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Exploring Cryptocurrency Investment Choices among Generation Z Muslims – A Conceptual Analysis

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Abstract

The emergence of cryptocurrency as a form of digital currency investment results from the global shift towards a technology-driven way of life. Despite its notable volatility, intricate price dynamics, and decentralized nature, cryptocurrencies have managed to attract a considerable number of investors for reasons that are not been extensively explored. Indonesia, situated in Asia and characterized by a predominantly Islamic population and heightened awareness of cryptocurrencies, stands out in this context. The primary objective of this study is to pinpoint the factors that influence investment decisions in cryptocurrencies among potential Generation Z investors in Indonesia. The research methodology involves the dissemination of surveys to individuals who meet specific criteria, including being Indonesian citizens, at least 17 years old, practicing Islam, and possessing a National Identity Card, a prerequisite for engaging in cryptocurrency investments. The gathered data will undergo analysis using Structural Equation Modeling (SEM) equations through the SmartPLS application

Keywords: *Cryptocurrencies, Investments, Attitudes to risk, Subjective norms, Machine learning forecasting.*

Introduction

Investing serves as a means of securing one's financial future, involving the allocation of funds into both current and long-term assets with the aim of generating a higher return. While the economy already offers a plethora of investment options, the advent of digitalization has expanded the landscape further. In addition to traditional investments in physical assets and currencies, contemporary investors now have the opportunity to explore digital currencies, with cryptocurrencies being a notable example. Cryptocurrency, an increasingly favored investment, operates on the foundation of blockchain technology. The internet hosts a diverse array of over 1,000 cryptocurrencies, including well-known ones such as Bitcoin, Dogecoin, Litecoin, Kittehcoin, Ripple, Peercoin, Vertcoin, and Darkcoin (Catania et al., 2019).

The primary concern associated with cryptocurrencies is their pronounced price volatility, surpassing that of traditional currencies. Conventional currencies, referred to as fiat money, exhibit high sensitivity to both local and global economic conditions, such as shifts in demand and supply, global crises, recessions, inflation, and political events, rendering them more predictable (Andrianto, 2017). In contrast, the valuation of cryptocurrencies relies heavily on technological factors, with only a limited impact from economic factors (Li & Wang, 2017). Despite the substantial uncertainty surrounding cryptocurrencies, investors persist in

making investment decisions in this realm, underscoring a notable degree of financial risk tolerance.

Previous research studies (Dickason & Ferreira, 2018; Gambetti & Giusberti, 2019; Kourtidis et al., 2011; Pak & Mahmood, 2015) have identified factors such as financial risk tolerance, herding behavior, knowledge about the investment, the ability to make the investment, and anticipated benefits as influential elements in shaping investor decisions. The successful integration of machine learning in enhancing investment performance (T.-H. Chen et al., 2019) forecasting stock market trends has spurred scholars to investigate its potential application in predicting cryptocurrency prices (Alessandretti et al., 2018).

The reactions and acceptance of cryptocurrency as an investment vary from one country to another, as seen in Indonesia where there are both supporters and critics of the use of crypto as a means of transaction. This is because cryptocurrency does not yet meet the criteria as a recognized currency in Indonesia, as stated in Law Number 7 of 2011 concerning Currency. Crypto trading in Indonesia is approved and supervised by the Commodity Futures Trading Regulatory Agency (Bappebti). Through a letter from the Coordinating Minister for Economic Affairs, Bappebti issued Regulation Number 7 of 2020 regarding the Determination of the List of Crypto Assets that Can Be Traded on the Physical Crypto Asset Market (Bappebti Regulation 7/2020), announcing that cryptocurrencies are not recognized as valid means of payment in the territory of the Republic of Indonesia, but rather function solely as tradable assets in the Physical Crypto Asset Market.

Despite the serious price volatility and low liquidity of cryptocurrencies, without physical presence and no government reserve backing, the investment trend in cryptocurrencies continues to rise (Lavere, 2019). The Blockchain Association of Indonesia (ABI) and the Indonesia Crypto Network (ICN) have recently released the Indonesia Crypto Outlook Report 2022, highlighting the development of the blockchain and crypto industry in the country throughout 2022. This report aims to provide a comprehensive overview of the blockchain industry and crypto assets in Indonesia. The report notes that the blockchain and crypto industry in Indonesia has grown exponentially over the last six years, supported by the increased internet penetration, currently reaching 77% or 210 million users.

