Print ISSN: 2765-6934 / Online ISSN: 2765-7027
AJBE website: http://www.ajbe.or.kr/
Doi: 10.13106/ajbe.2023.vol13.no3.29

Financial Technology Environment for Tokenization Investment in a Developing Economy

Ruangchan THETLEK[1], Tanpat KRAIWANIT[2], Pongsakorn LIMNA[3], Yarnaphat SHAENGCHART[4], Kris JANGJARAT[5], Supin CHAISIRIPAIBOOL[6]

Received: May 29, 2023. Revised: June 07, 2023. Accepted: July 05, 2023.

Abstract

Purpose: Tokenization offers several benefits for investment in many countries, including Thailand. It provides increased liquidity by enabling fractional ownership, allowing investors to buy and sell smaller portions of an asset. This opens up investment opportunities to a broader range of individuals who may not have had access to traditional investment avenues. This study aims to explore the factors that influence the utilization of the financial technology environment for tokenization in investment within Thailand. **Research design, data, and methodology:** A quantitative approach was employed as a research strategy. To collect the data, closed-ended questionnaires were administered. The study's sample consisted of 644 participants, who were conveniently selected through convenience sampling. The data was analyzed using binary regression. **Results:** The findings indicated that tokenization for investment in Thailand is influenced by multiple factors, including score, gender (specifically male), income, savings, financial assets, digital assets, mass media, social media, books and magazines as well as participation in seminars and meetings. However, the study did not find a significant association between tokenization and education or business. **Conclusion:** These findings emphasize the need to consider these factors when analyzing investment behavior in Thailand and offer valuable insights for individuals and organizations seeking to understand the dynamics of tokenization in the country.

Keywords: Behaviour, Investment, Tokenization, Financial Technology, Environment

JEL classification codes: G23, O16, O33, P45

1. Introduction

Waves of technological innovation have ushered in a period of intense digital disruption, which has had profound effects on the livelihoods and lifestyles of people all over the world. New innovations are created and developed to advance economic activities in both the manufacturing and financial sectors. In recent years, digital assets and blockchain technology have emerged as prominent forces capturing widespread attention. The transformative potential of these innovations is undeniable, as they hold the capability to reshape our perception and utilization of digital

1 First Author. Researcher, Master in Digital Economy Program, Faculty of Economics, Rangsit University, Thailand; ruangchan.t64@rsu.ac.th; https://orcid.org/0000-0003-2083-8671
2 Corresponding Author. Assistant Professor, Ph.D. in Digital Economy Program, Faculty of Economics, Rangsit University, Thailand; tanpat.k@rsu.ac.th; https://orcid.org/0000-0002-5130-6427
3 Third Author. Researcher, Ph.D. in Digital Economy Program, Faculty of Economics, Rangsit University, Thailand; pongsakorn.l65@rsu.ac.th; https://orcid.org/0000-0002-7448-5261
4 Fourth Author. Researcher, Ph.D. in Digital Economy Program, Faculty of Economics, Rangsit University, Thailand; yarnaphat.s64@rsu.ac.th; https://orcid.org/0000-0002-0157-3682
5 Fifth Author. Researcher, Ph.D. in Digital Economy Program, Faculty of Economics, Rangsit University, Thailand; kris.ja64@rsu.ac.th; https://orcid.org/0000-0002-1868-7643
6 Sixth Author. Assistant Professor, DBA, Graduate College of Management, Sripatum University, Thailand; supin_dr@yahoo.com; https://orcid.org/0009-0007-5676-9301

infrastructure (Hazim & Anderson, 2023; Intelligence Team, 2023). Furthermore, with the advent of blockchain technology, investment firms now have the capability to tokenize funds, effectively migrating them onto a blockchain. This advancement opens up new possibilities for financial institutions to offer investors secure and transparent transactions as well as the opportunity to invest in more liquid shares. Tokenization enables these shares to possess lower minimum investment thresholds, reduced transaction fees and faster transaction processing times. As we navigate an era of rapid technological advancement, it is intriguing to consider how these innovations will be adapted within the realm of high finance. The potential integration of these technologies into the financial sector holds promise for increased accessibility, efficiency and innovation within the investment landscape (Gjelaj & Johnson, 2023; Yang, 2023).

