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Bachelor of Science Information and Communication Technology

Blockchain for Economic Stimulation: Lessons from Thailand's Digital Wallet Scheme and the Case for Blockchain Integration

Team - NO.1
6607782 Kritin Lim
6509899 Kyaw Wunna Htun
6600780 Tanadit Plongthong
6610591 Panhaseth Dara

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Kyaw Wunna Htun[1] and Kritin Lim[2] , Tanadit Plongthong[3]

[1]Department of Information and Communication Technology, Rangsit University, Pathum Thani, Thailand

[2]Department of Information and Communication Technology, Rangsit University, Pathum Thani, Thailand

[*]Corresponding Author:[1]kyawwunna.h65@rsu.ac.th, [2]kritin.l66@rsu.ac.th, tanadit.p66@rsu.ac.th, [4]dara.p66@rsu.ac.th

Abstract

This study explores the potential of blockchain technology to enhance the delivery of public economic stimulus, with a focus on Thailand's 10,000-baht digital wallet scheme. Although blockchain was initially considered, the government implemented a centralized system due to infrastructure and regulatory constraints. Phase 3 of the scheme—which would have included additional eligible citizens verified through the Thang Rath application—was indefinitely delayed, resulting in a significant number of qualified individuals not receiving funds. This research examines perceptions among Rangsit University students who met eligibility criteria but were not reached due to the postponed rollout. A structured survey assessed attitudes toward three core blockchain features: programmability, fraud prevention, and accessibility and inclusion. Multiple linear regression analysis revealed that programmability and fraud prevention were positively associated with perceived effectiveness, while accessibility showed a statistically significant negative association. The model explained 67.8% of the variance in perceived effectiveness, indicating strong predictive power. These findings suggest that blockchain integration could improve automation, transparency, and trust in digital stimulus programs. However, accessibility challenges remain a critical concern, particularly in ensuring equitable participation. By comparing perceptions of centralized and blockchain-based models, this study contributes to broader policy discussions on digital public finance and highlights the importance of inclusive design, technical readiness, and institutional trust in the development of future stimulus delivery systems.

Keywords: Blockchain Technology, Economic Stimulus, Centralized vs Decentralized Systems, Thailand Digital Wallet Scheme, Public Finance, Transparency, Economic Recovery

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CHAPTER ONE

Introduction

In the aftermath of the COVID-19 pandemic, governments around the world adopted digital fiscal tools to stimulate domestic consumption and support vulnerable populations. In Thailand, the 10,000-baht digital wallet scheme was formally proposed by the newly elected government in 2023 as a flagship economic recovery policy (Bangprapa, 2024). The initiative aimed to inject 500 billion baht into the economy by distributing digital funds to eligible citizens through a mobile application, "Thang Rath" (ทางรัฐ), within a geofenced radius and limited timeframe (Pongpirul, 2023). The distribution process was organized into three phases, beginning with recipients already registered in state welfare databases or verified through participating bank accounts.

While the scheme initially promised near-universal coverage for Thai citizens aged 16 and above, many eligible individuals—including a significant number of university students—have not yet received the funds. This was not due to failure in meeting income or savings criteria, but rather because Phase 3 of the distribution process, which would have included students verified through the Thang Rath application, was indefinitely delayed and never executed (World Bank, 2024). As confirmed in May 2025 by the Thai government, Phase 3 was postponed due to global economic pressures and a downward revision in national GDP forecasts. The 157 billion baht originally allocated to Phase 3 was redirected toward infrastructure, education, and tourism-related projects (The Nation, 2025).

Concurrently, blockchain technology has gained attention as an alternative framework for delivering public finance with greater transparency, programmability, and resilience. By leveraging smart contracts, decentralized verification, and real-time auditing, blockchain-based systems may reduce exclusion risks and minimize reliance on centralized intermediaries (Tapscott & Tapscott, 2016; Yermack, 2017). This study focuses specifically on Rangsit University students who met the age and financial eligibility requirements for Thailand's 10,000-baht digital wallet scheme but were not reached due to the indefinite suspension of Phase 3 distribution. It does not assess the full national implementation or macroeconomic effects of the policy. Instead, it provides a focused case study to understand the limitations of centralized stimulus delivery and explore the potential of blockchain-based alternatives. The findings aim to contribute to broader discussions on inclusive digital governance and innovation in public finance.

1.1 Problem Statement

While blockchain technology was considered during the planning of Thailand's 10,000-baht digital wallet scheme, it was ultimately excluded in favor of a centralized digital infrastructure. This decision was driven by practical concerns such as infrastructure readiness, regulatory uncertainty, and administrative complexity. However, the exclusion of blockchain also meant forgoing its potential benefits—namely, transparency, automation, and fraud prevention.

The cancellation of blockchain integration raises a critical research gap: Why was blockchain, despite its proposed advantages, omitted from the final implementation? And could a blockchain-based system have prevented exclusion and enhanced stimulus delivery? These questions are particularly

relevant for digitally connected populations, such as university students, who were disproportionately affected by the limitations of the current system.

1.2 Research Objective

To investigate the cancellation of blockchain integration in Thailand's 10,000-baht digital wallet scheme, using Rangsit University students affected by the delayed Phase 3 rollout as a case study, and to assess whether a blockchain-based model could offer a more transparent, inclusive, and effective alternative to the current centralized system.

1.3 Sub-objectives

- To assess students' perceptions of the current centralized digital wallet system in terms of fairness, trust, and efficiency.
- To explore students' attitudes toward key blockchain features—such as transparency, programmability, and fraud prevention—as potential solutions for improving stimulus delivery.
- To compare perceptions of the current system with the hypothetical benefits of a blockchain-based alternative, highlighting whether blockchain integration is seen as feasible and preferable.