Furthermore, cryptocurrency trading is a relatively new financial investment that has not been extensively researched compared to traditional forms of investment that have existed for several decades. Due to the lack of best practices specifically credited to cryptocurrency investment, investors expose themselves to higher risks compared to traditional investments (Mokhtarian & Lindgren, 2017). Some previous studies have attempted to investigate the factors influencing investor investment decisions in crypto currencies in developed countries, however, studies are limited specifically for Indonesia (Ayedh et al., 2021).

Therefore, this research aims to determine the influence of investors' attitudes towards the risk of their investment decisions in cryptocurrency, to understand the influence of perceived behavioral control on investors' investment decisions in cryptocurrency, to test the influence of perceived benefits on investors' investment decisions in cryptocurrency, and to explore the moderating effect of Machine Learning forecasting on the relationship between perceived benefits and investment decisions in cryptocurrency.

Literature Review

The financial landscape across the globe has undergone a profound revolution due to technological advancements, breaking away from the traditional confines where valuable assets were predominantly physical and transitioning into the digital realm. Although virtual currency, a subset of digital currency, has existed for some time, primarily in the form of

gaming coins and social media tokens, these lacked regulation and lacked intrinsic economic value. In contrast, cryptocurrency emerged as a pioneering asset class, distinguishing itself as a regulated form of digital currency with tangible purchasing power in real-world transactions (C. Y. Chen et al., 2018). Bitcoin, the inaugural cryptocurrency introduced in 2009, initially held a dominant position in the market, commanding more than half of the cryptocurrency market capitalization during its early stages. Over time, however, its market share witnessed a shift as other emerging cryptocurrencies like Stellar, Ripple, Ethereum, and others gained traction, signaling a growing diversity in the sphere of cryptocurrency investments (Brauneis & Mestel, 2019).

This study is underpinned by the Theory of Planned Behavior (TPB), which posits that the most effective way to predict and explain an individual's behavior is through an examination of their behavioral intentions. The TPB is a dynamic theory that proves its utility in analyzing various behaviors, enhancing its applicability in technology analyses, as highlighted by Soomro et al. (2022). According to this theory, individuals make decisions to act or refrain from acting based on the information available to them and the consequences associated with those actions. This suggests that individuals are conscious of their actions, guided by deliberate intentions. The TPB asserts that a person's intention is shaped by their attitude, subjective norm, and perceived behavioral control, as noted by Schaupp et al. (2022). Subsequently, this intention influences the person's behavior, wherein a stronger intention theoretically increases the likelihood of the person engaging in the behavior (Ajzen, 1991). Therefore, the TPB is selected as the model to explore the influence of investors' attitudes toward risk, subjective norms, and perceived behavioral control on investment decisions in cryptocurrency among potential investors in Indonesia.

Attitude Towards Risk Cryptocurrency Investment Decision

Attitude, as defined in this context, represents an individual's favorable or unfavorable judgment toward a particular behavior. Khan (2019) has identified that an individual's attitude toward risk significantly influences their decision to invest in cryptocurrency. The components of attitude encompass affective, cognitive, and conative decision-making patterns, all of which are shaped by the goal of risk minimization (Bananuka et al., 2019). The heightened awareness of technology, owing to the technical nature of cryptocurrency, has a positive impact on shaping attitudes toward risk (Alaeddin & Altounjy, 2019).

Magendans et al. (2017) characterize financial risk tolerance as an investor's willingness to engage in financial behavior despite the uncertainty of the outcome. Factors such as high levels of non-investment income, ownership of liquid assets, time remaining until retirement, educational attainment, and male-headed households are associated with higher risk tolerance in investment decisions (Sung & Hanna, 1997). Professionals are likely to exhibit higher risk tolerance compared to those in lower-ranking positions, as suggested by (Grable, 2000). Similarly, Corter & Chen (2006) argue that experienced investors, presumed to possess extensive economic knowledge, tend to adopt a risk-tolerant attitude and engage in more risky investment portfolios.

