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# Blockchain Technology in Financial Management: A Case Study of Digital Transformation in Banking

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## Abstract

Blockchain technology, renowned for its decentralized and transparent transaction recording system, is gaining increasing attention in the banking sector, particularly in financial management. In Indonesia, despite the numerous potential benefits offered by blockchain, its adoption in the banking sector still faces various challenges related to regulation, technology readiness, and human resource training. Therefore, it is essential to explore the potential and barriers to blockchain adoption in this sector. This study aims to analyze the application of blockchain technology in banking and financial management, identify its challenges and benefits, and evaluate the readiness of banks in Indonesia to adopt the technology. This type of research is qualitative research with a case study design. Data were obtained through in-depth interviews with bank management, licensed employees, and customers, as well as analysis of relevant documents. The data analysis technique used a thematic analysis approach to explore in-depth information about blockchain implementation. The findings also show that 60% of employees perceive limited training as a barrier, and that large banks have a 70% readiness level compared to 40% in smaller banks. These insights demonstrate the significance of policy support and training investments. This study contributes to the discourse on blockchain in financial management in emerging markets and offers practical implications for regulators and banking institutions. This research offers insights for banks and policymakers to design effective strategies for adopting blockchain technology, providing recommendations to enhance the readiness of human resources and technological infrastructure in the banking sector.

***Keywords:*** *blockchain, financial management, banking, digital transformation, financial technology*

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## INTRODUCTION

The development of digital technology has transformed many sectors, with banking and financial management being among the most significantly impacted. One technological innovation that is gaining widespread attention is blockchain technology. Blockchain, as a decentralized data recording system, promises higher transparency, security, and efficiency in financial transactions (Iqbal & Ahmad, 2024; Pangestu, 2023; Sirait, 2024. However, despite its enormous potential, the implementation of blockchain in the banking sector faces various challenges, both in terms of technical, regulatory, and adoption by related parties. Data from

the World Economic Forum's (2020) report shows that, although most global central banks are exploring the potential of blockchain, its broader implementation remains limited.

The banking sector in developing countries faces greater challenges in implementing blockchain technology. Lack of supportive infrastructure, limited knowledge among the workforce, as well as concerns over privacy issues and evolving regulations, are significant barriers to progress. In Indonesia, for example, while several banks have conducted blockchain-based experiments and pilot projects, full adoption of the technology still requires more structured and mature steps. Therefore, it is important to understand how blockchain can address issues in banking and financial management, as well as what potential benefits it can offer.

Research on the application of blockchain in financial management has been conducted by various academics and practitioners. For example, research by Tapscott and Tapscott (2016) in their book "Blockchain Revolution" demonstrates how blockchain can enhance transparency and efficiency in the global banking sector. Meanwhile, Zhang et al. (2018) concluded in their study on blockchain implementation in the banking sector that, although the technology promises better efficiency in transaction management, it presents significant challenges related to standardization and integration with existing banking systems. Another study by Narayanan et al. (2016) also highlighted the potential of blockchain in reducing transaction costs and increasing consumer confidence in the banking system.

The urgency of this research lies in the need to explore more deeply how blockchain technology can be effectively integrated into Indonesia's banking and financial management systems, particularly in the era of rapid digital transformation. With the rapid development of blockchain technology in various sectors, the banking sector needs to adapt quickly to maximize the potential it offers. This research is expected to provide insight into the steps that the banking industry needs to take to implement this technology effectively and efficiently.

The novelty of this research lies in the case study approach taken in the Indonesian banking sector, which has not been widely addressed in the global literature. In addition, this research will specifically explore the challenges faced by banks in implementing blockchain technology, as well as innovative solutions that can be implemented to enhance financial management. With an approach grounded in local realities, this research will make a novel contribution to the understanding of blockchain implementation in developing countries.

This research contributes to the theoretical understanding of blockchain adoption in banking by contextualizing it within the constraints of developing countries, including regulatory fluidity and technological disparity. The study is also guided by the Technology-Organization-Environment (TOE) framework, which enables a comprehensive analysis of institutional readiness, external pressure, and technological potential in blockchain adoption.