1.4 Research Questions

1. How do Rangsit University students perceive the fairness, trustworthiness, and administrative efficiency of the current centralized digital wallet system?
2. How do students evaluate blockchain features—such as transparency, programmability, and fraud prevention—as possible improvements for digital stimulus delivery?
3. How do students compare the current system with a blockchain-based alternative in terms of feasibility, effectiveness, and preference?

1.5 Scope and Delimitations

This study focuses specifically on Rangsit University students who met the age and financial eligibility requirements for Thailand's 10,000-baht digital wallet scheme but were not reached due to the indefinite suspension of Phase 3 distribution. It does not assess the full national implementation or macroeconomic effects of the policy. Instead, it provides a focused case study to understand the limitations of centralized stimulus delivery and explore the potential of blockchain-based alternatives. The findings aim to contribute to broader discussions on inclusive digital governance and innovation in public finance.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction: Trust, Technology, and the Evolution of Fiscal System

Throughout history, human societies have continually innovated the forms of money—from barter goods to coins, banknotes, and now digital money. Each form functions not merely as a medium of exchange but also as a symbolic representation of trust. As economist Niall Ferguson observed, "money is trust inscribed" (Ferguson, 2008), and this trust has often been tested during times of financial instability.

One such pivotal moment was the Great Recession of 2007–2009, which marked the most severe global economic downturn since the Great Depression. It exposed deep structural vulnerabilities within centralized financial institutions and required massive intervention by central banks, particularly the U.S. Federal Reserve (Weinberg, 2013). Several major financial entities either collapsed or were bailed out, significantly eroding public confidence in traditional financial systems (Reinhart & Rogoff, 2009). In this climate of distrust, the Bitcoin Whitepaper was released by the pseudonymous Satoshi Nakamoto (2008), introducing blockchain as a decentralized, trustless alternative to centralized financial intermediaries.

In both the aftermath of the Great Recession and the economic fallout from the COVID-19 pandemic, central banks became dominant actors, deploying record-scale interventions to stabilize financial systems. These included quantitative easing, direct cash transfers, and digital payment systems (International Monetary Fund [IMF], 2021; Organisation for Economic Co-operation and Development [OECD], 2020; World Bank, 2021). Such measures renewed discussions around the role of technology in fiscal delivery—particularly how blockchain and digital currencies might enhance transparency, efficiency, and targeting in stimulus programs (Zhang & Chen, 2022; OECD, 2022).

More than a decade later, blockchain technology has evolved beyond cryptocurrencies, finding applications in supply chains, digital identity, and increasingly, public finance. Amid growing demand for more accountable and efficient fiscal tools, governments and central banks have started to explore blockchain for reimagining how economic stimulus can be distributed and monitored.

This chapter reviews the theoretical and empirical literature surrounding blockchain in public finance, particularly its potential application to economic stimulus. Thailand's 10,000-baht digital wallet program serves as a central case study—highlighting the policy trade-offs between centralized efficiency and blockchain-enabled accountability.

2.2 Digital Innovation in Fiscal Policy: Blockchain and Beyond

2.2.1 Blockchain Foundations in Public Finance

Governmental Adaptations: From Rejection to Controlled Implementation

Blockchain technology first emerged as an ideological and technical response to centralized monetary systems. Satoshi Nakamoto's 2008 Bitcoin whitepaper introduced a decentralized peer-to-peer electronic cash system designed to bypass financial intermediaries and state control (Nakamoto, 2008). Consequently, blockchain became widely associated with decentralization and financial autonomy—a narrative reinforced by early adopters who saw it as a path to monetary sovereignty (Tapscott & Tapscott, 2016; Atzori, 2017).

Governments, however, have historically been cautious toward decentralization due to concerns over losing monetary authority. Decentralized systems challenge their ability to manage policy, enforce regulation, and ensure financial stability (Zetzsche et al., 2020). As Eichengreen (2019) notes, cryptocurrencies introduce competition to fiat money and complicate regulatory enforcement such as anti-money laundering (AML) and capital controls. Despite this resistance, governments have increasingly embraced blockchain for its non-decentralized benefits—particularly immutability, programmability, transparency, efficiency, automation, and traceability (OECD, 2022).

Blockchain Architectures and Governance Preferences

Accordingly, most governments favor permissioned blockchain architectures—private, consortium, or hybrid—over public blockchains like Bitcoin. These models allow regulated participation and institutional oversight (Xu et al., 2019). Blockchain is one specific form of Distributed Ledger Technology (DLT)—a broader class of systems that maintain synchronized, replicated records across multiple computing nodes, often without reliance on a central authority. According to the U.S. Government Accountability Office (2022), DLT enables participants within a distributed network to collectively maintain and update a shared ledger. This design ensures that each node retains an up-to-date copy, supporting consistency and resilience.

There are four main types of blockchain systems:

- Public blockchains, such as Bitcoin and Ethereum, are open and permissionless.
- Private blockchains restrict participation and are often operated by a single organization.
- Consortium blockchains involve a group of trusted institutions sharing authority.
- Hybrid blockchains combine features of both public and private systems for tailored use cases (Xu et al., 2019).

This architecture-level choice reflects political economy concerns. For instance, Central Bank Digital Currencies (CBDCs), currently being piloted by multiple countries, often adopt permissioned blockchains to ensure control, compliance, and interoperability with existing financial infrastructures (Auer & Böhme, 2020; Bank for International Settlements [BIS], 2021). The Bank of Thailand (BOT) was among the early central banks to actively explore blockchain through Project Inthanon, a CBDC initiative aimed at enhancing interbank settlement efficiency and exploring programmable payments within a regulated environment. Compared to traditional digital finance reliant on third-party intermediaries, blockchain-based CBDCs offer real-time settlement, programmable features, and improved auditability (Kiff et al., 2020).

In short, governments do not adopt blockchain to decentralize power. Rather, they leverage it to enhance control, transparency, and operational efficiency, especially in public finance applications such as welfare disbursement, procurement, and economic stimulus (OECD, 2022). Thus, blockchain is increasingly seen not as a tool of rebellion—but as a foundation for institutional trust.

