The impact of blockchain technology on financial transparency: A study of SMEs in emerging economies

Ayman Ahmad Abu Haija[a*], Khaleel Ibrahim Al-Daoud[b], Badrea Al Oraini[c], Asokan Vasudevan[d], Amjad Ghazi AL-Habashneh[e], Peng Luo[f] and Anber Abraheem Shlash Mohammad[g,h]

[a]Accounting department, School of business, Jadara University, Jordan
[b]Department of accounting,business school Faculties, Al Ahilya Amman University, Amman, Jordan
[c]Department of Business Administration, Collage of Business and Economics, Qassim University, Qassim, Saudi Arabia
[d]Faculty of Business and Communications, INTI International University, 71800 Negeri Sembilan, Malaysia
[e]Department of Finance and Banking, Al-Bayt University, Al Mafraq, Jordan
[f]Faculty of Liberal Arts, Shinawatra University, Thailand
[g]Digital Marketing Department, Faculty of Administrative and Financial Sciences, Petra University, Jordan
[h]Research follower, INTI International University, 71800 Negeri Sembilan, Malaysia

A B S T R A C T

With the rapid advancement of blockchain technology, SMEs face an opportunity to leverage decentralized ledger systems to address longstanding challenges related to financial transparency. This study aims to assess the implications of blockchain adoption for SMEs operating in the Jordanian context, focusing on its potential to improve accountability, trust, and efficiency in financial operations. Drawing on quantitative research methods, this paper examines the current state of financial transparency using a structural equation modeling approach of 215 surveys. The findings indicated that there is a positive impact of block-chain technology on enhancing financial transparency. The findings of this research contribute to both academic understanding and practical implications for policymakers, regulators, and SMEs in Jordan seeking to enhance financial transparency through blockchain technology. By shedding light on the positive impact of blockchain on financial transparency in the Jordanian SME sector, this paper aims to inform strategic decision-making and stimulate further research in this emerging field. Ultimately, it underscores the transformative potential of block-chain technology in promoting accountability, trust, and eco-nomic development among SMEs in Jordan and beyond.

1. Introduction

Financial transparency is a cornerstone principle in corporate governance, representing the clear, open, and accessible disclosure of financial information to stakeholders (O'Hare, 2021). Al-Husban et al. (2023) indicated that financial transparency aims to foster trust, accountability and informed decision-making by providing relevant parties with a comprehensive view of an organization's financial health, performance, and operations. Moreover, financial transparency plays a vital role in maintaining the trust of shareholders, as it demonstrates the company's commitment to integrity, ethical conduct, and compliance with applicable laws and regulations (Mangoting et al., 2019) Transparent financial reporting practices also contribute to reducing information asymmetry between management and external stakeholders, thereby minimizing the potential for fraud, manipulation, or misleading disclosures (Salehi et al., 2023). Blockchain technology is a groundbreaking innovation that has captured the imagination of technologists, entrepreneurs, and industry leaders worldwide. At its core, blockchain represents a decentralized and immutable ledger system that enables the secure recording and verification of transactions across a distributed network of computers (Patibandla & Vejendla, 2022). Unlike traditional

databases, which rely on a central authority to validate and maintain records, blockchain operates as a peer-to-peer network, where transactions are confirmed by consensus among participants (Ai & Cui, 2021). Al-Abbadi et al. (2022) defined the term "blockchain" as the structure of data storage in the system, where transactions are grouped into blocks, cryptographically linked together in a chronological chain. Each block contains a unique cryptographic hash of the previous block, creating a continuous and tamper-resistant record of transactions. In addition to financial services, where blockchain has revolutionized payment systems, remittances, and asset management, the technology has found applications in supply chain management, healthcare, voting systems, intellectual property, and more as stated by Al-Serhan et al. (2023) Blockchain's ability to provide secure, transparent, and tamper-resistant record-keeping has led to its exploration in various sectors seeking to streamline operations, reduce costs, and enhance trust among stakeholders.

Despite the growing recognition of the importance of financial transparency for fostering trust, attracting investment, and promoting economic growth, SMEs in emerging economies like Jordan often face significant challenges in achieving and maintaining transparency in their financial operations. Factors such as limited access to traditional financial services, bureaucratic inefficiencies, and a lack of trust in centralized institutions contribute to the opacity of SME financial transactions. Additionally, Dalky et al. (2023) confirmed that manual record-keeping processes and the prevalence of informal economies further exacerbate the problem of financial opacity among SMEs in Jordan. While blockchain technology holds the promise of addressing these challenges by providing a decentralized, tamper-resistant ledger for recording financial transactions, its adoption and implementation among SMEs in emerging markets present unique challenges. Factors such as technological barriers, regulatory uncertainty, and the need for investment in infrastructure and human capital may hinder the widespread adoption of blockchain technology among SMEs in Jordan.

