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Design Of Profile Matching Decision Support System Software Against E-Commerce Selection For Sellers

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Abstract. Lazada, Shopee, and Tokopedia are online e-commerce applications for buying and selling processes that have different facilities and services, in selecting the best e-commerce that sellers hope toincrease their sales. The profile matching method is able to identify these problems with e-commerce. This thesis have to designs a decision support system software to determine the best e-commerce media used by sellers to increase their sales. The program is designed with Visual Basic for Application (VBA) and the Rapid Application Development (RAD) method in which there is data processing by profile matching and only up to the prototype stage. The results of the questionnaire from the expert seller (resource) act as input. Program testing was done by validating manual and program calculations, blackbox testing, and user acceptance test (UAT). The Conclusion is that the program is fast, dynamic, and suitable for use, 766 kb of storage memory, and the assessment determined by the expert results in a score of 6.00 on Shopee and a score of 5.35 on Tokopedia and Bukalapak.

INTRODUCTION

Electronic Commerce (E-Commerce)is the process of selling or purchasing goods or services through a computer network to receive or place orders on goods or services, but the process of payment and delivery of goods or services does not have to be done online. Such e-commerce transactions can occur between individuals, groups, organizations, businesses, households, individuals, and governments [1]. Lazada, Shopee, Buka Lapak, Tokopedia, and others are an e-commerce online application that facilitates the buying and selling process. Therefore, it is necessary to pay attention to what causes consumers to choose shopping in one e-commerce and what are the reasons and what products are sought after. [2] in other words the selection of e-commerce becomes an important issue for buyers and sellers. Each e-commerce has facilities and services offered differently, so it is necessary to contribute to the quality, service, and facilities owned by each e-commerce to determine the best [3]. As for some people who want to shop online but often have difficulty in shopping, such as the difficulty of finding the desired item and prices that do not match expectations, so it takes the determination of the right marketplace by the seller. Actors or sellers often have difficulty in choosing a suitable application, the factor is the type of goods to be sold, the cost of placing ads, the popularity or absence of the application, the level of difficulty operating the marketplace,and others.

To determine an accurate and fast decision with good solution quality, a decision support system is needed that can facilitate in the process of determining the best e-commerce [4]. The process of selecting alternatives on multiple criteria can take a long time, if the data processing is done manually. In addition, the criteria in a case can vary so that the time needed is long enough. The determination process involves assessing each criterion, so that data processing is required to be done as quickly and dynamically as possible so that the process of updating the displayed data is faster and up-to-date. One of the multi criteria decision making (MCDM) approaches that can be used in decision support systems is a profile matching method that is able to identify various marketplaces with its assessment which will then be decided by prospective sellers in the form of a program to facilitate users in the retrieval process. The decision, so the purpose of this research is to design decision support system software to determine the best e-commerce media used as sellers to increase their sales.

METHODOLOGY

Identify Problems and Research Objectives

Each marketplace has its own advantages and disadvantages. Actors or sellers often have difficulty in choosing a suitable application, the factor is the type of goods to be sold, the cost of placing ads, the popularity or absence of the application, the level of difficulty operating the marketplace,andothers. The purpose of this study is to design profile matching decision support system software to determine the best e-commerce media that sellers use to increase their sales. The software design method used is Rapid Application Development (RAD), according to Dennis et al (2012 in [5]) that rapid application development (RAD) is a new class of system development methodologies that emerged in the 1990s. RAD-based methodologies attempt to overcome the weaknesses of both constructed design methodologies by adjusting the SDLC phase so that some parts of the system develop quickly and enter the hands of the user. This way, users can better understand the system and suggest revisions that bring the system closer to what is needed.

System Planning

A system request is a document that explains the business's reasons for building the system and the expected value of the system. Analysis of software development feasibility there are three categories, namely, technical feasibility, economics, and organization. Engineering feasibility is assessed based on risks to similarity of function, technological similarity, the magnitude or smallness of a project, and the suitability to integrate existing systems. Economic feasibility is seen based on cost or expenditure on development, but in this study, an analysis of economic feasibility is not required. The feasibility of an organization is assessed based on the relationship between the project strategy and the level of whether or not the overall system is acceptable to users and related parties.