In summary, Khan (2019) notes that individuals with a higher risk tolerance, despite experiencing lower satisfaction levels in their investment experiences, tend to be more inclined toward risk-taking compared to risk-averse individuals. Kourtidis et al., (2011) demonstrate that investors with higher profiles, including greater risk tolerance, exhibit better performance in stock trading. Conversely, Dickason & Ferreira (2018) argue that investors with low-risk

tolerance and a conservative personality may be susceptible to loss aversion and mental accounting biases. Consequently, this study proposes the following hypotheses:

H1. Investors' attitude toward financial risk tolerance has positive significant influence on the investors' investment decision in cryptocurrency.

Subjective Norm and Cryptocurrency Investment Decision

Subjective norm, according to Ajzen (1991), refers to an individual's perception of social influence in determining whether to engage in a specific behavior. Schaupp et al. (2022) assert that the higher the evaluation of subjective norms, the greater the intention to use cryptocurrency. Research indicates that investors tend to make investment decisions in cryptocurrency when they observe a significant portion of society participating in such investments, a phenomenon known as herding behavior (Khan, 2019; Wang et al., 2019). Investors acquire insights into investment patterns through channels like social media or friends. Given the intricate nature of cryptocurrencies, new investors often hesitate to risk their wealth unless they witness others investing in these currencies and achieving profits, as noted by Bouri et al. (2019). The prevalence of herding behavior is particularly notable in cryptocurrency markets characterized by significant economic ambiguity. Cryptocurrency investors are notably influenced by the prevailing trend in cryptocurrencies, tending to mimic the behavior of others, especially during economic slowdowns (Khan, 2019).

In addition to herding behavior, past research indicates that investors are motivated to invest in cryptocurrency due to the influence of people around them. Park et al. (2014) found that perceived knowledge reduces the intention to seek information, while reputation enhances the intention to share information in online investment communities. Khan (2019) revealed that investors frequently base their investment decisions on the actions of friends, colleagues, and individuals they trust. Viscusi et al. (2011) emphasized that an investment decision made in a group differs significantly from an individual decision, as shared information exerts a strong influence on investor decisions. Therefore, this study posits the following hypothesis:

H2. Subjective norms of herding behavior and influence of others have positive significant influence on investors' investment decision in cryptocurrency.

Perceived Behavioral Control and Cryptocurrency Investment Decision

Perceived behavioral control, as defined by Ajzen (1991), refers to the perceived ease or difficulty of executing a particular behavior, shaped by past experiences and anticipated obstacles. Trafimow et al. (2002) elaborate on perceived behavioral control as specific factors that may or may not fall under an individual's voluntary control, interacting with the intention to perform a behavior within the Theory of Planned Behavior (TPB). However, Wallentin et al. (2004) argue that an individual is likely to fail in executing an intended behavior if their actual behavioral controls are low. Previous research has primarily focused on the motivation to perform a behavior, often disregarding the impact on the ability to perform based on intention.

Consistent with the TPB, past studies indicate that investors are inclined to make investment decisions in cryptocurrency when they possess sufficient knowledge about it (Khan, 2019; Jain & Mandot, 2012). A higher level of perceived behavioral control may result from secure cryptocurrency transactions, leading investors to perceive the behavior as less risky (Schaupp et al., 2022). Supporting this notion, Goldsmith & Goldsmith (2006) found that

women, compared to men, tend to have lower knowledge and skills in managing personal finances, exhibiting reduced confidence in financial analysis. Moreover, an increase in personal finance education correlates with enhanced financial literacy and an increased confidence level in financial analysis. Jain & Mandot (2012) further emphasize the relationship between investment knowledge and the ability to handle risks, asserting that individuals are more likely to make investment decisions when they are confident in their ability to navigate associated risks. Contrarily Gambetti & Giusberti, (2019) discovered that anxious individuals tend to avoid investments, perceiving high risks along with low control and returns. Therefore, this study proposes the following hypothesis:

H3. Perceived behavioral control of knowledge and ability has positive significant influence on the investors' investment decision in cryptocurrency.