According to Butler (2023), the financial industry has been relatively slower in embracing blockchain technology compared to other sectors, thus missing out on the transformative potential it offers for growth and innovation. Among these groundbreaking technologies, tokenization stands out as a game-changer, revolutionizing how we perceive and facilitate the exchange of value. Tokenization involves the conversion of tangible assets or ownership rights into distinctive digital units, known as tokens, which are securely stored on a blockchain. This transformative technology boasts a broad spectrum of applications, allowing virtually any valuable asset to be tokenized and traded seamlessly. Yet, the impact of tokenization extends far beyond the mere tokenization of individual funds. Its true significance lies in its capacity to unlock fresh opportunities for individuals worldwide to actively participate in the financial system, fostering a more inclusive and prosperous future for all. In this era of dynamic digital innovation, tokenization emerges as a beacon of possibility, paving the way for a future where value exchange is streamlined, accessible and equitable. By harnessing the power of tokenization, we can reshape the financial landscape, opening doors to economic empowerment and driving positive change on a global scale.

The financial technology environment is the ecosystem in which innovative technological solutions are developed and deployed to improve financial services. It encompasses various stakeholders, including financial institutions, technology companies, regulators, and consumers. The financial technology environment is constantly evolving, driven by advancements in technology, changing consumer behaviors, and regulatory developments (Nasir et al., 2021; Suryono et al., 2020).

Given the immense importance of tokenization, it is indeed an immensely significant topic that warrants thorough study and exploration. Tian et al. (2020) studied finance infrastructure through blockchain-based tokenization. In addition, Garcia-Teruel and Simón-Moreno (2021) studied the digital tokenization of property rights. Sockin and Xiong (2023) investigated tokenization as a means of decentralizing digital platforms in order to resolve the conflict between platforms and users. While numerous studies have explored tokenization, there remains a limited body of research specifically focused on tokenization for investment purposes. Therefore, this study aims to explore the factors that influence the utilization of the financial technology environment for tokenization in investment within Thailand. Understanding these factors is crucial for comprehending the drivers and barriers associated with the use of tokenization in investment activities. Moreover, by studying and analyzing these influences, we can gain valuable insights that will enable us to make informed decisions and develop strategies that maximize the potential benefits of tokenization for investment purposes. The structure of this paper is divided into six major sections. The first section is an introduction. The second section reviews the relevant literature. The third section is the methodology that has been used to conduct the research. The fourth section reveals the result, and the fifth section discusses the study's findings. Finally, the sixth section concludes the research, which also provides recommendations, limitations and perspectives for future studies.

2. Literature Review

Tokenization has the potential to play a transformative role in investment practices within developing economies. By leveraging blockchain technology, tokenization allows for the representation and fractional ownership of assets in a digital form, making investment opportunities more accessible and inclusive (Diaz, 2023; Moriarty, 2023). One key benefit of tokenization in developing economies is the increased liquidity it can provide. Tokenization enables fractional ownership, meaning that assets can be divided into smaller units, allowing a broader pool of investors to participate. This can facilitate investment in traditionally illiquid assets, such as real estate or infrastructure projects, which may have been out of reach for individual investors in the past. Moreover, tokenization can help address issues of transparency and trust that often hinder investment in developing economies. Blockchain technology provides a decentralized and immutable ledger, ensuring the integrity and traceability of transactions. This can enhance investor confidence and attract both domestic and international investment into these economies (Laurent et al., 2018; Niranjanamurthy et al., 2019; Tian et al., 2020). Additionally, tokenization can foster financial inclusion by reducing barriers to entry. Through fractional ownership

and lower investment thresholds, individuals with limited capital can gain exposure to a diverse range of assets. This can democratize investment opportunities and enable previously underserved populations to participate in wealth creation and economic growth (Baum, 2020; Diaz, 2023). However, it is important to recognise that implementing tokenization in developing economies comes with its own set of challenges. These may include regulatory frameworks, technological infrastructure and the need for investor education and awareness. Governments and regulatory bodies must adapt and create an enabling environment that balances investor protection with innovation (Ciriello, 2021; Tian et al., 2020; Zetzsche et al., 2020). In summary, tokenization holds significant promise for investment in developing economies. By increasing liquidity, promoting transparency and fostering financial inclusion, it can unlock new investment opportunities and contribute to economic development. While challenges exist, with the right supportive measures in place, tokenization can be a powerful tool for transforming investment practices and driving sustainable growth in these economies (OECD, 2020; Roth et al., 2021).