System Analysis

The first step in this stage is to determine the needs of the software by defining first and then making the need and comparing the existing problem with the need, whether it can help in solving the problem or not, and determine the functional and non-functional needs of the system as limitations and capabilities on the system to be designed. The second step is to identify the business process on the use case diagram by translating from each element. Use case diagrams are created as modeling on the system by describing several actors and the tasks to be performed. The third step of the business process modeler with activity diagram (AD). Activity diagrams describe the various activities combined to support the process. The final step is to realize business processes with sequence diagrams to sort various processes.

System Design

The third stage is the first step is to do user interface design modeling or designing a user interface (UI) based on inputs, processes, and outputs to be created. User interface modeling is made in the form of sketches or images of the program. It will be designed. Data modeling is done to determine the data needed to support business processes and ensure that the data can meet the needs in supporting business processes. Data models are created with entity relationship diagrams (ERDs) that can describe interconnected entities. After the entity relationship diagram (ERD) is made the next step is to display the example of calculation and the result of the calculation of the profile matching method. According to [6] the profile matching method is one of the simple methods in the decision support system by comparing GAP between alternative values and criteria. There are several things that are known about GAP analysis, one of which is the GAP weight value table. In addition, gap analysis must also understand the concept of Priority Scale because in the manufacture of weights with a range of 0-5 based on the priority of each criterion. Profile matching here is tasked with choosing criteria and alternatives to be identified first.

System Implementation

Implementation is the last stage that begins by discussing the activities needed to build the software starting from the construction of the software where the program began to be created. Software testing is done after software construction, the thing that is considered in testing is that the system designed must work. Blackbox testing is done by assessing whether the list of functional and non-functional requirements that have been determined in advance

succeeded or failed obtained from the results of discussions between users and user designers have the right to ask for improvements and if successful then there is no need for improvement. User acceptance test is done if the whole is considered successful, the designer provides a questionnaire about the software as an assessment that the software is feasible or not for use. Documentation creation is done to record on the operation of the application and processing steps to make it easier to evaluate, documentation that is done in the form of image recording when the program is run.

Overall Analysis, Conclusions, and Suggestions

The analysis process carried out is to analyze the program created as a whole starting from the events that occurred or the results obtained during the design of the system to the implementation. The important things that have been obtained from the analysis further become the final conclusions and suggestions that can be done in the next research process.

RESULTS

Coding View

Alternative Add Button Coding

The following is an example image of coding alternative add buttons that can be seen in Figure 1 below.