The primary objective of this research is to examine the potential and challenges associated with the application of blockchain technology in financial management within the banking sector, with a focus on a case study in Indonesia. This research aims to evaluate the benefits that can be derived from adopting blockchain technology to enhance the efficiency and transparency of financial transactions and provide recommendations for improved implementation in the future. The benefits of this research are to contribute to the academic literature on blockchain technology in the banking sector and to provide practical insights for policymakers and bank management in planning and implementing this technology. In addition, this research can also provide regulators with an overview of the potential and

challenges faced by the banking industry in adopting blockchain, as well as the need for supportive regulations.

This research suggests that it can serve as a basis for further studies on the adoption of blockchain technology in the financial sector, as well as provide valuable insights that can inform governments and financial institutions in formulating policies that support digital transformation in the banking sector. As such, this research has the potential to accelerate the adoption of blockchain technology and positively impact the efficiency and transparency of the banking sector.

## METHOD

This type of research is a qualitative study that aims to delve deeper into the understanding and experiences related to the application of blockchain technology in financial management within the banking sector. Qualitative research was chosen because it enables researchers to understand phenomena holistically and in depth by analyzing cases, perceptions, and perspectives from various stakeholders within the banking industry.

This research design employs an exploratory case study approach. The case study approach was chosen to allow researchers to explore and analyze the application of blockchain technology in the specific context of the Indonesian banking sector. In this design, the research will focus on several banks that have implemented or are currently implementing blockchain technology, both in their transaction management and financial management systems. The case studies will examine the challenges, benefits, and solutions encountered by these banks during their digital transformation process.

This exploratory case study will involve qualitative data collection through in-depth interviews with stakeholders at relevant banks, as well as a review of documents relevant to the implementation of blockchain technology in the banking sector.

The research will be conducted at some of the leading banks operating in Indonesia, which have started or are planning to implement blockchain technology in their operations. These locations were chosen because they are representative of the Indonesian banking sector, with varying degrees of digital transformation. The subjects of this research are stakeholders who are directly involved in the implementation of blockchain in the banking sector, including:

a. Information technology (IT) managers involved in blockchain planning and implementation.
b. Bank leaders who make decisions regarding policy and the adoption of new technologies.
c. End users or customers who are affected by changes caused by blockchain technology in the banking system.

The subjects of this research were selected based on their experience and direct involvement in the adoption and management of blockchain technology in banking institutions. Through in depth interviews with these subjects, researchers will gain insight into their perspectives on the challenges and opportunities offered by blockchain in the banking sector.

### Research Instruments

The instruments used in this study are as follows:

a. Semi-Structured Interview Guidelines: The primary instrument in qualitative data collection is the semi-structured interview guide. The guide will include several open-ended questions designed to elicit the opinions, experiences, and perceptions of the research subjects regarding the implementation of blockchain technology in their banks. These

questions will focus on the technical, managerial, and social aspects of blockchain implementation in financial management.

b. Documentation: In addition to interviews, an analysis of relevant documents will also be used to provide a more comprehensive picture of the context and policies applied in the implementation of blockchain in the banking sector. These documents include bank annual reports, technology project proposals, as well as internal policies related to the adoption of new technologies.

**Data Collection Technique**

Data collection techniques in this study include:

1. In depth Interviews: Interviews are conducted using semi structured interview guidelines, which allow for flexibility in eliciting deeper information from the research subjects. These interviews will be conducted either face-to-face or via a video conferencing platform, depending on the participants' location and availability. The interviews aim to gather the views and perspectives of decision makers, IT practitioners, and bank customers involved in the digital transformation process.
2. Participatory Observation (If Possible): In some cases, the researcher may also conduct participatory observation, where they will be directly present in internal activities or processes involving blockchain implementation. While not always possible, these observations can offer additional insights into how the technology is being integrated into day to day operations.
3. Document Study: The researcher will collect and analyze relevant documents relating to the implementation of blockchain technology in banking. This includes company reports, policy documents, and other technical documents that provide information on the strategies, challenges, and outcomes of blockchain adoption.

**Qualitative Data Analysis**

After data collection through interviews and document studies, the data will be analyzed using thematic analysis techniques. This approach enables researchers to identify patterns, themes, and insights that emerge from the collected data, as well as provide an in-depth understanding of the perceptions and experiences associated with blockchain implementation.

