IMPLEMENTATION OF WEIGHTED PRODUCT METHOD IN DETERMINING SELECTION THE BEST MUSIC STREAMING SERVICE APPLICATION

Lilyani Asri Utami[1*]; Kaffah Febriningrum[2]

[1,2]Sistem Informasi
Universitas Nusa Mandiri
www.nusamandiri.ac.id
lilyani.lau@nusamandiri.ac.id[1*]; kaffah11182952@nusamandiri.ac.id[2]

Abstract— *At this time, the music streaming service is a platform that is often easily found on every device, either through downloads from the Playstore and Appstore or the default application from the device itself. Many companies in the world are competing to create platforms and applications that provide the most complete songs. For example, several well-known music streaming service applications in Indonesia have their own innovations and characteristics, such as Spotify, Joox, Youtube Music, Apple Music, SoundCloud, and so on. This causes users to have difficulties because of several considerations in deciding how to use the application according to their needs. This study aims to assist in providing solutions to music streaming service subscribers by recommending several music streaming service applications according to the ranking results, which are the best choice for the user version of the application through a Decision Support System using the Weighted Product method based on 5 criteria: subscription rates, available features, streaming quality, music, application design, and application efficiency. The final result of this study is the ranking of applications that have the highest score in accordance with the criteria provided, namely that in first place with a value of 0.415 is Spotify as a recommendation for the best music streaming service application, and Apple Music ranks last out of the 6 alternatives that have been provided.*

Keywords: *Weighted Product, Decision Support System, music streaming.*

Intisari— Pada saat ini, layanan *streaming* musik merupakan salah satu *platform* yang seringkali dengan mudah ditemukan pada setiap perangkat baik melalui *download* pada *Playstore* dan *Appstore* maupun aplikasi bawaan dari perangkat itu sendiri. Banyak perusahaan di dunia berlomba – lomba membuat *platform* dan aplikasi yang menyediakan lagu terlengkap, contohnya beberapa aplikasi layanan *streaming* musik yang terkenal di Indonesia memiliki inovasi dan ciri khasnya sendiri seperti Spotify, Joox, Youtube Music, Apple Music, SoundCloud dan sebagainya. Hal tersebut membuat pengguna memiliki kesulitan karena beberapa pertimbangan dalam memutuskan penggunaan aplikasi sesuai kebutuhannya. Penelitian ini bertujuan untuk membantu dalam memberikan solusi kepada pelanggan layanan *streaming* musik dalam merekomendasikan beberapa aplikasi layanan *streaming* musik sesuai dengan hasil perangkingan yang menjadi pilihan terbaik versi pengguna aplikasi tersebut melalui Sistem Penunjang Keputusan dengan menggunakan metode Weighted Product berdasarkan 5 kriteria yaitu tarif berlangganan, fitur yang tersedia, kualitas streaming musik, design aplikasi, dan efisiensi aplikasi. Hasil akhir pada penelitian ini berupa perankingan aplikasi yang memiliki nilai tertinggi sesuai dengan kriteria yang disediakan yaitu pada peringkat pertama dengan nilai 0,415 adalah Spotify sebagai rekomendasi aplikasi layanan *streaming* musik terbaik, dan Apple Music menempati peringkat terakhir dari 6 alternatif yang telah disediakan.

Kata Kunci: *Weighted Product, Sistem Penunjang Keputusan, streaming musik.*

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INTRODUCTION

Music is an alternative hobby for many people, and it is not only a hobby that can be channeled through music; it can also be a source of income, particularly for musicians. Music is an example of a medium that functions as an expression of art and can reflect the culture present in society. The high interest in music for both listeners and music makers so that music marketing is growing from time to time, starting from physical sales in the form of LPs, cassettes, CDs until now it can be easily found marketing in physical and digital forms.

