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Application of Theory of Planned Behavior (TPB) in Cryptocurrency Investment Prediction: A Literature Review

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Abstract

This study aims to identify the application of Theory of Planned Behavior to predict people's intentions to invest in cryptocurrencies. Theory of Planned Behavior remains the most prominent theory in behavioral research to predict one's intention or behavior. This research selected and reviewed articles related to the application of Theory of Planned Behavior. Data was collected from journals, papers, books, and websites related to the theory of planned behavior (TPB) and cryptocurrency. This study revealed that Theory of Planned Behavior is valid and reliable to measure cryptocurrency investment intention. Self-efficacy was used to as a proxy for perceived of behavioral control. This study can be used to develop responsive strategies.

Keywords: Theory of Planned Behavior (TPB), Cryptocurrency, Investment

1. Introduction

Industrial revolution 4.0 causes technological disruptions that have an impact on the choice of financial investment products. The technological disruption had an impact on the financial investment revolution, from traditional to more complex investments. In Indonesia, several investment instruments have been used by the public, including stocks, bonds, mutual funds, deposits, and commodities (gold). Currently, there is a new investment with high market interest, namely cryptocurrency.

Cryptocurrency is a series of cryptographic codes that can be stored, transferred or used as a means of payment using a technology called blockchain (Departemen Hukum Bank Indonesia, 2019). Cryptography is a password with a specific meaning that is added to the programming language (coding) on the blockchain system every time there is a change in data (Bank Indonesia, 2021). Blockchain is a distributed ledger that is used to record every transaction and store data continuously (Schueffel et al., 2019). Blockchain technology allows transactions in cryptocurrencies to be decentralized and provides transaction security in cryptocurrencies due to the complex history of transactions and is available for free (Härdle et al., 2020).

Cryptocurrency has become an investment with high demand by people in various countries in the world even

though it is classified as an investment with high risk. Cryptocurrencies are classified as very risky and volatile investments due to extreme fluctuations (Anser et al., 2020). Based on data on coinmarketcap, on April 15, 2022, the Total Cryptocurrency Market Cap was \$1,872,068,948,686 while on April 21, 2022 it increased to be \$1,958,108,225,927. Within a month, on May 15, 2022, the Total Cryptocurrency Market Cap decreased to \$ 1,270,751,270,242. Despite the decline, the current Total Cryptocurrency Market Cap is still much higher when compared to the previous few years such as on May 15 2013 only \$1,403,069,952 (CoinMarketCap, 2022).

The high public interest in cryptocurrency investment can be predicted using the Theory of Planned Behavior (TPB). The Theory of Planned Behavior is a theory used to predict individual behavior in making rational decisions. The Theory of Planned Behavior also states that individual behavior is influenced by intentions. This can be seen through three factors, there are Attitude Towards Behavior, Subjective Norm and Self-Efficacy.

Investment intentions in cryptocurrencies that are predicted using the Theory of Planned Behavior (TPB) have different research results. The researchs results that the Theory of Planned Behavior (TPB) has an effect on investment intentions in cryptocurrencies but some researchs said that the Theory of Planned Behavior (TPB) is not related to investment intentions in cryptocurrencies. The existence of these differences makes researchers want to research conduct a literature study on cryptocurrency investment intentions using the Theory of Planned Behavior (TPB). Therefore, a researchs was carried out with the title “**Application of Theory of Planned Behavior (TPB) in Cryptocurrency Investment Prediction: A Literature Review.**”

1.1. Investment

Investment is the use of resources to increase income or production output in the future through profits. Investment is also defined as the purchase of a financial product or valuable item with the expectation that a positive return will be received in the future. Investments can be made in savings through delayed consumption (University of Delhi, 2020). Investment is different from speculation. The investment aims to achieve a return on investment through long-term profits whereas speculation is carried out when speculators want to take advantage of short-term profits (Capital Market Authority, n.d.). In investing, profit and risk are two things that will continue to be embedded in it, where every profit obtained there will be a risk that must be faced.

1.2. Cryptocurrency

Cryptocurrency is a digital asset that uses a series of cryptographic codes to be stored, transferred, or used as a means of payment through blockchain technology. Cryptography is a password with a specific meaning that is added to the programming language (coding) on the blockchain system every time there is a change in data (Bank Indonesia, 2021). The cryptographic process aims to protect information by using codes so cryptocurrency transactions cannot be counterfeited. Cryptocurrencies have a unique mode of exchange via the internet so they do not have a physical form and have the potential to bring about a revolution in the social structure of the world financial system (Anser et al., 2020). Cryptocurrencies are supported by blockchain technology allow transactions on cryptocurrencies to be decentralized so the transaction is open because everyone can see every transaction. Blockchain also provides certainty of transaction security in cryptocurrencies because the complex transaction history of cryptocurrencies has detailed data and is freely available (Härdle et al., 2020). The characteristics of the blockchain system are also being anonymous in every transaction, everyone can control it but no one has power except the party concerned (Milutinović, 2018).

