Jurnal Galaksi (Global Knowledge, Artificial Inteligent and Information System) E-ISSN: 3048-2399
Vol 1, No 2, August 2024, pp. 121-131
https://doi.org/10.70103/galaksi.v1i2.22

Multi Criteria Decision Making Approach in Determining the Best Online Streaming Platform for Alpha Generation

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ARTICLE INFO

Article history:
Received 20 August 2024
Revised 28 August 2024
Accepted 30 August 2024
Available Online 31 August 2024

Keywords:
Decision Making Model
Multi-Criteria Decision Making;
Online Streaming Platform

ABSTRACT

This research aims to determine the best online streaming platform for Generation Alpha using a Multi-Criteria Decision Making (MCDM) approach that combines the Analytical Hierarchy Process (AHP) and Weighted Product (WP) methods. The criteria evaluated include free nature, flexibility, ease of use, content diversity, and privacy security. Through the AHP model, the weights of the criteria were determined and used in the WP method to rank the alternatives. The results show that YouTube is the best platform with the highest preference value, followed by Netflix and Disney+ Hotstar. The combination of AHP and WP methods allows for more objective and scalable decision-making, providing relevant recommendations for users and developers of streaming platforms. The model also has the potential to be applied in other multi-criteria evaluation contexts.

1. Introduction

The development of information and communication technology in the last decade has drastically changed the way people access and consume entertainment content. One of the prominent evidences of this change is the emergence of various online streaming platforms that offer a wide array of content ranging from movies, television series, to original content (Ducange et al., 2019). Generation Alpha, generally born after 2010, grew up in a digital ecosystem rich in choice and ease of access. They are known to have high technological skills and different preferences than previous generations when it comes to media consumption (Liu et al., 2022; Wang et al., 2022). In this context, selecting the most suitable streaming platform to meet the needs and preferences of Generation Alpha is a challenge, given the many criteria to consider such as available content, subscription fees, interactive features, and security.

The main issue that arises is how to determine the best online streaming platform that can meet the specific needs of Generation Alpha (Biswas et al., 2022). With so many options available in the market, parents, educators, and even children themselves are faced with the dilemma of choosing a platform that is not only entertaining but also educational and safe. This complexity is compounded by the variety of criteria that must be considered, ranging from content quality, information, cost, ease of use, to data security. Therefore, a systematic and data-driven approach is needed to assist in making the right decision (Widjaja et al., 2024; Xu et al., 2024).

The urgency of this research lies in the pressing need to provide a decision model to determine the best online streaming platform that suits the characteristics and needs of Generation Alpha. Given that

the Alpha Generation are the future consumers who will dominate the market, understanding their preferences and needs is crucial for platform developers and content providers. In addition, with the increasing interest in online streaming platforms, there is a need for evaluation techniques that meet the criteria and parameters of easy access to information (Fuccio et al., 2022), having data security, being multiplatform, having diverse content and information and being free. Some of these parameters are very suitable in evaluating the most suitable online streaming platform for alpha generation (Zhou et al., 2022).

Based on the explanation above, this research aims to develop a decision-making model that combines the Analytical Hierarchy Process (AHP) and Weighted Product (WP) methods in determining the best online streaming platform for Generation Alpha. By utilizing AHP, this research will identify and prioritize criteria with a criteria weighting procedure based on the level of comparison of each criterion that is most important in platform selection (Khan & Ali, 2020). Furthermore, the WP method will be used to evaluate and rank the various platforms based on the predefined criteria to come up with the best alternative in the decision model. When determining the best movie viewing platform, the AHP (analytical hierarchy process) and WP (weighted product) approaches are key to making a more scalable decision. AHP is used to identify and consider various relevant criteria, such as content, service quality, price, accessibility, and other factors that are considered when choosing a platform. These weights can be used to measure the extent to which each criterion affects the final decision. The WP method is then used to create rankings based on the weights determined from the AHP. By inputting and weighting the criteria, WP can directly compare different movie-watching platforms and determine their relative rankings (Sudipa et al., 2022). Combining these two methods provides an opportunity for decision makers to make more objective decisions. The results of this decision support system do not replace the decision makers' decisions, but can be compared favorably with the results of other surveys and evaluations. This allows decision makers to conduct deeper analysis and gain clearer insights to select an image capture platform that suits the decision maker's needs and preferences.

2. Literature Review

In determining the best online streaming platform for Alpha Generation, a multi-criteria decision-making approach can be employed using the Analytical Hierarchy Process (AHP) and Weighted Product Method. This approach involves evaluating various factors to make an informed decision.

