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DECISION SUPPORT SYSTEM APPLICATION FOR DETERMINING CURRENCY PRODUCTS THE BEST CRYPTOCURRENCY USING THE METHODMULTI FACTOR EVALUATION PROCESS (MFEP)

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ABSTRACT

Information systems and computer technology are developing very rapidly. More and more decision support system applications are used to make it easier to solve problems using applications. The decision making of the best cryptocurrency products is currently still done manually. There is a need for a Decision Support System Application to assist potential investors in determining the best cryptocurrency product. In the Decision Support System Application to determine cryptocurrency virtual currency products, there are five criteria, namely Criteria, Adoption, Production Costs, Regulations, and Related News. The Multifactor Evaluation Process (MFEP) algorithm method can be used in decision support systems. By using the MFEP method, each predetermined criterion is given a weight, then each alternative is evaluated based on these consideration factors. The alternative with the highest value deserves to be determined as the best cryptocurrency. This decision support system application was developed using the waterfall method, namely by analyzing, then calculating the MFEP method algorithm, then designing the system, then implementing it into the system after that a blackbox trial was carried out. From this research, the results of the best crypto product, namely Bitcoin, have a total evaluation weight of 4.25 using a web-based MFEP method of decision support application. This application has helped potential investors before entering the crypto market in receiving information and making decisions in determining the best cryptocurrency product. It is hoped that this application can minimize the occurrence of errors in determining the best cryptocurrency virtual currency.

Keyword : Decision Support System, MFEP, CryptoCurrency

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1. INTRODUCTION

Cryptocurrency is a digital asset that provides investors who will invest in one of the crypto products. However, for potential investors in digital assets, it is difficult to determine which crypto product to invest in due to the large number of crypto products, making it difficult for potential investors to choose the virtual currency. Every day on the stock exchange market prices for crypto products are inaccurate and always change every day, potential investors select which crypto products are suitable for use as digital assets. This selection process requires accuracy and time, because the virtual currency product data will be compared with previously accurate data and examined one by one. Thus a system is needed that can help and make decisions for potential investors quickly and accurately, to determine the best crypto product. To make it easier for potential investors to determine the best crypto product to use for investment or transactions in the crypto market related to the crypto-related platform. (Afrizal, 2017). Prior to this research, potential investors were to be able to see the best virtual currency crypto products by creating an account related to the crypto platform (paid), and were obliged to invest in the Tokocrypto platform in order to be able to see the virtual currency market in more detail, therefore this research This program is held to make it easier for potential investors to carry out crypto buying and selling transactions, especially on the related Tokocrypto platform. Determination of virtual currencies for potential investors is carried out selectively according to the types of virtual currency products available. To be able to help with this, it needs to be supported into a computerized decision support system. Decision making is an act of management in achieving goals. Decision-making theory is the main element in

the form of a decision-making system. Decision support system MFEP method decision makers subjectively and intuitively consider various factors or criteria that have an important influence on the choice. This consideration is in the form of a weighting system for the multifactors involved and considered important, the MFEP method determines that the alternative with the highest value is the best solution based on the criteria or considerations that have been selected. With so many alternatives that affect a decision, it is difficult to make a decision manually. One of the methods that can be used in making a decision is to use the Multi Factor Evaluation Process (MFEP) method, namely decision making is done by giving subjective and intuitive considerations to the factors considered. important so as to obtain a sequence of factors based on their importance. (Widyastuti, 2017). Based on the introduction above that has been explained, the authors try to conduct research with the title "Decision Support System Application for Determining the Best Cryptocurrency Product Using the MFEP Method".

2. RESEARCH METHOD
2.1 Method of collecting data
One important factor in the development of information systems is how system developers understand existing systems and their problems. Therefore it is necessary to collect data with the right technique in order to obtain a clear and complete description of the system to be developed. One of the techniques used is the observation technique. In an effort to collect data and understand the running system, observation techniques are the main techniques that are usually used and are most often used. This technique produces data with a very good level of reliability and accuracy. The observation technique is carried out by direct observation of the object under study so that it can be seen and understood how the system works. In this case the author makes observations on the stock market, especially virtual currency products, in the process of observing to preparing reports. This data collection technique was carried out within 1 week during the research process.

2.2 Software Development Methods
For the development of this research system using the SDLC (Software Development Life Cycle) model. System Development Life Cycle (SDLC) is the process of creating and modifying the system as well as the models and methodologies used to develop a system. SDLC is also a pattern taken to develop a software system, which consists of the stages: planning, analysis, design, implementation, testing and maintenance. The SDLC model used in this study is the Waterfall model. The Waterfall Model or Classic Life Cicle is the most widely used model in Software Engineering (SE). According to Bassil (2012) it is called a waterfall because the stages that must be passed are waiting for the completion of the previous stage and run sequentially.