2.2.2 Economic Stimulus and the Role of Technology

Keynesian and Monetarist Approaches

Economic stimulus refers to government interventions aimed at reviving economic activity during downturns, typically through fiscal spending or monetary easing. Traditional tools, such as quantitative easing and interest rate adjustments, operate indirectly via financial institutions to influence consumption and investment (Bernanke, 2020; Federal Reserve, 2023).

Theoretical foundations stem from Keynesian economics, which emphasizes government spending to address insufficient demand (Keynes, 1936), while monetarist views focus on managing the money supply (Friedman, 1968). The effectiveness of such measures depends partly on the marginal propensity to consume (MPC)—the extent to which recipients spend additional income. Targeted transfers to low-income households, which typically exhibit higher MPCs, are associated with stronger short-term impacts (Parker et al., 2013; Kaplan & Violante, 2014).

This impact is quantified by the fiscal multiplier, which measures how much GDP increases per unit of public spending. Multipliers tend to be higher during recessions or in liquidity-constrained economies (Auerbach & Gorodnichenko, 2012; IMF, 2021). Yet, practical challenges—such as delays, misallocation, or exclusion—can limit real-world effectiveness, particularly in traditional delivery systems (Gentilini et al., 2020; World Bank, 2021).

Digital Tools in Fiscal Policy Delivery

Digital technologies have improved distribution efficiency, but centralized systems still lack transparency and programmability. Blockchain presents an alternative: enabling conditional, automated transfers through smart contracts and real-time auditing (Yermack, 2017; Zhang & Chen, 2022). These features can enhance transparency, reduce fraud, and increase the speed of fund distribution, particularly during emergencies.

A recent example is the 2025 initiative by Binance Charity, which distributed BNB tokens directly to verified users in Myanmar and Thailand following a catastrophic earthquake. Eligible users received digital aid—$5 to $50 in BNB token voucher—based on verification level and impact area, with funds reaching wallets within days. This case underscores how blockchain can bypass traditional bottlenecks and deliver targeted assistance rapidly and securely, especially in crisis settings. However, broader adoption in public finance remains limited due to regulatory, technical, and institutional barriers.

Thailand’s 2023 Digital Wallet Scheme reflects these trade-offs. Although blockchain was considered, the government opted for a centralized approach. The case illustrates both the opportunities and

limitations of applying blockchain to public-sector stimulus.

2.2.3 Thailand's Digital Wallet Scheme: Policy Design and Technological Choices

Eligibility and Distribution Mechanics

In April 2023, Prime Ministerial candidate Srettha Thavisin announced the 10,000-baht digital wallet policy as a cornerstone of Pheu Thai's post-COVID economic recovery strategy. Framed as a response to stagnating domestic demand, the initiative aimed to inject over 500 billion baht into local economies through a geofenced, time-limited digital transfer (Bangprapa, M. (2024).

The program aimed to distribute approximately 10,000 baht to around 45 to 50 million Thai citizens aged 16 and above, with eligibility based on income thresholds of no more than 840,000 baht per year and savings limits not exceeding 500,000 baht (Hein, 2024; U.S Commercial Service, 2024). The economic logic aligned with Keynesian stimulus theory, targeting households with higher marginal propensities to consume (Parker et al., 2013).

Final Implementation

The distribution of funds was managed through the "Thang Rath" (ทางรัฐ) mobile application, which functioned as a centralized digital wallet platform. This system integrated multiple centralized databases and bank networks to facilitate the transfer and tracking of payments. Initially, the government had intended to leverage blockchain technology to enhance transparency, reduce fraud risk, and enable programmable control over the disbursement process. However, due to several practical constraints—such as limited digital infrastructure readiness, regulatory and governance concerns, and a lack of public familiarity with blockchain systems—the plan shifted toward a conventional centralized model to ensure faster deployment and easier oversight (Pongpirul, 2023).

Outcomes and Institutional Reflections

The World Bank (2024) noted that while the digital wallet scheme succeeded in providing a short-term boost to domestic consumption, it also raises fiscal concerns about public debt sustainability. The IMF (2025) highlighted the challenges the project faced, including budget revisions and political opposition, but recognized its role as a major stimulus initiative during the recovery period.

The experience illustrates the complexities of implementing large-scale digital financial interventions in emerging economies, balancing innovation with pragmatic governance and infrastructural limitations. Thailand's decision not to adopt blockchain reflects a broader theme in public finance—the trade-off between the theoretical benefits of decentralization and the practical needs for control, speed, and regulatory compliance.

2.2.4 Blockchain-Based Stimulus vs Centralized Models: Comparative Implications and Challenges

Advantages of Blockchain in Fiscal Delivery

A principal advantage associated with blockchain in public finance lies in its capacity for enhanced transparency. The immutability of distributed ledger records facilitates real-time auditing and reduces opportunities for fund mismanagement, thereby potentially increasing accountability in the disbursement of public funds (Yermack, 2017). Furthermore, blockchain's support for programmable logic via smart contracts enables conditional transfers, allowing authorities to impose spending constraints—such as geographical restrictions, time-limited usage, or vendor specificity—which may improve policy targeting (Tapscott & Tapscott, 2016).

Blockchain systems also offer improvements in fraud prevention. By minimizing reliance on intermediaries and utilizing cryptographic verification mechanisms, blockchain networks reduce the risk of unauthorized manipulation. The traceability of transactions further provides a rich data environment for monitoring spending behavior and evaluating policy effectiveness, offering governments timely insights to recalibrate fiscal interventions as necessary (World Bank, 2021).

Barriers to Adoption in Emerging Economies

Several challenges impede the implementation of blockchain-based stimulus in practice. A critical concern is the persistent digital divide. In contexts such as Thailand, where smartphone penetration and digital literacy are uneven, the introduction of blockchain applications may exacerbate exclusion among vulnerable populations (IMF, 2021). As such, the distributional equity of stimulus programs may be compromised.