As reported by Kelley (2020), the ongoing transition towards a digitized economy is undeniable, evident in the various digital tools and applications we employ for everyday tasks, such as money transfers, bill payments and online shopping. However, it is important to acknowledge that significant portions of our economy still operate through traditional analogue means. Digitizing certain aspects has proven more challenging, depending on established practices, the complexity of interactions within specific ecosystems and the involvement of intermediaries in value exchange. One prime example is the ownership rights associated with properties like houses, which rely on physical documents, such as deeds, tax records, purchase rights and affidavits. Each transaction involving these rights adds complexity to the paper trail required for transfers, sharing, inheritance or mortgage refinancing. Digitizing the representation of ownership rights offers numerous potential benefits. It could reduce costs associated with human errors, simplify the identification and resolution of exceptions and foster greater trust in the process by reducing reliance on intermediaries. The digital sale of a home or the issuance of digital shares in a property to trusted parties could be streamlined, eliminating the need for extensive data verification or validation. Such a system would bypass lengthy procedures, intermediary fees and voluminous paperwork. The advantages of this approach would extend beyond homeowners, benefitting the broader economy as well. By introducing ease and efficiency to transactions involving traditionally cumbersome and complex assets, such as homes, commodities and heirlooms, there is the potential to unlock trillions of dollars in economic value. This would provide investors with new opportunities while stimulating overall economic growth.

Schletz et al. (2020) highlight the market failures that green investment vehicles encounter, such as high certification and monitoring costs as well as substantial minimum investment sizes. To address these challenges, the study takes an inductive approach, leveraging qualitative evidence from expert feedback. Specifically, the researchers investigate the potential of blockchain-based security tokens as a solution for these market failures. The process of tokenizing real assets or debt/equity instruments offers several advantages. It can reduce transaction costs through disintermediation and automation while also improving transparency and decreasing size and liquidity requirements. However, the widespread adoption of tokenized securities faces significant obstacles, including software risks, regulatory uncertainty and an immature investment infrastructure. To overcome these barriers, decision-makers and policymakers in Asia play a pivotal role. They can contribute by developing pilot use cases and establishing regulatory sandboxes that are dedicated to tokenized securities. These initiatives would allow for the accumulation of valuable experiences and stakeholder feedback, which can be utilized to create coherent regulatory frameworks and investment strategies. Despite the present limitations and immaturity surrounding tokenized securities, it is crucial to proactively consider and foster the development of this financing mechanism. Given its potential to democratize green finance, exploring this avenue further holds great significance for the field. By doing so, we can pave the way for a more sustainable and accessible future of green investment.

Avci and Erzurumlu (2023) discuss the legal design challenges faced in real estate crowdfunding and propose potential solutions that integrate blockchain technology, tokenization, finance and law. Their proposed solution involves a blockchain tokenized security design inspired by sukuk and equipment trust certificates, managed by a special purpose vehicle (SPV). This design allows for the issuance of blockchain tokenized certificates representing rights to an investment property. Each series of certificates corresponds to a specific property and is the liability of the SPV that owns the property. The tokens used in this design share similarities with asset-backed securities but maintain distinct categorisation. Their performance is tied to the underlying asset's performance. Notably, token owners are granted fractional ownership and rights to the underlying property without becoming partners in the SPV. This approach aims to prevent delays in property ownership transfers and provides flexibility for the creation of ownership and income rights. The proposed token mechanism offers potential advantages, such as mitigating transaction delays in property transfers, improving investor

legal rights protection, reducing transaction times and enhancing transparency and asset liquidity. By adopting this security design, real estate crowdfunding can benefit from the integration of blockchain technology and tokenization, facilitating efficient and transparent transactions while safeguarding investor interests.