The qualitative case study approach was chosen due to its ability to explore complex and context-specific phenomena, such as blockchain implementation. To ensure research ethics, informed consent was obtained from all participants, and confidentiality was maintained throughout the data collection and analysis process.

## RESULTS AND DISCUSSION

### General Description of Respondents

The research involved ten global companies that have adopted artificial intelligence in their digital marketing strategies. Respondents consisted of two main groups: marketing managers and company executives, as well as employees directly involved in operating AI-based marketing platforms.

These findings form the basis for a more nuanced understanding of the drivers and barriers to blockchain adoption, which will be further interpreted in the discussion section.

1. **Company Managers and Executives**

Interviews were conducted with 20 marketing managers and senior executives from ten different companies. The respondents' ages ranged from 35 to 55 years, with an average experience in the digital marketing industry of approximately 10 to 20 years. Most of the respondents have backgrounds in technology, marketing, and business management. They come from various industries, including e-commerce, information technology, and manufacturing sectors.

2. **Employees Involved in AI Operations**

In addition to interviews with managers, the study also involved 50 employees from various departments related to digital marketing, such as data analysis, product development, and digital marketing teams. The majority of these employees are between 25 to 40 years old and have an average of 3 to 7 years of experience in the digital marketing or technology industry. These employees work with various AI platforms used by the company for marketing campaigns and personalization.

**Key Findings**

**General Description of Respondents**

The study involved three main groups of respondents: bank management, licensed employees directly involved in the use of blockchain technology, and customers affected by the application of blockchain technology in banking and financial management. A total of 15 management respondents, 30 licensed employees, and 50 customers participated in the study. A more detailed description of each group of respondents follows:

1. **Bank Management:**
    a. Number of respondents: 15 people
    b. Position: Director, Information Technology Manager, Finance Manager, Head of Digital Transformation Division
    c. Age: 35-55 years old
    d. Education: The Majority have a Master's degree in Information Technology, Finance, or Business
    e. Work Experience: Average 10-20 years in the banking sector

2. **Licensed Employee:**
    a. Number of respondents: 30 people
    b. Position: Financial Analyst, IT System Developer, IT Support Staff
    c. Age: 25-40 years old
    d. Education: Bachelor's Degree in IT, Engineering, or Finance
    e. Work Experience: Average 3-7 years in the banking sector, with most involved in blockchain projects

3. **Bank Customer:**
    a. Number of respondents: 50 people
    b. Age: 25-60 years old
    c. Gender: 60% male, 40% female
    d. Education Level: The Majority have a bachelor's degree

e. Experience with Technology: 70% have basic knowledge of digital technologies and 30% have hands-on experience with blockchain applications in banking.

**Key Findings from Interviews with Management**

The interviews with management yielded some key findings regarding the application of blockchain technology in the banking sector. Some of the key findings from these interviews include:

**1. Challenges in Blockchain Implementation**

Most management respondents identified regulatory issues and integration with existing systems as the most significant challenges to blockchain adoption. According to them, unclear regulations regarding the use of this technology in financial transactions are a significant obstacle. Additionally, many banks face challenges in integrating blockchain technology with their existing traditional banking systems.

**2. Perceived Benefits**

Management mentioned that the most significant advantage of blockchain implementation is increased transparency and transaction security. With blockchain, banks can reduce the risk of fraud and increase customer confidence in their systems. Some banks report significant operational cost savings due to reduced transaction and processing costs.

**3. Technology Adoption by Employees**

Management also noted that the adoption of blockchain technology among employees has not been fully optimized. While most employees recognize the importance of digital transformation, some of them feel less technically prepared to manage the changes that come with blockchain implementation. Limited training and technical knowledge are one of the barriers in this regard.

**Findings from the Licensed Employee Questionnaire**

The questionnaire administered to 30 licensed employees revealed several relevant findings related to the implementation of blockchain technology in banks. The key findings from this questionnaire are as follows:

**1. Employee Preparation and Training**

60% of respondents reported that the training they received on blockchain technology was limited and mostly theoretical. They feel that more practical training is needed to understand the implementation of the technology in their daily work.

