Decision Support System Selection of Land Suitable for Coffee Types Using the SMART Method (Case Study of the Jember Cocoa Coffee Research Center)

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Decision Support System Selection of Land Suitable for Coffee Types Using the SMART Method (Case Study of the Jember Cocoa Coffee Research Center)

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Abstract

Coffee is one of Indonesia's mainstays in economic matters, coffee cultivation in Indonesia will produce 774.60 thousand tons of coffee in 2021. This means that this could be a lucrative opportunity. Not only that, the existence of coffee shops also began to be popular in many areas. The majority of these coffee shops utilize local farmers' products. Decision Support Systems are part of a computer-based (including knowledge-based) information system that is used to support decision-making within an organization or company. DSS can also be regarded as a computer system that processes data into information in making decisions on specific semi-structured problems. Decision support systems aim to provide information, guide, provide predictions, and direct solution options to users of information so they can make better decisions. the purpose of the research conducted is to develop a decision support system using the Simple Multi Attribute Rating Technique (SMART) method to determine the right coffee area and according to the time of planting at Jember Cocoa Coffee Research Center. The system successful performance of the features in the system, admin and user can use a decision support system for selecting coffee grounds according to their type.

Keywords : Decision Support System, Coffee Land, SMART Method

1 INTRODUCTION

Coffee is one of Indonesia's mainstays in economic matters, both from the regional to the national level. According to data from the Central Bureau of Statistics (BPS), coffee cultivation in Indonesia will produce 774.60 thousand tons of coffee in 2021 [1]. This means that this could be a lucrative opportunity. Not only that, the existence of coffee shops also began to be popular in many areas. The majority of these coffee shops utilize local farmers' products. Coffee is no longer just drinking coffee, but has become a routine for today's young people. Discussing or chatting while drinking coffee is the culture of the Indonesian people, especially among young people.

In order to get quality results, the selection of seeds must be considered carefully. Even since the determination of varieties and types [2]. Please note, that coffee is an annual plant. Which means it took several years to be produced. With characteristics like these, the selection of seeds should not be arbitrary [3]. Because once chosen, cannot be replaced again. There are several types of coffee, including Arabica, Robusta and Liberica. Arabica is the most popular type because it tastes the most delicious compared to other types. Arabica coffee cherries will be bright red when ripe. The yield or percentage of the final product and yield is around 18% to 20%. Robusta is a type of coffee that is popular in Indonesia. Compared to Arabica, this type can harvest faster. The shape of the fruit is rounded and tends to be dark red when ripe. The yield is also higher, which is around 22% but at a lower price than arabica [4]. Compared to the other two types of coffee, Liberika still loses its prestige. However, this coffee can grow well in the lowlands. The size of the fruit tends to be uneven and has a yield of around 12% (very low). The requirements for choosing land for growing Arabica, Robusta, and Liberica coffee plants differ from one another, especially in terms of altitude, soil type, and dry months. The other growing requirements are relatively almost the same. Several

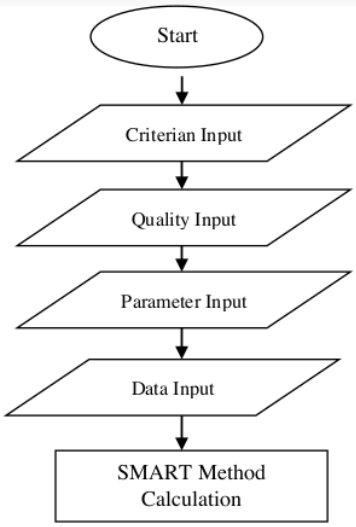
things must be considered in coffee nurseries, including the use of superior planting material, determining the location and location of the nursery, growing containers and media, transferring the sprouts to the nursery and maintaining the seedlings [5].