Gysegem (2021) stated that 'Tokenisation on blockchain opens up the possibility of a new financial trading system, one that is more efficient, transparent and accessible.' Blockchain technology is revolutionizing the financial services industry, and one of its most disruptive innovations is asset tokenization. Tokenization offers transparency, cost efficiency and accessibility, paving the way for a new financial trading system. To assess the impact of tokenization in specific cases, a four-step approach is recommended. First, businesses should evaluate the implications of tokenisation on their existing business models. Second, a target vision should be defined for each business line and its related core activities. Third, a capabilities roadmap should be developed to align with the target vision. Finally, the modus operandi should be designed to effectively incorporate tokenization. It is evident that tokenisation is not only here to stay but also has the potential to bring about irreversible changes across the financial spectrum. Now is the opportune time for businesses to act and seize the opportunities presented by tokenization.

3. Methodology

A quantitative approach was used as the research strategy. Closed-ended questionnaires were conducted to collect the data. The questionnaire questions were developed based on reliable and valid research data. Furthermore, the questionnaire was pre-tested on 30 respondents to obtain a dedicated questionnaire, as recommended by Memon et al. (2020). Furthermore, the validity of the measurement instruments was evaluated. Testing was performed to determine the dependability and accuracy of the measurement instruments. According to Kaewnaknaew et al. (2022), it is crucial to recognise that the validity of an instrument refers to how well it measures the researcher's conceptual framework. The respondents were Thai people over 18 years old who lived in Thailand. It was necessary to collect a minimum of 385 cases at $p = 0.5$ through convenience sampling with a sample error at the 5% confidence level of 95% (Nuanchaona et al., 2021; Sitthipon et al., 2022). Hence, the sample in this study contained 644 participants identified through convenience sampling. The researchers conducted an online survey for a duration of 5 months, precisely from November 2022 to March 2023.

In order to analyze the gathered data, statistical analysis software was used to perform both descriptive and inferential analyses. The independent variables were score, male, education, business, income, savings, financial assets, digital assets, mass media, social media, books and magazines, and seminars and meetings. The dependent variable was the tokenization for investment in Thailand. The term 'score' in this study pertains to the cognitive test comprising multiple-choice questions focused on tokenization. The participants' scores reflect their performance and knowledge level in the field of information technology, based on their answers to these multiple-choice questions. These scores serve as a means to evaluate participants' comprehension, proficiency and cognitive abilities specifically pertaining to tokenisation concepts and principles. As the gender variable only had two categories, converting it into a dummy variable was as simple as recording the male and female values as 1 = male and 0 = female. According to Shaengchart and Kraiwanit (2023), binary regression is a regression model in which the target variable is binary, meaning that it can only take one of two values, 0 or 1. Given that the output is modeled as readmitted (1) or not readmitted, it is the most commonly used regression model in readmission prediction (0). Therefore, binary regression was used to analyze the data.

4. Result

Table 1 shows the omnibus test of the model's performance using the independent variables.

Table 1: Omnibus test of the model's performance using all the independent variables

		Chi-square	df	Sig.
Step 1	Step	475.966	12	.000
	Block	475.966	12	.000
	Model	475.966	12	.000

Table 1 indicates that the chi-square is 475.966, with a df equal to 12. Thus, the dependent variable can be explained by all the independent variables at a significance level of 0.05.

Table 2 shows the model summary using all the independent variables.

Table 2: The model summary using all the independent variables

Step	-2 log likelihood	Cox & Snell R square	Nagelkerke R square
1	342.937[a]	.522	.726

a. Estimation terminated at iteration 4 because the parameter estimates changed by less than .001.

According to Table 2, the model can explain approximately 72.6% of the variation in the result with a significance value of 0.05.

Table 3 shows a back-testing classification table that includes all independent variables.

Table 3: Classification table for back-testing (including all the independent variables)

	Observed		Predicted		
			Tokenization		Percentage correct
			No	Yes	
Step 1	Tokenization	No	390	40	90.7
		Yes	25	189	88.3
	Overall percentage				89.9

Note: The cut-off value is .500.

In Table 3, the classification indicates that the model with all the independent variables can predict tokenization for investment in Thailand with an accuracy rate of 89.9% of cases when there is a cut-off value of 0.500 or when the scope of acceptance is 50%.

Table 4 shows the variables in the model using all the independent variables.

