EFFECT OF BLOCKCHAIN ON VIETNAMESE COMMERCIAL BANK PERFORMANCE: MEDIATING ROLE OF ACCOUNTING INFORMATION SYSTEM QUALITY

Tang My Sang[1,*]

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ABSTRACT

This study aims to understand the effect of blockchain on bank performance of banks under the mediating role of accounting information systems quality. Based on the Resource-based perspective, the proposed research model with 4 hypotheses and data is surveyed from 324 employees working in the finance and accounting departments of Vietnamese commercial banks. The data is then processed using SmartPLS 4.0 software. The results show that blockchain has a positive impact on accounting information systems and bank performance. The results also show the positive and significant effect of accounting information systems on bank performance. The study also proposes some governance implications for banks in their digitalization strategies.

Keywords: *Accounting, bank performance, blockchain, commercial banking, digitalization, information systems.*

[1]Ho Chi Minh City University of Economics and Finance (UEF), Vietnam
[*]Email: sangtm@uef.edu.vn
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1. INTRODUCTION

In the context of the rapid development of the modern banking industry, the integration of advanced technologies is inevitable. These technologies help improve efficiency, security, and transparency in financial operations [1]. As the foundation for cryptocurrencies, blockchain technology has emerged as a disruptive innovation. Although it is widely used in developing economies such as Vietnam, the impact of Blockchain on accounting information systems and banking operations still needs to be explored. Previous research has shown Blockchain's ability to innovate financial services, but studies on the impact of this technology on Vietnamese commercial banks have not yet been determined.

Recent studies increasingly show the benefits of Blockchain for accounting at banks [2]. In Vietnam, blockchain applications are improved, promoting bank performance, and increasing the security and transparency of financial activities. Common blockchain applications banks use include cross-border transactions, trade finance, credit reporting, clearing, and customer identity confirmation. The potential of Blockchain to help promote digital transformation in Vietnam, where banks are the main source of capital for the economy, so the requirement to ensure safety and transparency is very important.

This study explores the impact of blockchain applications on the quality of accounting information systems, thereby affecting bank performance in Vietnam. The results provide important information for strategic decisions in an environment where the financial system is constantly changing. This study aims to provide insights for policymakers and financial institutions in effectively leveraging blockchain technology to improve the quality of accounting information systems and improve the overall bank performance.

2. LITERATURE REVIEW

2.1. Resource-based perspective (RBV)

RBV introduced by [3] highlights how a firm's internal resources and capabilities are key to achieving a sustainable competitive advantage. Applying in this research, RBV emphasizes the importance of Blockchain as a valuable, rare, inimitable, and strategically irreplaceable resource, and positions it as a critical asset for organizations [4]. Blockchain integration positively affects the quality of accounting information, improving

the accuracy, reliability, and comprehension of financial data [5]. Blockchain's role in reducing information asymmetry, improving stakeholder collaboration and transforming enterprise resource planning systems underscores its potential to reshape the way the accounting industry works.

2.2. The function of blockchain applications in banking sector accounting information systems

In recent years, the banking industry has witnessed significant transformations under the impact of emerging technologies such as cloud computing, cloud data, artificial intelligence, and the Internet of Things (IoT) [6]. In particular, blockchain has emerged as a transformative force, strongly impacting the business model of the banking industry [7]. The most prominent feature of blockchain technology is that it is structured as a ledger, which is orderly, decentralized, and immutable, facilitating the recording of transactions within the network. Transactions are securely recorded in immutable blocks, including all relevant information. This decentralized approach is in contrast to traditional methods of recording transactions, which are often centralized, inefficient, and expensive. Blockchain provides an innovative solution that allows for the recording and sharing of valuable transaction information across the network.

The integration of blockchain technology into accounting information systems in the banking sector is the focus of recent research because of its distinctive features of security, transparency, and immutability [8]. Blockchain's transformative potential helps accelerate payments and reduce risks associated with financial reporting fraud [9]. Other outstanding characteristics of Blockchain have been identified such as providing differentiated access, high security, and good fraud prevention. In addition, blockchain technology is also used to record errors in the accounting profession [2].

2.3. Research hypothesis

This study aims to understand the relationship between blockchain application strategies, accounting information system quality, and bank performance. The resource-based perspective emphasizes the importance of resources to an organization's competitive advantage. Applied to this study, the implications of RBV are expressed through the use of blockchain applications that contribute to improving the quality of accounting information systems and then impact the overall performance of the organization.