Decision Support Systems are part of a computer-based (including knowledge-based) information system that is used to support decision-making within an organization or company. DSS can also be regarded as a computer system that processes data into information in making decisions on specific semi-structured problems. Decision support systems aim to provide information, guide, provide predictions, and direct solution options to users of information so they can make better decisions [6]. If in the past the formulation of problems and finding solutions was done by calculating literacy manually by determining minimum, maximum, and optimal values, now computer systems are smart enough to offer solutions to solving problems in a matter of seconds [7]. Previo3 research related to general elections has been carried out by several researchers using various methods. A decision support system for determining the location of oil palm plantations using the Simple Multi-Attribute Rating Techn2ue Exploiting Ranks (SMARTER) method and using the Rank Order Centroid (ROC) for calculations [8]. Computer System using Decision (SPK) can be used as a tool to give the decision of suitable plants planted in a land easily, quickly and accurately. The Promethee met9od is one of the methods involved in solving Multi Criteria Decision Making (MCDM) problems [9]. Decision Support System for Land Selection for Plantin5 Pandanwangi Seeds Using the MOORA (Multi-Objective Optimization by Ratio Analysis) Method. This method has a degree of flexibility and ease of understanding in separating the subjective part of an evaluation process into decision weighting criteria with several decision-making attributes [10].

In addition to the application of methods20at have been carried out in research, the difference with previous research is in the research object and criteria, this study aims to determine the best land for coffee plants according to the types of coffee4 Based on the explanation from previous research, the purpose of the research conducted is to develop a decision support system using the Simple Multi Attribute Rating Technique (SMART) method to determine the right coffee area and according to the time of planting. The SMART method can perform a good alternative analysis and is able to make estimates that adjust to the level of needs by providing assessments presented in intervals. The system is built based on a website so that it will make it easier for users to access information and use it. The criteria used for selecting coffee grounds depended on the type of coffee planted in this study including: Altitude, Temperature, Rainfall, Soil, and Wind.

2 RESEARCH METHOD

In this study, the stages carried out contained the steps in carrying out the research which are summarized in Figure 1 below.



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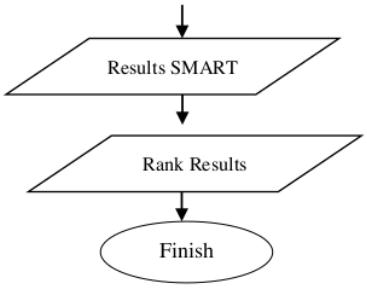

Figure 1. Flowchart Research

In compiling this research to determine the appropriate coffee planting area according to its type, the research stages carried out in this study were as follows:

a. Identification of Problems

First, do a problem analysis to find out the problems that exist in the research through problem identification. Identification of the problem in order to get information about the problem of choosing the right land according to the type of coffee when planted, so in this study observations were made on the land that will be used to plant coffee. The results of problem identification show that there are various variations from different land conditions, therefore planning is needed in choosing land to plant coffee. In choosing coffee land it is necessary to have accurate data and information about the land. So, when a decision is made conventionally it will take a lot of time, because there is discussion and comparison between data from one land with another, so it will be less effective and efficient. Therefore we need a system that can make an accurate decision and provide recommendations for suitable land for land adjustment to be used for planting coffee types in order to obtain quality coffee plants.

b. System Requirements Analysis

System requirements analysis is an analysis needed in making a coffee land decision making system for the type of coffee to be planted used to determine what specifications are in the system requirements. This specification includes what components are needed for the system to be built until the system can be implemented in determining coffee fields. This stage is carried out so that it can be known what is needed in solving the existing constraints in making a decision system from the results of the problem identification analysis. In this needs analysis, statements will be generated which contain features that can solve problems to meet the needs of the user. So, from this stage a statement will be compiled that will complement the features and facilities as well as system specifications.

c. Simple Multi Attribute Rating Technique (SMART)