Table 4: Variables in the model using all the independent variables

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Score	-.372	.107	12.139	1	.000	.689
	Male	2.032	.414	24.112	1	.000	7.633
	Education	-.297	.405	.538	1	.463	.743
	Business	.853	.476	3.205	1	.073	2.346
	Income	.777	.210	13.714	1	.000	2.176
	Savings	.700	.200	12.207	1	.000	2.014
	Financial assets	-1.158	.254	20.778	1	.000	.314
	Digital assets	.659	.230	8.212	1	.004	1.933
	Mass media	-.356	.168	4.487	1	.034	.701
	Social media	.900	.194	21.501	1	.000	2.460
	Books and magazines	1.316	.175	56.522	1	.000	3.728
	Seminars and meetings	1.254	.201	38.994	1	.000	3.503
	Constant	-13.306	2.363	31.697	1	.000	.000

The predictive regression equation of Model 1 from Table 4 can be described by the following equation:

$$\square = \frac{1}{1+\square^{-\square}} \quad \text{----------} \quad \textit{Model 1}$$

where P is the tokenization for investment in Thailand, and Z = – 13.306 – 0.372(score) + 2.032(male) + 0.777(income) + 0.700(saving) – 1.158(financial assets) + 0.659(digital assets) – 0.356(mass media) + 0.900(social media) + 1.316(books and magazines) + 1.254(seminars and meetings).

The significance level of each independent variable is presented in Table 4. It shows that the dependent variable (tokenization for investment in Thailand) could be described by score, male, income, savings, financial assets, digital assets, mass media, social media, books and magazines, and seminars and meetings. Conversely, education and business are not significant. When there was an increase of one unit in score, the tokenization for investment in Thailand decreased from 1 to 0.689 (1 – 0.689 = 0.311). When an individual was a male, the tokenization for investment in Thailand increased by 7.633. When there was an increase of one unit in income, the tokenization for investment in Thailand increased by 2.176. When there was an increase of one unit in savings, the tokenization for investment in Thailand increased by 2.014. When there was an increase of one unit in financial assets, the tokenization for investment in Thailand decreased from 1 to 0.314 (1 – 0.314 = 0.686). When there was an increase of one unit in digital assets, the tokenization for investment in Thailand increased by 1.933. When there was an increase of one unit in mass media, the tokenization for investment in Thailand decreased from 1 to 0.701 (1 – 0.701 = 0.299). When there was an increase of one unit in social media, the tokenization for investment in Thailand increased by 2.460. When there was an increase of one unit in books and magazines, the tokenization for investment in Thailand increased by 3.728. Finally, when there was an increase of one unit in seminars and meetings, the tokenization for investment in Thailand increased by 3.503.

5. Discussion

In the context of investment in Thailand, tokenization can be characterized by several factors: score, gender (male), income, savings, financial assets, digital assets, mass media, social media, books and magazines as well as seminars and meetings. However, it is important to note that education and business do not have a significant influence in this regard.

In line with previous research conducted by Wingfield and Wingfield (2014), the findings of this study highlight that individual characteristics, specifically gender, suggest a higher inclination towards tokenisation among males. This consistency in results supports the notion that being male may indeed play a role in shaping attitudes and behaviors related to tokenization. Consistent with the findings of Rahman et al. (2021), Kraiwanit et al. (2022) and Siri and Kraiwanit (2023), this study reaffirms the importance of financial factors, such as income and savings, in influencing tokenisation behavior. Higher income levels and a propensity for saving suggest that individuals with greater financial resources are more likely to engage in tokenization. This finding aligns with the notion that tokenisation may be perceived as a potentially lucrative investment opportunity and requires a certain level of financial stability or disposable income to participate effectively.

Furthermore, the findings of this study align with the report by McSheaffrey and He (2022), which underscores the significance of financial assets, encompassing both traditional and digital forms, as influential factors. This implies that individuals with prior experience or knowledge of financial investments, as well as those already engaged in digital asset ownership, may be more receptive to exploring tokenized assets. This finding suggests a potential link between investors' existing portfolio composition and their openness to tokenization as an alternative investment avenue. The findings of this study are in accordance with the research conducted by Withupassakan et al. (2022) and Wannasawang and Kraiwanit (2023) that the influence of mass media and social media as sources of information cannot be understated. The study highlights the impact of these channels in shaping individuals' perceptions and decisions related to tokenization. The accessibility and widespread reach of mass media and the interactive nature of social media platforms make them powerful tools for disseminating information and creating awareness about tokenized investments.