Given the rapid growth of the contemporary banking sector, it is now deemed necessary to integrate cutting-edge technologies, particularly blockchain, to improve transparency, efficiency, and security. Its importance lies in reshaping traditional processes, redefining behavior, and recording financial transactions in accounting information systems in the banking sector. The longevity and resistance to manipulation of Blockchain represents a paradigm shift for accounting as a transaction ledger [10]. Smart contracts are also an application of blockchain in the banking industry. This contract facilitates the execution of legally binding financial arrangements based on predetermined conditions. In the context of accounting information systems, Blockchain solves long-standing challenges related to the security, efficiency, and authenticity of financial data, bringing profound impacts [11].

Blockchain applications focus on cost and time advantages, removing intermediaries from the system. Transactions ensure security and certainty in a consensus system, allowing for transparent transactions without the need to reconcile different ledgers. Implementing blockchain technology significantly saves transaction time and operational costs, contributing to overall resource optimization [12]. Blockchain protects data integrity, facilitates instant information sharing, and provides automated control of processes. It is identified as a technology that can make accounting information more reliable and time-saving compared to traditional accounting and auditing systems. The application of Blockchain with optimal contracts can enhance compliance, risk management, and efficiency. It provides an opportunity to optimize functions, recognize uncertain transactions, and improve internal control. The role of auditors can evolve with Blockchain, leading to changes in the audit process [13]. In conclusion, integrating blockchain technology into accounting information systems is the key to reshaping bank performance.

The impact of Blockchain is revolutionary, ranging from enhancing the quality of information to automating compliance, auditing, and changing the role of accounting. The continuous development of technology, especially the adoption of Blockchain, requires a nuanced understanding of the challenges and an emphasis on empirical research to unlock the full potential of these innovations in the field of commercial banking and accounting. Previous research has shown the positive

impact of information technology, including blockchain technology, on the quality of accounting information [14]. Which, important factors affecting the quality of accounting information include timeliness, relevance, accuracy, completeness, and actual conversion rate. Qualitative features, including the reliability of financial statements, are further emphasized through verifiability, truthfulness, and neutrality in the information prepared are also confirmed [15]. This technology helps eliminate time differences in the release of financial statements. Real-time accounting systems allow stakeholders to track payments, providing a more accurate and up-to-date understanding of the financial situation. Since then, the bank's operational efficiency has also been promoted.

The quality of accounting information systems, measured through accuracy, reliability, timeliness, relevance, completeness, and actual conversion rates, acts as an intermediary variable [5]. The quality of accounting information systems plays an important intermediary role in the relationship between the effective use of blockchain applications and bank performance. When blockchain applications are deployed effectively, they provide highly transparent and secure financial data, which contributes to improving the quality of accounting information systems [10]. A high-quality accounting information system improves the accuracy, timeliness, and integrity of financial information, thereby enhancing risk management and strategic decision-making in banking [17].

Furthermore, the effective integration between blockchain applications and accounting information systems facilitates the automation of accounting and financial processes, minimizes manual errors, and enhances oversight [11]. This not only improves the bank's internal operational efficiency but also enhances the trust of customers and stakeholders in the bank's management and operation capacity. Therefore, the quality of accounting information systems becomes a decisive intermediary in transforming the effective use of blockchain into real improvements in the overall performance of banks [18]. Previous study show that the relationship between blockchain applications and bank performance was affected by accounting information systems [10].

The application of blockchain technology in the management of accounting information systems within Vietnamese commercial banks presents a transformative opportunity for enhancing transparency, security, and efficiency. By leveraging blockchain's decentralized and immutable ledger capabilities, banks can significantly reduce the risk of fraud and errors in financial transactions. This technology allows for real-time tracking of transactions, ensuring that all parties involved have access to the same information, thereby improving trust and accountability. Additionally, the automation of processes through smart contracts can streamline operations, reduce processing times, and lower operational costs. As Vietnamese banks continue to embrace digital transformation, integrating blockchain into their accounting systems can provide a competitive edge, foster regulatory compliance, and enhance customer satisfaction through improved service delivery.

3. RESEARCH MODEL AND HYPOTHESIS

3.1. Research model

Based on the resource-based viewpoint and theoretical basis presented above, the author proposes a model to understand the influence of Blockchain technology on the efficiency of banking operations as an intermediary of the quality of accounting information system as shown in Figure 1.