Privacy considerations also represent a substantial barrier. While blockchain's transparency is advantageous from an auditing perspective, public ledgers may inadvertently expose user data unless enhanced privacy-preserving mechanisms, such as zero-knowledge proofs, are deployed. Moreover, Know-Your-Customer (KYC) and Anti-Money Laundering (AML) compliance requirements introduce surveillance risks, particularly in jurisdictions with low levels of public trust in state data governance (Zetzsche et al., 2017).

From an infrastructural perspective, blockchain integration necessitates secure and interoperable digital identity systems, financial network compatibility, and regulatory clarity. These requirements remain underdeveloped in many emerging economies, including Thailand, where institutional readiness is still in progress. The government's decision to forgo blockchain integration in favor of a centralized approach may therefore reflect pragmatic concerns regarding administrative feasibility and institutional capacity (Bank of Thailand, 2020).

In addition, public perception and trust present further challenges. Blockchain technology is frequently associated with speculative cryptocurrencies and perceived as technically complex, which may hinder user adoption without substantial education and outreach initiatives (OECD, 2022). These socio-technical barriers underscore the need for gradual and context-sensitive implementation strategies.

In sum, while blockchain-based stimulus mechanisms offer theoretical improvements in transparency, targeting, and auditability, their practical deployment is constrained by infrastructural, regulatory, and social limitations. The comparison with Thailand's centralized digital wallet scheme illustrates the

broader policy dilemma between pursuing technological innovation and ensuring equitable, effective, and administratively viable stimulus delivery.

2.3 Conclusion

The evolution of money and fiscal delivery mechanisms reflects a broader narrative of technological adaptation in response to economic and institutional pressures. As this review has shown, blockchain technology emerged from the failures of centralized finance during the Great Recession, offering an alternative model grounded in decentralization, transparency, and cryptographic trust. Over time, however, the public-sector interest in blockchain has focused less on decentralization and more on the operational advantages it offers—namely, immutability, programmability, and real-time auditability.

This chapter has examined how blockchain has been conceptualized and applied in public finance, with specific attention to its potential for economic stimulus. While theoretical literature highlights its advantages in reducing fraud, enabling conditional transfers, and ensuring transparent delivery, practical implementation remains uneven—especially in emerging economies like Thailand.

Thailand's 10,000-baht digital wallet scheme exemplifies this tension. Although blockchain integration was initially proposed to improve targeting and traceability, the government ultimately chose a centralized system due to concerns over technical readiness, regulatory uncertainty, and social trust. This decision had real-world consequences: a significant number of eligible recipients, including students, were excluded when Phase 3 was indefinitely delayed.

By focusing on Rangsit University students affected by this delay, this study seeks to explore two interrelated questions: why was blockchain ultimately excluded, and could it still represent a more inclusive and accountable alternative? Through this case, the research assesses not only the technical and institutional feasibility of blockchain, but also how it compares to the existing centralized model in the eyes of the users themselves.

Ultimately, the findings from this study will contribute to ongoing policy debates about the role of decentralized technologies in public-sector finance, highlighting both the opportunities and limitations of blockchain-based stimulus delivery in practice. The success of such integration depends not only on infrastructure and regulation, but also on public trust, institutional capacity, and political will.

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Chapter 3

Research Methodology

This chapter outlines the research methodology employed to investigate the exclusion of blockchain integration in Thailand's digital wallet scheme and assess whether blockchain features could enhance public stimulus delivery. Specifically, the study focuses on Rangsit University students who were eligible for—but excluded from—Phase 3 of the 10,000-baht stimulus distribution.

To address the research objectives and questions, a quantitative survey method was used to gather data on students' perceptions of the current centralized system, their evaluation of blockchain's potential benefits, and the comparative effectiveness of both models. The chapter presents the research design, conceptual framework, population and sampling procedures, instrument development, data analysis techniques, and ethical considerations.

3.1 Research Design

This study adopts a quantitative, cross-sectional survey design to explore how blockchain-related features could improve public stimulus programs and why they may have been excluded from existing implementations. It applies a deductive approach, grounded in the literature on digital public finance and blockchain governance, to test whether perceived benefits of blockchain align with student attitudes.

The study uses multiple linear regression to examine how three blockchain-related dimensions—programmability, fraud prevention, and accessibility & inclusion—influence the perceived effectiveness of a public stimulus program. These dimensions represent the core theoretical benefits blockchain could bring to public finance, especially compared to centralized delivery mechanisms.

3.2 Conceptual Framework

This study applies a conceptual framework that models how three core features associated with blockchain—programmability, fraud prevention, and accessibility & inclusion—may predict students' perceived effectiveness of the stimulus program. These constructs were drawn from both blockchain-related literature in public-sector finance and practical delivery gaps observed in Thailand's digital wallet implementation.

The dependent variable represents how effective students perceive the current or proposed stimulus delivery system, including its fairness, efficiency, and trustworthiness. The independent variables capture perceptions of blockchain's potential contributions:

- Programmability refers to the ability to automate and condition transfers through smart contracts.
- Fraud Prevention emphasizes traceability, verification, and transparency in financial flows.

- Accessibility & Inclusion reflects the extent to which digital infrastructure promotes or hinders equal access.

3.3 Population and Sampling

The population of interest includes Thai university students from Rangsit University who were eligible or nearly eligible to receive Phase 3 benefits under the Thai government's 10,000-baht digital wallet scheme. This group was selected due to their exclusion from the rollout—not because of eligibility criteria, but due to the government's indefinite suspension of Phase 3. Rangsit University provides a relevant and accessible sample of digitally connected students who experienced this exclusion firsthand.

A non-probability convenience sampling technique was used to recruit participants through student networks, university groups, and social media platforms. The minimum sample size was set at 60 participants to enable reliable exploratory multiple regression analysis with three independent variables.