Perceived Benefits and Cryptocurrency Investment Decision

Perceived benefits in the realm of cryptocurrency can be classified into direct advantages, encompassing financial benefits like profits and information transparency, and indirect advantages such as 24/7 availability, security, and anonymity (Yilmaz & Hazar, 2018). Lee (2009) has affirmed that the perceived benefit is a significant predictor of the adoption of online trading. Concerning profitability, investors heavily rely on speculating future exchange rates of cryptocurrencies to inform their investment decisions (Andrianto, 2017; Rose, 2015; Wesley, 2018). Often, investors decide to invest in cryptocurrency based on its current value, speculating on future value and popularity using information available on the internet, articles, and advertisements (Shehhi et al., 2014).

The most notable distinction between cryptocurrency and other digital currencies lies in blockchain technology. The nature of blockchain records, secured by hash algorithms, timestamping, and irreversible entries, implies a high level of security for cryptocurrency investors (Crosby et al., 2015; Lin & Liao, 2017). This aligns with the perspectives of Rose (2015), Peng et al. (2018), and Kuo Chuen et al., (2017), asserting that the security of cryptocurrency is underpinned by cryptographic algorithms facilitated by blockchain technology. However, Bakar (2017) takes a contrary stance, suggesting that the security of cryptocurrency ledgers depends on the assumption that a majority of miners maintain the ledger for financial motivations. Vyas & Lunagaria (2014) and Gandal & Hałaburda 2014) note that while cryptocurrency algorithms may combat currency counterfeiting and transaction falsification, security vulnerabilities persist, particularly since individual private keys stored in e-wallets can be susceptible to hacking and theft.

Yilmaz & Hazar (2018) and Shehhi et al. (2014) have identified security as a crucial determinant of investors' behavior in purchasing cryptocurrencies. Andrianto (2017) disclosed that, in addition to profitability, the ability to keep users anonymous is another major selling point for cryptocurrencies. Hence, the study proposes the following hypothesis:

H4. Perceived benefits of profitability and security have positive significant influence on the investors' investment decision in cryptocurrency.

Machine Learning Forecasting, Perceived Benefits and Cryptocurrency Investment Decision

Machine learning, a subset of big data analytics, facilitates predictive analysis. Researchers such as Peng et al. (2018), Alessandretti et al. (2018), Patel et al. (2015), and Krollner et al. (2010) consistently highlight the viability of predicting cryptocurrency volatility using

machine learning. The output of machine learning forecasting provides insights into the potential profitability of cryptocurrency investments. This is considered essential to assist investors in making calculated risks, especially since current price predictions heavily rely on speculation. Alessandretti et al. (2018) confirmed that machine learning techniques outperformed the simple moving average strategy in price prediction. As machine learning relies on substantial data to enable algorithms to uncover detailed fundamental patterns, it holds the potential to enhance the accuracy of predictions (Zhou et al., 2017).

In contrast, Peng et al. (2018) argued that accurate estimations could be obtained from data collected through short-term observations. The inspiration to estimate cryptocurrency prices using machine learning techniques was drawn from the effective use of machine learning in predicting stock market trends (Alessandretti et al., 2018). Machine learning algorithms can easily achieve predictive accuracy levels above 70%, making them favorable for short-term forecasting of cryptocurrency trends in the markets (Akyildirim et al., 2021).

Given the inconsistent findings regarding the significant relationship between perceived benefits and investment decisions, there is a suggestion of a potential moderator that may enhance this relationship. Therefore, this study postulates the following hypothesis:
H5. Machine learning forecasting enhances the positive influence of perceived benefits on the investors' investment decision in cryptocurrency.