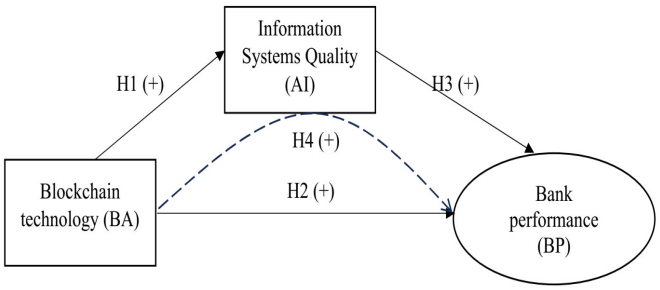

Figure 1. Proposed research model

3.2. Research Hypothesis

Hypothesis H1. Blockchain applications have a positive impact on the quality of accounting information systems.

Hypothesis H2. Blockchain applications have a positive impact on bank performance.

Hypothesis H3. The quality of the accounting information system has a positive impact on bank performance.

Hypothesis H4. The quality of accounting information systems plays a mediating role in the relationship between blockchain applications and bank performance.

4. RESEARCH METHODOLOGY

This study uses quantitative methods, collecting data through surveys. The study sample is employees working

in the finance and accounting departments of Vietnamese commercial banks. The author uses a convenient sampling method, the questionnaire is designed on Google Forms, and the survey by link via Zalo, text message, and email. The number of valid questionnaires collected is 324 tables. The research model is a model with intermediate variables, to process the data, the author uses SmartPLS software and analyzes it through two steps including measurement model analysis and structural model analysis. The research model scale is mainly based on previous studies and is presented in detail in Table 1.

5. RESEARCH RESULTS

5.1. Measurement model evaluation results

Evaluation of the measurement model is performed through convergence value, internal consistency reliability, and differentiation value. Specifically, the outer loading of all values must be greater than 0.7 [19]. In addition, the convergence value of the scale is evaluated through the AVE index of the variables, which is accepted when the AVE is greater than 0.5 [20]. Internal consistency reliability is assessed through Cronbach's alpha [19]. The results of Table 1 show that these values are between 0.732 and 0.894, which ensures the reliability of the scale.

Table 1. Measurement model evaluation results

Variable symbol	Scale	Outer loading	Cronbach's alpha	rho_a	Average Extracted Variance (AVE)
Bank performance (BP)					
BP1	Blockchain technology improves bank performance	0.843	0.924	0.927	0.654
BP2	Blockchain technology creates employee satisfaction	0.845			
BP3	Blockchain technology creates customer satisfaction	0.764			
BP4	Blockchain technology increases risk management efficiency	0.769			
BP5	Blockchain technology increases competitiveness for banks	0.829			
BP6	Blockchain technology increases social efficiency	0.824			
BP7	Blockchain technology increases environmental efficiency	0.795			
BP8	Blockchain technology increases bank profitability	0.796			
Quality of information systems (AI)					
AI1	High accuracy of bank data	0.804	0.955	0.956	0.712
AI2	High reliability of the bank's financial information	0.898			
AI3	The timeliness of the bank's information is high	0.894			
AI4	Relevant information is provided efficiently	0.792			
AI5	Easy-to-understand bank data	0.831			
AI7	The bank's financial information is provided comprehensively	0.903			
AI8	The bank's ability to verify financial data is high	0.773			
AI9	The bank's financial data fidelity is high.	0.759			
AI10	The bank's financial information security is high.	0.866			

Blockchain technology (BA)					
BA1	My bank secures cross-border payments and transactions	0.722	0.909	0.912	0.579
BA2	My bank offers smart contracts in the banking process	0.747			
BA3	My bank has loyalty programs	0.822			
BA4	My bank sponsors supply chains for sustainability initiatives	0.773			
BA5	My bank finance trade and supply chain management.	0.763			
BA6	My bank provides digital identity verification services.	0.787			
BA7	My bank has a fraud prevention and enhanced cybersecurity	0.734			
BA8	My bank has asset encryption services	0.732			
BA9	My bank has record-keeping and auditing	0.762			

(Source: Analysis results from SmartPLS 4.0)

Table 2. HTMT Analysis Results

	AI	BA	BP
AI			
BA	0.715		
BP	0.774	0.896	

(Source: Analysis results from SmartPLS 4.0)

The HTMT is used by the authors to further evaluate the distinction. The results in Table 2 show that all research concepts are markedly different at the HTMT threshold of 0.90 [20]. In addition, the author performed a multilinear test through the statistical value of the variance magnification factor (VIF). The results show that the VIF coefficients of the variables are all less than 3, indicating that there is no multilinearity.

