

# The Intention to Use Blockchain in Indonesia Using Extended Approach Technology Acceptance Model (TAM)

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**Abstract**—Globalization has quickly transformed the economy and society, marked by the rapid integration of data and information, supply chains, and increasingly huge use of technology. The research aims to analyze the level of intention to use blockchain in Indonesia, especially the My-T Wallet developed by Tokoin using the Extended Technology Acceptance Model (TAM) approach. The research modifies the TAM by adding other variables that play an essential role in making decisions about using blockchain. The target population is that the respondents at least know about blockchain developments, in this case, My-T Wallet from Tokoin. The research obtains as many as 103 respondents who fill out the questionnaire through the purposive sampling technique. The data are collected through online surveys and analyzed using the Structural Equation Model (SEM) approach with the SmartPLS software. The findings highlight that the perception of the usefulness of the My-T Wallet application is most strongly influenced by public influence. Meanwhile, perceived ease of use is most influenced by the user interface in My-T Wallet. Then, the intention to use My-T Wallet application is strongly influenced by users' positive behavior. On the other hand, the level of trust of application users must continuously be increased by paying more attention to government regulations and security aspects.

**Index Terms**—Intention to Use, Blockchain, Technology Acceptance Model (TAM)

## I. INTRODUCTION

**G**LOBALIZATION has transformed the economic, social, and cultural order quickly. It is marked by the rapid integration of data and information, supply chains, price declines, and massive use of technology. The Industrial Revolution 4.0 also emerges very quickly, marked by the connection between objects

with the help of artificial intelligence technology and several technologies, such as the Internet of Things (IoT), blockchain, 3D Printing, Big Data, Virtual Reality/Augmented Reality (VR /AR) [1]. As a result, revolutions have led to drastic changes in education, operational processes, economic growth, and health industry. For instance, many hospitals explore the use of technology to implement telemedicine. One of the applications of hospital integration systems is digital prescription (e- prescribing) to use technological developments to encourage better patient service [2]. In addition, changes also create interconnections in various stakeholders.

Although technology has greatly progressed and is widely applied in daily life in society, Indonesia has two main challenges. First, Indonesia is considered incapable of exploiting the potential of these new technologies effectively. For example, the infrastructure of Information and Communication Technology (ICT), which is the basis of the technology, is not yet evenly available across the Indonesian territory. The potential of blockchain can help the other sectors in Indonesia that still lag, such as agriculture and taxation. In addition, the use of blockchain is still focused on financial transaction applications. Second, the practical problem faced by Indonesia is the risk of using this new technology that has not been appropriately mitigated. Crucial issues, such as the absence of regulations regarding the management of personal data and the history of user transactions, can cause untrust, insecurity, and misunderstanding in society [3]. Therefore, blockchain is one of the best ways to solve those problems [4].

Blockchain, one of the technological developments, is defined as a distributed ledger that carries out its

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activities or transactions without going through central intermediaries [5]. Since the release of the Nakamoto white paper and the subsequent launch of Bitcoin, it has evolved into a de facto blockchain currency (cryptocurrency) and trading instrument with a market cap of over \$100 billion [6]. Then, in a survey conducted in 2018 by the World Economic Forum, one of the technologies that will be the focus of investment in 2022 is blockchain. The early emergence of blockchain has become a hot topic in various industries, especially the financial industry. Bitcoin can help someone to send money quickly without going through "intermediaries" and distance restrictions because they are connected to the Internet. In addition, eliminating intermediaries is the same as reducing costs arising from money transfer services. A system can be trusted and transparent with the combined advantages of using blockchain between decentralized and distributed ledgers. As seen in online trading, there is much manipulation on the purchase review so that blockchain can be the solution [7]. Thus, all data that has become a digital footprint is permanent and cannot be manipulated.