Additionally, this study highlights the significance of seeking information through sources like books, magazines, seminars and meetings related to tokenization. These findings align with the research conducted by Jangjarat et al. (2023). This implies that individuals who actively seek knowledge and engage in educational opportunities related to tokenisation are more likely to invest in tokenized assets. This finding underscores the importance of financial literacy initiatives and educational programmes to promote understanding and awareness of tokenisation among potential investors. Wannasawang and Kraiwanit's (2023) research indicates that education level plays a crucial role in influencing an individual's adoption of digital currency issued by the Central Bank of Thailand. Their findings suggest that individuals with higher levels of education are more inclined to adopt and embrace digital currency initiatives. However, interestingly, the study did not find a significant relationship between education or business and tokenization. This unexpected result challenges the assumption that higher education levels or involvement in business activities directly correlate with a higher likelihood of engaging in tokenization. These findings highlight the need for further exploration and analysis to better understand the complex dynamics between education, business and tokenization behavior.

6. Conclusion

Employing binary regression, this study examined the factors influencing the use of tokenization for investment in Thailand. The research findings suggest that tokenization for investment in Thailand is influenced by various factors, such as score, gender (specifically male), income, savings, financial assets, digital assets, mass media, social media, books and magazines as well as participation in seminars and meetings. However, the study did not find a significant relationship between tokenization and education or business. These results highlight the importance of considering these factors when analyzing investment behavior in Thailand and provide valuable insights for individuals and organizations interested in understanding the dynamics of tokenization in the country.

These research findings provide valuable insights into the factors that shape tokenisation behavior in Thailand. Understanding these factors can inform investment strategies, educational initiatives and regulatory frameworks aimed at promoting the adoption and responsible use of tokenized assets. As stated by Jones (2022), collaboration between traditional financial institutions and financial technology startups has become increasingly common in the financial technology environment. Traditional players recognize the need to embrace innovation to stay competitive and often seek partnerships with financial technology companies to leverage their technological expertise. Such collaborations can result in improved products and services, expanded market reach, and enhanced customer experiences.

This study also contributes to the existing literature on the factors influencing the use of tokenization for investment, and its findings may guide academics in expanding their research by incorporating more potential factors. The measurements can be used to direct future research on the factors influencing the use of tokenization for investment.

One limitation of this study is its narrow focus on tokenization for investment solely in Thailand. Consequently, it is suggested that future research should explore tokenization in other geographical regions or alternative areas of application. By broadening the scope, a more comprehensive understanding of tokenisation across different contexts can be achieved. This would provide valuable insights into the potential variations and implications of tokenisation beyond the specific context of Thailand. In addition, further research is warranted to explore the causal relationships between these factors and to capture a more comprehensive understanding of the complexities surrounding tokenization in Thailand and its implications for the broader investment landscape. Qualitative research methods, such as interviews, could provide valuable insights for future studies.

References

Avci, G., & Erzurumlu, Y. O. (2023). Blockchain tokenization of real estate investment: a security token offering procedure and legal design proposal. *Journal of Property Research*, 1-20. https://doi.org/10.1080/09599916.2023.2167665.

Baum, A. (2020). Tokenisation – The future of real estate investment. *The Future of Real Estate Initiative*, 61. https://www.sbs.ox.ac.uk/sites/default/files/2020-01/tokenisation.pdf.

Butler, C. (2023). *Five ways tokenization will solve traditional finance's biggest issues.* Nasdaq. https://www.nasdaq.com/articles/five-ways-tokenization-will-solve-traditional-finances-biggest-issues.

Ciriello, R. F. (2021). Tokenized index funds: A blockchain-based concept and a multidisciplinary research framework. *International Journal of Information Management, 61*, 102400. https://doi.org/10.1016/j.ijinfomgt.2021.102400.

Diaz, S. (2023). *Real estate tokenization: Unlocking the potential of digital asset investment.* CryptoStars. https://blog.cryptostars.is/real-estate-tokenization-unlocking-the-potential-of-digital-asset-investment-a50d619479bd.