2.3 Calculation of the Multi Factor Evaluation Process (MFEP) Method
The following is the calculation design for the Multi Factor Evaluation Process (MFEP) method to support the decision to determine the best cryptocurrency product using several methods, namely:
1. The criteria for determining crypto products consist of Availability, Adoption, Production costs, Regulations and related Announcements.
2. The following is the ranking of suitability for each criterion, rated with 1 to 5, ie
   1 = Very Bad,
   2 = Bad
   3 = Enough,
   4 = Good,
   5 = Very Good.
3. ($\sum$ weight = 1). The form value of the weight must be in decimal form so that the result is

Tabel 3.1 Weight Table

Faktor(Kriteria)	Bobot Faktor
Ketersediaan	0.3
Adopsi	0.25
Biaya produksi	0.2
Regulasi	0.15
Pemberitaan terkait	0.1
Total Bobot Faktor	1

It can be seen from table 3.1 that the first factor is availability with a weighted value of 0.3, the second is adoption with a weighted value of 0.25, the third is production costs with a weighted value of 0.2, the four regulations with a weighted value of 0.15 and the fifth news related to a weighted value of 0.1 so that when added up everything produces total weight value of factor 1.

4. Give the weight of each alternative to the determined important factors. Consists of 5 members in the table below.

Table 2. All Varian Alternative Value

Alternatif	Ketersediaan	Adopsi	Biaya produksi	Regulasi	Pemberitaan terkait
Bitcoin	2	3	5	4	2
Ethereum	2	5	3	1	4
Binace Coin	4	5	4	2	3
Dogecoin	3	4	3	1	1
Litecoin	5	5	5	2	2

4. Melakukan evaluasi faktor untuk masing masing alternatif yaitu :

Bitcoin

$BE = BF \times EF$

$BE(\text{Ketersediaan}) = 0.3 \times 2 = 0.6$

$BE_{(\text{Adopsi})} = 0.25 \times 3 = 0.75$

$BE(\text{Biaya Produksi}) = 0.2 \times 5 = 1$

$BE_{(\text{Regulasi})} = 0.15 \times 4 = 0.6$

$BE_{(\text{Pemberitaan terkait})} = 0.1 \times 2 = 0.2$

$BE = 0.6 + 0.75 + 1 + 0.6 + 0.2 = 3.15$

Jika disusun akan menghasilkan tabel berikut ini:

Table 3.Evaluation Bitcloin Value Weight

Bitcoin			
Faktor	Bobot Faktor (BF)	Evaluasi Faktor (EF)	Bobot Evaluasi (BE)
Ketersediaan	0.3	2	0.6
Adopsi	0.25	3	0.75
Biaya produksi	0.2	5	1
Regulasi	0.15	4	0.6
Pemberitaan terkait	0.1	2	0.2
Total bobot Evaluasi (TBE)			3.15

Ethereum

$BE = BF \times EF$

$BE(\text{Ketersediaan}) = 0.3 \times 2 = 0.6$

$BE_{(\text{Adopsi})} = 0.25 \times 5 = 1.25$

$BE(\text{Biaya Produksi}) = 0.2 \times 3 = 0.6$

$BE_{(\text{Regulasi})} = 0.15 \times 1 = 0.15$

$BE_{(\text{Pemberitaan terkait})} = 0.1 \times 4 = 0.4$

$TBE = 0.6 + 1.25 + 0.6 + 0.15 + 0.4 = 3$

Jika disusun akan menghasilkan tabel berikut ini:

Table 4. Etherium Value Weight

Ethereum			
Faktor	Bobot Faktor (BF)	Evaluasi Faktor (EF)	Bobot Evaluasi (BE)
Ketersediaan	0.3	2	0.6
Adopsi	0.25	5	1.25
Biaya Produksi	0.2	3	0.6

Regulasi	0.15	1	0.15
Pemberitaan Terakit	0.1	4	0.4
Total bobot Evaluasi (TBE)			3

3. RESULT AND DISCUSSION

3.1 Result

In accordance with the analysis and design as described in the previous chapter, namely the research method, this section will present the results of the system that was built using the design that was carried out in the previous chapter. In this chapter the discussion will be carried out on the results that are built and functional systems.

3.2 Interface Main Homepage

This page will appear when the admin or user has successfully logged in. The following is the main page interface of the decision support system application for determining the best cryptocurrency virtual currency product. The following is the main page view of the application:
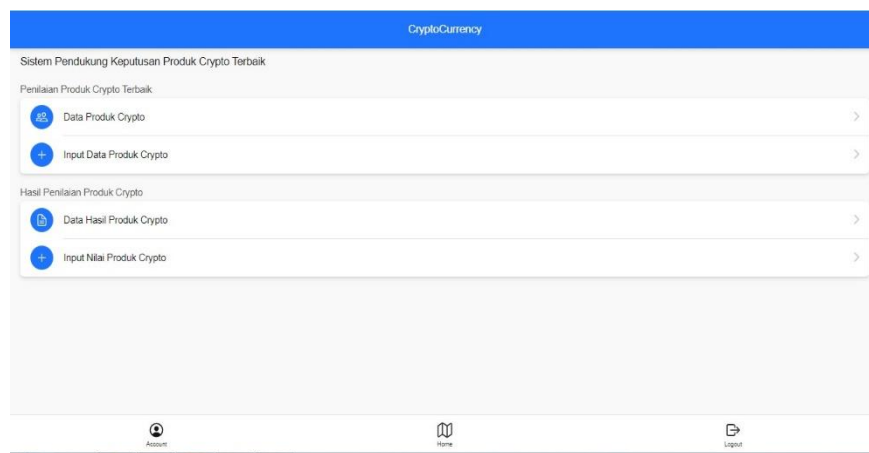

Fig 1. Main Home

This page is the main page of the application. This page contains all the information available on the Decision Support System Application Determining the Best Cryptocurrency Virtual Currency Product. On this page the admin can view or update crypto product data, and the admin can input crypto product data values.

