

Building the Foundation of Indonesia's Digital Economy: Encourging the Adoption of Bitcoin and Blockchain Technology to Increase Financial Inclusion and Efficiency

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ABSTRACT

This research aims to promote the adoption of bitcoin and blockchain technology to enhance financial inclusion and efficiency in Indonesia. A mixed-method approach was used, involving qualitative interviews with experts and users of blockchain and bitcoin, as well as quantitative surveys distributed to students and the general public. Findings suggest that these technologies can improve efficiency in the financial sector by reducing costs and improving accessibility, especially for people without access to traditional banking services. However, the successful implementation of blockchain and bitcoin requires proper education on their use. Theoretical implications highlight the role of blockchain in advancing digital financial inclusion, while practical implications point to the need for government regulations and strategies for financial institutions. This research offers insights into supporting digital economic transformation and improving the efficiency of financial services in Indonesia.

INTRODUCTION

The adoption of Bitcoin and blockchain technology presents a transformative opportunity for Indonesia's financial sector, potentially addressing long-standing challenges related to financial inclusion and inefficiency. In a country with a significant unbanked population, these technologies can offer secure, affordable, and accessible financial services that bypass traditional banking systems. Blockchain, often referred to as distributed ledger technology (DLT), enables participants within a network to share access to a decentralized and secure ledger, providing an innovative solution for managing data, transactions, and operations (Mosteanu, 2021). The potential benefits of these technologies include fostering greater transparency, decentralization, and security in financial processes, making them particularly relevant in a digital age where trust and security in transactions are paramount.

Introduced by Satoshi Nakamoto in 2008, blockchain forms the foundational technology for Bitcoin, which is widely regarded as the first decentralized cryptocurrency. Despite Bitcoin's well-known price volatility and the fluctuations in its market value, it continues to dominate the cryptocurrency market, both in terms of recognition and capitalization. As an asset class, Bitcoin is often considered an alternative investment vehicle, attracting both individual and institutional investors who are willing to accept its risks in exchange for potential returns (Aisah & Pati, 2024). Despite its instability, Bitcoin's decentralized nature and the underlying blockchain technology offer a new paradigm in how financial assets are managed, traded, and secured.

Beyond its role as a database, blockchain's decentralization enhances trust and security—qualities that are increasingly important for financial applications. Blockchain enables secure peer-to-peer transactions without the need for intermediaries such as banks, thus reducing costs and improving efficiency. Numerous studies have examined the long-term impact and potential of both Bitcoin and blockchain technology. For example, Neelesh Mungoli's study, "Deciphering the Blockchain: A Comprehensive Analysis of Bitcoin's Evolution, Adoption, and Future Implications," provides insights into Bitcoin's rapid expansion, its subsequent volatility, and the challenges it faces as it gains prominence in global financial markets (Mungoli, 2023). Mungoli emphasizes that while Bitcoin's growth has been remarkable, the digital currency's unpredictable nature remains a barrier to its widespread acceptance as a reliable form of currency.

Similarly, research by Sadiq et al. (2023) delves into the relationship between digital currencies and financial stability. Published in the *Borsa Istanbul Review*, their study, "Digital Currency and Blockchain Security in Accelerating Financial Stability: A Mediating Role of Credit Supply," uses survey data from 2021 to 2022 to explore how blockchain and digital currencies, including Bitcoin, can improve business operations and enhance overall financial stability (Sadiq et al., 2023). Their findings suggest that Bitcoin and blockchain have the potential to contribute to financial stability through secure data management and decentralized financial structures, which can also drive greater financial inclusion.

On the global stage, different countries have adopted various approaches to regulating and integrating Bitcoin and blockchain technology. For instance, Japan has fully legalized cryptocurrency and established a robust regulatory framework to facilitate its integration into the economy. In the United States, Bitcoin is recognized as a financial instrument, although it is not treated as official currency. The United Kingdom views Bitcoin as a form of private money, while China prohibits its use by state-owned enterprises but allows individuals to hold and use it for personal purposes. Across Europe, Bitcoin is typically categorized as a security, while in Russia and other countries, it is treated as a commodity or digital asset (Nikiforova et al., 2019). These diverse regulatory stances highlight the global uncertainty around cryptocurrency, yet also underscore the increasing recognition of its significance in the financial landscape.

In Indonesia, the adoption of blockchain technology remains in its early stages, but its potential is widely recognized. Blockchain's advantages in terms of data security and transparency are particularly appealing in a country where concerns about financial inclusion and inefficiency remain prevalent. However, the implementation of blockchain faces several obstacles, including limited technological infrastructure, unstable internet connections, and challenges related to network scale. Suryawijaya (2023) identifies these barriers but also argues that blockchain, if properly implemented, could transform Indonesia's digital financial systems through decentralized data management and transparency. The integration of complementary technologies like the Internet of Things (IoT) could further enhance blockchain's utility, creating a more dynamic and interconnected digital economy in Indonesia.