The use of blockchain in Indonesia is enough to attract the attention of the blockchain community engaged in agriculture, Micro, Small, and Medium Enterprises (MSMEs), and the financial sector. For example, Indonesia is the second-largest in the world after Brazil as an agricultural country and bio-diversity land. When people buy products locally, they are not aware of the origins of these goods or the environmental footprint of production by using blockchain. Although they will try to find the data, it will take around five to six days with the traditional method. On the other hand, this information can be obtained in just a few seconds with blockchain [8, 9].

One of the blockchain communities is Tokoin, a platform that utilizes blockchain technology to build digital business identity and digital bookkeeping systems for MSMEs in Indonesia. Tokoin assists MSMEs in reducing costs associated with expensive, time-consuming, and overseas money transfer fees by obtaining lower prices through aggregate purchases. MSMEs have an essential role in the economy by absorbing jobs and contributing to GDP growth. However, MSMEs always experience difficulties in borrowing capital from banks because of their micro-business scale, inappropriate management, information asymmetry, and other factors [10]. With so many challenges. Tokoin has several applications that can assist operations in MSMEs, such as Tokobits to manage blockchain-based transactions, My-T Wallet as a digital wallet for transacting using Toko or other cryptocurrencies, and Tokobook as an application to manage financial reports like accounts

payable and receivable.

A decentralized blockchain structure is a basic capability of eliminating the need to trust other parties who transact with users [11]. The implementation of blockchain, especially in Indonesia, can be influenced by various factors, such as trust, regulation, people's support, security, and user interface design. For the aspect of trust and security, the implementation of blockchain can be seen in the more secured transactions as the users must agree before data are recorded. It makes hackers challenging to compromise the transaction data [12]. The key to sustainable growth is tackling the security issues facing blockchain [13]. According to [14], at the individual level, social influence is affected by the beliefs and actions of peers, family, and friends in the social environment.

Moreover, the quality of the user interface is a critical element in determining the level of usability and ease of use of the system [15]. However, the main problem of Bitcoin cryptocurrency in Indonesia is government regulation. Therefore, the government must regulate and make a law regarding the system and transactions with Bitcoin rather than continuously prohibiting Bitcoin transactions [16]. Government regulations and laws are essential for dealing with digital businesses and monitoring service quality, authorizing new technologies, and deploying them in countries under their government regulations [17].

There are several implementations of blockchain. For example, there is an implementation in the e-voting system to prevent the spread of COVID-19. It is designed with a blockchain system to be accessed online. The public can apply many devices to provide voting rights, such as smartphones or computers that combine current sophisticated technology [18]. Moreover, in terms of social influence, one of the companies (Indodax) provides more public awareness about the advantages and benefits of using Bitcoin [19]. Furthermore, Indodax represents a business-like, professional, and convenient interface representing trust for online design [20].

The use of new information technology in this context, namely blockchain, can be analyzed using one of the behavioral theories developed by Davis (1989), namely the Technology Acceptance Model (TAM). TAM focuses on providing the main constructs: perceived usefulness (PU) and perceived ease of use (PEOU), as unique variables. Moreover, it is assumed that PEOU directly impacts PU [21]. Many studies have applied the TAM model to measure the acceptance of blockchain-based technologies [22–24]. It indicates that the TAM model is reliable in measuring the acceptance of new technologies.

The research integrates the TAM constructs and adds

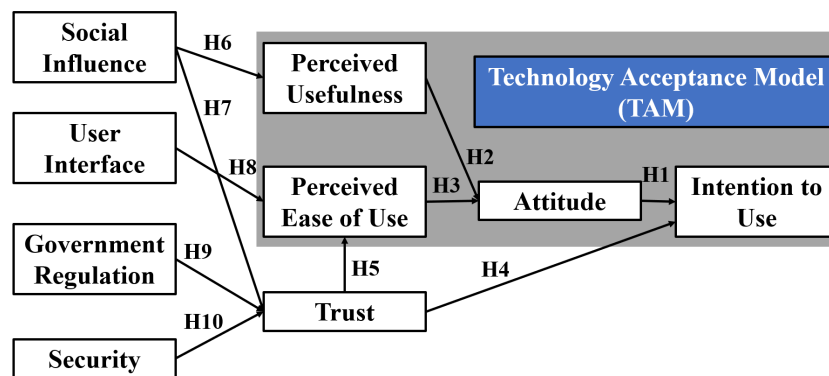


Fig. 1. Conceptual model.