Crypto Product Data

This page will appear if the admin clicks on the crypto product data menu which is on the main page of the application. The following shows the crypto product data page in the application

Fig 2. Halaman Data Produk

On the product data page, the admin can view and change, crypto product id numbers, crypto product names. To be able to make changes the admin can click delete or edit in the right corner of the line. For the next page the admin needs to click on home below the application

Crypto Product Input Page Interface

After viewing the crypto product data, the next page is the crypto product input page. This page will appear if the admin clicks on the crypto product data input menu on the main page of the application. The following shows the input page for crypto products

Fig 3. Interface Product Page

Result Test Interface

Halaman ini muncul apabila admin me The following is the data page for the best crypto product assessment results in the application:ngklik menu data hasil tes yang berada pada halaman utama aplikasi. Berikut alaman data hasil penilaian produk crypto terbaik pada aplikasi:

CryptoCurrency									

Bobot			Perhitungan	
Nilai Ketersediaan Crypto	0			
Nilai Adopsi Crypto	0.25	Nbe (Nilai Bobot Evaluasi)	Nbe = Nb x b	
Nilai Biaya Produksi Crypto	0.2			
Nilai Regulasi Crypto	0.15	Tbe (Total Bobot Evaluasi)	Tne = Nbe 1+Nbe 2+Nbe n...	
Nilai Pemberitaan Terkait Crypto	0.1			

No	ID Produk	Nama Produk	(Nb) Ketersediaan	(Nb) Adopsi	(Nb) Biaya Produksi	(Nb) Regulasi	(Nb) Pemberitaan Terkait	(Tne) Total	Standar	Keterangan	Aksi	
1	1	Bitcoin	9	9	9	9	9	6.3	4	STRONG	Hapus	Edit
2	4	Dogecoin	4	3	2	2	2	1.65	4	WEAK	Hapus	Edit
3	2	Ethereum	8	7	6	5	4	4.1	4	STRONG	Hapus	Edit
4	3	Litecoin	5	5	3	2	1	2.25	4	WEAK		

Account   Home   Logout

Fig 5. Result Product Page

It is explained that after the admin inputs the criteria values on the previous page, the system automatically processes the calculation of the criteria values using the Multi Factor Evaluation Process (MFEP) method so that the system will display the best crypto product value results. On this page the researcher enters data that has been calculated using the Multi Factor Evaluation Process (MFEP) method in the previous chapter, namely the research methods chapter. On the user display page, users can only see the display of the best crypto product value data that has been input by the admin.

3.2 Discussion

The design of a decision support system application to determine the best cryptocurrency virtual currency product was made with the aim of producing an application that can help potential investors who wish to transact in crypto currency. With this application, potential investors can determine the best crypto product without having to enter another paid application that requires a minimum deposit.The use of the waterfall method was successfully applied, namely by system and data analysis, system design, implementing into applications and system testing. The programming language used by the author is PHP and MySQL database. The author designs a user interface or users with a system that is simple and easy to understand by the user or users. So that the user or users are easy and have no difficulties when running the application. The user or users only need to click on the menu, fill in the data, and click the buttons that are already available in the application according to the needs of the user or users. Then the system will automatically process everything. In the application of a decision support system for determining cryptocurrency currency products using the Multi Factor Evaluation Process (MFEP) method starting from:

Step 1: Fill in crypto product data into the crypto product data input form.
Step 2: Entering the value of crypto products, in which there is a lot or little crypto product data.
Step 3 : The process of calculating the value of the criteria.
Step 4: Calculation results of the Multi Factor Evaluation Process (MFEP) Method
which are sorted from the largest and the smallest.
The result of determining the best cryptocurrency product with the highest total factor weight is bitcoin which has a total evaluation weight value of 6.3.

4.   CONCLUSION

The conclusions of this study are:
  a.   The results of this study can determine the best crypto virtual currency product, namely Bitcoin, which has a total evaluation weight of 6.3 using the Multi Factor Evaluation Process (MFEP) method.
  b.   Decision Support System Application to Determine the Best Cryptocurrency Virtual Currency Product Using the Multi Factor Evaluation Process (MFEP) method that has been made has helped the community to make decisions in determining the best cryptocurrency product before transacting in crypto currency

c. It is hoped that this application can minimize errors in making decisions to choose the best crypto
product.

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