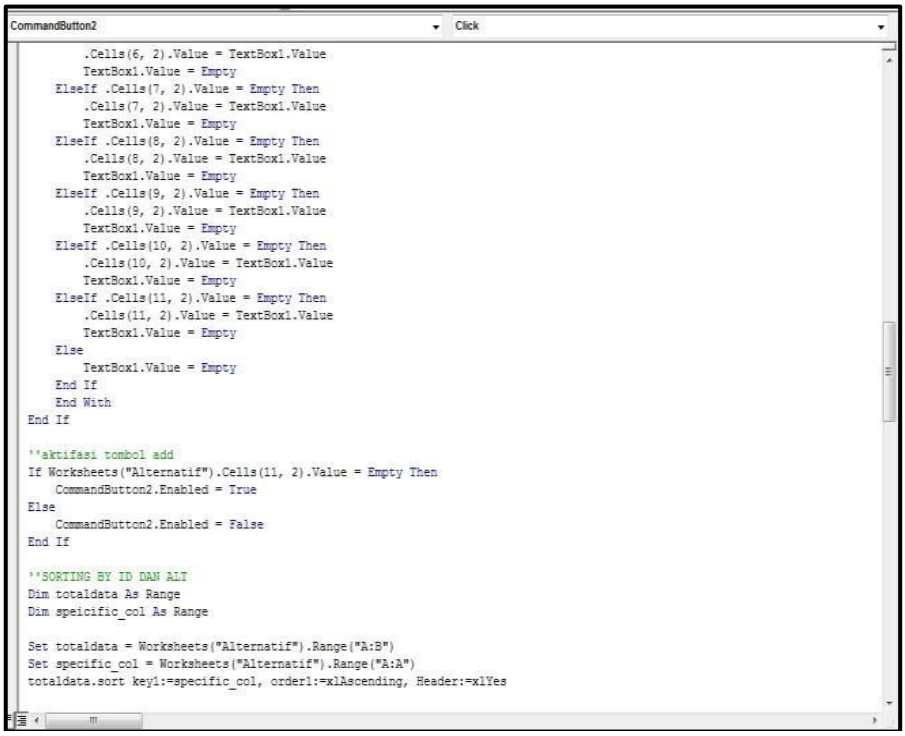
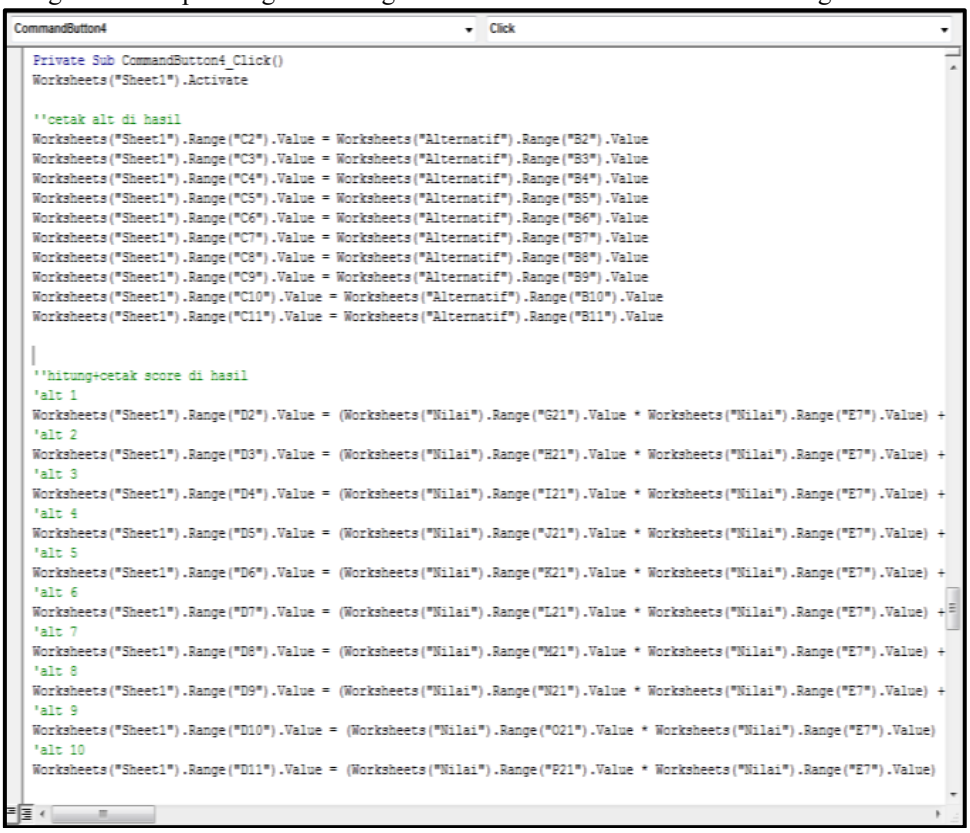


FIGURE 1. Alternative Add Button Coding

Coding there are conditions that contain if the cells are empty, then the program will print from the textbox (section to enter data) into the empty cell, and the program will automatically look for empty cells to print the inputted data.

Results Button Coding

The following is an example image of coding the results button that can be seen in Figure 2 below.



```
CommandButton4                                                    Click

Private Sub CommandButton4_Click()
Worksheets("Sheet1").Activate

''cetak alt di hasil
Worksheets("Sheet1").Range("C2").Value = Worksheets("Alternatif").Range("B2").Value
Worksheets("Sheet1").Range("C3").Value = Worksheets("Alternatif").Range("B3").Value
Worksheets("Sheet1").Range("C4").Value = Worksheets("Alternatif").Range("B4").Value
Worksheets("Sheet1").Range("C5").Value = Worksheets("Alternatif").Range("B5").Value
Worksheets("Sheet1").Range("C6").Value = Worksheets("Alternatif").Range("B6").Value
Worksheets("Sheet1").Range("C7").Value = Worksheets("Alternatif").Range("B7").Value
Worksheets("Sheet1").Range("C8").Value = Worksheets("Alternatif").Range("B8").Value
Worksheets("Sheet1").Range("C9").Value = Worksheets("Alternatif").Range("B9").Value
Worksheets("Sheet1").Range("C10").Value = Worksheets("Alternatif").Range("B10").Value
Worksheets("Sheet1").Range("C11").Value = Worksheets("Alternatif").Range("B11").Value

''hitung+cetak score di hasil
'alt 1
Worksheets("Sheet1").Range("D2").Value = (Worksheets("Nilai").Range("G21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 2
Worksheets("Sheet1").Range("D3").Value = (Worksheets("Nilai").Range("H21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 3
Worksheets("Sheet1").Range("D4").Value = (Worksheets("Nilai").Range("I21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 4
Worksheets("Sheet1").Range("D5").Value = (Worksheets("Nilai").Range("J21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 5
Worksheets("Sheet1").Range("D6").Value = (Worksheets("Nilai").Range("K21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 6
Worksheets("Sheet1").Range("D7").Value = (Worksheets("Nilai").Range("L21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 7
Worksheets("Sheet1").Range("D8").Value = (Worksheets("Nilai").Range("M21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 8
Worksheets("Sheet1").Range("D9").Value = (Worksheets("Nilai").Range("N21").Value * Worksheets("Nilai").Range("E7").Value) +
'alt 9
Worksheets("Sheet1").Range("D10").Value = (Worksheets("Nilai").Range("O21").Value * Worksheets("Nilai").Range("E7").Value)
'alt 10
Worksheets("Sheet1").Range("D11").Value = (Worksheets("Nilai").Range("P21").Value * Worksheets("Nilai").Range("E7").Value)
```