In January 2020, there were 338.2 million cellular connections in Indonesia, of which 84% used music streaming services for at least 1.5 hours per day (Nabila, 2020). Many companies in the world are competing to create platforms and applications that provide the most complete songs on smartphones, tablets, and laptops with the reason that it is easy to find songs and download songs and save on storage memory (Dewatara & Agustin, 2019). For example some well-known music streaming service applications in Indonesia have their own innovations and characteristics such as Spotify, Joox, Youtube Music, Apple Music, SoundCloud.

From the results of the explanation above, this research using one of the methods in Decision Support System namely Weighted Product method which is used to support decisions, This method has the ability to obtain optimal solutions in decision making (Fitria & Rakhmah, 2019). Then the calculation results will be equated with calculations using SPSS using the value of each criterion and vector V to determine the best alternative sequence, which will be the final decision. It is hoped that the implementation will have accurate and effective results to achieve optimal results and assist in providing solutions to music streaming service customers in recommending several music streaming service applications according to the ranking results which are the best choices for the user. Implementation of the Weighted Product Method for Selection of the Best Music Streaming Application Services will be designed using a website-based system using the PHP programming language and a MySQL database.

Related Research

This study refers to several related studies shown in Table 1.

Table 1. Related Research

No	Topic/Title	Author	Results/Conclusion
1	Implementation of the Weighted Product Method in the Decision Support System for Choosing the Best Electronic Money Service	M. Wasti, S. Hartini, R. Rinawati	The purpose of this research is to identify the best electronic money service application that suits user needs and generate an assessment on each of the criteria provided. The results showed that the OVO application was ranked first with an ease value of 0.394 which had a positive influence and was the most chosen by 44 respondents in Bekasi City by answering 15 questionnaire questions (Wasti, Hartini, & Rinawati, 2019).
2	Analysis of Student Interest in Listening to Paid Music Apps and Free Music Downloads	J. Andry, C. Tjee	To get an idea of student interest in listening to music, one of which is through the Spotify application for streaming paid and unpaid music via downloads on the internet or websites. The results showed that there was more interest in music streaming applications with a value of 27.38 compared to free music downloads via the internet at 14.54, and it can be concluded from the research that respondents prefer streaming music more (Andry & Tjee, 2019).
3	Decision Support System for Determining the Best Customer Using the Weighted Product Method	V. Marudut, M. Siregar, S. Siregar, E. Damanik	The research was conducted at Subur Graphic Printing with the aim of being able to overcome problems in selecting the best customers using the assistance of a Decision Support System. Using the Weighted Product method where this method was chosen because it can do multi-criteria decision making, the incoming data is processed and will then enter the implementation stage and system testing (Marudut, Siregar, S, & Damanik, 2021).

MATERIALS AND METHODS

Implementation

An action or final result in applying a method or idea from an idea into a system that will have an impact on the final result that is in line with expectations, according to (Oktaviani.J, 2018) Implementation is carried out for a purpose in completing a policy or activity in order to achieve the end of a desired process, and implementation is carried out by parties who have an interest and have the authority to realize a program that has been prepared.

Music Streaming Service Application

Music streaming service is a service that is engaged in the music industry. This service provides digital music that is connected to the internet and can be listened to both online and offline, packaged in an application to a website. According to (Noviani, Pratiwi, Silvianadewi, Benny Alexandri, & Aulia Hakim, 2020) in addition to getting a wide audience reach and easy and flexible payments, it also makes it easier for users to listen to music without having to download audio files from the music itself.

PHP

Hypertext Preprocessor is an abbreviation of PHP or a programming language that has the function to create dynamic websites and website applications. The PHP programming language can interact with databases, files and folders so that the display of content on the website can be more dynamic (Yuliano, 2017).

Decision Support System

A form of artificial intelligence that helps make decisions and solve problems, The Decision Support System itself has the aim that in making a decision and providing more or better alternatives, it must increase the ability of the decision makers themselves (Setiyaningsih, 2015). Decision Support System serves the management, operations and planning levels of the organization and helps in making decisions about problems (Tonni Limbong, Muttaqin Muttaqin, Akbar Iskandar, Et. al, 2020).