external variables, such as trust, social influence, user interface, government regulation, and security, which are a challenge for blockchain. In addition, there are still few types of research about the use of blockchain platforms empirically in Indonesia. The research fills the literature gap on how the influence of external factors on the use of blockchain-based technology in Indonesia. In addition, the research is expected to make a practical and theoretical contribution to the literature on blockchain development from various aspects.

## II. RESEARCH METHOD

Measurement is a fundamental concept in conducting social science research. Measurement is the same as measuring length using a ruler as a measuring tool [25]. The research applies quantitative approach. The data collection tool uses a survey technique with a web-based digital questionnaire (Google Form), allowing researchers to obtain large data samples effectively. The research location is in Indonesia, where MSMEs have an important role in becoming the largest economic backbone by distributing digital links to questionnaires through Google Forms. The digital links of the questionnaire are sent to the blockchain community through social media like Telegram, WhatsApp, E-mail, and others. The specific question (do you know Tokoin?) has been inserted in the first place to make sure that the respondents are familiar with Tokoin before they continue to answer the other questions. Furthermore, digital links of the questionnaire have been spread out to the respondents who have understood and applied the ecosystem of Tokoin, especially in My-T Wallet.

The target population is the respondents who at least know about blockchain developments, in this case, My-T Wallet from Tokoin. Through the purposive sampling technique, the researchers obtain 103 respondents. Then, the data will be analyzed at a later stage.

The measurement used in the research is an adaptation of several previous studies. The 10-point Likert scale in predicting the intention to use My-T Wallet measures each research indicator. The research uses nine constructs arranged in a conceptual framework, including perceived usefulness, ease of use, trust, attitude, social influence, user interface, government regulation, security, and intention to use. Figure 1 shows the conceptual model. As the basic construct in the TAM model, the statement items on each variable (attitude, perceived ease of use, perceived usefulness, and intention to use) are adapted from the previous research [26, 27]. Then, the statements on variables of trust, social influence, user interface, and government regulation are from another previous research [22]. Next, the security construct is also measured using the statements adopted from the previous study [28].

Then, the data are analyzed using the SmartPLS software. Partial Least Squares (PLS) can simultaneously test the measurement model used to test the validity and reliability. Then, the structural model tests the causality. The validity test is carried out with two correlation methods: convergent and discriminant validity tests. The convergent validity test uses the loading factor value ( $> 0.7$ ) and the AVE value ( $> 0.5$ ). Meanwhile, the discriminant validity is analyzed by the value of cross-loading ( $> 0.7$ ) and the root of the AVE, which must be greater than the correlation of the latent variables. Two methods will be used in the reliability test: composite reliability and Cronbach's alpha. Each test has a rule of thumb above 0.6 [29].

## III. RESULTS AND DISCUSSION

The characteristics of the respondents are listed in Table I. It is known that most respondents who participate in the research are male (75.7%). Their age ranges from 19 to 30 years (60.2%). Based on the age, they are categorized as Gen Z and Millennial.

TABLE I  
RESPONDENTS' CHARACTERISTICS.

		Number of Respondents	Percentage
Age	19–30	62	60.30
	31–40	34	33.00
	> 40	7	6.70
Gender	Male	78	75.60
	Female	25	24.40
Education	High School	16	15.60
	Bachelor's Degree	66	64.00
	Master's Degree	17	16.50
	Doctoral Degree	4	3.90
Occupation	Public Employee	15	14.60
	Private Employee	46	44.65
	Student	37	35.90
	Academics	5	4.85

Moreover, the last education level is dominated by the bachelor's degree (64%). Meanwhile, most of them work as private employees (44.66%).