Cryptocurrency is not regulated or controlled by any party including central authorities. The government does not have the authority to produce new units, influence, or regulate transactions in cryptocurrencies because everything is controlled by blockchain technology (Milutinović, 2018). The government can only determine whether or not cryptocurrency is used as a means of payment in its country. In some countries, cryptocurrency can be used as a payment and also as an investment. But in some countries cryptocurrency can only be used as an investment.

- Types of Cryptocurrencies

Currently there are thousands of cryptocurrencies that can be purchased. Each type of cryptocurrency has its own

set of rules as well as advantages and disadvantages. Cryptocurrencies traded 24/7 can be accessed through WorldCoinIndex, CoinMarketCap, CryptoCompare, CryptoCurrencyIndex30, or the CME CF Cryptocurrency Index. Bonded with several popular types of cryptocurrencies:

a. Bitcoin

Bitcoin is a type of currency in cryptocurrency that allows users to transfer digital money to other parties (Almarashdeh, 2018). Bitcoin appeared in 2008 which was represented by a person, or group of people who called himself Satoshi Nakamoto in his scientific study namely Bitcoin: Peer-to-Peer Electronic Money System. The paper describes a revolutionary technology to create a decentralized peer-to-peer monetary system that allows online payments to be sent directly from one party to another without going through financial institutions or third parties (Oliva et al., 2019). Bitcoin is a cryptocurrency that is considered to be the top of the bunch because it is the most recognized, most powerful and revolutionary cryptocurrency in the world's virtual financial market (Anser et al., 2020). In seeing the potential of Bitcoin, it can be seen through the Bitcoin Market Potential Index (BMPI) which is a composite indicator that evaluates the potential of Bitcoin in 178 countries.

b. Ethereum

Ethereum is a type of cryptocurrency that emerged in mid-2015 created by Vitalik Buterin, a young cryptogenius. Ethereum is not only used as a digital asset transfer tool but also creates smart contract technology. The existence of this technology allows developers to develop applications such as crypto asset exchange applications to borrow crypto assets. Ethereum is an open software platform based on blockchain technology that allows developers to build several decentralized applications or programs called Decentralized Applications (DAPPS) (worldcoinindex.co, 2022).

1.3. Theory of Planned Behaviour

The Theory of Planned Behavior is a theory used to predict individual behavior in making rational decisions. The Theory of Planned Behavior developed by Ajzen is a development of The Theory of Reasoned Action (Ajzen, 1991) where there is an additional factor in influencing individual behavior, namely perceived behavioral control (Culos-Reed, 2000). The Theory of Planned Behavior states that individual behavior is influenced by intentions. Intention is a factor that motivates individuals to behave through effort in trying something and how much planning effort has been made. The higher the intention to engage in a behavior, the higher the individual's performance. Intention to perform a behavior can be predicted through attitudes toward behavior, subjective norms or perceptions of social norms, and perceived behavioral control or self-efficacy (Ajzen, 1991):

- Attitude towards behavior

Attitude towards behavior refers to the views or perspectives of individuals in viewing behavior as positive or negative. Based on the social psychology literature, it is stated that attitude is the most important construction in social psychology (Schaupp & Festa, 2018). Individuals will have a stronger intention to engage in a behavior when they have a strong positive attitude (Wang et al., 2018). When an individual has an attitude of refusing (negative) it will have an impact on reducing intention or until he has no intention. Strong behavioral intentions occur when there are no resouches and do not require high skills (Kim, 2021). If implemented with the intention to invest in cryptocurrencies, it can be said that individuals who have the belief that transacting in cryptocurrencies do not have a high risk, then the intention to invest will be great. On the other hand, if individuals believe that investing in cryptocurrencies will have a high risk, they are likely to have a lower intention to make transactions (Schaupp & Festa, 2018). Previous research has stated that the main weakness of Attitude towards behavior as a predictor of behavioral intention is they do not predict intentional human behavior. Even though it is known that attitudes can change in terms of time and situation, TPB is static (Mazambani & Mutambara, 2020).

- Subjective Norm

Subjective norms relate to the individual's assumptions about something that is considered common in his social group so it affects the individual's behavior. This indicates that, the higher the subjective norm perceived by individuals, the greater their intention to perform the behavior (Wang et al., 2018). Norms can

be divided into two, namely descriptive and prescriptive norms about what is usually done and approved by a person's social group. Individuals will have intentions when people in their environment agree with what they are doing, so social disapproval can inhibit intentions to carry out behaviors such as investing in cryptocurrencies (Mazambani & Mutambara, 2020). Explicitly the influence of the social environment can be through direct discussion or through observed behavior that becomes a habit in that environment. Therefore, the expectations and behavior of others can serve as a motivating factor for a person's behavior (Kim, 2021).

