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Blockchain Enabled Smart Contracts for Secure SME's Accounting and Financial Transparency in Oman

Mohammed Babiker [000-0001-6169-3048]

Administrative and Financial Sciences Department,
Oman College of Management and Technology,
320 Barka, Sultanate of Oman.
E-mail: mohammed.babiker@ocmt.edu.om

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Abstract:

This study aims to provide general insights into blockchain smart contracts for secureSMEs accounting and financial transparencyin the Sultanate of Oman. The backbone of Oman economy is Small and Medium Enterprises (SMEs) which playsavital role ineconomic development and diversification, yet it struggles with inefficient financial systems, lack of transparency and limited access to the trusted financial records. Therefore, the main focus of this research is to address the development of blockchain enabled smart contracts system tailored to improveSMEsfinancial accuracy, security and transparency in Oman.

This research uses mixed-methods analysis which unites quantitative and qualitative approaches to study blockchain smart contracts for secure accounting and financial transparency in Omani Small and Medium Enterprises (SMEs). The methodology uses both primary and secondary data collection methods to study the research problem and objectives and questions which leads to a thorough evaluation of blockchain adoption benefits and challenges and implementation strategies for Omani SMEs.

It enables automated accounting processes, enforce conceptual obligations and provide tamper proof financial records through using smart contracts. Adopting decentralized blockchain can lead to reduce financial fraud, human error and compliance risks as well as enabling better access to finance via verified and auditable data. The research explores the way of supporting sustainable economic growth through focusing on policy needs, challenges of implementation and practical solution with long-term outcomes of commercializing the blockchain smart contracts system.The system is automated, secure and streamlined accounting and financial operations for Omani SMEs which records transactions on multiple ledgers, automated recurring financial agreements such loan repayments, payroll, supplier &contracts and allow real time financial reporting that is tamper resistant and verifiable by auditors and financial managers.

Keywords: *SMEs, Blockchain, Financial Transparency, Smart Contracts, GDP, Oman Vision 2040, EBP.*

Introduction:

Despite of the significant role that played by Omani Small and Medium Enterprises (SMEs) foreconomic landscape, contribution to the diversification, job creation and employment opportunities, the SMEs often grapple with challenges in terms of manual accounting process, financial transparency and limited access to secure financial system. These obstaclescan stand as stumbling blocks to SMEs development and growth, by adopting blockchain technology its characterized, decentralized and immutable SMEs ledger system and provide transformative solutions to these obstacles through initiating smart contracts, self-implementing contracts with the terms directly written into code, the SMEs can automate and secure their accounting and financial processes. These initiativescan ensure instantaneous auditing, control risk of fraud and improve overall financial and accounting transparency (Dan, 2024).

To contextualize this study based on Oman SMEs the adoption of blockchain technology line up with Oman's national Vision 2040 which accentuate economic diversification, digital transformation and innovation. Anew study in the domain of SMEs indicates that the implementation of blockchain solutions in any Country can significantly enhance its SMEs performance efficiency and financial position, thus contributes to the growth of the economicsof the Country and achieving the long-term goals thereon. Moreover, these solutions canboostthe SMEs financial performance by secure accounting & financial transactions, dominatethe new markets and improve their supply chain management. It fosters blockchain technology support for Sultanate of Oman, broader economic expansion and persistence with Country strategic plan development (Al Hilali & Shaker, 2021). To automate the digital transformation of transactional process into comprehensive accounting and financial reports for SMEs in Oman, the Country needs to develop Blockchain Financial Statements (BFS) in order to enhance the reliability and accuracy of SME's accounting and financial transparency as well as the timeliness of financial information bythe users for better decision making. It enables real-time tracking of financial activities, reduces manual entry errors and allowsfor immutable audit trails which are particularly beneficial for SMEs that often lack advanced internal controls. To integrate Smart Contracts (ST) through blockchain into the financial & accounting processes it will boost transparency and operational efficiency, the smart contracts enable automation of recurring transactions such as payroll and rent payments and supplier payments by executing payments only when specific conditions are fulfilled. It reduces dependency on middlemen while protecting against payment delays and fraudulent activities (Khalfan et al., n.d.).