To begin with, the study by (Su et al., 2023) introduces a multi-criteria group decision-making method for risk assessment of live-streaming e-commerce platforms, which can be adapted to assess the risks associated with different online streaming platforms. Understanding the risks involved is crucial in decision-making(Wijaya et al., 2022).

Moreover, the research by (Meng & Lin, 2023) highlights the importance of factors like online stickiness, trust, and satisfaction in influencing consumer repurchase intention on live streaming platforms. These factors can be considered as criteria in the decision-making process.

Additionally, (Erciş et al., 2021) discuss the impact of brand experience, loyalty, and preference on online TV streaming platforms. Brand loyalty and preference can be significant criteria when evaluating the streaming platforms for Alpha Generation.

Furthermore, (Guo et al., 2021) emphasize how live streaming features can impact consumers' purchase intention. These features can be evaluated as part of the decision-making process to determine the platform that aligns best with the needs of Alpha Generation.

By integrating insights from these studies, a comprehensive evaluation framework can be developed using AHP and the Weighted Product Method to select the most suitable online streaming platform for Alpha Generation based on factors such as risk assessment, consumer behavior, brand loyalty, and purchase intention.

3. Research Methods

Analytical Hierarchy Process (AHP) Method

The AHP method is one of the Multiple Criteria Decision Making (MCDM) methods used to create a ratio scale based on discrete and continuous pairwise comparisons in a hierarchical multi-level structure. This is advantageous in decision making when choosing the best option based on certain criteria. AHP can solve problems by analyzing simultaneously and integrating between its parameters. The parameter value can be quantitative or qualitative or a combination of both, where qualitative parameters are first converted into quantitative so as to produce a more objective decision (Maulidah et al., 2024; Muni et al., 2024). The main component of AHP is a functional hierarchy that defines the goal or problem then criteria, sub criteria, attributes to the selected alternative (Kraugusteeliana & Violin, 2024). Based on the Saaty scale assessment technique, the AHP technique divides complex things into separate groups and arranges them in a hierarchical format and performs pairwise comparisons of each criterion value. The solution will be carried out in several stages of problems in the AHP method: decomposition (hierarchy), comparative assessment (evaluation of criteria and alternatives), priority synthesis (priority setting) and logical consistency.

Analytical Hierarchy Process is a hierarchical functional method that plays a role in solving complex and unstructured problems. These complex problems are organized into groups to form a hierarchical model. The main input of this method is human perception. The steps of AHP involve Identifying the problem and creating a hierarchical structure of the problem. Comparing elements in pairs based on predetermined criteria (Leal, 2020). Filling the pairwise comparison matrix with numbers that reflect the relative importance of each element. Sum the values of each column in the matrix. Find the normalization matrix by dividing each column value by the total column. Sum the values of each row and divide them by the number of elements to get the average value.

Furthermore, there is a process in measuring the consistency of the weighting results of the AHP method, this consistency checking process is an advantage of the AHP method in determining the weight value of the criteria, there are several steps to complete, namely (Khan & Ali, 2020):

A. Multiply the value in the first column by the relative priority of the first element.
B. Sum each row.
C. Divide the row sum result by the relative priority element.
D. Sum the result of the above division by the number of elements present. The result is called λ max.
E. Calculate the CI Consistency Index using the formula: (formula not provided in the question).

$$CI = \frac{\lambda max - n}{n-1} \quad (1)$$

Description:
n = number of criteria or sub-criteria
c1 = consistent index

F. Calculate the Consistency Ratio (CR) using the formula:

$$CR = \frac{CI}{RI} \quad (2)$$

Description:
CR = Consistency Ratio
CI = Consistency Index
RI = Random Index

Checking the consistency of the hierarchy. If the value is more than 10%, then the judgment data must be corrected. However, if the consistency ratio (CI/IR is less than equal to 0.1, then the calculation results are declared correct.

Weighted Product (WP) Method

The Weighted Product (WP) method is one of the methods of Multiple Attribute Decision Making (MADM) using multiplication techniques to connect attribute ratings, where the rating of each attribute must first be multiplied by the weight of the attribute concerned (Wahidin et al., 2024). The weighted product method is a technique that uses multiplication to connect attribute ratings, the rating of each attribute must first be multiplied by the weight of the attribute in question or what is commonly called the normalization process (Piantari et al., 2024; Putri et al., 2024; Wahidin & Sari, 2024). In this study, the weighting has been completed using the AHP method, followed by the calculation of rankings using the WP method starting from normalizing alternatives in WP to get a preference value.

