industry, dealing with the logistical challenges of coordinating the contributions of multiple parties to public or private blockchains, and developing the legal frameworks required to oversee crypto assets. But besides possible changes in their roles, accountants and auditors will still be needed, and future research should concentrate on educating people in this field, as well as the logistical challenges of managing multiple parties who contribute to public or private blockchains and the legal frameworks required to regulate crypto assets.

Blockchain technology has the potential to revolutionize the accounting and auditing industry, and a recent study by Bellucci, Cesa Bianchi and Manetti (2022) in the Meditari Accountancy Research delves deep into the current state of accounting research on blockchain. Through a systematic literature review and bibliometric analyses, the authors mapped out 346 relevant research products from Scopus and critically discussed them in relation to three main topics: the impact of blockchain on accounting and auditing, crypto assets and finance, and business models and supply chain management. Their research highlights the potential of blockchain to increase transparency, reduce fraud and enhance financial transactions. However, the study also sheds light on the challenges that need to be addressed, such as regulatory and legal issues, and the need for further research in areas such as business models and supply chain management. The authors provide a comprehensive overview of the current state of accounting research on blockchain and its potential implications for accounting practice and further avenues for study, making it a valuable resource for researchers, practitioners, and policymakers.

- *Methodology*

The research methodology adopted in this study is a combination of literature review and case studies. Literature review was used to gather and review existing research on the trends, techniques, and challenges in big data analytics for decision making. Case studies were used to gather and analyze data from organizations that are currently using big data analytics for decision making. The data used in this study is secondary data sources. Secondary data was collected through online sources such as academic journals, industry reports, and government publications. The data was analyzed using a variety of statistical and qualitative methods to identify trends, challenges, and opportunities in the field of big data analytics for decision making.

- *Explanation of How Blockchain Technology Works*

Blockchain technology is a decentralized, digital ledger system that allows multiple parties to record and verify transactions without the need for central authority. The ledger is composed of blocks of information, which are linked together chronologically to create a chain. Each block in the chain contains a record of multiple transactions, and once a block is added to the chain, it cannot be altered or deleted. The ledger is maintained by a network of computers, called nodes, that work together to validate and record transactions. When a transaction is initiated, it is broadcasted to the network and verified by the nodes using complex algorithms.

Once the transaction is verified, it is grouped with other transactions and added to a new block. This block is then added to the existing chain, creating an unbroken chain of blocks that contains a record of all transactions. The ledger is secured through cryptography, which ensures that only authorized parties can access and modify the information. Additionally, the decentralized nature of the blockchain means that there is no central point of control, making it more secure and resistant to hacking or tampering.

Blockchain technology can be used in various industries, such as finance, supply chain management, and healthcare. Due to its transparency and immutability, it can be used to reduce fraud and increase efficiency in different sectors.

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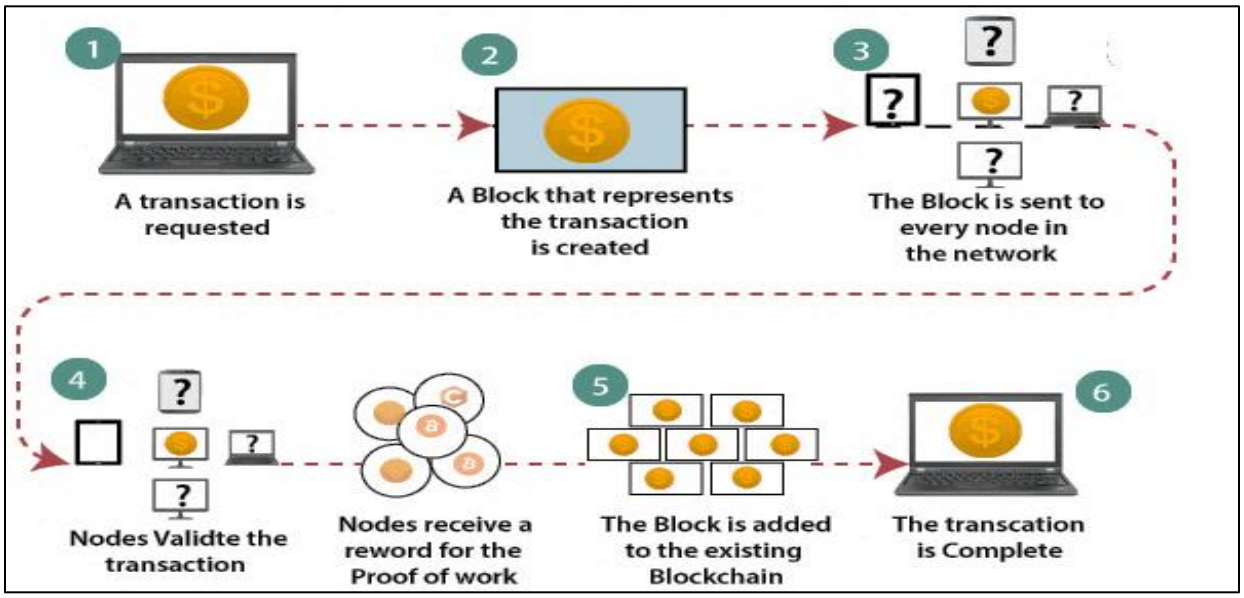

Fig 1: How Blockchain Works
Source: https://shishirkant.com/working-of-blockchain/

➢ *Discussion of Specific Features of Blockchain that Make it Well-Suited for Accounting Applications.*

Blockchain technology has several features that make it well-suited for accounting applications. These features include immutability, transparency, and decentralization.