FIGURE 2. Results Button Coding

The coding is reprinted from alternative to "sheet1", it is done to read the data contained in the cells in "sheet1" into the listbox (the display of data based on certain cells), and there is a process of calculating the final result of each alternative inputted, the result will be printed into "sheet1", so that the result of the score calculation can appear into the listbox. It's on the results menu.

Program View

Alternative Add Program View

The following is an example image of an alternative add program display that can be seen in Figure 3 below. The program view image above is a view contained in the alternative menu. Alternate IDs and names will appear in the listbox if the user fills in a blank column and clicks the add button.

FIGURE 3. Alternative Add Program View

Results Program View

The following is an example image of the program view results that can be seen in Figure 4 below.

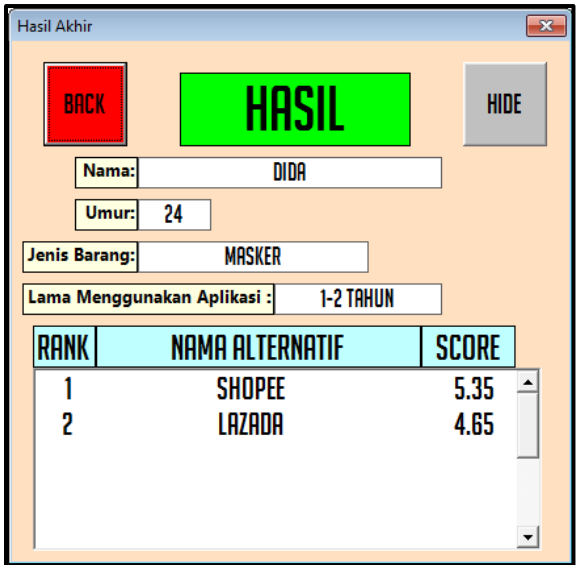


FIGURE 4. Results Program View

The appearance of the processing program contains an identity containing the name, age, type of goods, and long use of the application as the identity of someone who performs the assessment. However, this program does not require filling in such data. The listbox contained in the menu contains a rank as a rank of existing alternatives based on the score of the results of automatic calculations performed by the program to display the overall results of the use of this program.

Software Testing Results

The following software testing is a test on profile matching calculations that are calculated manually and programally.

Manual Calculation

a. GAP value

The following is a table of GAP values that can be seen in Table 1.

TABLE 1. GAP Value

No	Criterion	Alternative			Profile Criterion	GAP A01	GAP A02	GAP A03
		A01	A02	AO3				
1	K01	4	4	5	4	0	0	1
2	K02	5	4	4	4	1	0	0
3	K03	5	5	4	5	0	0	-1

Examples of Alternative Calculations A01 in Criterion K01:

GAP A01 on K01 $= Alternative\ Value(A01) - Profile\ Criteria\ (K01)$ (1)

$= 4 - 4$

$= 0$

b. Mapping GAP

The following is a gap mapping table that can be seen in Table 2.

TABLE 2. Mapping GAP

No	Criterion	Alternative			Profile Criterion	GAP A01	GAP A02	GAP A03
		A01	A02	AO3				
1	K01	0	0	1	6	6	5.5	0
2	K02	1	0	0	5.5	6	6	1
3	K03	0	0	-1	6	6	5	0

c. Final Results

The following is a gap mapping table that can be seen in Table 3.