Next, Table II shows the summary of validity and reliability results. Outer loadings of each indicator range from 0.781 to 0.991. Then, the Average Variance Extracted (AVE) value of each variable is also above the expected value (0.5). The results of AVE values range from 0.772 to 0.943. The reliability testing shows that Cronbach's alpha for all scales is 0.903 to 0.988. meanwhile, composite reliability has values from 0.962 to 0.992. It means all indicators are valid and reliable to measure the variables.

The analysis results through the SmartPLS software are shown in Table III. It suggests that the relationship between attitude and intention to use is significant. The result is in line with previous research [30]. When users perceive the benefits of using an application (e.g., saving time and convenience), they will tend to have a positive attitude towards using the application. In addition, it also proves that the higher the attitude is, the higher the behavioral intention will be in using Bitcoin as a means of payment [22].

The research also proves that the users' positive behavior is influenced by the perceived ease and usability of the My-T Wallet application. This result is supported by previous researchers that perceived usefulness is what customers perceive for this technology to make their lives easier. That information and content are available online and feasible to provide convenience [31, 32]. Meanwhile, perceived ease of use reflects what customers consider that this technology is easy to use. The existence of apparent ease and usability can increase positive behavior towards the My-T Wallet application.

The analysis results demonstrate that a high level of trust will increase the intention to use the My-

T Wallet application. This result is in line with the argument stated by previous researchers [33]. A high level of trust in online services will make it easier for users to validate the details of these services to evaluate their reality. With trusted services, users will feel comfortable and easy to use because they no longer need to check for authenticity and legitimacy [34]. In contrast, users' level of trust cannot affect the perceived ease of use of My-T Wallet. It can happen when My-T Wallet users experience anxiety when making transactions. It is due to a very long delay when making transactions, so it causes uncertainty for users. This result is in line with a previous study [35]. A strong association is between crypto trading and problem gambling. Then, a weak association is with symptoms of depression and anxiety that get attention regarding crypto trading.

Furthermore, the research provides surprising results that the role of the support provided by the people around the users can significantly increase the perception of the usefulness of the My-T Wallet. The previous studies support the results. For example, it is also found that the factors, such as social influence, strategic orientation, and individual characteristics of Small and Medium-Sized Enterprise (SME) owners or managers, significantly influence behavioral intentions to adopt cryptocurrency payments [36]. In addition, there is a close relationship between social influence and perceived usefulness [37]. Not only that, but social influence can also provide a higher level of trust in the My-T Wallet. When people find that peers and the whole community have positive reviews and are more interested in the use of technology, at the same time, they tend to believe that the use of technology can provide them with the same benefits and values as others [38, 39].

The results also indicate that the user interface of My-T Wallet influences the increasing perception of convenience. The result is supported by the argument that users will feel more comfortable when the system design is developed in a more comfortable form and the system is easier to use [40]. It is also found that higher ratings of user interface and personal innovation will result in higher perceived ease of use in mobile learning [41].

On the other hand, government regulations and security are not proven to affect the level of trust significantly. For government regulation, the regulation of the use of cryptocurrencies, especially in Indonesia, is still unclear. The respondents feel that government regulation does not provide enough support in using the My-T Wallet. Besides, the risk of using My-T Wallet (blockchain) is not sought enough by government regulation. Moreover, they feel that the government

TABLE II  
THE RESULTS OF VALIDITY AND RELIABILITY TESTS.