The SMART method is a decision-making method that aims to collect information about all data related to several attributes (multi attributes) and several criteria (multi criteria). This parameter uses data before and after data, from which the data will be generated classification and linkages between one data and other data so that the final result will get a solution best result. This multi-attribute decision-making technique is mathematical calculation procedures that assist decis makers in automatically evaluating and ranking lots alternative possibilities [9]. SMART method can be used to make a decision support system,because it collects information data that related with this system.

d. Implementation of System

System procedures performed to complete an approved system design such as testing, installing, and starting to use a new system or a repaired system. The implementation stage is import to do in this phase the results of the analysis and design that have been carried out are implemented in the form of a decision support system. The coding stage has the goal to make a system of converting the design results to a certain programming language into software. The SPK for selecting coffee grounds with

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selecting of various coffee plants was developed on a website, so the programming language used was Java with Netbeans and database using Mysql.

e. Pengujian Sistem

The stages in system testing are used to detect and evaluate how and to what extent the performance of the system can work. System testing aims so that the software that is built will be detected when an error occurs in the test which aims to be used by the user. The test technique used is by using black-box testing. In testing in this way, the software will be tested based on the features that exist on the system whether it is functioning properly or is still having problems.

Simple Multi Attribute Rating Technique (SMART) Method

SMART (Simple Multi Attribute Rating Technique) is a multi-criteria decision-making method developed by Edward in 1977. This multi-criteria decision-making technique is based on the theory that each alternative consists of a number of criteria that have values and each criterion has a weight that describes how important it is compared to other criteria. This weighting is used to assess each alternative in order to obtain the best alternative.

SMART uses a linear additive model to predict the value of each alternative. SMART is a flexible decision-making method. SMART is more widely used because of its simplicity in responding to the needs of decision makers and the way it analyzes responses. The analysis involved is transparent so that this method provides a high understanding of the problem and is acceptable to decision makers.

SMART has several advantages compared to other decision-making methods, namely:

1. Make additions / subtractions

Alternatives to the SMART method, adding or subtracting alternatives will not affect the weighting calculation because each alternative assessment is independent of each other.

2. Simple

Calculations in the SMART method are very simple so that they do not require complicated mathematical calculations that require a strong understanding of mathematics. The use of complex methods will make it difficult for the user to understand how the method works.

3. Transparent

The process of analyzing alternatives and criteria in SMART can be seen by the user so that the user can understand how the alternative was selected. The reasons for how the alternatives were chosen can be seen from the procedures carried out in SMART starting from determining the criteria, weighting, and assigning a value to each alternative.

4. Multicriteria

The SMART method supports decision making with multiple criteria. Making decisions with many criteria will make it difficult for the user to make the right decision. In this study, the SMART method was used. The SMART method supports decision making with multiple criteria. Making decisions with many criteria will make it difficult for the user to make the right decision. In this study, the SMART method was used, because the SMART method is multicriteria which supports many criteria in determining the decision making and does not affect the weighting calculation if there are additions or subtractions of alternatives because each alternative assessment does not depend on one another.

As follows:

1. Step 1: determine the number of criteria.

2. Step 2: the system by default gives a scale of 0-100 based on the priority that has been input then normalization is carried out. Explained by formula(1)

$$\text{Normalization} = Wj\Sigma Wj \quad (1)$$

Information :

-Wj : weight of a criterion

- ΣWj : total weight of all criteria

3. Step 3: provide a criterion value for each alternative.

4. Step 4: calculate the utility value for each of the respective criteria. Explained by formula (2)

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$$ui(ai)=100\ (Cout\ i-\ Cmin)(Cmax-\ Cmin)\% \quad (2)$$

Information :

- $ui(ai)$: utility value of the 1st criterion for the i-criterion
- $Cmax$: maximum criterion value
- $Cmin$: minimum criterion value
- $Cout\ i$: criterion value i