TABLE 3. Manual Calculation Final Result

No	Alternative Name	Final Value	*Rank*
1	Shopee (A01)	5.90	2
2	Lace (A02)	6.00	1
3	Tokopedia (A03)	5.35	3

Example of Alternative Final Value Calculation A01:

Final Value A0 = *(Map GAP K01 × Weight K01) + (Map GAP K02 × Weight K02) + (Map GAP K03 × Weight K03)* (2)

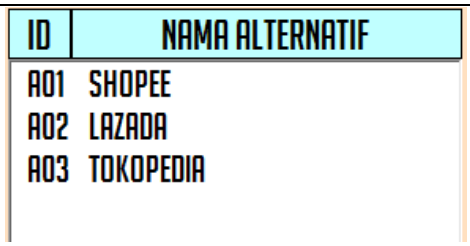
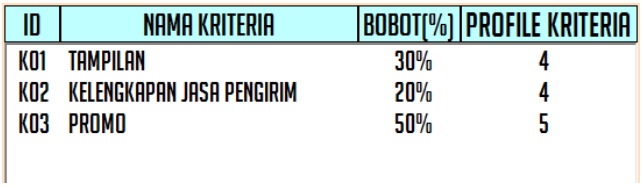
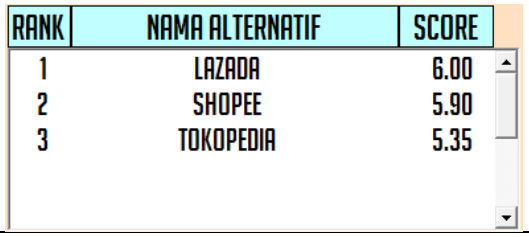
$= (6 \times 30\%) + (5.5 \times 20\%) + (6 \times 50\%)$

$= 5.90$

Program Calculations

The following is a table on the program that contains a picture as a program calculation can be seen in Table 4 below.

TABLE 4. Program Calculations

No	Program	Picture
1	Alternative	
2	Criterion	
3	Alternative Assessment A01 Shopee	
4	Alternative Assessment A02 Lazada	
5	Tokopedia's A03 Alternative Assessment	
6	Final Results	

The results of manual calculations obtained in Shopee alternatives are 5.90, Lazada alternatives by 6.00, tokopedia alternatives by 5.35. The results of the manual calculation are declared to be the same as the results of the program calculation, this validation process can be said to be successful. Next can be done to the black box testingprocess.

Black Box Testing

Black Box Testing is conducted on two categories, namely, a list of functional and non-functional requirements, and included the test results based on the analysis of software needs contained in Table 5 and Table 6 as follows.

TABEL 5. List Requirement Functional

No.	List Requirement (Functional)	Test Results
1	Systems that can input *e-commerce* selection criteria	Succeed
2	A system that can input the results of respondents' assessments	Succeed
3	Systems that can dynamically change data	Succeed
4	Systems that can input *alternatives to e-commerce* selection	Succeed
5	Systems that can sort *e-commerce*	Succeed
6	A system that can reveal the identity of the respondent	Succeed
7	A system that can move display menus easily	Succeed
8	A system that can display identity	Succeed
9	Systems that can display *e-commerce* assessment results	Succeed

TABEL 6. List Requirement Non Functional

No.	List Requirement (Non Functional)	Test Results
1	100% system service availability	Succeed
2	The system is only used in MS. Excel software.	Succeed
3	The system can be used by anyone.	Succeed
4	The system can only be accessed by one user at the same time.	Succeed
5	Unlimited data charging time	Succeed
6	The system can be used at any time.	Succeed
7	Data can only be changed by *the user* or user.	Succeed
8	Data can be saved*when* it has filled in all the data	Succeed

User Acceptance Test (Uat)

The following is a table of user acceptance test calculations that have been filled by 3 users or respondents and can be seen in Tables 7 and 8 as classifications.

