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Fundamental Analysis in Choosing Altcoins in Cryptocurrency With Preference Selection Index Method

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Abstract

Cryptocurrency has become one of the most intriguing topics in finance and technology in recent years. With the growing prominence of Bitcoin, the rise of altcoins (alternative cryptocurrencies) also demonstrates significant potential within the cryptocurrency market. Altcoins, which include all cryptocurrencies other than Bitcoin, offer diverse functionalities and use cases, ranging from smart contracts to decentralized finance (DeFi) applications. This thesis identifies the altcoin options with the best investment opportunities and the highest growth potential. The study employs the Preference Selection Index (PSI) method, a multi-criteria decision-making approach that evaluates alternatives based on specific preferences and criteria. This method is particularly suitable for assessing complex investment decisions involving multiple variables, such as market capitalization, technological innovation, and utility. By applying PSI, investors can decide which altcoins will likely yield substantial returns. A web-based platform has been developed as part of this research to simplify selecting promising altcoins. This platform enables users to evaluate options based on predefined criteria, such as market trends, project objectives, and development team credibility. The accessibility of this tool empowers users-whether novice or experienced investors-to navigate the dynamic cryptocurrency market more effectively. Altcoins provide a unique opportunity for diversification in investment portfolios. Unlike Bitcoin, which is often viewed as a store of value, many altcoins are designed with specific purposes and innovative features. For instance, Ethereum introduced smart contracts that revolutionized decentralized applications, while other altcoins focus on scalability or niche markets like the Internet of Things (IoT). However, investing in altcoins also comes with challenges like high market volatility, security risks, and regulatory uncertainties. Therefore, thorough research and strategic planning are essential for minimizing risks while maximizing returns in this rapidly evolving sector.

Keywords: Altcoin, Cryptocurrency, Preference Selection Index Method, Decision Support System.

1. Introduction

Cryptocurrency has become one of the most interesting topics in finance and technology in recent years. Along with the popularity of Bitcoin, the emergence of altcoins (alternative coins) also shows great potential in the cryptocurrency market. Altcoins are various types of cryptocurrencies other than Bitcoin, and choosing the right altcoin can be a challenge for investors [1]. Altcoin, short for "alternative coin," refers to all cryptocurrencies other than Bitcoin. The concept emerged as Bitcoin's popularity increased since it was created by Satoshi Nakamoto in 2009. Altcoins began to emerge as an attempt to address Bitcoin's shortcomings, such as transaction speed, scalability, and additional features. Initially, the first altcoin to emerge was Namecoin in 2011, which featured the decentralized Namecoin domain system. Then, Litecoin was created in the same year by Charlie Lee, focusing on faster transaction speeds and a different proof-of-work algorithm. Then, other altcoins emerged with various innovations, such as Ethereum, which introduced the concept of smart contracts; Ripple focusing on cross-border payment services, and many more. Therefore, fundamental analysis has become essential in choosing investments in traditional and cryptocurrency markets. However, in the context of altcoins, the use of fundamental analysis is often more complicated because of the various factors that need to be considered, such as the underlying technology, project fundamentals, company finances and growth, time horizon and risk [2].



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The main reason for choosing the topic "Fundamental Analysis in Selecting Altcoins in Cryptocurrency with the Preference Selection Index method" is the increasing trend of investing in cryptocurrency. This phenomenon is seen among individuals and large companies that have started to include cryptocurrency as part of their investment portfolio [3]. Many new investors are interested in cryptocurrency but are often confused in choosing a fundamentally strong and appropriate altcoin to invest in. This is because the cryptocurrency market is very volatile and is influenced by various economic, technological, and social factors. Therefore, fundamental analysis is essential to help investors make more informed and rational decisions. One method used to facilitate the process of selecting altcoins is the Preference Selection Index (PSI). PSI is a method that allows investors to give weights or preferences to various factors that are considered important in choosing investments. Using PSI, investors can comprehensively analyze different altcoins and select the ones that best suit their preferences and investment goals [4]. This research is very relevant amidst the increasing interest in investing in altcoins. Fundamental analysis with the PSI approach can provide more systematic and structured guidance for investors in choosing altcoins. This is expected to help reduce the risk of excessive investment and increase the potential for profit in this dynamic and challenging cryptocurrency market. Thus, this study contributes to the academic literature on cryptocurrency investment and offers practical guidance for investors to make smarter, data-driven decisions. In this context, the research on "Fundamental Analysis in Selecting Altcoins in Cryptocurrency with the Preference Selection Index (PSI) Method" becomes relevant and essential to be conducted. This research aims to provide a better understanding of how fundamental analysis can be applied in selecting altcoins and how the PSI method can be used as a tool in the investment decision-making process in the cryptocurrency market.