5. Step 5 : calculate the final value of each. Explained by formula (3)

$$u(ai)=\Sigma wjui(ai)mj=1$$

3 RESULTS AND ANALYSIS

In this study, to build a decision support system for land selection by adjusting the type of coffee planted using the SMART method, it begins with determining the criteria, weights and normalization and compiling conversion values for each criterion. Based on the survey and data collection on the spot, the criteria used to determine the planting area for this type of coffee include: Altitude, Temperature, Rainfall, Soil and Wind. Based on the criteria that have been determined, then proceed with determining the range of criteria values and converting the values for each criterion to facilitate the decision making process. Each criterion, In this case study, the range of values for each of the criteria and their conversion values are presented in the table1.

3.1. Explaining About Criteria, Quality and Normalization

Determination of good and suitable land is a very important criterion to produce the desired quality of coffee. For planting coffee according to the type of coffee planted, it requires indicators that will determine the appropriate criteria.

Table 1. Explaining About Suitability of Arabica Coffee Plant

I	no	criteria	quality	normalization
	1	altitude (a)	30	0,3
	2	temperature (t)	30	0,3
	3	rainfall (r)	20	0,2
	4	soil (s)	10	0,1
	5	wind (w)	10	0,1
		total	100	1

Minimum of arabica	
suitable "arabika"	Not suitable
0,8	< 0.5

Explaining about how to choose suitable and not suitable coffee plant with criteria altitude, temperature, rainfall, soil and wind. Explained by table 1.

Table 2. Alternative and Criteria Land of Coffee

II	no	alternative	criteria				
			a	t	r	s	w
	1	a1	900	20	1500	5	not strong
	2	a2	1200	15	1000	6	strong
	3	a3	700	21	900	4	not strong
	4	a4	1500	27	1200	6	strong
	5	a5	2000	20	1500	7	very strong
		arabica	1200	18	1125	5	very strong

Explaining about criteria and alternative, Determination of good and suitable land is a very important criterion for producing the desired quality of coffee. Explained by table 2.

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Table 3. Value and Parameter Land of Coffee Plant

III	no	value	parameter
	1	Very good	1
	2	good	2
	3	enough	3
	4	less	4

no	C	value
1	min	1
2	max	4

Explaining about value and parameter, with information about different value information land of coffee plant. Explained by table 3.

Table 4. Criteria, Value and Parameter Land of Coffee

IV	no	criteria	value	parameter
	1	a	> 2000 m	1
			1500 - 2000 m	2
			1000 m - 1500 m	3
			< 1000 m	4
	2	t	> 30 C	1
			25 C - 30 C	2
			20 C - 25 C	3
			< 20 C	4
	3	r	> 3000	1
			2000 - 3000	2
			1200 - 2000	3
			< 1200	4
	4	s	> 7 ph	1
			5 - 7 ph	2
			< 5 ph	4
	5	w	Not strong	1
			strong	2
			Very strong	3

arabica	
utility	normalization
0,67	0,3
1,00	0,3
1,00	0,2
0,33	0,1
0,67	0,1

Table 4 shows the criteria, the range of values for each criterion and the conversion value. After the criteria have been determined, the next step is to determine the level of importance for each criterion. The level of importance or weight of the criteria is determined by the decision maker in the form of a percentage, which is the total value of all weighted criteria. In addition to determining the weight value, it is also necessary to identify the characteristics of the criteria, whether these criteria are suitable criteria or vice versa, namely in the criteria, values and parameters, so that utility and normalization will be obtained for the types of coffee that are suitable for planting.

Table 5. Alternative and Criteria Land of Coffee Plant

V	no	alternative	criteria				
			a	t	r	s	w
	1	a1	4	3	4	2	2
	2	a2	3	4	3	2	3
	3	a3	3	4	4	3	3

xx

4	a4	2	2	4	2	2
5	a5	1	2	1	2	3
	arabica	3	4	4	2	3

After that in table 5 an alternative value will be obtained from each predetermined criterion to determine the right land for the various coffees.