- Immutability refers to the ability of blockchain to prevent any changes or tampering of the data once it is recorded on the ledger. This ensures that the financial data recorded on the blockchain is accurate and cannot be altered.
- Transparency is another key feature of blockchain technology. The blockchain ledger is publicly accessible, which means that anyone can view the transactions recorded on it. This allows for greater transparency in financial transactions, making it easier to detect fraudulent activity or errors.
- Decentralization is another feature of blockchain technology that makes it well-suited for accounting applications. The decentralized nature of blockchain means that there is no central authority controlling the ledger, which reduces the risk of data breaches or other security issues.

Table 1: Features of Blockchain that Make it Well-Suited for Accounting Applications

Feature	Description
Immutability	The ability of blockchain to prevent any changes or tampering of the data once it is recorded on the ledger.
Transparency	The blockchain ledger is publicly accessible, which means that anyone can view the transactions recorded on it.
Decentralization	The decentralized nature of blockchain means that there is no central authority controlling the ledger, which reduces the risk of data breaches or other security issues.

Source: https://due.com/blog/blockchain-to-change-accounting-forever/

III. THE BENEFITS OF BLOCKCHAIN FOR THE ACCOUNTING INDUSTRY

By delivering a safe and transparent method to record and monitor financial transactions, blockchain can radically change the accounting sector. Some of the benefits include:

- Increased security: Blockchain uses cryptography to secure transactions, making it difficult for hackers to tamper with the records.
- Improved transparency: Transactions are recorded on a public ledger that is accessible to all parties, making it easier to track and verify financial activity.
- Reduced costs: Blockchain eliminates the need for intermediaries, such as banks, to verify transactions, which can save on fees and other costs.
- Enhanced accuracy: Blockchain automates many processes and eliminates the need for manual reconciliation, which can reduce errors and improve overall accuracy.
- Increased efficiency: Blockchain can streamline and speed up many accounting processes, such as invoicing, payments, and audits.

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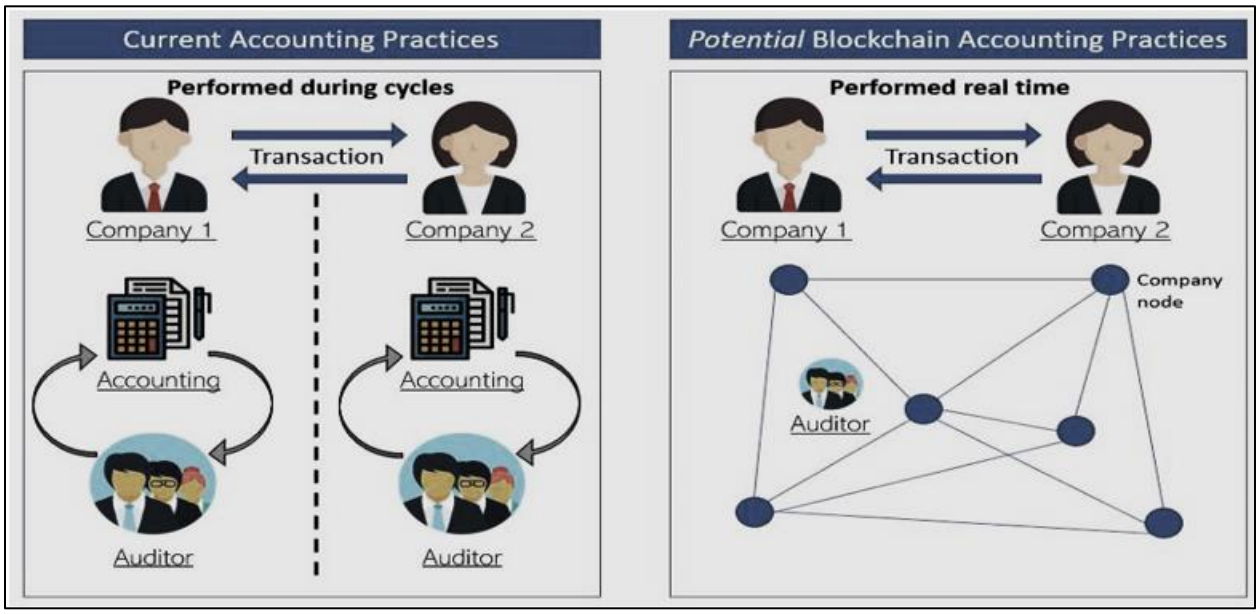

Fig 2: Blockchain Technology's Potential Disruption in Accounting Practices
Source: https://medium.com/@ianbondw/blockchain-technology-and-its-potential-to-disrupt-accounting-a018488a6360

However, it's important to keep in mind that blockchain is still a relatively new technology and it's not without its own set of challenges. Also, it is important to consider the regulatory environment of the industry and the country, it's important to comply with all the current laws and regulations.