The SMEs in Oman can be enhanced through adoption of blockchainbased accounting systems receives backing from regulatory bodies. Therefore, a financial institutions in Estonia, Singapore and the UAE because these countries actively promote digital finance frameworks, these countries practically lead the way to integrate blockchain into financial infrastructure, likewise Oman

can use it to achieve its Vision 2040 objectives for digital transformation and economic diversification, the Blockchain Technology (BT) provides enhanced compliance and auditing capabilities through its secure tamper-proof ledger system which records all financial transactions. The auditors gain access to verified data through complete traceability which reduces audit time and costs. The system of Blockchain Technology (BT) proves beneficial for environments with complex regulations and situations where small business credibility needs verification.The adoption of these technologies enables SMEs in Oman to boost their internal efficiency and trustworthiness while gaining better access to credit and investors and global markets. The implementation of blockchain technology supports both national development goals and worldwide industry trends which positions it as a fundamental tool for modernizing financial practices in the SME sector (Khalfan et al., n.d.)

On the other hand, accounting & finance system implementation for blockchain technology solves major problems which include fraud and data tampering and system inefficiencies, that exist in traditional systems. Blockchain's immutable ledger enables SMEs to store precise and protected financial records which decreases fraudulent risks and makes auditing operations more straightforward. The related research scope demonstrates blockchain accounting implementation cuts audit duration by thirty per cent and audit expenses by twenty per cent which proves its ability to reshape financial management operations. The efficiency improvements in Oman's SME sector hold special value because these businesses need to maximize their limited resources for growth and innovation. Blockchain integration with artificial intelligence and big data analytics enables better decisionmaking and operational agility according to research that examines blockchain supply chain management for SMEs (Fahdil et al., 2024). This study investigates blockchainenabled smart contracts for SMEs accounting security and financial transparency in Oman through an evaluation of their advantages and obstacles and their compatibility with national economic objectives. However, thisresearch examines recent studies and real-world applications to deliver practical recommendations for SMEs and policymakers and researchers who want to use blockchain technology for sustainable economic growth in Oman.Implementation of blockchainenabled smart contracts for Oman's SMEs remains challenging because of technological complexity and regulatory uncertainties and the requirement for improved technical capabilities among small firms. The barriers to adoption need policymakers and industry stakeholders and educational institutions to work together for developing supportive frameworks and training programs and establishing clear regulations (Bhat et al., 2025).

Eventually, the digital landscape undergoes rapid transformation through blockchain technology which provides new solutions to traditional problems in accounting and financial management sectors. Under its Vision 2040 framework, Oman aims to achieve economic diversificationand digital transformation while blockchainenabled smart contracts create an attractive

solution to boost operational efficiency and financial transparency and security for Small and Medium Enterprises (SMEs). The backbone of Oman economy consists of SMEs which generate substantial employment opportunities and drive GDP growth, but they struggle with information asymmetry and high transaction costs and restricted access to financial resources. Blockchain technology with its decentralized and immutable ledger system and smart contracts provides a strong solution to these problems which build trust while reducing fraud and simplifying financial operations (Chen, 2023).

Review of Literature:

This study on blockchainenabled Smart Contracts (SC) for secure accounting and financial transparency in Small and Medium Enterprises (SMEs) is actively developing especially in Oman to promotes Vision 2040 in terms of digital transformation and economic diversification. These previousstudiesreview initially integratesresearch from 15 studies from 2019 to 2025 to which examines blockchain applications and benefits and challenges and its relevance for SMEs in Oman's financial ecosystem. The research studies demonstrate how blockchain technology can transform SMEs accounting & finance through enhanced transparency, security and efficiency while identifying obstacles to adoption in Oman.The relevant literature review will be furnished from tow prospectives that contain conceptual review and empirical review.

Conceptual Review:

Accounting Transparency via Blockchain:

The transparency within the accounting domainpractices builds stakeholder trust while ensuring regulatory requirements and long-term business expansion particularly for Small and Medium Enterprises (SMEs). In the past accounting systems faced problems because data manipulation combined with non-real time reporting and unclear record-keeping methods damage financial integrity. The problems faced by Omani SMEs regarding these issues create barriers to credit access and reduce investor interest while putting them at risk of violating national and international standards (Al-Harthy, 2021)

Financial Transparency via Blockchain:

Blockchain-based accounting systems provide accurate accounting data access together with unalterable transaction records and automated audit trails. Through blockchain integration SMEs can offer stakeholders including investors and regulators and banks verifiable time-stamped records which decrease both fraud and manual errors. Smart contracts enable automated financial operations including payroll and invoicing and taxation and supplier payments while maintaining pre-defined rules and time constraints according to (Al-Busaidi, 2022).