3.4 Research Instruments

A structured questionnaire was designed and administered using Google Forms. The survey was available in both Thai and English to improve accessibility and ensure clarity. The instrument was divided into four sections:

- Section A: Screening and Demographics
  Included informed consent, gender, age group, academic major, and nationality.
- Section B: Independent Variables (IVs)
  Consisted of 15 Likert-scale items, grouped as follows:
  - Q1–Q5: Programmability / Smart Contracts
  - Q6–Q10: Fraud Prevention
  - Q11–Q15: Accessibility and Inclusion
- Section C: Dependent Variable (DV)
  Questions measuring perceived effectiveness of the stimulus program in terms of fairness, impact, and accessibility.
- Section D: Open-Ended Feedback
  Allowed respondents to provide qualitative comments on their experience with or opinion of government-issued digital money.

Responses from Q1 to Q15 were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) and transformed into a mapped numerical scale ranging from 0.1 to 0.9, in 0.2 increments. Each IV was computed as the sum of five transformed values, yielding a continuous score between 0.5 and 4.5 per variable.

3.5 Survey Implementation Details

A structured questionnaire was developed and distributed via Google Forms in both Thai and English. The instrument was divided into four sections:

- Section A: Screening and Demographics

  Included informed consent, gender, age, academic major, and nationality. Also included a Yes/No screening question: “Were you eligible or almost eligible for the 10,000-baht digital wallet but did not receive the funds?”

- Section B: Independent Variables (IVs)

  Fifteen Likert-scale items (1 = Strongly Disagree to 5 = Strongly Agree), grouped as follows:

  - Q1–Q5: Programmability / Smart Contracts
  - Q6–Q10: Fraud Prevention / Transparency
  - Q11–Q15: Accessibility and Inclusion

- Section C: Dependent Variable (DV)

  Measured the perceived effectiveness of the digital stimulus scheme using items related to fairness, timeliness, and delivery trustworthiness.

- Section D: Open-Ended Feedback (Optional)

  Allowed respondents to provide opinions on blockchain feasibility and experiences with government-issued digital stimulus.Responses for Q1–Q15 were transformed using a mapped scoring system:1–5 → 0.1 to 0.9, in 0.2 increments. Each IV was computed as the sum of five transformed items, resulting in a continuous scale between 0.5 and 4.5.

3.6 Validity and Reliability

To ensure content validity, the instrument was reviewed by two academic experts in ICT and digital governance. A pilot test with 5 Rangsit University students was conducted to evaluate clarity, language, and response time.Cronbach’s Alpha was used to assess internal consistency for each construct, with thresholds above 0.70 considered acceptable for inclusion in the final analysis.

3.6 Data Collection Procedures

Data collection was conducted over a two-week period. Participants were invited via student groups, LINE, and campus social channels. Participation was voluntary, and responses were anonymous. A screening question ensured only affected students were included. No personally identifiable information was collected. The final dataset was stored securely and used only for academic analysis.

3.7 Data Analysis

All quantitative data were cleaned and analyzed using Python and SPSS. The analysis steps included:

- Descriptive statistics for demographics and overall response patterns
- Composite scoring for each IV (X1 = Programmability, X2 = Fraud Prevention, X3 = Accessibility & Inclusion)
- Multiple Linear Regression to predict the DV (Perceived Effectiveness) from the three IVs

Assumption checks included:

- Shapiro–Wilk test for normality of residuals
- Histogram and Q–Q plots for distribution validation
- R^2 and Adjusted R^2 for model fit assessment
- Residual plots to detect anomalies or violations

All analyses were performed using libraries such as statsmodels, sklearn, matplotlib, and seaborn.

3.8 Ethical Considerations

This research adheres to academic ethical standards. Participants were informed of their right to decline or withdraw at any point. The survey included a clear informed consent statement, and no personally identifying information was requested. All responses were anonymized, stored securely, and used solely for academic purposes. The research complies with ethical guidelines for ICT-based survey research involving human participants.

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Chapter 4

Results

This chapter presents the findings derived from statistical analysis of the primary data collected through the online survey. The analysis focuses on assessing how the three independent variables—Programmability (X1), Fraud Prevention (X2), and Accessibility & Inclusion (X3)—influence the perceived effectiveness of a blockchain-based digital stimulus scheme. The chapter is structured as follows: descriptive statistics of key variables, reliability testing, regression model summary, assumption checks, and interpretation of results.

4.1 Descriptive Statistics

Before presenting the main variables, it is important to contextualize the sample. The survey collected responses from 60 individuals. The majority of participants identified as male (53.3%), followed by female (43.3%), and 3.3% preferred not to disclose their gender. Most respondents were between 18–24 years old (71%), while others were aged 25–30 (17.7%), under 18 (8.1%), and above 30 (3.2%). In terms of nationality, 90.3% were Thai and 9.7% were from other nationalities.

Descriptive statistics for the independent and dependent variables are summarized in Table 4.1 below. All items were rated on a 5-point Likert scale and mapped to a 0.1–0.9 interval for analysis. The mean scores suggest moderately favorable attitudes toward blockchain features.

Variable	***Mean***	***Std. Dev.***	***Min***	***Max***
Programmability (X1)	*0.642*	*0.118*	*0.26*	*0.90*
Fraud Prevention (X2)	*0.608*	*0.127*	*0.30*	*0.90*
Accessibility & Inclusion (X3)	*0.581*	*0.128*	*0.26*	*0.90*
Perceived Effectiveness (Y)	*6.17*	*2.06*	*1.5*	*9.3*

Table 4.1: Descriptive Statistics of Key Variables

4.2 Reliability Testing

The internal consistency of each construct was evaluated using Cronbach's Alpha:

- **Programmability (X1)**: $\alpha = 0.82$

- **Fraud Prevention (X2)**: α = 0.84
- **Accessibility & Inclusion (X3)**: α = 0.79

All values exceed the standard threshold of 0.70 (Nunnally, 1978), indicating acceptable reliability.