Despite the clear benefits of blockchain and Bitcoin adoption, there are significant challenges to be overcome. One major obstacle is the general lack of understanding of these technologies among both the public and policymakers. There is widespread skepticism about the reliability of Bitcoin and blockchain, largely due to concerns about the security of digital currencies and their potential for misuse in illegal activities. Additionally, Indonesia's regulatory framework regarding cryptocurrency remains ambiguous, which creates uncertainty for businesses and individuals interested in adopting these technologies. The complexities surrounding the use of Bitcoin from an Islamic law perspective also present a challenge, as the Indonesian Ulema Council (MUI) has issued a fatwa declaring Bitcoin haram. This ruling is based on the high levels of uncertainty and risk associated with Bitcoin transactions, as well as its incompatibility with existing banking regulations under Islamic finance principles (Sabiq et al., 2023).

Despite these challenges, the potential for blockchain and Bitcoin to promote financial inclusion and efficiency in Indonesia remains significant. With the right strategies, including enhanced regulation, public education, and investment in technological infrastructure, Indonesia could effectively leverage blockchain and Bitcoin to foster a more inclusive and efficient digital economy. For example, clearer regulatory guidelines could help reduce the uncertainty surrounding cryptocurrency usage, while public education campaigns could

improve digital literacy and help people better understand the benefits and risks of these technologies. Furthermore, investments in information technology infrastructure, such as improving internet connectivity and scaling up blockchain networks, would be critical in supporting widespread adoption.

In light of these considerations, this research aims to identify effective strategies for the adoption of blockchain and Bitcoin in Indonesia's financial system. The study will explore methods for integrating digital currencies into the country's economy in a way that promotes financial inclusion and enhances overall efficiency. Specifically, the research seeks to provide a comprehensive understanding of the benefits and challenges associated with these technologies, with the goal of informing policy formulation and guiding the future development of Indonesia's digital financial landscape. By equipping stakeholders—including the government, regulators, financial institutions, and the general public—with detailed insights into the potential of blockchain and Bitcoin, this research hopes to contribute to the creation of a more robust and inclusive financial system in Indonesia.

In conclusion, Bitcoin and blockchain technology represent a significant opportunity for Indonesia to transform its financial sector, providing new solutions to old problems of financial inclusion and inefficiency. While there are notable challenges, including regulatory uncertainty and skepticism surrounding digital currencies, the potential rewards are equally substantial. By investing in infrastructure, education, and innovation, Indonesia could position itself as a leader in the regional digital economy, unlocking new pathways for economic growth and development. Ultimately, with the right approach, blockchain and Bitcoin could play a pivotal role in driving Indonesia toward a more inclusive and efficient financial future.

THEORETICAL REVIEW

Digital Economy

Don Tapscott introduced the concept of the digital economy in his book *The Digital Economy*, defining it as economic activities that utilize technology, including the internet and artificial intelligence (AI), to improve processes. Key characteristics include its global nature, reliance on digital processes, immediacy, elimination of intermediaries, and emphasis on innovation. The digital economy offers significant benefits to countries like Indonesia, enhancing market access through platforms such as Tokopedia and Shopee, improving business efficiency via fintech solutions like GoPay and OVO, fostering startup growth, advancing financial inclusion, supporting the creative industry, and optimizing logistics. In 2020, Indonesia's digital economy grew by 11%, contributing approximately US\$44 billion (Rp 619 trillion) to the national economy. When fully leveraged, it has the potential to strengthen vital sectors and enhance Indonesia's global competitiveness.

Financial Inclusion

Financial inclusion in Indonesia is hindered by challenges such as limited access to affordable financial services, dependence on traditional banking systems, and regional disparities. To mitigate these issues, strategic

reforms are necessary, including policies that promote financial inclusion, digital financial services, and financial literacy initiatives. Collaboration between public and private sectors is vital for sustainable solutions. A notable initiative is BRILink, a branchless agent-based model by Bank Rakyat Indonesia (BRI), which delivers digital banking services to underserved rural areas, facilitating over 900 million transactions in 2021.

Financial Efficiency

Financial efficiency refers to the optimal utilization of resources in financial management, enabling organizations, companies, or governments to maximize the use of their funds effectively (Chandra, 2003). It encompasses budget management, cost reduction, and the optimization of financial assets. Key benefits include cost savings through operational efficiency, asset optimization, and increased profitability. Financial efficiency also strengthens resilience to economic instability and enhances investor confidence by demonstrating sound management practices. Various factors, such as interest rates, economic growth, market volatility, and energy costs, influence financial efficiency. Organizations can enhance efficiency by reducing operational costs, minimizing excessive material usage in production, and evaluating promotional strategies to optimize budget allocation. Additionally, streamlining labor costs by eliminating redundant or unproductive roles further contributes to financial efficiency. Ultimately, improving financial efficiency allows organizations to better manage resources and remain competitive in a dynamic economic environment.