(Fitriyani, Komarudin, Maulana, & Haidir, 2020) the following are the architectural stages in the DSS for selecting the best decision:

1. Intelligence, carried out the process of analysis and search for problems.
2. Design, this stage is a process to be able to understand the problems taken, find solutions and test the feasibility of these solutions.
3. Choice, to make a selection from the various available alternatives that will be processed

4. Implementation, implementation of the results of the previous three stages into a decision support system for final decision making. Conducting testing, evaluation, demonstration, orientation, training and deployment.

Weighted Product

In decisions involving multi-criteria or Multi-Criteria Decision Making (MCDM) (Sari, 2018) the set of decision alternatives described in the form of several criteria or referred to as a Weighted Product. The Weighted Product itself has stages of solving a problem, including:

a. Determine the criteria to be used
b. The process of normalizing the value of the weight of the criteria (W)

$$Wj = \frac{wj}{\sum wj} \dotfill (1)$$

Information:
Wj = Criteria Weight

c. calculate the preference (S) value of each alternative with the equation 2

$$Si = \prod_{j=1}^{n} (Xij)^{Wj} \; ; 1 = 1,2,\dots,m \dotfill (2)$$

Information:
Si   = value result of matrix normalization
Xij   = Variable Value of the alternatives on each criterion
Wj   = Criteria weight value
I   = Alternative value
J   = Criteria value
$\sum_{j=1}^{n} Wj = 1$. Wj is a positive value for the profit criteria and negative value for the cost criteria.

d. Calculate the relative preference of each alternative using equation 3, the result will be a vector V.

$$Vi = \frac{Si}{\prod_{j=1}^{n}(Xij)^{Wj}} \; ; \text{with } i = 1,2,\dots,m \dotfill (3)$$

e. The higher the value of V, the better the alternative.

Weighted Product has two variables, namely cost and benefit, which function in determining the criteria. If the benefit produces the largest value then the weight is negative, whereas if the cost produces the smallest value then the weight is positive.

Research Stages

The research stages that have been compiled by researchers are shown in Figure 1.

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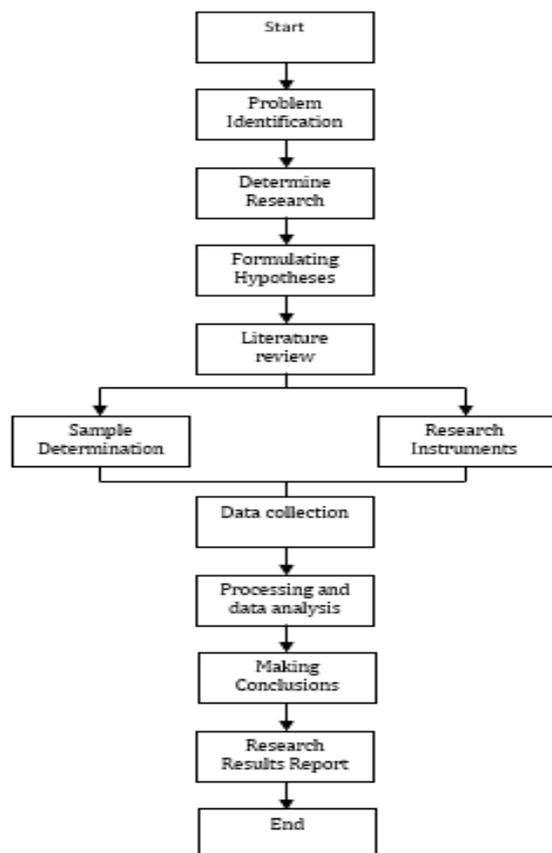As an Accredited Journal Rank 4 based on **Surat Keputusan Dirjen Risbang SK Nomor 85/M/KPT/2020**

Figure 1. Research Stages

Based on Figure 1 above, the explanation is as follows:

1. Problem Identification and Formulation
   In this study, the problems that can be found in the selection of music streaming service applications are providing several alternative application options using the Weighted Product method and providing superior criteria as a step for considering the final decision in selecting a music streaming application.