Table 6. Results and Information Land of Coffee Plant

VI	no	alternative	criteria	utility	normalization	results	information
	1	a1	a	1,00	0,3	0,77	Not suitable
			t	0,67	0,3		
			r	1,00	0,2		
			s	0,33	0,1		
			w	0,33	0,1		
	2	a2	a	0,67	0,3	0,73	Not suitable
			t	1,00	0,3		
			r	0,67	0,2		
			s	0,33	0,1		
			w	0,67	0,1		
	3	a3	a	0,67	0,3	0,83	suitable "arabica"
			t	1,00	0,3		
			r	1,00	0,2		
			s	0,67	0,1		
			w	0,67	0,1		
	4	a4	a	0,33	0,3	0,47	Not suitable
			t	0,33	0,3		
			r	1,00	0,2		
			s	0,33	0,1		
			w	0,33	0,1		
	5	a5	a	0,00	0,3	0,20	Not suitable
			t	0,33	0,3		
			r	0,00	0,2		
			s	0,33	0,1		
			w	0,67	0,1		

It can be seen in Table 6, that the alternative values, utilities, criteria and parameters have shown results regarding suitable and unsuitable land according to the type of coffee that is planted. From the types of Arabica, Robusta and Liberica. These results indicate that the case studies that have been conducted at the Cocoa Coffee Research Center in Jember have shown results for land adjustment for the type of coffee to be planted, which will then be made and a decision-making system will be developed.

3.2. Explaining About System

Furthermore, the SMART method created and developed is then implemented in a decision support system built with the Java programming language with Netbeans and MySQL used as the database. This decision support system consists of a Login Menu, Dashboard, User Form, Robusta Land Menu, Arabica Land Menu, Liberica Land Menu, Land Data and Land Planting Verification.

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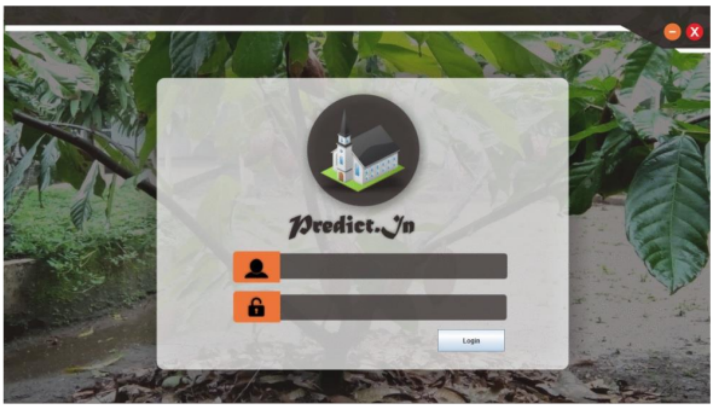

Figure 2. Form Login

Figure 2 shows the login menu display which contains the account and password used when entering the system dashboard.

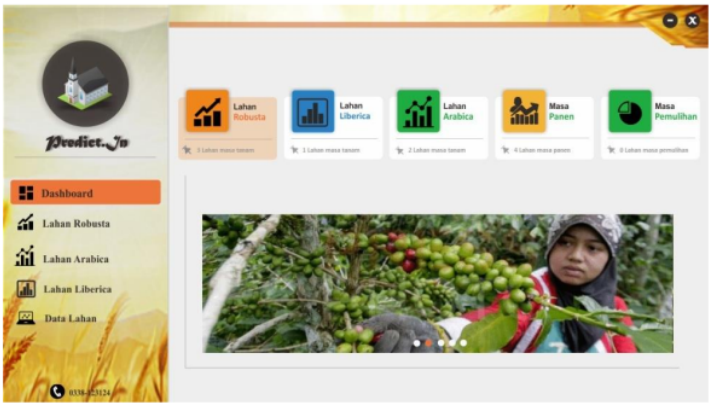

Figure 3. Admin Dashboard

Figure 3 shows the dashboard menu display which contains menus for robusta land, arabica land, liberika land and land data, the output of which will explain the coffee harvest period and soil recovery period so that it will adjust which coffee planting is suitable from the three types.