TABLE 7. User Acceptance Test (UAT)

Question	Value		
	Sum	Number / Respondent	%
1	11	3.67	91.67
2	9	3.00	75.00
3	10	3.33	83.33
4	10	3.33	83.33

TABLE 7. User Acceptance Test (UAT) (Continue)

Question	Value		
	Sum	Number / Respondent	%
5	11	3.67	91.67
6	12	4.00	100.00
7	11	3.67	91.67
8	12	4.00	100.00
9	10	3.33	83.33
10	12	4.00	100.00
11	10	3.33	83.33
12	9	3.00	75.00
Total Average %			88.19

Examples of Total Percentage Average Calculations:

a. Number / Respondent of Question 1

$$= \frac{Sum\ of\ Number}{Number\ of\ Respondent} \quad (3)$$
$$= \frac{11}{3}$$
$$= 3.67$$

b. Percentage Value of Question 1

$$= \frac{Number\ /\ Respondent\ of\ Question\ 1}{Highest\ Weight\ Figures} \quad (4)$$
$$= \frac{3.67}{4.00}$$
$$= 91.67\%$$

c. Average of Total Percentage

$$= \frac{\Sigma \quad Percentage\ of\ Question\ Value}{Number\ of\ Question} \quad (5)$$
$$= \frac{91.67 + 75.00 + 83.33 + \ldots + 75.00}{12}$$
$$= 88.19\%$$

TABLE 8. Classification of User Acceptance Test (UAT) Results

Percentage	Information
0%-20%	Sangat Lemah
21%-40%	Lemah
41%-60%	Cukup
61%-80%	Kuat
81%-100%	Sangat Kuat

Source: Riduwan, 2008 in [7]

Based on the average result of the total percentage worth 88.19%, the user acceptance test was declared very strong. Judging from Table 8, the value is included in the percentage classification between 81% to 100% with very strong information. The results obtained are said to be received by the user and not done further iternation.

Documentation (Manual User)

The documentation shown in the images on the program that runs in Figure 5, Figure 6, and Figure 7.