2. Determine Research Objectives
   The purpose of this research is to assist in providing solutions to music streaming service customers and to recommend several music streaming applications according to the ranking results, which are the final result, namely the best choice of the user version of the application, and to develop research on selecting the best music streaming application using the Weighted Product method to implement into a system.

3. Formulating Hypotheses
   In expressing initial opinions about the research on selecting the best music streaming service application, a hypothesis was created for the research results, including:
   H0 : There is no relationship between the selection criteria and the selection of the best music streaming service application.
   H1 : There is a relationship between the selection criteria and the selection of the best music streaming service application.

4. Literature review
   Literature study includes books, articles, journals, theses, and others as a basis or source of writing to be compiled.

5. Data collection
   Data collection was carried out using questionnaires, observations, and interviews. The data can be used in hypothesis testing. In this study, researchers used questionnaires and observation as data collection techniques.

6. Processing and data analysis
   After the data is collected, the researcher can compile the data, and then the data that has been collected is processed and analyzed. Data processing uses the weighted product method, according to the steps, where this method functions as the main calculating tool in obtaining research results.

7. Making Conclusions
   After the data processing and analysis are done, the researcher can begin drawing conclusions. The conclusion must be related to the hypothesis that was previously made, so that it can be seen that the hypothesis can be rejected or accepted.

8. Research Results Report
   The final step in conducting scientific research is to write a scientific report on the findings.

Research methods

The researcher obtained research data using three methods of data collection techniques as follows:

a. Observation Method
   Observations or observations are made on related research objects in order to find problems and factually existing data from a group or an area.

b. Questionnaire
   As an instrument to obtain research primary data. Data collection techniques through this questionnaire target active users of music streaming services based on the selected criteria group.

c. Literature review
   Literature study is the stage where the collection of information about the object of research and research problems (Fernandez, Prihantoro, & Hidayah, 2021). This research contains books and journals of previous scientific works as a reference source for starting research.

Population and Research Sample

Population is not only about humans but population can also be in the form of goods and other things as well as nature that is in an area (Nalendra et al., 2021). Researchers used population data from Depok City, West Java Province as the research population. On the official website of the Central Statistics Agency of Depok City from 2018 to 2020 based on age and gender, 2,484,186 people were recorded as residents of Depok City (Statistik, 2021). The research sampling technique was using the Slovin formula. According to (Nalendra et al., 2021) The Slovin Formula is a formula for calculating the sample if the behavior in a population is not known with certainty, and is used for a population with a relatively large number.

$$n = \frac{N}{1+Ne^2}$$ .... (1)

In the application of this formula, the researchers set 15% as the level of error tolerance and the total population of 2,484,186 people as the value of N, then the sample that can be obtained is as follows:

$$n = \frac{2.484.186}{1+(2.484.186(0,15)^2)} = 44,4436 \sim 44$$

The research sample obtained by using the Slovin formula and being able to fill out the questionnaire was 44 respondents.

Research Instruments

According to (Yusup, 2018) a tool that is used as a tool to measure an object in research variables and functions as a tool to collect research data is a Research Instrument. The grid of research instruments is shown based on the five criteria that have been provided and is assumed to be valid and reliable and will be distributed to respondents:

1. Subscription Rates, commensurate with the quality and features of the application obtained and attractive to new users.
2. Available Features, very suitable for its use and very useful in daily use.
3. Music Streaming Quality, not constrained even though the internet network is not stable (no buffering), runs smoothly if open other apps at the same time.
4. Application Design (User Interface), Attractive interface, clear and easy to access menu layout, find song titles quickly.
5. Application Efficiency, use of internet quota in the application includes a small amount, saves

battery usage, doesn't take much time to run the application.

Likert scale

The Likert scale is used to measure the nature, perception, view of a person or group with the social symptoms they experience (Hidayat, 2021). This scale is characterized by its measurement using positive statements and negative statements. In the study of selecting the best music streaming, researchers used a Likert Scale with positive statements. The Likert Scale Rating is shown in Table 2.