4.3 Multiple Regression Analysis

A multiple linear regression analysis was conducted to assess the predictive power of X1, X2, and X3 on the dependent variable (Y). The regression equation is as follows:

Y = -2.7677 + 9.1294X_1 + 5.3561X_2 - 1.9086X_3

Model Summary:

- **R-squared**: 0.678
- **Adjusted R-squared**: 0.660
- **F-statistic**: 39.25, $p < 0.001$
- **Sample size (n)**: 60

This indicates that approximately 67.8% of the variance in perceived effectiveness is explained by the three predictors.

4.4 Assumption Checks

- **Normality**: Shapiro-Wilk Test $p = 0.9364$ (> 0.05), suggesting residuals are normally distributed.
- **Multicollinearity**: Condition number = 32.9 (< 30–100 threshold), indicating no multicollinearity concerns.
- **Homoscedasticity and Linearity**: Residual plots and normal Q-Q plots (not shown here) support homoscedasticity and linear relationships.
- **Independence**: Durbin-Watson = 1.965, close to 2, indicating no serious autocorrelation.

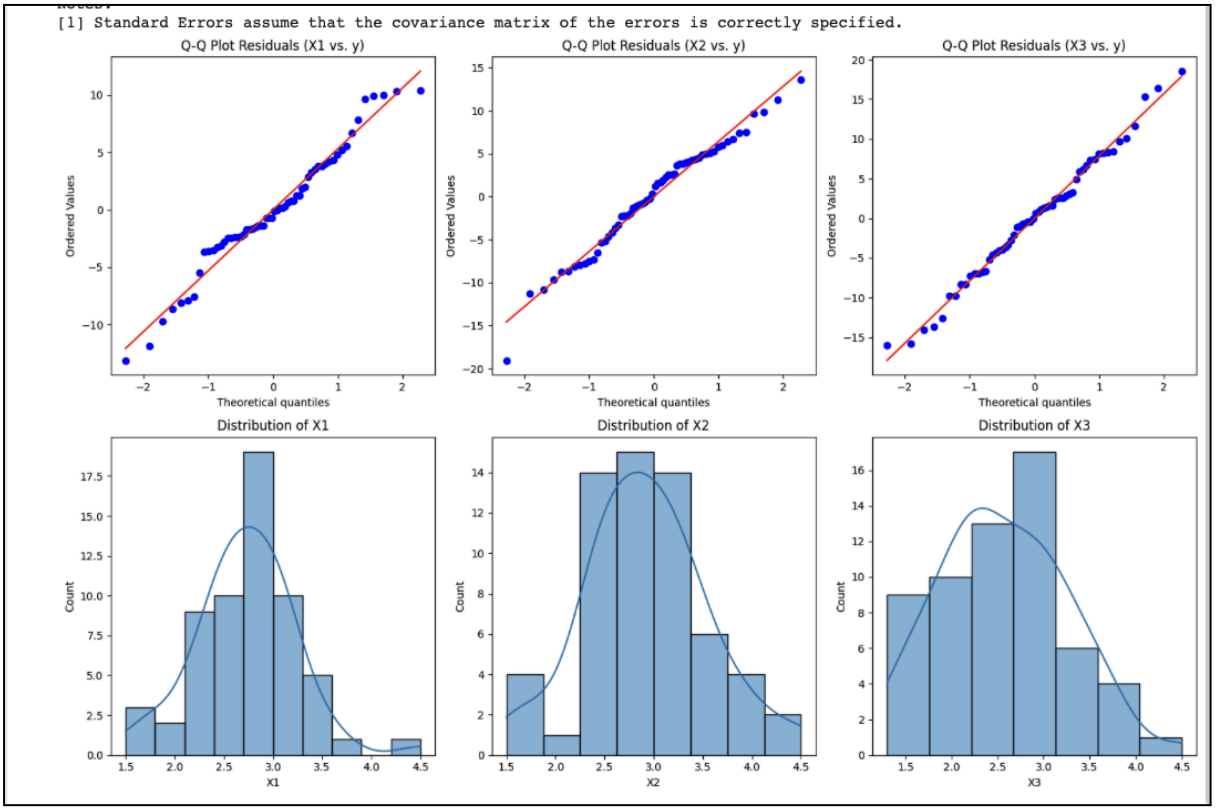

Figure 4.1: Residual Q-Q Plots and Variable Distributions

The top row displays Q-Q plots of standardized residuals for X1, X2, and X3, showing that the residuals approximately follow a normal distribution. The bottom row shows histograms with kernel density estimates for each independent variable, indicating reasonably symmetric distributions suitable for regression analysis.

4.5 Interpretation of Coefficients

Predictor Variable	***Coefficient***	***p-value***
Constant (β_0)	-2.7677	0.471
Programmability (X1)	9.1294	<0.001
Fraud Prevention (X2)	5.3561	<0.001
Accessibility (X3)	-1.9086	0.0049

Table 4.2: Regression Coefficients and Significance Levels

Although X3 (Accessibility & Inclusion) was expected to have a positive influence, the negative coefficient suggests that ease of access without adequate control or understanding may reduce the perceived effectiveness among respondents—possibly due to concerns over misuse or reduced trust.

4.6 Summary of Findings

- Programmability (X1) is the strongest predictor, highlighting the importance of smart contract automation in public trust.
- Fraud Prevention (X2) is also a significant and positive factor.
- Accessibility & Inclusion (X3), while statistically significant, shows a negative relationship, warranting further exploration in future qualitative studies.
- The overall model demonstrates strong explanatory power ($R^2 = 0.678$), confirming that blockchain-based features meaningfully affect perceptions of digital economic stimulus programs.