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Figure 4. Menu of Robusta Land

Figure 4 contains a menu for each type of coffee and criteria for selecting soil according to its type after the harvest period, so that it will be suitable for the type of coffee to be planted on the soil from the coffee fields.

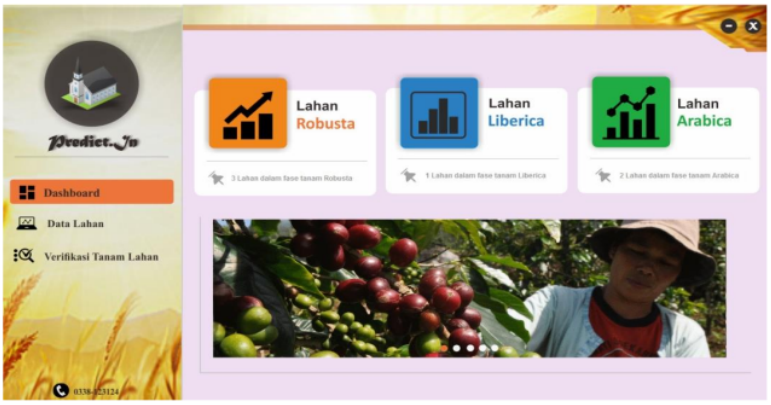

Figure 5. User Dashboard

Figure 5 contains a user menu consisting of a dashboard, arabica land, robusta land, liberika land, as well as a land data menu and a land planting verification menu. Coffee planting employees will easily and easily access information from the system.

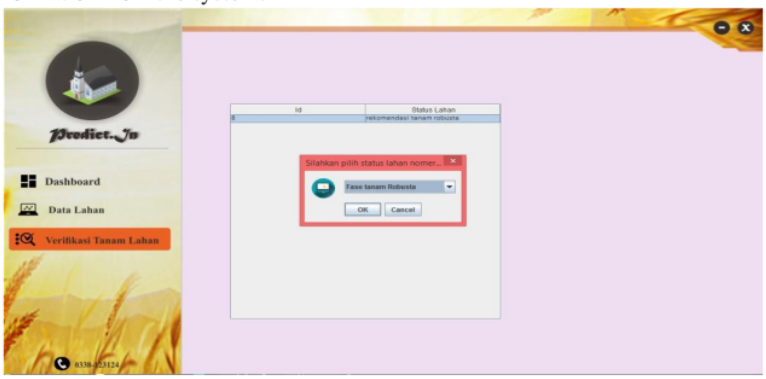

Figure 6. Menu of Land Planting Verification

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Figure 6 contains the user menu which consists of the dashboard menu, the land data menu and the land planting verification menu. it will determine the status and selection of land that will be suitable for planting of the three types of coffee.

Table 7. Results Using Black-box Testing

No	Function	Testing	Results
1	Login	Users can enter the system after entering their username and password appropriate key	Success
2	Dashboard	Displays the main features of the decision support system	Success
3	Menu Criteria	Users can manage criteria data, such as inputting, changing and delete criteria data.	Success
4	Land Data	Users can access,check and manage about land data of coffee	Success
5	Verification Land	Users can choose suitable land for three various of coffee	Success

In Table 7, the test results are presented with Black-Box Testing where all the functionality of the system tested gets the result "Success". So, it can be said that the system created and developed can function to determine the planting area of the three types of coffee that are suitable.