Table 2. Positive Statement Likert Scale

Very Important	5
Important	4
Quite important	3
Unimportant	2
Very unimportant	1

Source: (Purnia & Alawiyah, 2020)

Instrument Validity Test

Validity test is used to measure the validity or invalidity of a research instrument. The instrument was tested using the formula 1 Pearson Correlation (Product Moment) (Yusup, 2018), namely the correlation coefficient with the following formula:

$$r_{xy} = \frac{n(\sum X_i Y_i) - (\sum X_i)(\sum Y_i)}{\sqrt{(n(\sum X_i^2) - (\sum X_i)^2)(n(\sum Y_i^2) - (\sum Y_i)^2)}}$$ ....(1)

Reliability Test

Reliability Test is a series of measuring instruments that give the same results. That is, the measurement is fixed and free from error (measurement error) and reliable. This test is carried out using Cronbach's alpha with a significant value of 0.5, 0.6 to 0.7 depending on research needs. The formula is as follows:

$$r_{11} = \frac{k}{k-1} \left(1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right)$$ ....(2)

Data Analysis

To determine the weighting value of the criteria, the criteria that are included in the calculation must be first described. The criteria for research on music streaming service applications are 5, so each criterion value is added and the results produce W (Amount of Criteria Weighting).

The value of each alternative in this study was obtained after distributing the questionnaire, where the results of filling out the questionnaire could be an alternative value or vector S. After correcting the weight value, the alternative value can be raised to the power of the weight value that has been normalized to become a positive rank or

vector V. The final calculation results from Vector V are sorted from the largest to the smallest weight, the weight value with the highest result can be categorized as the best result from the calculation using the Weighted Product method.

RESULTS AND DISCUSSION

Research Data

In Table 3, the researcher describes alternative tables, and in Table 4, the criteria used to determine the best music streaming service application using the weighted product method.

Table 3. Alternative

Alternative	Description
A1	Spotify
A2	Joox
A3	Apple Music
A4	Deezer
A5	Youtube Music
A6	Resso

Table 4. Criteria

Criteria	Description
C1	Subscription Rates
C2	Available Features
C3	Music Streaming Quality
C4	Application Design
C5	Application Efficiency

Research Result

The research was conducted using a questionnaire in Depok City, West Java, and collecting questionnaire data was carried out for approximately seven days, with the results showing that 44 respondents were categorized as active users of music streaming services for the last three months and distinguished by gender in Table 5 and age of respondents in Table 6.

Table 5. Respondents by Gender

Gender	Respondent	Percentage
Woman	25	57%
Man	19	43%
Total	**44**	**100%**

Table 6. Respondent Age Category

Age	Respondent	Percentage
15 – 20	26	59%
21 – 25	17	39%
26 – 30	1	2%
31 – 40	0	0%
Total	**44**	**100%**

The results of selecting respondents based on the alternatives provided and collected through a questionnaire, as shown in Table 7.

Table 7. Respondents on Music Streaming Applications

Application	Respondent	Percentage
Joox	13	30%
Youtube Music	6	14%
Spotify	21	48%
Resso	3	7%
Deezer	1	2%
Apple Music	0	0%
Total	**44**	**100%**

Calculation of Validity Test and Reliability Test

Test the validity of the questionnaire manually with a two-way test, which is a test of a hypothesis whose direction is unknown, to find Rtable using the formula df = N-2, df = 44−2 = 42, so that it can be seen through the distribution of the R table that a significance value of 5% is equal to 0.304. If r_count>r_table, the instrument is declared valid; otherwise, it is declared invalid. Calculations are performed using the following formula:

$$r_{xy} = \frac{44(12270)-(188)(2851)}{\sqrt{(44(820)-(188)^2)(44(186627)-(2851)^2)}} =$$

$$\frac{3892}{\sqrt{82736.83387}} = 0,4968$$

$$r_{table} = 0,304$$

Table 8. Validity Test Result

Number	r_{xy}	r_{table}	Status
1	0,4968	0,304	Valid
2	0,5891	0,304	Valid
3	0,5229	0,304	Valid
4	0,5256	0,304	Valid
5	0,5960	0,304	Valid
6	0,6002	0,304	Valid
7	0,5273	0,304	Valid
8	0,6629	0,304	Valid
9	0,6627	0,304	Valid
10	0,7468	0,304	Valid
11	0,6978	0,304	Valid
12	0,5659	0,304	Valid
13	0,7204	0,304	Valid
14	0,5283	0,304	Valid
15	0,7190	0,304	Valid