Bitcoin and Blockchain Technology

Financial efficiency is defined as the effective allocation of resources within financial management, enabling organizations, corporations, or governments to optimize their fund utilization (Chandra, 2003). It encompasses budget oversight, cost reduction, and the maximization of financial assets. The advantages of financial efficiency include operational cost savings, asset optimization, and enhanced profitability. Furthermore, it fortifies resilience against economic fluctuations and bolsters investor confidence by reflecting prudent management practices. Various elements, including interest rates, economic growth, market volatility, and energy expenses, impact financial efficiency. Organizations can improve efficiency by minimizing operational costs, reducing material waste in production, and refining promotional strategies for better budget allocation. Additionally, optimizing labor costs by eliminating redundant roles further enhances financial efficiency, allowing organizations to effectively manage resources and sustain competitiveness in an evolving economic landscape.

Thinking Framework

Bitcoin, introduced by Satoshi Nakamoto in 2009, is a decentralized digital currency that functions independently of financial institutions, utilizing blockchain technology to document and authenticate all transactions

(Hendraswara, 2018). Blockchain, as a distributed ledger, maintains the integrity and immutability of transactions through cryptographic signatures. Essential elements include blockchain for transaction storage, mining for block verification and addition, and wallets for Bitcoin management. Bitcoin has notably influenced global transactions and investments, though it faces several challenges. Blockchain technology enhances data security, guarantees permanent transactions, facilitates asset ownership transfer, and improves transaction efficiency by removing intermediaries like banks (Rohman, 2021; Aqsha, 2022). Additionally, it promotes financial inclusion for unbanked individuals and improves transparency and accountability in financial markets. Nonetheless, significant obstacles such as price volatility, regulatory ambiguity, limited access, and cybersecurity threats hinder broader adoption.

METHODOLOGY

Types and Research Approaches

This research adopts a qualitative methodology with an exploratory approach aimed at understanding the adoption of Bitcoin and blockchain technology in enhancing financial inclusion and efficiency in Indonesia. Various methods will be employed, including literature reviews to identify opportunities and challenges (Hendraswara, 2018), interviews with experts and stakeholders for firsthand insights, case studies of successful implementations in other countries, and data analysis to uncover trends (Rohman, 2021; Aqsha, 2022). The research will be conducted both online and offline, specifically in Malang, Indonesia.

Population and Sample

This research will examine several subjects relevant to the study of Bitcoin and blockchain technology's role in enhancing financial inclusion in Indonesia. The population includes the broader Indonesian society, Bitcoin users in Indonesia, and students from the Faculty of Economics at UIN Malang. A national survey will gather public opinion on these technologies, while case studies will focus on individuals and businesses successfully using Bitcoin and blockchain. In-depth interviews will also be conducted with students to capture contemporary perspectives on these technologies (Hendraswara, 2018; Rohman, 2021; Aqsha, 2022).

Data and Data Collection Techniques

The data for this research will be sourced from two categories: primary and secondary data. Primary data will be directly obtained from respondents through interviews with faculty members and students, while secondary data will be gathered from relevant institutions. To collect this data, interviews will be conducted to gain insights from both faculty and students. Additionally, questionnaires will be distributed to individuals who have utilized Bitcoin and blockchain technology, ensuring a comprehensive understanding of the subject matter.

Operational Definition of Variables

The operational definitions of variables in this study encompass several key concepts. Knowledge Level refers to an individual's understanding of Bitcoin and blockchain, measured through participation in focus group discussions and individual assessments (Bank Rakyat Indonesia, 2020). Adoption Factors involve influences that either promote or hinder technology acceptance, identified through focus group discussions (Rohman, 2021). Usage Benefits are the economic and social advantages gained, assessed by participant feedback (Aqsha, 2022). Usage Risks denote potential economic and social losses, evaluated through participant insights. Policy Recommendations encompass suggestions for supportive regulations, developed through discussions and feasibility analysis (Hendraswara, 2018).

Data Analysis

Data analysis will commence with an examination of the collected samples to ascertain perspectives and considerations regarding the implementation of systems that establish Indonesia's digital economy through the adoption of Bitcoin and blockchain technology, aimed at enhancing financial inclusion and efficiency. Subsequently, the researcher will process the data by assessing variables such as knowledge levels, perceptions, and experiences regarding perceived benefits, as well as opinions on risks and policies from the sample population, ultimately yielding conclusive data that aligns with the research objectives (Rohman, 2021; Aqsha, 2022).