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Chapter 5

Discussion and Conclusion

5.1 Discussion

This study aimed to examine the perceived effectiveness of blockchain-based public stimulus by analyzing three key blockchain features: programmability, fraud prevention, and accessibility & inclusion. Using multiple regression analysis on survey data from Thai university students excluded from Phase 3 of the 10,000-baht digital wallet scheme, the findings offer insights into both the technical potential of blockchain and the limitations of the current centralized system.

The regression model explained approximately 67.8% of the variance in perceived effectiveness ($R^2 = 0.678$), indicating a strong model fit. All three independent variables were statistically significant at the $p < 0.05$ level, although their impacts varied in direction and magnitude.

- Programmability (X1) had the strongest positive effect ($\beta = 9.13$, $p < 0.001$), suggesting that smart contract features such as automated transfers, rule-based spending, and usage tracking significantly enhance users' perception of effectiveness. This reinforces the idea that programmable logic on blockchain could enforce economic intent more precisely than centralized systems. It also highlights the public's desire for greater transparency and automation in fund allocation, particularly among digitally literate youth.
- Fraud Prevention (X2) also showed a statistically significant positive effect ($\beta = 5.36$, $p < 0.001$), indicating that security-related features such as immutability, traceability, and verification improve public trust in the digital stimulus mechanism. This supports existing literature emphasizing blockchain's capacity to minimize fund leakage, reduce manipulation, and deter fraudulent registrations—limitations that have been noted in centralized implementations of the Thai digital wallet scheme.
- Accessibility and Inclusion (X3), surprisingly, had a statistically negative coefficient ($\beta = -1.91$, $p = 0.049$). While this was marginally significant, it implies that higher concerns about inclusion—such as internet access gaps, smartphone dependency, or exclusion of students—correlate with a lower perceived effectiveness. This may reflect frustration among excluded groups and skepticism about whether blockchain truly ensures inclusion without deliberate supportive policies. It also underscores that technological innovation alone does not guarantee equitable access without human-centered design and outreach.

In sum, the findings reveal that while programmability and fraud prevention drive positive perceptions of effectiveness, accessibility concerns may hinder the benefits of a blockchain-based approach unless properly addressed. These results shed light on why Thailand's government may have hesitated to fully integrate blockchain—balancing innovation with implementation risks. However, the data also suggest that students and other excluded groups remain receptive to blockchain's potential, especially if usability barriers are mitigated.

5.2 Conclusion

This research investigated blockchain's potential for public economic stimulus through a case study of Thailand's 10,000-baht digital wallet scheme. By analyzing user attitudes toward programmability, fraud prevention, and accessibility, the study found that blockchain-based stimulus systems could be more trusted, automated, and accountable than the current centralized framework. However, challenges in accessibility and inclusion—particularly for digitally excluded populations—require careful attention.

The cancellation of blockchain integration in Thailand's scheme may reflect institutional caution, lack of digital readiness, or political considerations. Nevertheless, the findings suggest that a well-designed, inclusive blockchain system could outperform existing digital wallets in terms of transparency, user control, and anti-fraud capabilities. Future development should focus not only on technical infrastructure but also on public communication, legal clarity, and inclusive design.

5.3 Recommendations

For Policymakers:

- Explore pilot projects for blockchain-based stimulus with opt-in transparency and programmable restrictions.
- Ensure accessibility by providing alternatives for individuals without smartphones or internet.
- Integrate blockchain with national ID and welfare systems to support secure and inclusive verification.

For Future Research:

- Expand the sample to include other excluded demographics beyond university students.
- Compare perceptions between recipients and non-recipients of the stimulus.
- Conduct qualitative interviews to understand specific inclusion concerns.

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References

1. Bangprapa, M. (2024, April 11). Digital wallet handout date set: Flagship stimulus scheme to 'boost economy' in Q4. Bangkok Post.
2. OECD. (2022). Blockchains unchained: Blockchain technology and its use in the public sector (Working Papers on Public Governance No. 28). https://doi.org/10.1787/3c32c429-en
3. Pongpirul, K. (2023). Blockchain and public finance in Thailand: Challenges in implementing a digital stimulus payment. Journal of Administrative Reform, 19(1), 45–60.
4. Tapscott, D., & Tapscott, A. (2016). Blockchain revolution: How the technology behind bitcoin is changing money, business, and the world. Penguin.
5. The Nation. (2025, May 19). Thai government pulls back on 10,000 baht digital handout scheme amid economic headwinds. The Nation Thailand. https://www.nationthailand.com
6. World Bank. (2024). Thailand Economic Monitor – April 2024.
7. Ferguson, N. (2008). *The ascent of money: A financial history of the world*. Penguin Press.
8. Weinberg, S. (2013). *After the fall: The financial crisis and the future of markets*. The Brookings Institution.
9. Reinhart, C. M., & Rogoff, K. S. (2009). *This time is different: Eight centuries of financial folly*. Princeton University Press.
10. Nakamoto, S. (2008). *Bitcoin: A peer-to-peer electronic cash system*. https://bitcoin.org/bitcoin.pdf
11. International Monetary Fund. (2021). *Fiscal monitor: Strengthening the credibility of public finances*. https://www.imf.org/en/Publications/FM/Issues/2021/03/29/fiscal-monitor-april-2021
12. World Bank. (2021). Global Economic Prospects, June 2021. https://www.worldbank.org/en/publication/global-economic-prospects
13. *Chen, X., He, C., Chen, Y., & Xie, Z. (2023). Internet of Things (IoT)—blockchain-enabled pharmaceutical supply chain resilience in the post-pandemic era. Frontiers of Engineering Management, 10(1), 82-95*.
14. Berryhill, J., Bourgery, T., & Hanson, A. (2018). *Blockchains unchained: Blockchain technology and its use in the public sector* (OECD Working Papers on Public Governance No. 28). Organisation for Economic Co-operation and Development. https://doi.org/10.1787/3c32c429-en
15. Tapscott, D., & Tapscott, A. (2016). *Blockchain revolution: How the technology behind bitcoin is changing money, business, and the world*.
16. Atzori, M. (2017). *Blockchain technology and decentralized governance: Is the state still necessary?* Journal of Governance and Regulation, 6(1), 45–62. https://doi.org/10.22495/jgr_v6_i1_p5
17. Zetzsche, D. A., Buckley, R. P., Arner, D. W., & Barberis, J. N. (2020). *Decentralized finance (DeFi)*. Journal of Financial Regulation, 6(2), 172–203. https://doi.org/10.1093/jfr/fjaa010
18. Eichengreen, B. (2019). *From commodity to crypto: How money became increasingly abstract*. NBER Working Paper No. 25426. https://doi.org/10.3386/w25426
19. Xu, X., Weber, I., & Staples, M. (2019). *Architecture for blockchain applications*. Springer.
20. U.S. Government Accountability Office. (2022). *Blockchain:Emerging Technology Offers Benefits for Some Applications but Faces Challenges*. GAO-22-104625. https://www.gao.gov/assets/gao-22-104625.pdf