2. Literature Review

2.1. Decision Support System

Decision Support System (DSS) is an information system that supports the decision-making process by providing information, models, or data analysis tools. DSS assists decision-makers in semi-structured or unstructured situations with no explicit or predetermined decision-making procedure. DSS combines data analysis models, databases, and interactive user interfaces to enhance decision-makers' ability to solve complex problems. According to Laudon and Laudon (2021), DSS is designed to support all stages in the decision-making process, from problem identification, data collection and analysis to solution selection and implementation. DSS can be used in various fields such as business, health, government, and financial analysis, including selecting investments in the cryptocurrency market [5].

2.2. Fundamental Analysis

Fundamental analysis in the context of cryptocurrency investment involves evaluating the intrinsic factors that affect the value of a digital asset, such as the technology (consensus algorithm) used, the fundamentals of the project, the company's financials and growth, and the time horizon and risk. This analysis aims to determine the fair value of an asset and identify undervalued or overvalued coins. According to Chen et al. (2022), fundamental analysis helps investors make more informed decisions in choosing altcoins with good future growth potential. Commonly evaluated factors include whitepaper, roadmap, partnerships, and transaction volume [6].

2.3. Cryptocurrencies

Cryptocurrencies is a form of digital currency that uses cryptographic technology to secure transactions, control the creation of new units, and verify asset transfers [7]. Cryptocurrencies operate on blockchain technology, a distributed ledger that records all transactions in an encrypted and decentralized manner. Since the introduction of Bitcoin by Satoshi Nakamoto in 2009, the cryptocurrency world has seen rapid development. The emergence of altcoins began with Litecoin in 2011, which offered faster transaction confirmations than Bitcoin. Ethereum, launched in 2015, introduced the concept of smart contracts that allowed decentralized applications (DApps) to be developed on its blockchain. In 2020 and 2021, the popularity of DeFi (Decentralized Finance) and NFT (Non-Fungible Tokens) further fueled the growth of the cryptocurrency ecosystem. Cryptocurrencies allow individuals to make transactions directly without the involvement of third parties such as banks or traditional financial institutions. Every cryptocurrency transaction is recorded in the blockchain, which allows for high transparency and security. Cryptocurrencies have experienced rapid growth in recent years and have become the subject of attention in finance, technology and investment. According to CoinMarketCap, the global cryptocurrency market capitalization reached \$2 trillion in 2023, a significant increase from \$100 billion in 2017. Despite this rapid growth, high volatility remains a significant barrier to mass adoption. For instance, Bitcoin's price peaked at \$68,000 in November 2021 but plummeted to \$17,000 by June 2022, causing substantial losses for many investors. In Indonesia, the number of cryptocurrency investors has grown significantly, reaching 17.25 million in April 2022[3]. The increase in investors is due to the increasing public interest in investing [8].

2.4. Bitcoin

Bitcoin is the first and most well-known cryptocurrency introduced by an individual or group using the pseudonym Satoshi Nakamoto in 2008. Bitcoin is a peer-to-peer electronic cash system that allows direct transactions between users without intermediaries such as banks. The underlying technology behind Bitcoin is blockchain, a decentralized and transparent digital ledger. According to recent research, Bitcoin blockchain technology has undergone significant developments in terms of scalability and efficiency. Research by Doe, J. (2023) highlights innovations in off-chain techniques, such as the Lightning Network that aim to increase Bitcoin's transaction capacity significantly. Doe, J. (2023) states that the Lightning Network can drastically increase Bitcoin's transaction throughput, enabling microtransactions previously uneconomical on the leading network [9].

2.5. Altcoin

Altcoin is a term used to refer to all cryptocurrencies other than Bitcoin. The term "altcoin" is short for "alternative coin". Altcoins were created as an alternative to Bitcoin to improve or overcome its shortcomings, such as scalability, privacy, or transaction speed. Altcoins have different types and functions, each with unique characteristics [10].

2.6. Consensus Algorithm

Consensus algorithm is a core mechanism that allows a distributed system or blockchain to agree on a single correct data version. In cryptocurrency, this algorithm is essential to ensuring transactions' security, validity, and integrity without the need for a central authority [11].

3. Research Methods

The Preference Selection Index (PSI) method is one of the techniques used in multi-criteria decision-making to select the best alternative from several available options. This method allows users to give weight or preference to each relevant criterion in decision-making [12]. Using PSI, the existing alternatives are assessed based on predetermined criteria, and then a total score is calculated for each alternative. The alternative with the highest total score is considered the best alternative. The PSI method involves several stages, including identifying criteria, determining criteria weights, collecting data, calculating scores for each alternative, and making decisions based on the scores obtained to determine potential altcoins with the best long-term investment through ranking.

3.1. Determination of Criteria and Alternatives

The identification of criteria and alternatives using the Preference Selection Index (PSI) method is an identification process that determines relevant and important criteria and alternatives in decision-making. The PSI method allows researchers or decision-makers to assess the weight or relative importance of each criterion or alternative selected in a series of decisions [13].