Accordingly, this study seeks to address the following research questions: (1) What are the current challenges faced by SMEs in Jordan regarding financial transparency? (2) What is the level of awareness and understanding of blockchain technology among SMEs in Jordan? (3) What are the potential implications of blockchain technology on financial transparency and business operations for SMEs in Jordan? By exploring these questions, this study aims to contribute to the existing literature on blockchain technology and financial transparency while providing practical insights and recommendations for policymakers, regulators, and SMEs in Jordan seeking to leverage blockchain for enhancing transparency and promoting economic development.

2. Literature Review

The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value (Marković, 2020). It is considered as a decentralized technology that enables a distributed ledger of transactions to be recorded and shared across a network of computers (Antal et al., 2021) Aggarwal and Kumar (2021) indicated that blockchain is a network of computers (called nodes) that all have the same history of transactions and thus are trusted to come to the same conclusions when they process those transactions. It is a distributed database technology that maintains a continuously growing list of records, called blocks, which are linked and secured using cryptographic techniques, ensuring the integrity and immutability of data (Muzammal & Nasrolin, 2019). On the other hand, blockchain is a distributed timestamping system that aims to solve the double-spending problem without the need for a central authority or trusted third party (Iqbal & Matulevičius, 2021).

Financial transparency refers to the extent to which a company's management provides timely and reliable information to the public and markets about its financial management and performance (Prekazi, 2022). Lee (2023) mentioned that they are the practice of openly providing access to information related to an organization's financial operations, including revenues, expenditures, assets, liabilities, and financial performance, to stakeholders such as investors, creditors, regulators, and the public. Financial transparency encompasses the disclosure of relevant and reliable financial information by corporations, governments, and other entities to enable stakeholders to assess their financial health, performance, and risks (Romero, 2023). Moreover, it refers to the extent to which financial information is accessible, understandable, and reliable, allowing stakeholders to assess the financial position, performance, and risks of an organization and hold it accountable for its use of resources (Bogucka et al., 2024). Blockchain technology offers a multitude of benefits for the financial services sector, significantly enhancing authenticity, security, and risk management (Baliker et al., 2023). By leveraging blockchain, financial service providers can deploy smart contracts, leading to improved efficiency, transparency, and the exploration of novel revenue streams (Miah et al., 2023). Research by Menand and Ricks (2024) confirms that blockchain's distinctive recording capabilities render traditional clearing and settlement processes obsolete. Furthermore, as highlighted by Scott et al. (2024), blockchain facilitates faster, more cost-effective, and tailored issuance of digital securities, thereby mitigating counterparty risk. Beyond this, blockchain technology clarifies asset ownership and obligations, thereby enhancing accountability and transparency for accountants (Han et al., 2023). Moreover, the integration of blockchain technology in financial services greatly improves the management, communication, and analysis of financial information. It establishes a secure and tamper-proof mechanism for handling financial data, guaranteeing the integrity and accuracy of financial disclosures (Dashkevich et al., 2024). In essence, blockchain revolutionizes the way financial services are conducted, ushering in a new era of efficiency, security, and transparency. Accordingly, Fig. 1 depicts the research framework regarding the impact of blockchain technology on financial transparency and identifies the hypotheses to be evaluated in the study.
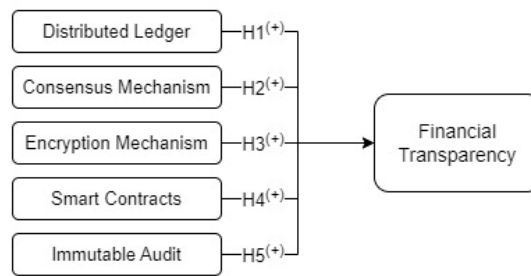
Fig. 1. Research framework.