In the WP method there are 3 stages, namely weight normalization, vector.s calculation and vector.v calculation. In the Weighted Product (WP) method, multiplication is needed to integrate attribute ratings, where the previous attribute value needs to go through a multiplication calculation with the associated weight. Calculating the value of V is to share the value of each vector S with the sum of all vectors S. Data processing using the Weighted Product method (Siregar et al., 2021) and the use of the Weighted Product (WP) method in the recruitment process can be applied in cases where there is still a high element of subjectivity.

There are several stages of determining the final value of the best alternative using the WP method, namely (Sudipa et al., 2022).

A. Determine the criteria that will be used as a reference in decision making (Ci) and alternatives (Ai).
B. Determine the value, weight on each criterion. In the context of this research, the weight value is determined using the AHP method.
C. Perform weight normalization with the total weight must be made a value of 1, with the equation

$$\sum_{j}^{n} = 1\, w_j = 1 \qquad (3)$$

D. Calculate the value of vector S with equation :

$$S_i = \prod_{j=1}^{n} X\ ij^{\,w\,j} \qquad (4)$$

Description:

S: expresses alternative preferences which are analogous to the vector S
x : stated criterion value
w. : states the weight of the criteria
X. : states the alternative
j : states the criteria
n : states the number of criteria
w_j is a positive rank for the profit attribute, and negative for the cost attribute.

E. Determine the value of the vector V:

$$V_i = \frac{\prod_{j=1}^{n} X_{\ ij}^{\ \ w\,j}}{\prod_{j=1}^{n} (X_{\ \ j\ \ *})^{w\ \ j}} \qquad (5)$$

Description:

V : expresses alternative preferences analogous to a vector V
x : stated criterion value
w : states the weight of the criteria
i : states the alternative
j : states the criteria
n : states the number of criteria

Overview of Decision Support System Model

The overview of this model is intended to facilitate and facilitate knowing the flow of the research process and knowing the functionality of the combination of methods applied.

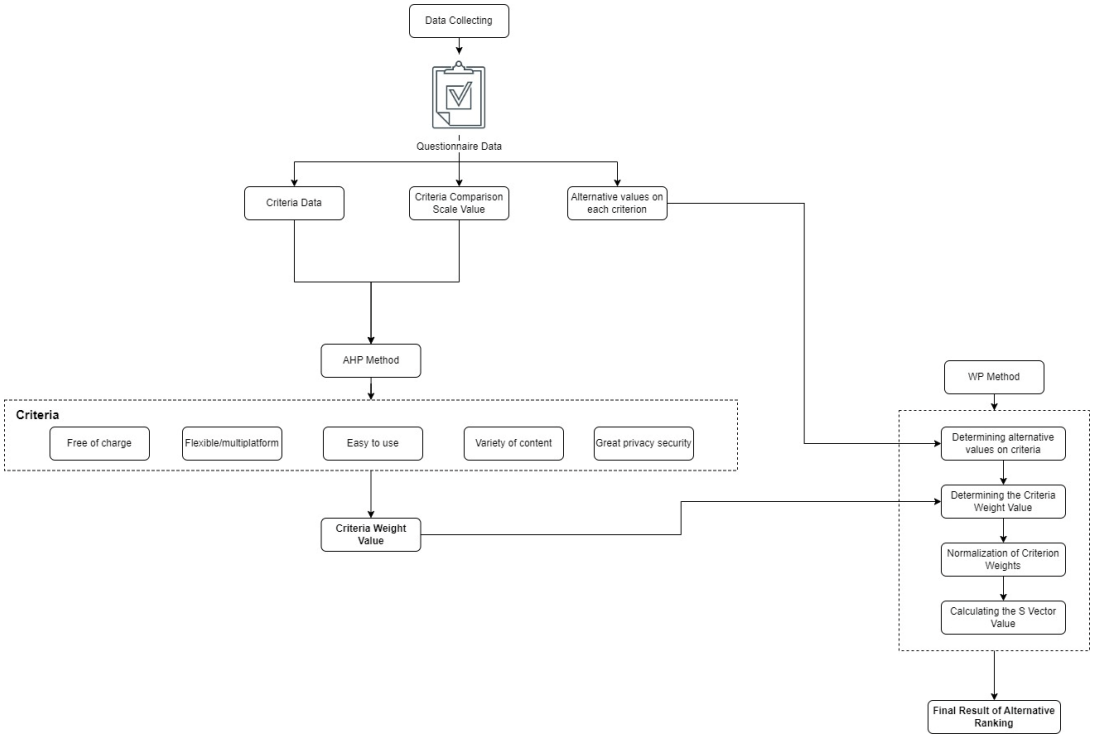

Fig. 1. Overview of AHP-WP Decision Support System Model

Based on Figure 1, an overview of the data collection process and the functionality of the AHP-WP method in determining online streaming platforms can be explained as follows.