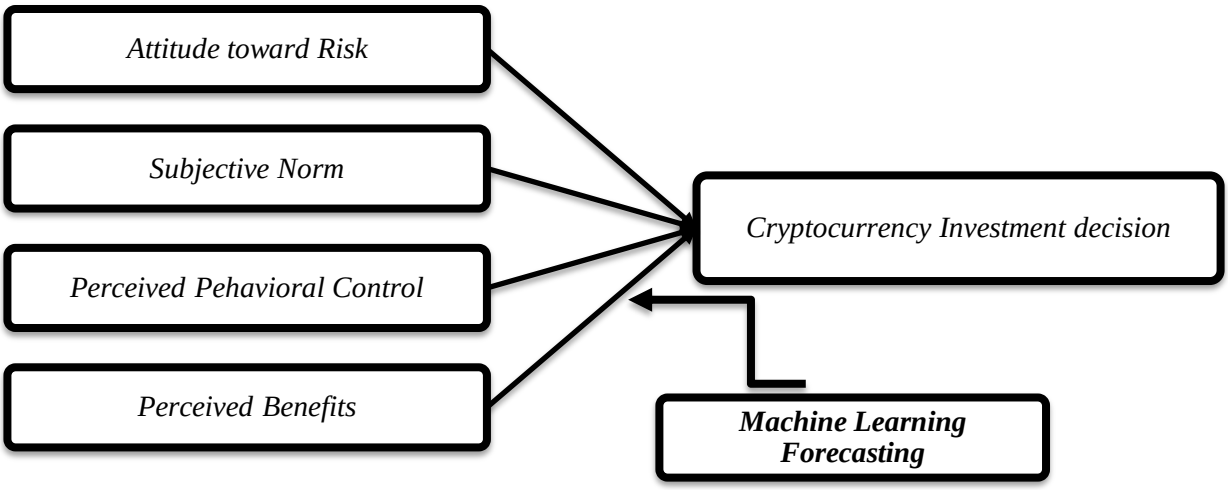

Figure 1. Conceptual Framework

Research Method

The aim of this research is to explore the relationships between different variables. A quantitative approach is employed to test the relationships between variables and the moderating effects of machine learning forecasting on investors' decisions in cryptocurrency. Data were collected through a questionnaire, and quantitative analysis methods were applied (Punch, 2013). The units of analysis were individuals from various groups and occupational categories. The Indonesian government has established the legal age for cryptocurrency investment, as outlined in the Commodity Futures Trading Regulatory Agency Regulation Number 8 of 2021 regarding the Guidelines for Conducting Trading in the Physical Market on Futures Exchanges, with criteria including a minimum age limit of 17 years, being a Muslim,

and possessing an Identity Card. Hence, the sample must meet the minimum age requirement of 17 years.

This research relies on primary data collected from individuals who are Indonesian citizens. Individuals must be above 17 years old and have internet access. Data collection was conducted using an online survey questionnaire. Responses dedicated to the variables in this study were measured using a 5-point Likert scale, where "1" represents Strongly Disagree and "5" represents Strongly Agree. The questionnaire consists of four sections: introduction, demographic questions, and respondents' investment decisions in cryptocurrency, and factors influencing investment decisions in cryptocurrency. The measurement model was evaluated in terms of internal consistency, convergent validity, and discriminant validity using SmartPLS software. Bootstrapping procedures in SmartPLS were utilized to perform structural model analysis, including hypothesis testing. Path coefficients and p-values from indicators were used as the main evaluation criteria (Hair et al., 2011).

Conclusion

This research makes several significant contributions to the existing cryptocurrency literature. From a theoretical standpoint, the study addresses various gaps in the body of knowledge by exploring the previously unexamined role of machine learning forecasting as a moderator. Additionally, it provides methodological contributions to quantitative studies and empirically identifies key factors influencing investors' decisions in cryptocurrency, which have shown inconsistencies in prior research.

The study's findings offer a fundamental understanding of the determinants of investors' decision-making in cryptocurrency, expanding on the Theory of Planned Behavior (TPB) perspective (Schaupp et al., 2022). In the academic realm, the hypotheses tested and confirmed in this study can serve as a valuable reference for future researchers interested in investigating the behavior of cryptocurrency investors in Indonesia. This reference can aid in comprehending the essential factors that influence Indonesia investors' intentions to invest in cryptocurrency and the extent to which the application of machine learning forecasting and blockchain security moderates these factors.

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