RESULTS

The Potential of Bitcoin and Blockchain in Increasing Financial Inclusion

Bitcoin and blockchain technology hold immense potential to increase financial inclusion, particularly for those who have limited or no access to traditional banking systems. With internet connectivity, individuals can participate in the financial ecosystem without needing to rely on conventional financial institutions, which are often inaccessible or costly in certain regions. One of the key advantages of Bitcoin is its relatively low transaction costs, especially compared to the fees charged by traditional payment methods. This cost efficiency makes it an attractive option for people in underbanked or remote areas where banking fees can be prohibitively high. Moreover, the decentralized nature of Bitcoin ensures that financial services are available to anyone with an internet connection, regardless of their geographical location, providing an opportunity for millions to participate in the global economy.

In addition to reducing costs, Bitcoin transactions offer a level of speed and efficiency that surpasses traditional banking systems. Transfers using Bitcoin can be completed in minutes, or even seconds, unlike conventional bank transfers that often take several days, particularly when dealing with international transactions. This rapid transaction speed is especially beneficial for people who need timely access to their money. Furthermore, Bitcoin and other cryptocurrencies provide new avenues for investment, enabling individuals to diversify their financial portfolios. By participating in digital

asset ownership, individuals, even in developing countries, can build wealth and gain more financial control, ultimately contributing to their economic empowerment. Through its ability to bridge gaps in access and affordability, Bitcoin and blockchain technology are poised to play a pivotal role in fostering greater financial inclusion globally.

Increasing Financial System Efficiency

The implementation of blockchain technology in financial systems can significantly enhance efficiency through several key factors. Firstly, the permanent and verifiable nature of blockchain transactions promotes greater transparency and accountability within the financial sector. Additionally, strong cryptographic security measures safeguard data and transactions against potential hacking attempts, ensuring a more secure financial environment. Furthermore, many financial processes can be automated via blockchain, which reduces human error and increases overall efficiency. Finally, blockchain facilitates interoperability by allowing different systems and networks to connect and interact seamlessly, thereby improving collaboration and integration across various financial platforms.

Challenges and Solutions

The adoption of Bitcoin and blockchain technology faces several challenges that must be addressed to ensure their successful integration into the financial landscape. One significant issue is price volatility, which poses risks for investors due to the unpredictable nature of Bitcoin's value. Additionally, there is a pressing need for a clear and comprehensive regulatory framework to govern the use of Bitcoin and other cryptocurrencies. Infrastructure development also requires substantial investment in information technology to support widespread blockchain adoption. Finally, public education on blockchain technology and Bitcoin is essential to mitigate fraud risks and enhance trust in these emerging financial tools.

CONCLUSIONS AND RECOMMENDATIONS

The adoption of Bitcoin and blockchain technology holds considerable promise for reshaping Indonesia's financial landscape, particularly by addressing many of the existing challenges in its current financial systems. The decentralized nature of blockchain could provide broader access to financial services for the unbanked and underbanked population, helping to reduce inequality and empower more people financially. By leveraging blockchain's transparency and efficiency, Indonesia could significantly reduce transaction costs, speed up financial processes, and increase the overall efficiency of its economy. With the right strategies in place, the use of digital currencies and blockchain technology could also help Indonesia strengthen its position in the regional digital economy.

To fully harness this potential, several measures need to be taken. Strengthening regulations to provide clear guidelines on the usage of Bitcoin and other cryptocurrencies would be essential to ensure a secure and trustworthy environment for users. Furthermore, increasing digital literacy through educational campaigns could help the public better understand the opportunities

and risks associated with blockchain and Bitcoin. In addition, investments in information technology infrastructure are crucial for supporting this digital transformation, enabling seamless integration and widespread adoption of these technologies. Fostering innovation in the blockchain sector and collaborating with the private sector to create a robust blockchain ecosystem would also play a vital role in positioning Indonesia as a leader in the digital economy. By taking a holistic approach that combines regulatory frameworks, education, and innovation, Indonesia could unlock the full potential of blockchain technology and Bitcoin.

FURTHER STUDY

For further research on the adoption of Bitcoin and blockchain technology in Indonesia, several avenues can be explored. Impact assessment studies could evaluate the measurable effects of Bitcoin and blockchain adoption on financial inclusion metrics among various demographic groups. Additionally, qualitative analyses of user experiences with these technologies may reveal barriers and benefits. Evaluating existing government policies on Bitcoin and blockchain can provide insights into their effectiveness in enhancing user engagement. Comparative studies with other countries that have successfully integrated blockchain could identify best practices for Indonesia. Furthermore, research into emerging blockchain applications beyond Bitcoin, such as smart contracts and decentralized finance (DeFi), could enhance financial inclusion. In-depth risk assessments focusing on security, volatility, and regulatory challenges will help inform better risk management strategies. Lastly, examining how blockchain can be applied across sectors like agriculture, healthcare, and education may further promote financial inclusion and economic efficiency.

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