a. Alternatives and Criteria

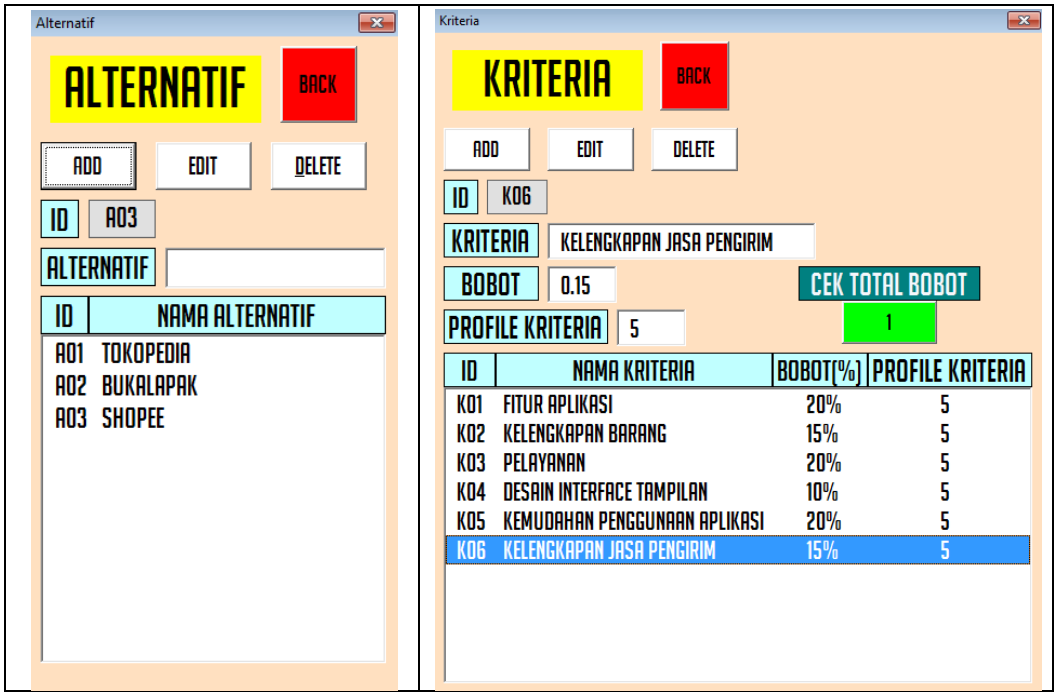


FIGURE 5. Alternatives and Criteria

b. Tokopedia, Bukalapak, and Shopee Alternative Assessments

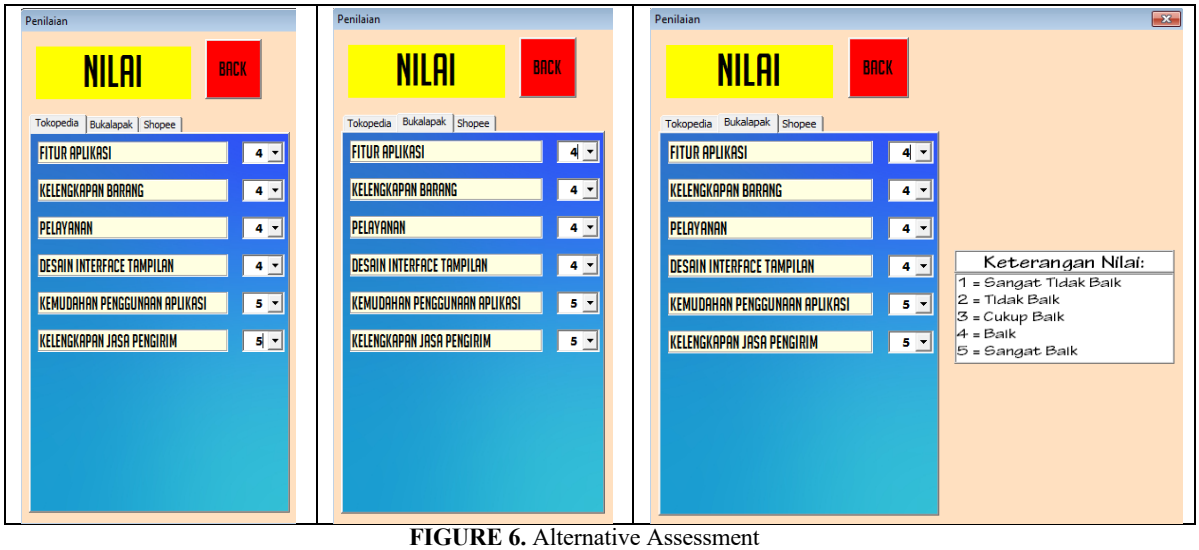


FIGURE 6. Alternative Assessment

c. Final Results

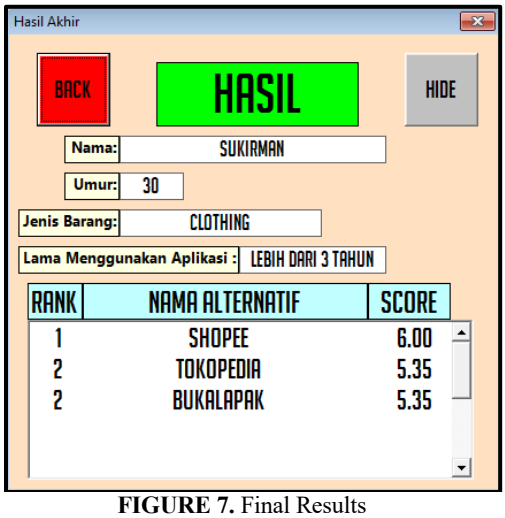


FIGURE 7. Final Results

DISCUSSION

This program is not a program that is just made, but this program is able to process the data needed by calculating profile matching methods. This program is made with results that are quite easy to use, the use of the program does not take long enough, the user simply inputs the required data according to what will be decided. The storage memory of this program only requires 766 kb.

This data processing program is dynamic, where data can be changed ranging from identity, alternatives, criteria, and assessments. This can make it easier for users if there is data that needs to be changed based on their needs and users do not need to input data again if there are changes to some data. Dynamic nature is able to develop the results of previous decisions to the latest.

The results of the processing can be obtained quickly, this is due to the easy use of the program. The time and process required to obtain the results of the decision is only the input of data needed. The data processing process is already automatically calculated by the program, so that results or outputs can be obtained quickly. The comparison between programs that are fast and dynamic and those that are not can be seen from the process carried out by each program, for example, in the process of input values, programs that are fast and dynamic only simply enter numbers without having to change formulas or recreate formulas and do not need to look for table cells, while for those that are not fast and not dynamic it is inversely proportional, the user needs to find the cell they want to change and recreate the formula.

CONCLUSION

The program is dynamic, the data can be changed (updated), the results of program processing can be obtained quickly, based on expert seller data named Sukirman it produces a score for Shopee of 6.00, and for Bukalapak and Tokopedia it is 5.35. The storage capacity of this program is 766 kb. Based on the problems that occur especially to users that with this program, the decision can be decided and obtained quickly, even users can change data easily without the need to calculate or create formulas.

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