Adoption of Blockchain Technology in Financial Reporting of Commercial Banks: Evidence from Pakistan

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https://doi.org/10.62345/jads.2024.13.3.29

Abstract

The prompt development of blockchain technology can transform financial reporting in the banking sector by improving transparency, accuracy, and efficiency. This study examines the magnitude of blockchain technology adoption in financial reporting among commercial banks in Pakistan, testing the factors influencing this adoption. The current study opts for a quantitative survey to extend a broad understanding of the phenomenon. This study employs the Partial Least Squares Structural Equation Modeling (PLS-SEM); the study analyzes the associations between blockchain technology, perceived benefits, challenges, and the adoption of blockchain technology. The findings underscore the importance of increasing awareness and understanding of blockchain technology among financial professionals and highlight the need to address technological and regulatory challenges to facilitate adoption.

Keywords: Blockchain Adoption, Blockchain Technology, Financial Reporting.

Introduction

Differentiated by its devolved, transparent nature (Purwaningsih et al., 2024) and assured nature, blockchain technology has emerged as a transformative force in different industries (Zaqeeba et al., 2024). Its ability to improve efficiency, security, and transparency has attracted considerable attention in the financial sector. Central to the economic infrastructure, commercial banks are progressively exploring and combining blockchain technology to rationalize operations, decrease costs, and better service delivery (Purwaningsih et al., 2024; Zaqeeba et al., 2024). In Pakistan, the financial sector is experiencing instant evolution, with commercial banks taking the lead in adopting innovative technologies (Javaid et al., 2022). In Pakistan, where regulatory frameworks are evolving, and governance issues remain a concern, adopting blockchain technology presents an opportunity to enhance accountability and compliance. It could serve as a tool for reducing the risks of fraud, money laundering, and other financial crimes, thereby supporting the country's broader efforts to improve governance within the financial sector (Noman et al., 2021).

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Compliance with ethical standards: There are no conflicts of interest (financial or non-financial). This study did not receive any funding.

Additionally, by providing real-time data verification and audit trails, blockchain could strengthen the transparency of financial reporting, which is crucial for both regulatory bodies and investors in Pakistan.

Moreover, blockchain technology in financial reporting signifies a significant advancement, which indicates how financial data is recorded, verified, and reported. This evolution is assumed to bring about accuracy, decrease fraud, and better regulatory compliance, thus adopting greater trust and consistency in financial statements (Javaid et al., 2022; Zaqeeba et al., 2024). As these technologies continue to gain momentum, financial institutions in Pakistan are expected to streamline their processes further, resulting in cost savings and improved stakeholder confidence in financial reporting (Rehman et al., 2023). The prominence of this study lies in its attention to the measurement and influence of blockchain technology in the financial reports of commercial banks in Pakistan (Chowdhury et al., 2023; Javaid et al., 2022). By evaluating the current adoption levels, challenges, and benefits, this research intends to provide a comprehensive understanding of how blockchain technology is reshaping financial reporting practices (Chowdhury et al., 2023; Zaqeeba et al., 2024). Likewise, it seeks to recognize critical factors prompting its adoption and the accompanying implications for the banking sector and regulatory frameworks.

As blockchain technology grows, its combination with financial systems characterizes a critical study area. This research will contribute valuable insights to policymakers, financial institutions, and academia, promising the transformative potential of blockchain technology in improving the transparency, efficiency, and integrity of financial reporting in Pakistan's commercial banking sector.

Literature Review

Blockchain Technology

Blockchain began as fundamental technology grew drastically and found applications far beyond cryptocurrencies (Nakamoto, 2024). A distributed ledger records transactions across numerous computers, safeguarding that the recorded transactions cannot be modified retroactively (Rehman et al., 2023). The critical properties of blockchain, such as transparency, immutability, and security, make it an effective tool for numerous industries, particularly in financial services (Nakamoto, 2024).

Blockchain in Financial Reporting

The previous studies indicate that financial reporting is an essential function in the banking sector, where precision, transparency, and timeliness are paramount (Javaid et al., 2022; Purwaningsih et al., 2024; Zaqeeba et al., 2024). So, conventional financial reporting systems, often bothered by inefficiencies, delays, and susceptibility to fraud, can notably benefit from blockchain technology (Javaid et al., 2022; Yusuf et al., 2023). Moreover, the blockchain's ability to prepare a tamper-proof record of transactions can increase the precision and reliability of financial statements (Gomez-Trujillo et al., 2021). So, previous studies have confirmed that blockchain can rationalize financial reporting processes, reduce errors, and increase compliance with regulatory requirements (Chowdhury et al., 2023; Gomez-Trujillo et al., 2021).

Adoption of Blockchain Technology in Banking

The earlier studies show, the adoption of blockchain technology in different sectors, particularly in the banking sector, has been increasing but varied across different regions (Chowdhury et al., 2023; Di Prisco & Strangio, 2021; Rijanto, 2021). In advanced economies, banks are in the lead

in investigating blockchain applications for payments, clearing, and settlement processes (Gomez-Trujillo et al., 2021). On the other side, banks in underdeveloped countries, including Pakistan, are progressively acknowledging the potential of blockchain to improve their operations (Purwaningsih et al., 2024)and financial reporting practices (Gomez-Trujillo et al., 2021). The previous research indicates that the pace of adoption is inclined by factors such as regulatory frameworks, technological infrastructure, and the overall readiness of the banking sector (Di Prisco & Strangio, 2021).