- **Self-efficacy**

Self-efficacy refers to the self-agency of individuals who have the belief that the individual can complete and overcome the tasks and challenges of life given (Kusairi et al., 2019). Self-efficacy will also affect individual decisions on the activities being carried out, the efforts being carried out, persistence when in difficult times, and the mindset and emotions that are practiced (Faison, 2019). Self-efficacy can also be understood through individual behavior to survive on difficulties, stress, or other problems both external and internal with the abilities possessed (Kusairi et al., 2019). Self-efficacy will also affect how you think and can motivate you to get results (Noor et al., 2020). Individuals will have self-confidence, motivation, and optimism for success in overcoming problems. This belief arises as a result of individuals taking advantage of opportunities and is proven by concrete actions to achieve optimal performance. Wood and Bandura state that individuals who have high self-efficacy will tend to be diligent in carrying out activities and be confident so they do not hesitate in making decisions and prefer new challenges (Kusairi et al., 2019). Ramdhani (2011) also states in his research that individuals will have confidence in their abilities and skills in completing tasks if they individual has the availability of resources such as equipment, compatibility, competence, and opportunities that support and realize these behaviors (Ramdhani, 2011).

2. Research Methods

The research method was carried out using desk research by collecting data through library research. The literature review provides a framework for establishing the importance of the study as well as a benchmark for comparing results with other findings (Creswell & Creswell, 2018). In the process researchers identify relevant literature through journals, papers, books, and websites related to cryptocurrency. Literature is obtained through Google Scholar, ProQuest, Springer Link, Emerald the official government website, and Website crypto exchange. Researchers conducted a complete text search related to cryptocurrencies and Theory Theory of Planned Behavior.

3. Discussion

Technological innovations have an impact on increasing the efficiency of the financial system as well as supporting new financial products and services to invest in. One example is cryptocurrency. Cryptocurrency is a digital asset that uses cryptographic code so that it can be stored, transferred, or used as a means of payment through blockchain technology. Technological innovations related to cryptocurrencies offer many promised possibilities like the potential to build capital services and increase access to finance. until now, there have been cryptocurrencies both in the form of coins and tokens with different focuses and features (Zhao & Zhang, 2021).

Although cryptocurrencies are classified as investments that have high risk, the public's interest in investing in cryptocurrencies is still high. The public's enthusiasm for cryptocurrencies can be seen through the Total Cryptocurrency Market Cap. it can be seen that on May 15, 2022 the Total Cryptocurrency Market Cap reached \$1,270,751,270,242 USD. One significant development is the global push towards the Internet of Things. This is because cryptocurrency has various advantages compared to existing investments lsuch us cheaper transaction fees, and fast transaction times without any minimum-maximum decentralized transactions and systems. Increasing the Total Cryptocurrency Market Cap has an impact on increasing public choice in investing and at the same time increasing the new economy, other example is the growth of e-commerce (Mazambani & Mutambara, 2020).

Investments in cryptocurrencies can be studied more deeply through scientific studies. Previous research has stated

that increased investment will be in vain if there is no research related to predicting consumer intentions to adopt cryptocurrencies. This is because cryptocurrency investment is dependent on wider market adoption (Polasik et al., 2015). Previous research has mostly focused on the design and features of technology and the factors that influence technology adoption (Risius and Spohrer, 2017). Therefore, it is necessary to further study the factors that determine the intention to use cryptocurrencies.

The theory of planned behavior can be used as an approach that predicts an individual's intention to invest in cryptocurrencies. In the theory of planned behavior, three factors are used as factors that influence individual intentions to invest in cryptocurrencies, namely Attitudes towards Behavior, Subjective Norms, and Self-efficacy. Based on previous research, self-efficacy, subjective norms, and attitudes towards certain behaviors result in the formation of individual behavioral intentions, which lead to actual behavior. The theory of planned behavior has demonstrated its validity as a model for the study of technology acceptance in many fields. However, there are several different research results related to the application of TPB in cryptocurrency intention (Mazambani & Mutambara, 2020). The figure below is a depiction of the research model on the effect of indicators from the theory of planned behavior on cryptocurrency investment intentions. Furthermore, it will be explained how the results of previous research on the effect of indicators from the theory of planned behavior on cryptocurrency investment intentions using a literature review.