Based on Table 8, research instruments 1 to 15 are calculated using the Pearson Product Moment Correlation formula and are declared Valid because they have exceeded the predetermined R table value.

After the Validity Test is carried out, it is continued with the Reliability Test of the questionnaire which is carried out using the following formula:

$\sigma_b^2 = \frac{820 - \frac{188^{\wedge}2}{44}}{44} = 0,38$

$\sum \sigma_b^2 = 0,38 + 0,64 + 0,83 + 0,39 + 0,53 + 0,63 + 0,94 + 0,28 + 0,48 + 0,47 + 0,39 + 0,53 + 0,41 + 0,83 + 0,47 = 8,27$

$r_{11} = \frac{44}{44-1} \left(1 - \frac{\sum 8,27^2}{44,07^2}\right) = 0,870 \sim 0,87$ Very High Reliability

The results of the calculation above show that r11 is the reliability that is sought. According to the Guilford reliability coefficient, which is categorized based on the level of reliability

Number	Variance Item	Status
1	0,3890	*Reliable*
2	0,6427	*Reliable*
3	0,8351	*Reliable*
4	0,3932	*Reliable*
5	0,5301	*Reliable*
6	0,6321	*Reliable*
7	0,9487	*Reliable*
8	0,2833	*Reliable*
9	0,4862	*Reliable*
10	0,4799	*Reliable*
11	0,3932	*Reliable*
12	0,5327	*Reliable*
13	0,4122	*Reliable*
14	0,8372	*Reliable*
15	0,4751	*Reliable*

ranging from 0.80≤r11≤1.00 has a very high reliability status. Followed by 0.60≤ r11 0.80 which has high reliability, then at 0.40≤ r11 0.60 has moderate reliability, at 0.20≤ r11 0.40 has low reliability and the last 0, 00≤ r11 0.20 has a very low level of reliability.

Table 9. Reliability Test Result

Based on Table 9, the results of the Reliability Test show that the 1st to 15th research instruments are declared reliable with a Cronbach's Alpha value of 0.870 out of a total of 15 variants. The instrument is declared invalid if the Cronbach's Alpha value is <0.6.

Calculation with Weighted Product Method
A. Determining the Weighting and Normalization of Criteria

To start the calculation using the Weighted Product method, it is necessary to determine the value of the weight of the criteria for each of the Cost and Benefit criteria.

In Table 10, it has been determined as the initial value of the weight of each criterion. The criteria set as the cost value are subscription rates because they relate to a price issued for an application.

Table 10. Criteria Weight Value

Criteria	Code	Weight	C/B
Subscription Rates	C1	2	Cost
Available Features	C2	4	Benefit
Music Streaming Quality	C3	5	Benefit
Application Design	C4	3	Benefit
Application Efficiency	C5	4	Benefit
Total		**18**	

The second step is to set the Relative Value or Normalize the Weight Value that has been previously set using the following formula:

$W_1 = \dfrac{2}{2 + 4 + 5 + 3 + 4} = 0,11$

$W_2 = \dfrac{4}{2 + 4 + 5 + 3 + 4} = 0,22$

$W_3 = \dfrac{5}{2 + 4 + 5 + 3 + 4} = 0,28$

$W_4 = \dfrac{3}{2 + 4 + 5 + 3 + 4} = 0,17$

$W_5 = \dfrac{4}{2 + 4 + 5 + 3 + 4} = 0,22$

In Table 11, where 1.00 is the sum of the total criterion weights that have been normalized, or $\sum Wj$ and is the value that must be achieved after normalizing the criterion weights.