Variable	Indicator		Loadings	Cronbach's Alpha	CR	AVE
Intention to Use	ITU1	If there is access, I intend to use My-T Wallet (blockchain).	0.973	0.955	0.971	0.918
	ITU2	If there is access, I am willing to use My-T Wallet (blockchain).	0.965			
	ITU3	I will use My-T Wallet (blockchain) in the future.	0.935			
Attitude	ATT1	I am interested in using My-T Wallet (blockchain).	0.781	0.945	0.962	0.863
	ATT2	I use My-T Wallet (blockchain) because of its attractiveness.	0.979			
	ATT3	Using My-T Wallet (blockchain) makes me more productive in conducting transactions.	0.981			
	ATT4	The thought of using My-T Wallet (blockchain) is appealing to me.	0.961			
Perceived Ease of Use	PEOU1	I learn that My-T Wallet (blockchain) is very easy.	0.980	0.985	0.988	0.943
	PEOU2	I think My-T Wallet (blockchain) is easy to operate.	0.983			
	PEOU3	The My-T Wallet (blockchain) improves my ability to do transactions.	0.972			
	PEOU4	I believe using My-T Wallet (blockchain) is easy.	0.963			
	PEOU5	My-T Wallet (blockchain) is clear and easy to understand.	0.958			
Perceived Usefulness	PU1	I believe My-T Wallet (blockchain) makes me work faster.	0.926	0.903	0.931	0.772
	PU2	I believe My-T Wallet (blockchain) increases productivity.	0.916			
	PU3	I believe the My-T Wallet (blockchain) system increases effectiveness.	0.856			
	PU4	I believe My-T Wallet (blockchain) improves the quality of my transactions.	0.813			
Trust	TRST1	The service that My-T Wallet provides is trustworthy.	0.977	0.977	0.985	0.956
	TRST2	The service provided by My-T Wallet is very committed.	0.984			
	TRST3	The services provided by My-T Wallet keep my best interests in mind.	0.972			
Social Influence	SI1	There is a community that encourages me to use My-T Wallet.	0.974	0.968	0.976	0.889
	SI2	I am recommended by the senior I work with to use My-T Wallet.	0.972			
	SI3	I am recommended by a friend to use My-T Wallet.	0.957			
	SI4	My family recommends using My-T Wallet.	0.976			
	SI5	People who have a strong relationship with me think I should use My-T Wallet.	0.828			
User Interface	UI1	I feel that the My-T Wallet platform clearly displays ongoing activities.	0.981	0.985	0.989	0.957
	UI2	I feel that the My-T Wallet platform is very simple to use.	0.974			
	UI3	I find that the My-T Wallet platform has a very effective operation.	0.981			
	UI4	I feel that the My-T Wallet platform is free from technical issues.	0.977			
Government Regulation	GR1	The government provides support in the use of the My-T Wallet.	0.965	0.962	0.975	0.930
	GR2	The government seeks to reduce the risk of using My-T Wallet (blockchain).	0.949			
	GR3	The government should be responsible and regulate the use of My-T Wallet (blockchain).	0.978			
Security	SEC1	I feel that My-T Wallet (blockchain) is very safe.	0.991	0.988	0.992	0.977
	SEC2	I feel that My-T Wallet (blockchain) is so secure that no one can change anything without notice.	0.986			
	SEC3	I can access the My-T Wallet (blockchain) anytime without any problems.	0.988			

lacks responsibility and regulation in My-T Wallet (blockchain). This situation contrasts with Commodity Futures Trading Regulatory Agency (Badan Pengawas Perdagangan Berjangka Komoditi (BAPPEBTI)) which

TABLE III  
THE RESULTS OF PATH COEFFICIENTS.