Blockchain and Smart Contracts Introduction:

Blockchain technologyperformsits functions as a tamper-resistant digital ledger system which

distributes transaction records across multiple nodes. Smart contracts represent one of blockchain technology's most revolutionary applications because they function as self-executing agreements where programmers embed their terms directly into code. Smart contracts are implemented automatically on Ethereum Blockchain Platforms (EBP) to enable trustless ledgers transactions without requiring any intermediaries. SMEs operating in emerging economies such as Oman can leverage smart contracts to improve their financial systems through enhanced transparency and security as well as increased operational efficiency, it runs virtually through online system called Ethereum Virtual Machine (EVM), (World Bank, 2020).

Oman Economy and the Role of SMEs:

Under strategic plan of Oman Vision 2040, SMEs play a vital role in the economic diversification of Oman as they constitute more than 90% of registered businesses and contribute substantially to employment and GDP (Riyaad, 2023). However, many SMEs encounter problems with financial accountability, delayed audits, restricted access to formal financing, and poor to maintain book-keeping (Al-Harthy, 2021).

Empirical Review

According to (Bhat et al., 2025) the research analyzed blockchain adoption in Omani SMEs through the TechnologyOrganizationEnvironment (TOE) framework. The research which analyzed data from 282 SMEs owners demonstrated that blockchain technology improves financial and market performance through enhanced data security and transparency and process efficiency which supports Oman's Vision 2040 objectives for technological development and economic stability. Thisstudyaddressed how smart contracts enable automated financial transactions which decrease costs while building stakeholder trust.

Based on the (Bhandari et al., 2025) authors performed a systematic review of blockchain in sustainable finance which highlighted smart contracts as a tool for automating agreements to increase accountability. This study does not focus on Oman, however, the results of the research are applicable because smart contracts help SMEs by creating tamperproof transparent financial records which reduces disputes and enhances compliance with regulatory standards.

According to (Munyanyi&Pooe, 2025) this research analyzed blockchain technology effects on food supply chain transparency for South African SMEs while drawing conclusions for Oman. This study used mixed methods to show that smart contracts improve both traceability and accountability which leads to reduced fraud and increased trust levels. If this applied in Oman would protect SMEs financial records by creating transparent audit trails.

Based on (MOUSAVI et al., 2025) the research analyzed blockchain and smart Sukuk in Islamic finance which is relevant to Oman's Islamic Banking Sector. This research found that smart contracts cut international transfer costs by 40% and enhance transparency which provides Omani

SMEs with a secure Shariacompliant Financial Transaction Model (FTM).

As reported by (Jabbar et al., 2025) the research examined blockchain technology's effects on supply chain value creation for SMEs through the combination of smart contracts with big data analytics. This study shows better traceability and security which implies that Omani SMEs could adopt similar integrations to protect financial data and enhance decision-making.

As mentioned by (Retouniotis & Tzagarakis, 2024) the study analyzed blockchain solutions for SMEs through smart contracts that manage accounting and supply chain finance operations. This study emphasized blockchain's trust building features which are essential for Omani SMEs because they struggle with information asymmetry. Smart contracts enable automated payment systems which decreasemanual mistakes while improving financial transparency.

In the opinion of (Rick Johnson, 2024) the study on blockchain technology in accounting revealed that smart contracts and automated verification systems decreased audit time by 30% and audit costs by 20%. The efficiency of this research improvesthe blockchain technology and could help Omani SMEs overcome resource limitations thus making it a practical solution for transparent financial reporting.

As stated by(Almadadha, 2024) the research analyzed blockchain technology applications in financial accounting and Environmental, Social and Governance (ESG) reporting by highlighting its decentralized and tamper-resistant characteristics. This study indicates that Omani SMEs should use blockchain technology to build stakeholder trust by providing transparent financial information which remains essential for investment attraction.