5.2. Results of structural model evaluation

The partial least squared linear structure (PLS-SEM) analysis method is used with the help of SmartPLS 4.0 software to validate the model and research hypotheses. The authors performed a combined Bootstrap analysis with n = 5,000, and the initial and average Bootstrap estimates showed that all paths were stable. This is a good quality model for explaining the relationship between concepts.

Table 3. Results of structural model evaluation

Hypothesis	Relationship	Coefficient	t value	p-value	Conclusion
Direct effect					
H3	AI -> BP	0.309	7.854	0.000	Accept
H1	BA -> AI	0.679	22.232	0.000	Accept
H2	BA -> BP	0.633	18.192	0.000	Accept
Indirect effect					
H4	BA -> AI -> BP	0.210	7.048	0.000	Accept
Determination coefficient $R^2 = 0.762$, Adj $R^2 = 0.761$					

(Source: Analysis results from SmartPLS 4.0)

Specifically, the analysis results in Table 3 show that the effective use of blockchain technology (BA) and the quality of information systems (AI) have a positive impact on the operational efficiency (BP) of Vietnamese commercial banks with the corresponding path coefficients of 0.633 ($p < 0.01$); 0.309 ($p < 0.01$) respectively. This result confirms the H2 and H3 hypothesis and is similar to the previous study [5]. The effective use of blockchain technology can bring many significant benefits to commercial banks in Vietnam, contributing to improving their operational efficiency. Blockchain, with its decentralized, transparent, and secure nature, helps to minimize the risk of fraud and enhance trust in financial transactions. The application of blockchain in banking processes such as payments, remittances, and smart contract management helps optimize these processes, minimizing operational costs and processing time. This not only helps the bank operate more efficiently but also improves the quality of services provided to customers, thereby enhancing competition in the market. The quality of the accounting information system also plays an important role in improving the operational efficiency of commercial banks in Vietnam. A

high-quality accounting information system ensures the accuracy, timeliness, and completeness of financial information, thereby supporting management in strategic decision-making and risk management more effectively [21]. The powerful information system also facilitates the integration of advanced technologies such as blockchain, helping banks make the most of the benefits that blockchain brings. When the quality of information systems and blockchain technology are used effectively, they not only help banks improve their current operations but also create a solid foundation for sustainable development in the future.

The results of Table 3 also show that the effective use of blockchain technology (BA) has a positive impact on the quality of information systems (AI) with an impact coefficient of 0.679 and a p-value of 0.000. In addition, the results also confirm the intermediary role of information system (AI) quality in the relationship between the effective use of blockchain technology (BA) and operational efficiency (BP) of Vietnamese commercial banks. This result confirms the H1 and H4 hypothesis and is similar to the previous research [5]. The effective use of blockchain technology has a significant positive impact on the quality of information systems of commercial banks in Vietnam. Blockchain, with the ability to provide transparent, immutable, and secure data, helps improve the reliability and accuracy of financial information recorded and stored in the bank's information system. When blockchain is integrated into data management and transaction processes, it eliminates the possibility of information being edited or tampered with, thereby ensuring the integrity and timeliness of data. This helps banks not only better manage their financial activities but also improve efficiency in controlling and assessing risks. Moreover, blockchain technology also plays an important role in automating and optimizing the information management process in banks. By using smart contracts and consensus protocols, blockchain minimizes reliance on manual operations and minimizes errors arising from the human factor [18]. This helps the bank's information system operate more smoothly and enhances data processing and analysis capabilities. As a result, when blockchain technology is applied effectively, it not only improves the quality of information systems but also helps Vietnamese commercial banks meet the increasing requirements for information management and customer service in an increasingly competitive business environment.