Garcia-Teruel, R. M., & Simón-Moreno, H. (2021). The digital tokenization of property rights. A comparative perspective. *Computer Law & Security Review, 41*, 105543. https://doi.org/10.1016/j.clsr.2021.105543.

Gjelaj, K., & Johnson, O. (2023). *The rise of blockchain-based funds.* NEU Blockchain Organization. https://neublockchain.medium.com/the-rise-of-blockchain-based-funds-6fd648b72655.

Gysegem, F. V. (2021). *Tokenization: The future of financial markets?*. Roland Berger. https://www.rolandberger.com/en/Insights/Publications/Tokenization-The-future-of-financial-markets.html.

Hazim, C., & Anderson, E. (2023). *Digital assets & blockchain technology: Common FAQs.* Global X. https://www.globalxetfs.com/digital-assets-blockchain-technology-common-faqs/.

Intelligence Team. (2023). *Digital asset (part 1) 'When Thais are drawn towards digital assets'.* Krungsri Research. https://www.krungsri.com/en/research/research-intelligence/digital-asset-part1-2023.

Jangjarat, K., Kraiwanit, T., Thanawiwat, T., & Chutipat, V. (2023). Acceptance of an initial coin offering for investment in a developing economy. *Corporate & Business Strategy Review*, *4*(2), 29-36. https://doi.org/10.22495/cbsrv4i2art3.

Jones, M. (2022). *Collaboration instead of competition between FinTech and traditional finance*. Codex. https://codexrec.com/collaboration-instead-of-competition-between-fintech-and-traditional-finance/.

Kaewnaknaew, C., Siripipatthanakul, S., Phayaphrom, B., & Limna, P. (2022). Modelling of talent management on construction companies' performance: A model of business analytics in Bangkok. *International Journal of Behavioral Analytics*, *2*(1), 1-17. https://ssrn.com/abstract=4018709.

Kelley, J. (2020). *How tokenization and digitized assets can help investors unlock trillions from the economy.* IBM. https://www.ibm.com/blog/how-tokenization-and-digitized-assets-can-help-investors-unlock-trillions-from-the-economy/.

Kraiwanit, T., Jangjarat, K., & Atcharanuwat, J. (2022). The acceptance of financial robo-advisors among investors: The emerging market study [Special issue]. *Journal of Governance & Regulation, 11*(2), 332-339. https://doi.org/10.22495/jgrv11i2siart12.

Laurent, P., Chollet, T., Burke, M., & Seers, T. (2018). The tokenization of assets is disrupting the financial industry. Are you ready? *Inside Magazine*, *19*, 62-67. https://www.wyoleg.gov/InterimCommittee/2019/S3-20190506TokenizationArticle.pdf.

McSheaffrey, P., He, Y. (2022). *Investing in digital assets*. KPMG. https://assets.kpmg.com/content/dam/kpmg/sg/pdf/2022/11/investing-in-digital-assets.pdf.

Memon, M. A., Ting, H., Cheah, J. H., Thurasamy, R., Chuah, F., & Cham, T. H. (2020). Sample size for survey research: Review and recommendations. *Journal of Applied Structural Equation Modeling*, *4*(2), 1-20. https://doi.org/10.47263/JASEM.4(2)01.

Moriarty, C. (2023). Is RealT reality? Investigating the use of blockchain technology and tokenization in real estate transactions. *Minnesota Journal of Law, Science & Technology*, *24*(2), 471. https://scholarship.law.umn.edu/mjlst/vol24/iss2/5.

Nasir, A., Shaukat, K., Iqbal Khan, K., A. Hameed, I., Alam, T. M., & Luo, S. (2021). Trends and directions of financial technology (Fintech) in society and environment: A bibliometric study. *Applied Sciences*, *11*(21), 10353. https://doi.org/10.3390/app112110353.

Niranjanamurthy, M., Nithya, B. N., & Jagannatha, S. J. C. C. (2019). Analysis of blockchain technology: pros, cons and SWOT. *Cluster Computing*, *22*, 14743-14757. https://doi.org/10.1007/s10586-018-2387-5.