Table 11. Criteria Weight Normalization Results

Description	Criteria Weight
C1	0,11
C2	0,22
C3	0,28
C4	0,17
C5	0,22
Total ($\sum Wj$)	1,00

B. Assigning the Value of Each Alternative

After getting the value for normalizing the criteria weights, the next step is to enter the alternative values obtained from filling out the questionnaire according to the criteria shown in Table 12. Apple Music with the alternative code A3 received a rating of 0 out of 44 respondents who had chosen each alternative.

Table 12. Respondent's Answer of Each App

Alternative	Criteria				
	C1	**C2**	**C3**	**C4**	**C5**
A1	269	272	275	281	264
A2	152	167	176	178	167
A4	14	13	15	15	11
A5	68	76	74	77	72
A6	43	45	43	43	41

C. Determining the Value of the Vector S

In determining the preference value for each alternative, the respondent's answers in each alternative are summed.

$$S_i = \prod_{j=1}^{n} (X_{ij})^{W_j} ; 1 = 1, 2, \ldots, m \ldots\ldots\ldots\ldots\ldots (2)$$

S_1 = 78,503
S_2 = 55,497
S_4 = 7,487
S_5 = 28,889
S_6 = 18,632

Table 13. S Vector Value Result

Alternative	Vector S
A1	78,503
A2	55,497
A4	7,487
A5	28,889
A6	18,632
Total	**189,0089**

In Table 13, the value of the vector S for each alternative is A1 = 78.503, A2 = 55.497, A4 = 7.487, A5 = 28.889, and A6 = 18.632, for a total value of 189.0089. After getting the value of the vector S, the calculation continues to determine the value of the vector V for each criterion.

D. Determining the Value of the Vector V

The result in Vector V will be the value for ranking the results, using Vector S in each alternative and dividing by the sum of Vector S.

$$V_i = \frac{S_i}{\prod_{j=1}^{n}(X_{ij})^{W_j}} ; \text{with } i = 1, 2, \ldots, m \ldots\ldots\ldots\ldots(3)$$

V_1 = 0,415
V_2 = 0,293
V_4 = 0,039
V_5 = 0,152
V_6 = 0,098

Table 14. V Vector Value Result

Alternative	Vector V
A1	0,415
A2	0,293
A4	0,039
A5	0,152
A6	0,098
Total	**1,00**

In Table 14, it can be seen that the results of the vector V values for each alternative are V1 or A1 = 0.415, V2 or A2 = 0.293, V4 or A4 = 0.039, V5 or A5 = 0.152, and V6 or A6 = 0.098, with a total vector value of V of 1.00. The ranking will be sorted according to the results of the vector V value, from the highest to the lowest.

E. Results Ranking

After completing the calculation phase of the Weighted Product method, the last step is to rank the results by using the Vector V value to get the best application recommendations.

Table 15. Alternative Ranking Results

Alternative	Vector V	Rank
A1	0,415	1
A2	0,293	2
A5	0,152	3
A6	0,098	4
A4	0,039	5
A3	0	6

Table 15 shows that the highest acquisition value of Vector V from the top three, namely 0.415 is A1 or Spotify, in the 2nd position with a value of 0.293 is A2 or Joox and the 3rd position with a value of 0.152 is A5 or Youtube Music. While the 4th position with a value of 0.098 is Resso, the 5th position with a value of 0.039 is Deezer and in the 6th position is A3, namely Apple Music with a value of 0 because it was not chosen by the respondent

Implementation of the Website-Based Weighted Product Method

Implementation of the Weighted Product Method Selection of the Best Music Streaming Application Services into a simple website-based system using the PHP programming language and database using MySQL. This system can be accessed with localhost using the help of the XAMPP application.