IV. CHALLENGES AND CONSIDERATIONS

➢ *Current Limitations and Challenges of Implementing Blockchain in the Accounting Industry.*

There are several limitations and challenges that must be considered when implementing blockchain technology in the accounting industry. Some of these include:

- Lack of standardization: There is currently a lack of standardization in the blockchain industry, which can make it difficult for organizations to adopt and implement blockchain solutions.
- Complexity: Blockchain technology can be complex and difficult to understand for non-technical professionals. This can make it difficult for accounting firms to implement and manage blockchain solutions.
- Regulatory compliance: There are concerns around regulatory compliance and data privacy, which must be addressed to ensure that blockchain solutions are in line with existing laws and regulations. The regulatory environment is constantly evolving and might require frequent changes to the implementation.
- Interoperability: Blockchain solutions developed by different organizations may not be able to communicate with one another, which can hinder the overall adoption of blockchain technology in the accounting industry.
- Lack of expertise: There is currently a lack of skilled personnel with the knowledge and expertise required to implement and manage blockchain solutions. This can be a significant barrier for small and medium-sized enterprises.
- High cost: The development and implementation of blockchain solutions can be costly, especially for small and medium-sized enterprises.
- Scalability: Blockchain solutions may not be able to handle the volume of transactions required by large organizations, which can limit their usefulness in the accounting industry.
- Data privacy: Blockchain solutions can present a risk to data privacy as transactions are recorded on a public ledger that is accessible to all parties.

V. DISCUSSION OF POTENTIAL REGULATORY AND LEGAL ISSUES

One major issue that would need to be addressed is regulatory compliance. Blockchain technology is still relatively new, and regulations surrounding its use are constantly evolving. Organizations implementing blockchain solutions must ensure that they are following all relevant laws and regulations to avoid any legal issues.

Another issue that would need to be addressed is data privacy. Blockchain solutions record transactions on a public ledger that is accessible to all parties. This can present a risk to data privacy as sensitive financial information may be exposed. Organizations must ensure that they are taking appropriate measures to protect sensitive data, such as implementing encryption and access controls.

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Another important aspect is the environmental impact, as blockchain solutions are energy-intensive and can have a significant impact on the environment. Organizations must consider the environmental impact of their blockchain solutions and take steps to minimize their carbon footprint. This may include using renewable energy sources or implementing energy-efficient technologies. Furthermore, there may be a need to address the issue of interoperability, as different blockchain solutions developed by different organizations may not be able to communicate with one another, which can hinder the overall adoption of blockchain technology in the accounting industry. Finally, this study would need to consider the legal and regulatory aspect of smart contracts, which are self-executing contracts with the terms of the agreement written into code, in the context of accounting and bookkeeping, and how they interact with the existing laws and regulations.

- *How Blockchain can Help in Creating a Greener Future by Tracking the Environmental Impact of Companies and Organizations.*

Blockchain technology can help create a greener future by providing a transparent and secure way to track the environmental impact of companies and organizations. This can be done using "green" blockchain platforms, which allow for the creation of decentralized applications (dApps) that can track and verify the environmental performance of organizations. These dApps can include features such as carbon offsetting, renewable energy tracking, and sustainability reporting. By providing a transparent and tamper-proof record of a company's environmental performance, blockchain can help consumers and investors make more informed decisions about which organizations to support and can also help organizations improve their environmental performance by making it more transparent and accountable.

VI. CONCLUSION

- *Summary of the Potential for Blockchain to Transform the Accounting Industry.*

Blockchain technology has the potential to bring radical and transformative change to the accounting industry, as well as the auditing industry. The core tenants of immutability, security, and near real-time processing of blockchain can make companies more transparent and trustworthy. Two key areas that blockchain technology can disrupt in accounting include paying invoices, accounts payable and accounts receivable processes and auditing a firm's accounting. By incorporating smart contracts, the monitoring and record-keeping of these processes can be done instantly, without the need for accountants to ensure that the proper accounting steps were taken. However, for blockchain technology to bring about this change, it must overcome certain hurdles such as regulatory compliance, data privacy and interoperability. Nevertheless, the potential for blockchain technology to revolutionize the accounting industry is undeniable and it's worth exploring further.

- *Discussion of Future Developments and Opportunities in the Field.*

In the future, accountants will need to have a strong understanding of data analytics, machine learning, and blockchain technology to increase the efficiency and value of the accounting function. This will involve reducing or eliminating tasks such as reconciliations and provenance reassurance, and focusing on technology, advisory, and value-adding activities. They will also need to be able to advise on blockchain adoption and its impact on businesses and clients, and act as mediators for technologists and business stakeholders. Overall, accountants will need to have a strong understanding of blockchain's principal features, functions, and beneficial aspects to lead the industry forward.

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