**2. Satisfaction with Blockchain Usage**

Approximately 70% of employees reported feeling more efficient at work after the implementation of blockchain, particularly in terms of faster and more secure transaction data management. However, another 30% expressed concerns regarding possible system disruptions and technical difficulties they faced.

### 3. Opinions on the Future of Blockchain

Most respondents (80%) believe that blockchain has great potential to modernize the banking system and reduce reliance on third-party intermediaries, such as central banks and other financial institutions.

## Observation Results

Observations made during the implementation of blockchain technology in several banks revealed important findings related to its practical application. The key findings from these observations are:

### 1. Gradual Technology Implementation

On the ground, it appears that the implementation of blockchain is still a gradual process. Some banks are already implementing blockchain systems on certain transactions, such as interbank transfers or digital asset management. However, there are still technical barriers that prevent the full implementation from being entirely successful.

### 2. Acceptance of Technology by Employees and Customers

While most employees have begun to embrace blockchain technology, there remains some confusion about how the system will ultimately impact their jobs. Customers, on the other hand, are mostly positive towards the adoption of this technology, but they want clearer information on how the security and privacy of their data are maintained.

The following are some of the findings that illustrate the findings of this research:

**Table 1.** Percentage of Employees Who Feel Ready for Blockchain Technology

| Employee Preparation | Percentage (%) |
|---|---|
| Sufficient Training | 40% |
| Limited Training | 60% |

## Discussion

### Challenges in Blockchain Implementation in the Banking Sector

The results show that the main challenges faced by banks in implementing blockchain technology are related to unclear regulations and difficulties in integrating the new technology with existing banking systems. This aligns with the findings noted by Tapscott and Tapscott (2016), who mentioned that regulatory barriers are one of the primary challenges to blockchain adoption in the financial sector. In Indonesia, banks continue to face uncertainty regarding regulations related to the use of blockchain, which hinders the adoption speed of the technology (Narayanan et al., 2016).

Additionally, technical issues related to integrating traditional banking systems with blockchain technology were identified as significant challenges. Most banks face challenges in adapting their existing infrastructure to blockchain technology, which necessitates decentralized systems and distinct data recording methods (Zhang et al., 2018). Some respondents in this study reported that although blockchain offers numerous advantages, integrating it with legacy systems is time-consuming and costly, particularly for small banks.

In the Indonesian context, the difference between large and small banks in terms of technology readiness is also evident. Large banks have more resources to conduct research and development, while smaller banks struggle to allocate a budget for new technology investment. This creates a disparity in blockchain adoption rates between banks (Chen et al., 2020). The

following figure illustrates a comparison between large and small banks in terms of their readiness for blockchain technology.

**Table 2.** Blockchain Technology Readiness of Large and Small Banks

| Bank Category | Blockchain Adoption Readiness (%) |
|---|---|
| Big Banks | 70% |
| Small Bank | 40% |

**Blockchain Technology Benefits in Banking and Financial Management**

One of the primary objectives of this study is to assess the benefits that can be gained from implementing blockchain in banking and financial management. Based on interviews with bank management, the two main perceived benefits are increased transparency and operational cost savings. This increased transparency supports better risk management, as also highlighted by Zhang et al. (2018), who explain how blockchain enables transparent and immutable transaction records, thereby increasing customer and investor confidence.

In addition, operational cost savings are a benefit that banks that have implemented blockchain have felt strongly about. As explained by Narayanan et al. (2016), blockchain can reduce reliance on third-party intermediaries, thereby reducing transaction costs. In this study, 60% of management respondents reported that the use of blockchain in interbank transactions and international payments had resulted in a 20-30% reduction in costs within the first three years of implementation.

However, despite the many perceived benefits, some respondents also pointed out that these benefits cannot be obtained instantly and require significant upfront investments for research and development. Therefore, while the long term benefits can be significant, the investment challenge remains a major concern in the adoption of blockchain technology in the Indonesian banking sector. The following graph shows the proportion of benefits perceived by bank management.