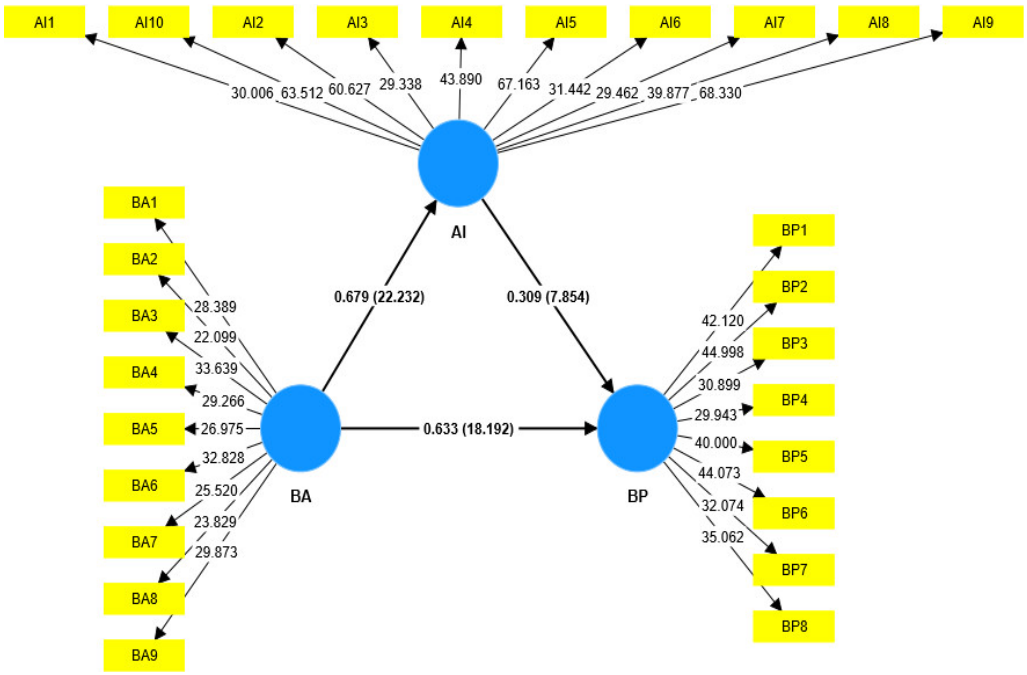

Figure 2. Structural model prediction results

6. MANAGEMENT IMPLICATIONS

The study aims to determine the influence of blockchain technology on bank performance under the intermediary impact of information system quality. The results of the study show that the effective use of blockchain technology promotes the efficiency of bank operations. In addition, the results also confirm the intermediary role of information system quality in promoting the bank's operational efficiency under the impact of the effective use of blockchain technology.

The findings from this study have important implications for bank managers and policymakers in the banking sector, especially in developing economies such as Vietnam. The results show the positive impact of the use of blockchain applications on the quality of accounting information systems and the performance of banks, highlighting the strategic importance of this technology. Bank managers should prioritize the integration of blockchain technology to enhance the

quality of accounting information systems and realize its potential to significantly improve operational efficiency and secure data processes. This involves strategic investments in blockchain solutions to meet the operational needs of banks. Furthermore, bank managers should implement training programs to enhance employees' understanding and proficiency in blockchain technology. This helps equip workers with blockchain knowledge, thereby maximizing its benefits in improving the quality of accounting information systems and overall efficiency.

Furthermore, strengthening the accounting information system with blockchain technology to increase data security, reliability, and transparency are issues that banks need to focus on. This will allow banks to use blockchain technology to improve operational efficiency and gain a competitive advantage in the financial sector. The revolutionary potential of blockchain technology highlights for policymakers the necessity of regulatory frameworks that encourage incentives and promote adoption in the banking sector. Policymakers should develop guidelines that promote a conducive environment for technological innovation, including providing incentives for blockchain adoption. The most important thing is to ensure that the regulatory frameworks are in line with the capabilities and advantages of blockchain technology, which will facilitate integration into existing banking systems.

7. LIMITATIONS OF THE STUDY

This study has laid out a fundamental understanding of the impact of Blockchain on the Accounting Information System and the organizational efficiency of Vietnamese commercial banks. However, future studies may delve into specific factors that affect the adoption of blockchain technology in banking. Exploring variables such as organizational readiness, technology adoption patterns, and cultural influences on technology adoption will provide a richer understanding of blockchain barriers and integration. Because blockchain technology is developing so quickly, ongoing research is required to stay up to date. Future studies should also explore how Blockchain can be integrated with other emerging technologies such as artificial intelligence and the Internet of Things (IoT). Investigating the synergistic impacts of these integrations on AIS and banking operations can uncover solutions to improve efficiency in financial services.

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