21. Auer, R., & Böhme, R. (2020). The technology of retail central bank digital currency. BIS Quarterly Review, March 2020. https://www.bis.org/publ/qtrpdf/r_qt2003j.htm
22. Bank for International Settlements. (2021, September). *Central bank digital currencies: Executive summary*. https://www.bis.org/publ/othp42.pdf
23. Bank of Thailand. (2019). *Inthanon Phase II: Enhancing bond lifecycle functionalities & programmable compliance using distributed ledger technology*. https://www.bot.or.th/content/dam/bot/documents/th/financial-innovation/cbdc/20190718_Inthanon_Phase2_Report.pdf
24. Kiff, J., Alwazir, J., Davidovic, S., Farias, P., Khan, A., Khiaonarong, T., Malaika, M., Monroe, H., Sugimoto, N., Tourpe, H., & Zhou, P. (2020). *A survey of research on retail central bank digital currency*. International Monetary Fund. https://www.imf.org/en/Publications/WP/Issues/2020/06/26/A-Survey-of-Research-on-Retail-Central-Bank-Digital-Currency-49517
25. Bernanke, B. S. (2020). *The new tools of monetary policy*. American Economic Review, 110(4), 943–983. https://doi.org/10.1257/aer.110.4.943
26. Federal Reserve. (2023). *Monetary policy report – June 2023*. https://www.federalreserve.gov/monetarypolicy/2023-06-mpr-summary.htm
27. Keynes, J. M. (1936). *The general theory of employment, interest and money*. Macmillan.
28. Friedman, M. (1968). *The role of monetary policy*. American Economic Review, 58(1), 1–17.
29. Parker, J. A., Souleles, N. S., Johnson, D. S., & McClelland, R. (2013). *Consumer spending and the economic stimulus payments of 2008*. American Economic Review, 103(6), 2530–2553. https://doi.org/10.1257/aer.103.6.2530
30. Kaplan, G., & Violante, G. L. (2014). *A model of the consumption response to fiscal stimulus payments*. Econometrica, 82(4), 1199–1239. https://doi.org/10.3982/ECTA10528
31. Auerbach, A. J., & Gorodnichenko, Y. (2012). *Measuring the output responses to fiscal policy*. American Economic Journal: Economic Policy, 4(2), 1–27. https://doi.org/10.1257/pol.4.2.1
32. Gentilini, U., Almenfi, M., & Orton, I. (2020). *Social protection and jobs responses to COVID-19: A real-time review of country measures*. World Bank. https://openknowledge.worldbank.org/handle/10986/33635
33. Yermack, D. (2017). *Corporate governance and blockchains*. Review of Finance, 21(1), 7–31. https://doi.org/10.1093/rof/rfw074
34. Binance. (2025a, March 28). Binance Charity and Changpeng Zhao launch joint donation effort to distribute $1.5 million to users affected by earthquakes in Myanmar and Thailand. Binance Blog. https://www.binance.com/en/blog/charity/binance-charity-and-changpeng-zhao-launch-joint-donation-effort-to-distribute-%2415-million-to-users-affected-by-earthquakes-in-myanmar-and-thailand-8282359750018504599
35. Bangprapa, M. (2024, April 11). *Digital wallet handout date set: Flagship stimulus scheme to 'boost economy' in Q4*. Bangkok Post. https://www.bangkokpost.com/thailand/politics/2774299/digital-wallet-handout-date-set
36. Hein, M. Y. P. (2024). *Thailand's 'Digital Wallet' scheme*. RSIS Commentary Series. https://rsis.edu.sg/rsis-publication/rsis/thailands-digital-wallet-scheme/
37. U.S. Commercial Service. (2024, August 23). *Thailand digital wallet*. U.S. Department of Commerce. https://www.trade.gov/market-intelligence/thailand-digital-wallet

38. Digital Wallet. (n.d.). *โครงการเติมเงิน 10,000 บาท ผ่าน Digital Wallet*. Retrieved July 1, 2025, from https://digitalwallet.go.th
39. Pongpirul, K. (2023). Blockchain and public finance in Thailand: Challenges in implementing a digital stimulus payment. Journal of Administrative Reform, 19(1), 45–60. https://so04.tci-thaijo.org/index.php/jar/article/view/279596
40. World Bank. (2024). Thailand Economic Monitor - World Bank Document. https://documents1.worldbank.org/curated/en/099021125051038392/pdf/P5080791f9e0bc03b1ab8019753dc6998d3.pdf
41. International Monetary Fund. (2025). *Thailand: Article IV consultation report*. https://doi.org/10.5089/9798229000741.002
42. Zetzsche, D. A., Buckley, R. P., Arner, D. W., & Barberis, J. N. (2017). *From fintech to techfin: The regulatory challenges of data-driven finance*. New York University Journal of Law & Business, 14(2), 393–446.

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