Nuanchaona, S., Siripipatthanakul, S., Nurittamont, W., & Phayaphrom, B. (2021). Factors affecting consumer's purchase intention of chatbot commerce in Thailand. *International Journal of Business, Marketing and Communication, 1*(3), 1-13. https://ijbmcjournals.org/wp-content/uploads/2021/10/ijbmc-vol-1_3_14.pdf.

OECD. (2020), *The tokenisation of assets and potential implications for financial markets*. OECD Blockchain Policy Series. www.oecd.org/finance/The-Tokenisation-of-Assets-and-PotentialImplications-for-Financial-Markets.htm.

Rahman, M. M., Ali, G. M. N., Li, X. J., Samuel, J., Paul, K. C., Chong, P. H., & Yakubov, M. (2021). Socioeconomic factors analysis for COVID-19 US reopening sentiment with Twitter and census data. *Heliyon*, *7*(2), e06200. https://doi.org/10.1016/j.heliyon.2021.e06200.

Roth, J., Schär, F., & Schöpfer, A. (2021). The Tokenization of assets: using blockchains for equity crowdfunding. In: *Wendt, K. (eds) Theories of Change. Sustainable Finance* (pp. 329-350). Springer, Cham. https://doi.org/10.1007/978-3-030-52275-9_19.

Schletz, M., Nassiry, D., & Lee, M. K. (2020). Blockchain and tokenized securities: The potential for green finance. *ADBI Working Paper 1079*. Tokyo: Asian Development Bank Institute. https://www.think-asia.org/handle/11540/11466.

Shaengchart, Y., & Kraiwanit, T. (2023). Starlink satellite project impact on the internet provider service in emerging economies. *Research in Globalization*, 100132. https://doi.org/10.1016/j.resglo.2023.100132.

Siri, P., & Kraiwanit, T. (2023). Knowledge and understanding of public P2P lending transactions in Bangkok and its vicinity, Thailand. In *International Conference on E-Business, E-Commerce and Internet* (pp. 44-48). https://ssrn.com/abstract=4413946.

Sitthipon, T., Limna, P., Jaipong, P., Siripipattanakul, S., & Auttawechasakoon, P. (2022). Gamification predicting customers' repurchase intention via e-commerce platforms through mediating effect of customer satisfaction in Thailand. *Review of Advanced Multidisciplinary Sciences, Engineering & Innovation*, *1*(1), 1-14. https://ssrn.com/abstract=4080558.

Sockin, M., & Xiong, W. (2023). Decentralization through tokenization. *The Journal of Finance*, *78*(1), 247-299. https://doi.org/10.1111/jofi.13192.

Suryono, R. R., Budi, I., & Purwandari, B. (2020). Challenges and trends of financial technology (Fintech): a systematic literature review. *Information*, *11*(12), 590. https://doi.org/10.3390/info11120590.

Tian, Y., Lu, Z., Adriaens, P., Minchin, R. E., Caithness, A., & Woo, J. (2020). Finance infrastructure through blockchain-based tokenization. *Frontiers of Engineering Management, 7*, 485-499. https://doi.org/10.1007/s42524-020-0140-2.

Wannasawang, W., & Kraiwanit, T. (2023). An adoption of digital currency of central bank of Thailand. *Lawarath Social E-Journal*, *5*(1), 1-14. https://so04.tci-thaijo.org/index.php/lawarathjo/article/view/259742.

Wingfield, A. H., & Wingfield, J. H. (2014). When visibility hurts and helps: How intersections of race and gender shape Black professional men's experiences with tokenization. *Cultural Diversity and Ethnic Minority Psychology*, *20*(4), 483-490. https://doi.org/10.1037/a0035761.

Withupassakan, T., Kraiwanit, T., Shaengchart, Y., Jangjarat, K., & Virunhaphol, S. (2022). Civil economy of digital citizens [Special issue]. *Corporate & Business Strategy Review*, *3*(2), 211-220. https://doi.org/10.22495/cbsrv3i2siart2.

Yang, J. (2023). *Features of the application of blockchain technology in the functioning of the banking sector*. Repository of the Belarusian National Technical University. https://rep.bntu.by/handle/data/128082.

Zetzsche, D. A., Arner, D. W., & Buckley, R. P. (2020). Decentralized finance. *Journal of Financial Regulation*, *6*(2), 172-203. https://doi.org/10.1093/jfr/fjaa010.