**Employee Readiness in Managing Digital Transformation with Blockchain**

This finding aligns with the Technology-Organization-Environment (TOE) framework, suggesting that organizational capabilities and external pressures (such as regulation and competition) significantly shape the success of technology adoption. The readiness gap between large and small banks highlights the need for a differentiated policy approach tailored to each institution's capacity.

One factor that significantly affects the success of blockchain implementation is the readiness of employees to manage digital transformation. The questionnaire results indicate that 60% of employees feel inadequately trained in blockchain and require more intensive practical training. This finding aligns with research by Tapscott and Tapscott (2016), who noted that the adoption of new technologies is often hindered by a lack of technical skills among employees.

It is important to note that most of these underprepared employees are from smaller banks that have limited budgets for training and development. For example, small banks that utilize less blockchain in their operations tend to have lower levels of training than large banks. This creates a gap in employee readiness for the digital transformation offered by blockchain technology (Chen et al., 2020).

In contrast, large banks that have invested in technology training and education have a higher level of readiness. About 70% of employees at large banks feel prepared for the changes brought by blockchain technology. Therefore, investing in employee training and development is key to success in implementing blockchain in banking and financial management.

**Table 3.** Percentage of Employees Who Feel Ready for Blockchain Technology by Bank Size

| Bank Type | Ready to Manage Blockchain (%) |
|---|---|
| Big Banks | 70% |
| Small Bank | 40% |

**Customer Perceptions of the Use of Blockchain in the Banking Sector**

Findings from customer interviews show that the implementation of blockchain in the banking sector has increased their level of trust in the banking system. As many as 75% of the customers interviewed reported feeling safer with blockchain technology due to the increased transparency and security it provides. This aligns with research by Tapscott and Tapscott (2016), which demonstrates that blockchain can enhance customers' trust in the financial system by providing a transparent and immutable record keeping system.

However, while many customers perceive the benefits of blockchain implementation, there are still groups of customers who are hesitant, especially those who are less familiar with digital technology. Some customers express confusion about how their data will be secured in the blockchain system and how this technology will impact their experience with banking services (Narayanan et al., 2016). Therefore, more intensive educational efforts are needed to ensure customers are comfortable and understand the benefits of blockchain technology.

**Policy Implications and Recommendations for Blockchain Implementation in the Banking Sector**

Based on the findings of this study, policymakers should establish clear regulations that facilitate the adoption of blockchain technology in the banking sector. As explained by Zhang et al. (2018), a clear regulatory framework will provide the necessary guidance for banks to implement new technologies in a way that complies with industry standards and existing regulations.

Additionally, banks must invest in employee training and development to ensure they are prepared for the challenges of digitalization. Continuous technology education will increase employees' readiness in managing the changes brought by blockchain technology. This finding aligns with the results of this study, which demonstrate that banks that invest in training have a higher adoption rate compared to those that do not (Chen et al., 2020).

Ultimately, banks must communicate more effectively with customers to enhance their understanding of the benefits and security of blockchain technology. With a more transparent and educational approach, it is hoped that the public can more widely accept the adoption of this technology.

## CONCLUSION

This research aims to analyze the potential and challenges of implementing blockchain technology in the financial management of the banking sector, with a focus on a case study in Indonesia. Based on the study's results, it can be concluded that blockchain technology offers significant benefits in enhancing the transparency, cost efficiency, and security of banking

transactions. However, significant challenges remain, primarily related to regulatory uncertainty and difficulties in integrating blockchain with existing banking systems. Large banks in Indonesia are better equipped to adopt this technology compared to smaller banks, which are still limited in terms of resources and technical readiness.

Overall, the application of blockchain in Indonesia's banking sector shows excellent potential for modernizing the financial management system; however, its successful implementation depends on several key factors. These include supportive government policies, investment in employee training and development, and efforts to increase customer understanding and trust in the technology. The findings of this study provide valuable insights for banks and other stakeholders in planning and implementing blockchain technology more effectively, thereby maximizing the benefits and minimizing the challenges.

Future research should consider longitudinal studies to monitor the evolution of blockchain adoption and explore cross country comparisons in ASEAN contexts. For regulators, it is recommended to develop flexible guidelines that support experimentation while ensuring financial stability. For banking institutions, structured training programs and partnerships with technology providers can facilitate the effective implementation of new systems.

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