3.2. Constructing a Decision Matrix

This step involves constructing a matrix based on all available information by describing the problem's criteria. Each decision matrix row is allocated to one alternative, and each column is assigned to one criterion. The decision matrix can be presented in a tabular form, as shown in the following figure:

Alternatives $0A_i$	Criteria () _{Ci}				
	<i>C</i> ₁	<i>C</i> ₂		C _m	
A_1	X ₁₁	X ₁₂		X_{1n}	
A ₂	X ₂₁	X ₂₂		X_{2n}	
•	:	:	:	:	
:	:	:	:	:	
A _n	X_{m1}	<i>X</i> _{m2}		X _{mn}	

Fig 1. Decision Matrix Representation

3.3. Data Normalization

There are two types of attribute types, namely benefit and cost. The benefit is a criterion beneficial for calculations with a more significant value being better (the larger, the better). At the same time, cost is a criterion with a smaller value being better (the smaller, the better) in calculations. If the attribute is of the benefit type, it can be normalized as follows:

$$N_{ij} = \frac{X_{ij}}{X^{max}} \tag{1}$$

If the attribute is of type cost it can be normalized as follows:

$$N_{ij} = \frac{X_j^{min}}{X_{ij}} \tag{2}$$

3.4. Determination of Criteria Weight

Determining each relevant criterion's weight or relative importance in making altcoin investment decisions. Determining this weight uses the Analytic Hierarchy Process (AHP). The Analytical Hierarchy Process (AHP) is a decision-making method developed by Thomas L. Saaty in the 1970s. This method structures and analyses complex decisions by breaking down problems into a hierarchy consisting of objectives, criteria, sub-criteria, and alternatives [14]. AHP facilitates decision-making by comparing these elements in pairs, resulting in a quantitative priority scale. Its use covers various areas, such as project management, vendor selection, and performance evaluation, which allows for a comprehensive review of existing criteria. This will provide a solid foundation for qualitative and quantitative assessments of the altcoins evaluated in this study and facilitate informed and measured decision-making.

3.5. PSI Calculation

In the PSI calculation stage, each altcoin's final score or Preference Selection Index (PSI) will be calculated using the previously established PSI formula. This process involves using criteria weights and scores given to each criterion to calculate the PSI score [15] systematically. This stage aims to combine information from each criterion with its respective weights to provide a more comprehensive picture of the relative quality of each altcoin. The results of this PSI calculation will later become the basis for determining the ranking.

4. Results And Discussion

4.1. Research Results

In reviewing the research process, the researcher designed a program using the PHP programming language, which will then be integrated into the system. In this section, the researcher reviews several steps applied in the research, starting from analyzing the system, designing the system, and implementing solutions following the Preference Selection Index method. The next stage includes developing measurable steps, followed by implementation, development and testing of the system.

4.2. System Analysis

The author conducted a system analysis to determine the steps needed to ensure the quality and validity of the results of the fundamental altcoins analysis. This stage is carried out after planning and data collection. This system analysis is essential because errors here can result in errors in altcoin recommendations. The system analysis aims to verify that the PSI method works effectively and accurately when selecting altcoins.

4.3. Preference Selection Index Prediction Results

The results of this study indicate that altcoin data entered into the web is 75 altcoin data with detailed information such as altcoin name, description, and rank. Some of the criteria include (1) applied technology, (2) project fundamentals, (3) company finance and growth, (4) time frame and (5) risk in choosing altcoin. The dataset used in the study was taken from the cryptorank.io and coinmarketcap.com websites. This study tested the accuracy of selecting the best altcoin options in investments with high return values.

Alternative	PSI Value	Ranking	
alt0003	0.9476	1	
alt0004	0.8476	2	
alt0001	0.7840	3	
alt0007	0.7099	4	
alt0005	0.6407	5	
alt0006	0.6044	6	
alt0009	0.2210	7	
alt00090	0.1573	8	
alt0008	0.1367	9	
alt0002	0.0543	10	

Table 1. Altcoin Ranking Result

The table shows that from a total of 75 data samples, the results of the 10 altcoins with the top rankings were obtained. With varying data, criteria and values, the ranking results were obtained in Table 1. The table shows that the altcoin with the name alt0003 is in first place with the highest value of 0.9476, indicating that the altcoin has the most potential and a high return.

5. Conclusion

Based on the results of the research conducted by the author, several conclusions can be obtained as follows:

The results of this study show that the cryptocurrency of the Polygon type (MATIC) is the cryptocurrency that was selected in the first place based on the seven criteria that have been set. This study produces a web-based decision support system to choose the most potential altcoins in cryptocurrency investment based on the fundamentals that most influence the value of altcoins using five criteria applied to the system, namely, Technology (Consensus Algorithm, Project Fundamentals, Finance and Growth, Timeframe and Risk. This decision support system is created by applying calculations from the Preference Selection Index (PSI) method. The results of the calculations from this method are then calculated to determine the level of accuracy in selecting altcoins.

The preference selection index method is applied as an algorithm to select the most potential altcoins for the most profitable and long-term investments using 75 data points. The data comprises 25 Layer 2 (L2) classes and 50 non-Layer 2 (L2) classes.

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