Hypotheses	Original Sample	Sample Mean	Standard Deviation	T-Statistics	P-Values
H1: Attitude → Intention to Use	0.814	0.819	0.054	15.035	0.000**
H2: Perceived Usefulness → Attitude	0.160	0.154	0.070	2.288	0.011*
H3: Perceived Ease of Use → Attitude	0.799	0.805	0.065	12.359	0.000**
H4: Trust → Intention to Use	0.165	0.160	0.057	2.894	0.002**
H5: Trust → Perceived Ease of Use	0.130	0.131	0.094	1.390	0.083
H6: Social Influence → Perceived Usefulness	0.919	0.920	0.014	63.910	0.000**
H7: Social Influence → Trust	0.730	0.723	0.092	7.918	0.000**
H8: User Interface → Perceived Ease of Use	0.841	0.841	0.087	9.664	0.000**
H9: Government Regulation → Trust	0.085	0.087	0.182	0.470	0.319
H10: Security → Trust	0.163	0.167	0.109	1.488	0.069

Note: \*Significant at  $0.01 \geq p\text{-value} \leq 0.05$  and \*\* Significant at  $p\text{-value} < 0.01$

allows digital currency as a traded commodity. It will make people distrustful of the unclear rules in Indonesia.

Meanwhile, on the security aspect, frequent bugs and delays in the application cause users to feel insecure when using it. It may be because My-T Wallet is a new application, so it needs development. Based on the respondents, the t-statistic value of the security to trust (1.488) is smaller than the t-table value (1.65). Hence, the relationship between security and trust is proven to be insignificant. Therefore, the users show their discomfort in using My-T Wallet in the security aspect. In addition, blockchain is a decentralized technology, so there is no guarantee for users to be safe from hackers. Blockchain is always vulnerable to malicious security attacks resulting in huge value and data theft [42].

One of the aims of the research is to contribute theoretically and practically. The results reveal that overall, the intention to use the My-T Wallet is influenced by several factors, such as trust in the application (trust), perceived usefulness, and perceived ease of use. It can encourage positive behavior (attitude) towards the application. Moreover, support from the crowd (social influence) is the most important factor of the high intention of using the My-T Wallet. Theoretically, the research provides new insights about the level of intention to use blockchain technology in developing countries by integrating the TAM model with several other important variables related to blockchain. Meanwhile, practically, the research results are beneficial for the development of business and government. Practical suggestions and recommendations for My-T Wallet application developers are to increase public awareness by always creating content on social media. Thus, more and more people are aware of the presence of this application. Then, it will encourage people to recommend and support each other to apply My-T Wallet. In addition, improving the quality of services and systems can increase the positive behavior of the community towards the My-T Wallet. Thus, the

public’s perception of the ease and usefulness of this application will also increase. The research results also reveal that trust is the main factor that My-T Wallet developers must consider.

#### IV. CONCLUSION

The research provides new insight by developing a new model framework through the extended TAM model to predict the intention to use blockchain in Indonesia. The conceptual framework shows that the modified TAM model includes the original TAM construct (attitude, perceived ease of use, perceived usefulness, and intention to use) and several variables that play an essential role in using blockchain applications. In addition, the research can explain what factors that affect the intention to use blockchain.

The research aims to predict the level of intention to use blockchain applications, one of which is My-T Wallet developed by Tokoin in Indonesia. Through the extended TAM model approach, it is found that the perceived usefulness of the My-T Wallet is most strongly influenced by social influence. Meanwhile, the perceived ease of use of the My-T Wallet is the most affected by the user interface. Then, users’ positive behavior influences the intention to use My-T Wallet strongly. On the other hand, the users’ level of trust must always be increased by paying more attention to government regulations and security aspects.

The research also has some limitations that further researchers can improve. First, the conceptual framework presented does not include any moderating variables that can strengthen or weaken the relationship between variables. Thus, future research can apply the same research framework but with several moderating variables, such as age and gender, to further explain the application of this model. Second, future research can investigate different approaches, such as the qualitative method. The method can get the result specifically by interviewing the respondents in a deep-talk, especially variables of government and security in Indonesia. It

can have a better understanding of the intention to use blockchain. Third, given that the technology acceptance theory has been developed rapidly from year to year, further research can use the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) research model [43] to investigate the level of intention to use My-T Wallet. Fourth, future researchers can expand the population and sample to determine the level of intention to use My-T Wallet more broadly.

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