Based on the findings from the literature review, the hypotheses for the present research can be articulated as follows:

Hypothesis 1 (H1): *Distributed ledger has a positive impact on financial transparency.*
Hypothesis 2 (H2): *Consensus mechanism has a positive impact on financial transparency.*
Hypothesis 3 (H3): *Encryption mechanism has a positive impact on financial transparency.*
Hypothesis 4 (H4): *Smart contracts have a positive impact on financial transparency.*
Hypothesis 5 (H5): *Immutable audit has a positive impact on financial transparency.*

3. Methodology

3.1 Study Design and Sample

The study relies on the positivist approach since it depends on real events for systematic observation and measurement. This analysis aims to detect patterns and relationships between variables in terms of quantity. Concerning the cross-sectional research approach, it explores directly how the SEMs' financial transparency in Jordan is impacted by blockchain technology. This strategy enables data collection at a point in time, which results in a cross-sectional study of the Jordanian SEMs' attitudes to adopting blockchain technology without having to track the changes over time. The research focused on managers of small and medium-sized enterprises in Jordan. Gathering primary data required a sampling strategy, which was employed due to the limitations of studying the whole creative population. Therefore, in this study, the researcher had to use convenience sampling that allowed the results to be generalized to a vast population. This method needed at least 200 participants, and this is in line with the recommendation we have highlighted by. As a result, 300 managers received the research instrument. Out of the initial sample, 241 responses were collected, but 26 of these did not meet the criteria for statistical analysis. Therefore, the ultimate research sample included 215 valid replies, which led to a response rate of 71.6% from the original sample.

3.2 Data Collection and Measures

In this research, primary data was gathered using a self-administered survey. The survey questions were created after conducting an extensive literature review and were originally created in English. Subsequently, they were translated into Arabic to make sure that the participants were clear with what was being asked of them. Data collection took place from November 5 to January 16,2024. As a part of the initial information provided to the participants, they were introduced to the survey's purposes and goals, the general policy of voluntary participation, an individual's right to withdraw from the study, and some concerns regarding the ethical treatment of the received information. It also encompassed demographic details and the key variables of the study. Participants used a five-point Likert scale; the scale ranged from (1), which represents "strongly disagree", to (5), which represents "strongly agree", to assess the observed variables. The study performed an elaborate review of blockchain technology by adopting an appropriately chosen set of 18 elements from (Erol et al., 2023). These elements collectively formed a second-level hidden construct compromising five primary hidden constructs: These are distributed ledgers, DL1-DL3, consensus mechanisms, CM1-CM3, encryption mechanisms, EM1-EM4, smart contracts, SCs1-SCs4, and immutability audit, IA1-IA4. Furthermore, the study concentrated on financial transparency (FT), the dependent variable, which was evaluated through a collection of seven elements taken from (Iannario et al., 2024).

3.3 Analytical Procedures

An analytical method was used to study how blockchain technology impacts the financial transparency of small and medium enterprises (SMEs) in Jordan. This method consisted of two steps. Firstly, a descriptive analysis approach was conducted to allow the determination of means and standard deviations as well as the relationships between the collected data points. Then, structural equation modeling (SEM) was used based on the suggestions of (Alzyoud et al., 2024). This approach was chosen to compare the direct effects and relationships between blockchain implementation and financial transparency with pragmatics, particularly the path coefficients and model fit indices.

4. Results

4.1 Measurement Model

Referring to the results of the research, it is possible to mention that the measurement model plays a crucial role in providing the credibility of hidden constructs. The convergent validity, composite reliability, and discriminant validity were checked according to the procedure prescribed by (Muda et al., 2022)

Table 1
Validity and reliability of the questionnaire.

Variables	Items	Loadings	AVE	MSV	√AVE	CR
Distributed Ledger	DL1	0.714	0.539	0.469	0.734	0.777
	DL2	0.703				
	DL3	0.782				
Consensus Mechanism	CM1	0.806	0.604	0.464	0.777	0.820
	CM2	0.787				
	CM3	0.736				
Encryption Mechanism	EM1	0.725	0.540	0.399	0.735	0.824
	EM2	0.661				
	EM3	0.794				
	EM4	0.752				
Smart Contracts	SCs1	0.682	0.555	0.359	0.745	0.833
	SCs2	0.813				
	SCs3	0.766				
	SCs4	0.713				
Immutable Audit	IA1	0.726	0.522	0.406	0.722	0.812
	IA2	0.611				
	IA3	0.806				
	IA4	0.733				
Financial Transparency	FT1	0.693	0.544	0.497	0.737	0.856
	FT2	0.715				
	FT3	0.775				
	FT4	0.732				
	FT5	0.768				

The findings that emerged from the estimates depicted in Table 1 reaffirmed substantive and positive convergent validity with regard to the relations between the measures of the underlying constructs and their respective factors of loading, which ranged from 0.611 to 0.813. These loadings exceeded the 0.50 cutoff suggested by Tariq et al. (2024). The measure of convergent validity, which is the Average Variance Extracted (AVE), was established to show values ranging from 0.522 to 0.604 for all constructs, surpassing the accepted threshold of 0.5, as per (Zuhri et al., 2023). The extent of discriminant validity was evaluated by using the maximum shared variance analysis (MSV), which again proceeded by taking the square root of the AVE. The results, therefore, showed minimal correlation between the factors by presenting low MSV values that varied from 0.359 to 0.497. The values of the Square Root of AVE ranged from 0.722 to 0.777, which means that each of them emerged as a unique construct while having very low inter-correlations with other constructs. Also, the values for the composite reliability (CR) in this study were above the recommended standard of 0.7, indicating that the measurement model had good internal consistency.