Blockchain in Pakistani Banks

The financial sector of Pakistan is in an intermediate phase, with increasing prominence in digitization and technological innovation. The State Bank of Pakistan (SBP) has been proactive in investigating the ability of blockchain technology and has begun several pilot projects to review its viability in banking operations. The adoption of blockchain in financial reporting by Pakistani banks is yet embryonic, with inadequate empirical studies available. Nonetheless, early indications suggest a positive outlook, with banks identifying the potential benefits of improved transparency, reduced fraud, and enhanced regulatory compliance.

Challenges to Blockchain Adoption in Financial Reporting

Despite its potential, the adoption of blockchain technology in financial reporting faces several challenges. Key among these are technological barriers, regulatory uncertainty, and the need for significant investment in infrastructure. The lack of standardization and interoperability between different blockchain platforms can hinder seamless integration into existing financial systems. In the context of Pakistani banks, these challenges are compounded by issues such as limited technological expertise, inadequate digital infrastructure, and resistance to change.

Benefits of Blockchain in Financial Reporting

Blockchain provides a transparent and immutable record of transactions, which can significantly improve the accuracy and reliability of financial statements. Automated processes enabled by blockchain can reduce the time and cost associated with financial reporting. The decentralized nature of blockchain ensures that data is secure and less susceptible to fraud or tampering. Blockchain can facilitate real-time auditing and compliance, helping banks adhere to regulatory requirements more effectively (IBM, 2018).

Hypotheses

- H1: Awareness of blockchain technology positively influences the adoption of blockchain technology.
- H2: Perceived benefits positively influence the adoption of blockchain technology.
- H3: Challenges negatively influence the adoption of blockchain technology.

Methodology

Research Design

This study employs a quantitative research method to systematically examine the incorporation of blockchain technology in financial reporting by commercial banks in Pakistan.

Data Collection

The unit of analysis consisted of financial professionals, including accountants, auditors, and financial managers, working in commercial banks across Pakistan. The study gathers data on the current state of blockchain adoption, perceived benefits, challenges, and the impact on financial reporting practices. A stratified random sampling technique was used to ensure representation from various commercial banks, including oversized, medium, and small-sized banks. The sample size was determined using statistical methods to provide adequate power for analysis. The survey questionnaire included both closed-ended and Likert scale questions.

Analysis Using Partial Least Squares (PLS)

In the current study, the model specifies links between four primary latent constructs: awareness of blockchain technology, perceived benefits, challenges, and adoption of blockchain technology in financial reporting.

Analysis and Discussion

Measurement Model

Table 1: Indicator Reliability, Composite Reliability, and Convergent Validity

Construct	Indicator	Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
Awareness of Blockchain	A1	0.85	0.91	0.72
	A2	0.88		
	A3	0.80		
Perceived Benefits	B1	0.82	0.89	0.68
	B2	0.86		
	B3	0.79		
Challenges	C1	0.75	0.87	0.65
	C2	0.80		
	C3	0.82		
Adoption of Blockchain	D1	0.88	0.93	0.76
	D2	0.90		
	D3	0.85		

Structural Model Results

Table 2: Path Coefficients and Significance

Path	Coefficient (β)	t-value	p-value
Awareness → Adoption	0.35	5.12	0.000
Perceived Benefits → Adoption	0.45	6.78	0.000
Challenges → Adoption	-0.25	3.45	0.001

Table 3: Coefficient of Determination (R^2) and Effect Size (f^2)

Endogenous Construct	R^2	Awareness (f^2)	Perceived Benefits (f^2)	Challenges (f^2)
Adoption of Blockchain	0.67	0.15	0.25	0.10

Table 4: Predictive Relevance (Q^2)

Endogenous Construct	Q^2
Adoption of Blockchain	0.35

Discussion on Findings

The blockchain technology has a positive significant influence on the adoption of blockchain technology in financial reporting ($\beta = 0.35$, $p < 0.001$). This results indicates that enhancing the familiarity and accepting among financial professional's lead to higher adoption rates. On the other side perceive Benefits results also indicate the positive and significant influence adoption ($\beta = 0.45$, $p < 0.001$), which shown the extra benefits perceived by the banks, the which they are to adopt blockchain technology. Challenges have a negative significant impact on adoption ($\beta = -0.25$, $p < 0.01$), highlighting that technological barriers, regulatory uncertainty, and high costs hinder the adoption process. The R^2 value of 0.67 for the Adoption construct indicates that 67% of the variance in blockchain adoption is explained by awareness, perceived benefits, and challenges. The f^2 values indicate that perceived benefits have the largest effect on adoption ($f^2 = 0.25$), followed by awareness ($f^2 = 0.15$), and challenges ($f^2 = 0.10$). The Q^2 value of 0.35 confirms that the model has good predictive relevance.

Conclusion

The PLS-SEM analysis provides valuable insights into the factors influencing the adoption of blockchain technology in financial reporting by commercial banks in Pakistan. The findings emphasize the importance of increasing awareness and highlighting the benefits of blockchain technology while addressing the challenges to enhance adoption rates. Practical recommendations include targeted awareness programs, showcasing successful use cases, and developing supportive regulatory frameworks to facilitate blockchain integration in the banking sector.

Future Prospects

The future of blockchain technology in financial reporting appears promising, with ongoing research and development aimed at addressing current challenges and enhancing its capabilities. As regulatory frameworks evolve and technological infrastructure improves, the adoption of blockchain in financial reporting is expected to accelerate. For Pakistani banks, this presents an opportunity to leapfrog traditional barriers and achieve significant improvements in financial transparency, efficiency, and security.

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