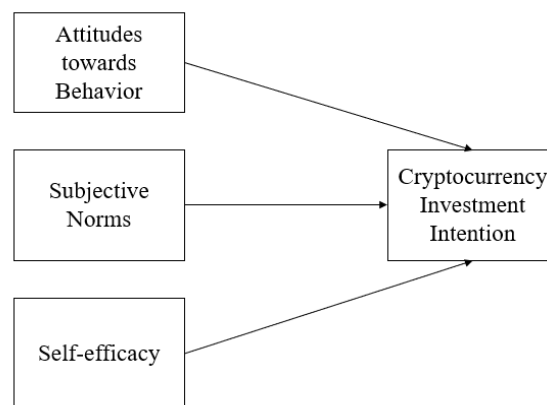


Figure 1: Research Model

Source: Researcher (2022)

In the previous study, Attitude towards behavior was the most significant and strongest factor influencing the behavioral intention to be followed (Mazambani & Mutambara, 2020). The research was supported by Soomro et.al (2022) who stated that there was a relationship between attitude and intention to adopt cryptocurrency (Soomro et al., 2022). Individuals who have a better attitude towards cryptocurrencies will show a higher intention to use them (Schaupp & Festa, 2018). Maria gaganias research states that only a quarter of survey participants (26%) believe that cryptocurrencies will be issued by the state and replace money in the next 10 years, and only 28% believe most of the stores they shop at will accept payments in Bitcoin in the next 5 years. Individuals who are afraid can increase the uncertainty of their financial position, shift responsibility for their economic well-being to external guarantors, and are likely to experience concerns about the introduction of cryptocurrencies into everyday life (Gagarina et al., 2019).

Individuals who have higher subjective norms are more likely to adopt the use of cryptocurrencies (Schaupp & Festa, 2018). Soomro et al. (2022) results state that subjective norms have a significant effect on intentions to invest in cryptocurrencies. For investors, the opinions of people affiliated with them and close to them are very important to support of the use of cryptocurrencies (Soomro et al., 2022). The results of the research by Mazambani & Mutambara (2020) have different results, they state that subjective norms have an insignificant relationship with the intention to adopt cryptocurrency. This is because individuals treat financial matters with confidentiality and privacy, so there is no dependence on others to influence their behavioral intentions. Another factor is that there is

general skepticism about financial transactions and information that does not come from traditional financial institutions or government agencies in closed societies and countries that are prone to electronic fraud (Mazambani & Mutambara, 2020). Mazambani & Mutambara (2020) research is supported by Ayedh et al. (2021) research which states that subjective norms do not have a significant impact on Malaysian Muslim intentions to invest in the Bitcoin market. This is because cryptocurrencies are relatively new, so most investors do experience not too much it make a fewer suggestions and recommendations to others (Ayedh et al., 2021).

Almarashdeh's research (2018) states that self-efficacy can influence individuals to use new services such as investing in cryptocurrencies (Almarashdeh, 2018). This is also supported research by Mazambani & Mutambara (2020) which states that self-efficacy has a positive and significant influence on behavioral intentions to adopt cryptocurrency (Mazambani & Mutambara, 2020). Other research also states that self-efficacy affects several financial-related contexts such as investment ownership in general (Montford & Goldsmith, 2016) (Farrell et al., 2016). Self-efficacy affects the level of risky investment (Czaja & Roder, 2021) both in stocks, property, mortgages, and insurance savings (Farrell et al., 2016) as well as being ability to accept and adopt new technologies. This happens because, from a psychological point of view, individuals who have a high level of financial self-efficacy perceive all difficulties as challenges, not threats that can be solved with confidence in their abilities. There are differences in the results of research conducted by Widjaja and Sembel (2020) which state that financial self-efficacy has no significant effect on investment intentions (Widjaja & Sembel, 2020).

Table 1: Application of TPB on Predicting Cryptocurrency Investment Intention

Application of TPB	Finding
Mazambani & Mutambara (2020)	Attitude and Perceived behavioural control positively impact the intention to adopt cryptocurrency, but Subjective norms showed a negative non-significant influence
Soomro et al. (2022)	A young people who seek financial autonomy and do not trust social institutions are ready to use cryptocurrency
Schaupp & Festa (2018)	Attitude, subjective norms, and perceived behavioral control are all positively associated with intention to adopt the use of cryptocurrency
Ayedh et al. (2021)	Compatibility, awareness and facilitating conditions have a significant impact on the Malaysian Muslims' decision to invest in Bitcoin. Perceived ease of use, profitability, Subjective Norm and trust have no significant impact.
Almarashdeh (2018)	Transaction processing, Perceived Trust and Self-efficacy has a significant impact on user behavioural intention to use Bitcoins, but security and control did not have. Transaction processing, Security and control and Perceived Trust have a significant impact on user self-efficacy to use Bitcoins.

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