As claimed by (Wang, 2024) the authors analyzed blockchain and smart contracts in financial applications, which they found that improved transparency and reduced transaction costs. Smart contracts based on blockchain technology could automate crossborder payments and supply chain finance for Omani SMEs, which would address inefficiencies in traditional accounting systems.

On the authorityof (Antova, 2023) the authors analyzed blockchain and smart contracts as risk management tools in Islamic finance through an examination of AlInma Bank. This studyaddressed that smart contracts decrease credit losses and improve transparency which provides Omani SMEs with a secure financial operations framework that adheres to Sharia principles.

In line with (Javaid et al., 2022) the review of blockchain applications for financial services express how smart contracts revoke intermediaries and increase transparency. The application of this technology for Omani SMEs would result in affordable accounting systems and improved financial reporting trust.

In conformity with (Kaur & Parashar, 2021) the authors proposed a blockchain payment system for rural areas which they argued would be secure through smart contracts. This research rural focus provides evidence that Omani SMEs can use smart contracts to secure financial

transactions in underserved regions which supports Vision 2040's inclusive growth objectives.

As believed by (Pimentel, 2020) the authors investigated blockchain technology in accounting research to determine its potential for clarifying asset ownership and streamlining audit processes. This research indicates that Omani SMEs can implement blockchain technology to decrease fraud and enhance financial record integrity which supports Vision of Oman 2040's digital objectives under economic diversification.

As per the (Du, 2020) this research focused on blockchain technology in supply chain finance while highlighting smart contracts as a tool for transaction automation. The studyoutcomes are relevant to Omani SMEs because smart contracts can decrease financial costs and improve transparency in financial& accounting operations.

On the testimony of (Almadadha, 2019) the research explored blockchain technology's effects on financial accounting systems while revealing its ability to support Environmental, Social and Governance (ESG) objectives. The transparency features of blockchain technology would benefit Omani SMEs by improving their accountability which would draw investors who focus on sustainable finance goals.

At the end it shows blockchain smart contracts provide substantial advantages to Omani SMEs through transparent operations, cost reduction, secure financial and accounting transactions and efficient auditing systems. Smart contracts automate financial transactions, reduce intermediaries, and ensure tamperproof records, addressing challenges like fraud, inefficiency, and information asymmetry prevalent in SMEs accounting& finance. The focus on digital transformation and Islamic finance principles in Vision 2040 of Oman makes blockchain technology more relevant for the country. The studies by (Bhat et al., 2025) and (Wang, 2024) show that technological complexity and regulatory uncertainties and limited technical expertise among SMEs remain as challenges.

Statement of the Problem:

The Vision of Sultanate of Oman's 2040 framework depends on Small and Medium Enterprises (SMEs) in Oman to achieve economic diversification and growth as well innovation because these sectors drive substantial GDP and employment numbers. SMEs in Oman encounter major accounting and financial management obstacles which stem from inefficiencies and high transaction costs and fraud risks and information asymmetry that reduce transparency and limit financial access. The traditional accounting systems depend on manual processes and centralized databases which create vulnerabilities to errors and data tampering and expensive audit requirements (Bhat et al., 2025).

The automated processesand decentralization of blockchainenabled smart contracts provide a promising solution to improve security and transparency in financial operations of SMEs. Due

toresource constraintsandtechnological complexity, the adoption of blockchain solutions in Oman faces significant challenges. The lack of localized research about blockchain solutions for SMEs and frameworks to implement these solutions demonstrates the need to study their effectiveness and secure accounting and financial transparency impact on Oman (Fahdil et al., 2024).

Objectives of the Study:

The main focus of this study is to assess blockchain smart contracts as a tool for improving secure accounting and financial transparency for Small and Medium Enterprises (SMEs) in Oman. Specific objectives are to:

1. Evaluate blockchainenabled smart contracts to determine their effects on improving SMEs accounting process efficiency and security and transparency levels.
2. Investigate the main advantages of smart contracts for financial management in Omani SMEs which include cost reduction and fraud prevention and better access to finance.
3. Investigate the technological regulatory and organizational barriers which Omani SMEs encounter when implementing blockchainbased accountingsolutions.
4. Present an implementation framework for blockchainenabled smart contracts in SMEs financial operations which supports Oman's Vision 2040 objectives.