1. Login and Home Pages

In Figure 2, the login page is shown. This website is intended for administrators who will manage data in a decision support system. After the admin has successfully logged in, the page will be forwarded to the dashboard shown in Figure 3. menu consisting of Home, Criteria Data, Alternative Data, Calculation Analysis, Calculations, About Weighted Products, and Logout.
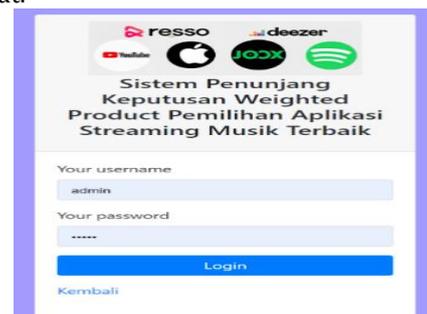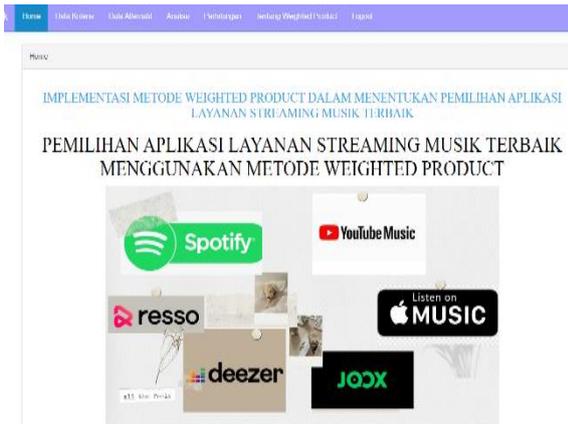

Figure 2. Login Page

Figure 3. Home Page

2. Criteria Data Menu

Figure 4 shows the criteria data table, which consists of criteria, interests, costs and benefits, and editing features.

Figure 4. Criteria Data Page

3. Criteria Alternative Menu

Figure 5 displays the alternative data provided along with the results of collecting questionnaire data.

Figure 5. Alternative Data Page

4. Calculation Analysis Menu
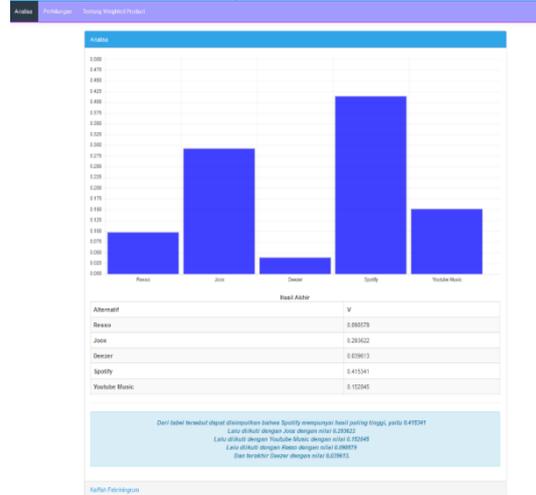
Figure 6. Calculation Analysis Page

In Figure 6, the data is displayed, which contains the bar chart of the results of the ranking analysis on the calculation menu. This menu displays visually and briefly the ranking results using a bar chart with a Vector V value along with the name of the recommended music streaming application with the highest gain. This menu can assist in displaying ranking results other than when using the calculation menu.

Display of the top recommendation results obtained from the final table of results, which can be printed in PDF format as shown in Figure 7,

Figure 7. Calculation Page

CONCLUSION

The first best music streaming service application is Spotify = 0.415, the second order is

Joox = 0.293, the third order is Youtube Music = 0.152, The fourth order is Resso = 0.098, The fifth order is Deezer = 0.039, while for the Apple Music application did not get an assessment from respondents and was in the last position with a total score of 0. In the implementation of the Weighted Product method, the solution to the problem of selecting the best music streaming service application with a relatively simple calculation and a high level of subjectivity in the formation of consideration criteria to get the best alternative results. The process and calculation results of the Weighted Product method have a high level of accuracy between SPSS calculations and a website-based system using the PHP programming language in recommending the best music streaming service application according to suitable criteria for users to increase the promotion of these services.

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