4 CONCLUSION

This research has developed a decision support system that is used to select coffee fields by adjusting the right type of coffee to be planted, so as to produce quality coffee products. the Simple Multi Attribute Rating Technique (SMART) method. The SMART approach can carry out different alternative analyzes and is able to make alternative estimates that are adjusted to the utility level by providing an assessment stated in determining the appropriate criteria. The SMART method has an optimal level of selectivity, by overcoming the problem of criteria that are mutually incompatible. Based on a case study conducted at the Jember Coffee Cocoa Research Center using the SMART method, the land suitability for planting coffee of three different types was found. Testing the system with blackbox testing has also resulted in successful performance of the features in the system, admin and user can use a decision support system for selecting coffee grounds according to their type.

REFERENCES

[1] Vintarno, J., Sugandi, Y. S., & Adiwisastra, J. (2019). Perkembangan penyuluhan pertanian dalam mendukung pertumbuhan pertanian di Indonesia. *Responsive: Jurnal Pemikiran Dan Penelitian Administrasi, Sosial, Humaniora Dan Kebijakan Publik*, *1*(3), 90-96.

[2] Mas'ud Hermansyah, R. A. H., Sidik, F., & Wibowo, A. Klasterisasi Data Travel Umroh di Marketplace Umroh. com Menggunakan Metode K-Means.

[3] Campera, M., Budiadi, B., Adinda, E., Ahmad, N., Balestri, M., Hedger, K., ... & Nekaris, K. A. I. (2021). Fostering a wildlife-friendly program for sustainable coffee farming: The case of small-holder farmers in Indonesia. *Land*, *10*(2), 121.

[4] Rowe, R. L., Prayogo, C., Oakley, S., Hairiah, K., van Noordwijk, M., Wicaksono, K. P., ... & McNamara, N. P. (2022). Improved coffee management by farmers in state forest plantations in Indonesia: an experimental platform. *Land*, *11*(5), 671.

[5] Muliawan, A., Badriyah, T., & Syarif, I. (2022). Membangun Sistem Rekomendasi Hotel dengan Content Based Filtering Menggunakan K-Nearest Neighbor dan Haversine Formula. *Technomedia Journal*, *7*(2 October), 231-247.

[6] Cantini, A., Peron, M., De Carlo, F., & Sgarbossa, F. (2022). A decision support system for configuring spare parts supply chains considering different manufacturing technologies. *International Journal of Production Research*, 1-21.

[7] WIRANTO, F. Sistem Temu Kembali (Information Retrieval System) Dokumen Berita Online menggunakan Metode Matriks Studi Kasus: Tiga Situs Berita Populer di Indonesia (Doctoral dissertation, Fakultas Matematika dan Ilmu Pengetahuan Alam).
[8] Monalisa, S., & Wahid, A. (2021). IMPLEMENTASI METODE SMARTER UNTUK SISTEM PENDUKUNG KEPUTUSAN PEMILIHAN LAHAN KELAPA SAWIT PADA PT EKA DURA INDONESIA. *Jurnal Ilmiah Rekayasa dan Manajemen Sistem Informasi*, *7*(2), 133-138.
[9] Adila, W. N., Regasari, R., & Nurwasito, H. (2018). Sistem Pendukung Keputusan (SPK) Pemilihan Tanaman Pangan Pada Suatu Lahan Berdasarkan Kondisi Tanah Dengan Metode Promethee. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer E-ISSN*, *2548*, 964X.
[10] Kusnadi, S., & Jaelani, L. (2020). Sistem pendukung keputusan pemilihan lahan untuk tanam bibit pandanwangi dengan menggunakan metode moora di dinas pertanian perkebunan pangan dan hortikultura kabupaten cianjur. *Media Jurnal Informatika*, *12*(1), 18-28.
[11] Hutagalung, B. T., Siregar, E. T., & Lubis, J. H. (2021). Penerapan Metode SMART dalam Seleksi Penerima Bantuan Sosial Warga Masyarakat Terdampak COVID-19. *Jurnal Media Informatika Budidarma*, *5*(1), 170-185.

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