4.2 Structural Model

In the following part of this study, the structural connections are investigated while focusing on the relationships between different factors that affect the level of financial reports' openness of Jordanian SMEs. It is important to note that the structural model gives the paths of relationships between different hidden constructs and observable variables, showing more analysis of the relationship. The overall results of the goodness-of-fit indices are shown in Fig. 2 below, which provides an estimate of the model's fit.

Based on the indices for the goodness of fit indicated in Fig. 2, the findings provided a favorable model fit for conducting the research. With a Cmin/df ratio of 2.126 (below 3), the fit was good in relation to the chi-square statistic and degrees of freedom. These results are supported by the values for the Comparative Fit Index (CFI). More precisely, it was 0.929, and the Tucker-Lewis Index (TLI) of 0.91 was above 0.90, confirming it to be a satisfactory fit in comparison to a null model. The (RMSEA) Root Mean Square Error was less than 0.08. Pointing to a reasonably good fit in the structural model. In summary, based on these indices, the research model showed a good fit, which supports the reliability of the effect coefficients listed in Table 2.
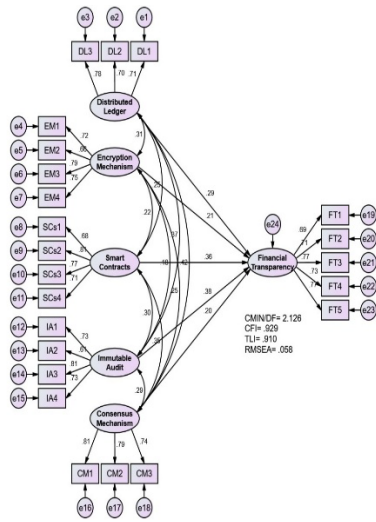
Fig. 2. SEM for the impact of personality characteristics on investor behavior

Table 2
Structural equation path coefficients among variables.

			B	β	S.E.	T
Distributed	→	Financial	0.318	0.287	0.056	5.68**
Consensus	→	Financial	0.204	0.198	0.052	3.92*
Encryption	→	Financial	0.222	0.215	0.050	4.44**
Smart Contracts	→	Financial	0.374	0.362	0.059	6.34***
Immutable Audit	→	Financial	0.403	0.385	0.062	6.50***
Note: * $p< 0.05$, ** $p< 0.01$, *** $p< 0.001$.						

Table 2 also shows the path coefficients of structural equations that reveal relationships between the hidden variables addressed in the research model. Intuitively, there is a very general positive relationship with the concept of immutable audit (B = 0.403, β = 0.385, t = 6.50, P < 0.001), as well as smart contracts (B = 0.374, β= 0.362, t = 6.34, P < 0.001), distributed ledger (B = 0.318, β = 0.287, t = 5.68, P < 0.01), and the encryption mechanism itself (B = 0.222, β = 0.215, t = 4.44, P < 0.01). While positively linked, the consensus mechanism shows a somewhat moderate relationship (B = 0.204, β = 0.198, t = 3.92, P < 0.05).

5. Discussion and Conclusion

The impact of blockchain technology on the financial transparency of SMEs in Jordan is significant, offering improvements in accountability, trust, and operational efficiency. Blockchain provides a decentralized, immutable ledger that enhances transparency by preventing the alteration of financial data without network consensus. This is particularly beneficial for SMEs in Jordan, addressing issues such as distrust in centralized institutions and error-prone manual record-keeping. Additionally, blockchain can streamline financial operations, reduce intermediary costs, and automate record-keeping, thus improving financial reporting accuracy and aiding regulatory compliance. Blockchain also improves access to financial services for SMEs, especially in underserved areas, by facilitating peer-to-peer transactions and simplifying access to capital, which can spur economic growth and entrepreneurship. Despite its potential, the adoption of blockchain faces challenges such as technological barriers, regulatory uncertainties, and a lack of understanding of its benefits, requiring SMEs to invest in training and infrastructure integration. Overall, blockchain holds transformative potential for enhancing the financial integrity and efficiency of SMEs in Jordan.

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