Research Questions:

The research aims to answer the following research questions:

1. How the blockchain enabled smart contracts improve the efficiency and security and transparency of accounting processes for Omani SMEs through what mechanisms?
2. What are the primary benefits of adopting smart contracts for SMEs financial management in Oman?
3. What technological, regulatory, and organizational challenges hinder the adoption of blockchainenabled smart contracts in Omani SMEs?
4. How a customized framework should enable the implementation of blockchainenabled smart contracts in SME accounting systems to achieve Oman's Vision 2040 goals.

Research Methodology:

With reference to the research topic, this study uses mixedmethods analysis which unites quantitative and qualitative approaches to investigate blockchain smart contracts for secure accounting and financial transparency in Omani Small and Medium Enterprises (SMEs). The study methodology uses both primary and secondary data collection methods to set out the research problem, objectives and questions which leads to a thorough evaluation of blockchain adoption benefits, challenges and implementation strategies for Omani SMEs. This study design follows the requirement for empirical evidence in the Omani context which the literature review supports and conceptual framework ((Bhat et al., 2025); (Fahdil et al., 2024).

Data Sources and Collection:

This study relies exclusively on secondary data, collected from a range of reputable academic, institutional, and policy-based sources. These include:

1. Academic literature: Peer-reviewed journals, conference proceedings, and doctoral theses addressing blockchain, smart contracts, SME finance, and accounting innovation.
2. Government and regulatory documents: Reports from the Ministry of Commerce, Industry and Investment Promotion, the Oman Vision 2040 framework, Central Bank of Oman publications, and policy white papers.
3. Industry case studies: Documentation from early blockchain adopters globally and regionally, with a focus on financial applications in SMEs.
4. Technical reports: Publications by international bodies such as the World Bank, OECD, and WEF that analyze blockchain adoption in emerging economies.
5. Research databases and repositories: Scopus, Web of Science, Google Scholar, and SSRN were used to retrieve relevant secondary data using keywords like: "Blockchain," "Smart Contracts," "SMEs," "Accounting Transparency," "Oman," "Blockchain Challenges," "Financial Inclusion."

Data Analysis Approach:

The study uses a thematic content analysis method to interpret and categorize findings from the literature. The analysis process follows these steps:

Data Selection and Screening:

Documents were screened for relevance, credibility, and applicability to the Omani SME environment. Preference went to recent literature from 2020 to 2025 and studies focused on the region.

Thematic Coding:

Using both deductive (based on the research questions) and inductive (emerging from the data) methods, the literature was organized into major themes:

- Efficiency, security, and transparency mechanisms of smart contracts
- Benefits for financial management and fraud prevention
- Adoption barriers: technological, regulatory, and organizational
- Frameworks and models from global contexts relevant to Oman

Cross-Referencing with Oman Vision 2040:

The extracted themes were compared to the goals of Oman Vision 2040, especially those related to innovation, digital transformation, SME development, and economic diversification.

Framework Development:

Based on the findings, a customized implementation framework will be created to guide the adoption of blockchain smart contracts in SME accounting systems in Oman.

Conceptual Framework:

The conceptual model guiding this study is structured as follows:

Blockchain-Enabled Smart Contracts in Omani SMEs

+--> Mechanisms of Impact

| ├── Automation & Error Reduction

| ├── Decentralized Ledger for Security

| └── Real-Time Transparency in Transactions

+--> Financial Management Benefits

| ├── Cost Reduction

| ├── Enhanced Access to Finance

| └── Fraud Detection & Prevention

+--> Adoption Barriers

| ├── Technological Infrastructure Gaps

| ├── Legal and Regulatory Uncertainty

| └── Organizational Resistance and Lack of Skills

+--> Implementation Framework

├── Stakeholder Roles (SMEs, Government, Tech Providers)

├── Policy Recommendations

└── Roadmap for Vision 2040 Alignment

Justification for Methodology:

Here, the absence of empirical local data regarding the adoption of blockchain technology in SMEs, along with the exploratory nature of the study, provides a rationale for using this approach. By utilizing abundant secondary data, this study:

- Develops an understanding of the application of blockchain smart contracts within accounting that is relevant and backed by evidence.
- Maps out systemic obstacles and challenges pervasive to the ecosystem for Oman's implementation deficit.
- Constructs a framework that is strategically prioritized on a national level and that exhibits feasible logistics owing to the absence of primary data collection constraints.

The Expected Outcomes and Benefits to Sultanate of Oman and Outcomes:

The Blockchain Technology (BT) enables smart contracts which produce secure SMEs accounting transactions and transparent financial management systems in Oman while achieving Vision 2040 targets for digital transformation and economic development and sustainable growth. This research will demonstrate the following main pros which are derived from the study problem, objectives, questions, and literature review:

Enhanced SMEs Efficiency and Cost Reduction:

Through this study the authors will prove that blockchain smart contracts automate standard accounting operations which include billing and payment settlement and financial statements compilation. According to (Fahdil et al., 2024) the implementation of blockchain technology can reduce audit costs by 20% and audit times by 30% which helps alleviate resource constraints that affect Omani SMEs. The improved efficiency of SMEs through this process enables them to direct resources toward development initiatives which improves their market position.

Improved Financial Transparency and Trust:

This study will use blockchain's immutable and transparent ledger to show how smart contracts enhance the accuracy and accessibility of financial records which reduces errors and fraud. (Bhat et al., 2025) showed that blockchain technology builds stakeholder trust which becomes vital for Omani SMEs when seeking investments or partnerships. A transparent financial data system strengthens the connections between businesses and banks and investors and regulators which supports Oman's goal of building a trusted business environment.

Increased Access to Finance for SMEs:

This research will focus on information asymmetry as one of the primary obstacles that Omani SMEs face when trying to get credit. (Javaid et al., 2022) expressed how blockchain verifies financial records which enables banks to get reliable information that leads to faster loan approval and attracts investment. This strategy supports Vision 2040 by establishing SMEs as key drivers for economic diversification.

Fraud Prevention and Security:

This study will show that blockchain technology combined with smart contracts limits fraudulent activities in SME accounting because both features function with tamper-proof mechanisms and automated execution capabilities. The authors (Pimentel, 2020) explain how blockchain technology clarifies ownership and prevents tampering which helps protect Omani SMEs from financial losses and operational integrity breaches.

Support for Vision 2040's Digital Transformation Goals:

This study proposes an adoption framework for blockchain which provides specific implementation strategies for SMEs to integrate smart contracts into their operations and fulfills Oman's Vision 2040 focus on technology-based economic development. A framework will help policymakers along with SMEs develop strategies to use blockchain for financial system modernization and digital economy growth.

Economic Diversification and SME Growth:

SMEs play a crucial role in helping Oman decrease its dependence on oil as an essential goal of Vision 2040. The research shows blockchain-enabled efficiencies and transparency improve SME

performance which aligns with (Bhat et al., 2025) and leads to GDP growth and job creation as well as economic diversification.

Regulatory and Policy Development:

The study's findings about regulatory challenges including unclear blockchain guidelines will help policymakers develop supportive frameworks. The study by(Wang, 2024)illustrates that blockchain adoption can speed up due to Oman's efforts to stay competitive in the worldwide digital economy.

Capacity Building and Knowledge Transfer:

This study will illustratethe technological and organizational challenges that require training programs and technical support for SMEs. Local businesses in Oman will gain enhanced capability through this empowerment initiative which will allow them to adopt modern technologies and create a culture of innovation according to (Retouniotis & Tzagarakis, 2024).

Alignment with Islamic Finance Principles:

The sector of Islamic finance in Oman's plays a major role so the research will investigate smart contracts that support Sharia-compliant transactions according to (MOUSAVI et al., 2025). This solution enhances financial inclusion for SMEs who use Islamic principles and thus reinforces Oman's position as a leading Islamic finance hub.

Global Competitiveness and Investment Attraction:

The blockchain technology implementation within SMEs enables Oman to become an industry leader in modern financial systems which will attract technological partnerships and foreign investments. The study by (Bhandari et al., 2025) emphasizes secure and transparent accounting practices which increases Oman's attractiveness to international investors for economic expansion.

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