Data Collection

The data collection process uses a questionnaire technique to 30 respondents, there are several data obtained, namely data on criteria that become decision criteria, namely the platform is free, flexible or multiplatform, easy to use, has diverse content and has privacy security that can guarantee the security of user data. Furthermore, there is data on the value of pairwise comparisons for each criterion obtained using the saaty scale, as well as alternative value data on each criterion using a scale of 1 to 5.

Decision Support System Method Functionality

Based on the results of data collection, there is criteria data that becomes the assessment criteria in determining the best online streaming platform, the criteria data is used in the AHP method to further determine the weight value of the criteria based on the pairwise comparison value of each criterion. The weight value of the criteria that has been generated from the AHP method is then used in the completion stage of the WP method.

Based on the results of data collection, there are alternative values for each criterion used in the completion stage of the WP method, after which the weight value of the criteria from the calculation of the AHP method is used as a priority for each criterion, the WP method stage is continued by normalizing the weight value of the criteria, determining the vector S value for each criterion, so that the final ranking value of the best alternative is obtained.

4. Results and Discussions

Criteria and Alternative Analysis

Choosing the best platform to watch movies is a challenge in the ever-evolving digital entertainment industry. The increasing competition between the various streaming services Netflix, Vidio, Viu, Youtube, and Disney+ makes choosing the best option complicated. Users not only consider the exclusive content that each platform offers, but also consider factors such as broadcast quality, genre diversity, and pricing policies. Although user preferences are constantly changing, the platform that can offer the best combination of diverse content, high video quality, easy access, and competitive subscription value is the best choice for financially users and passionate movie buffs. Criteria and Alternatives were obtained from interviewing 30 respondents.

Table 1. Criteria

Description	Criteria
C1	Free of charge
C2	Flexible/multiplatform
C3	Easy to use
C4	Has diverse content
C5	Has great privacy security

Table 2. Alternatives

Description	Alternative
A1	Netflix
A2	Youtube
A3	Video
A4	Disney+ Hotstar
A5	Viu

When determining the best movie-watching platform, the AHP (analytical hierarchy process) and WP (weighted product) approaches are key to making a more measured decision. AHP is used to identify and weigh various relevant criteria, such as content, service quality, price, accessibility, and other factors that are considered when choosing a platform. These weights can be used to measure the extent to which each criterion affects the final decision.

The WP method is then used to create rankings based on the weights determined from AHP. By entering and weighting the criteria, WP can directly compare different movie-watching platforms and determine their relative rankings. Combining these two methods provides an opportunity for decision makers to make more objective decisions. The results of this decision support system do not replace the decision makers' decisions, but can be compared favorably with the results of other surveys and evaluations. This allows decision-makers to conduct deeper analysis and gain clearer insights to select an image capture platform that suits their needs and preferences.

Table 3. Criteria Attribute Values

Weight	Description
5	Strongly Agree
4	Agree
3	Disagree
2	Disagree
1	Strongly Disagree

Determination of Criteria Weight Value with AHP Method

Create a Pairwise Comparison Matrix, perform calculations using AHP

Table 3. Pairwise Comparison Matrix

Step 1	C1	C2	C3	C4	C5
C1	1	2	5	4	3
C2	0,5	1	2	4	3
C3	0,2	0,5	1	2	5
C4	0,25	0,25	0,5	1	4
C5	0,333333333	0,333333333	0,2	0,25	1
Total	2,283333333	4,083333333	8,7	11,25	16

Table 4. Normalization

Step 2	C1	C2	C3	C4	C5	Total	Average
C1	0,437956204	0,489795918	0,574712644	0,355555556	0,1875	2,045520322	0,409104064
C2	0,218978102	0,244897959	0,229885057	0,355555556	0,1875	1,236816674	0,247363335
C3	0,087591241	0,12244898	0,114942529	0,177777778	0,3125	0,815260527	0,163052105
C4	0,109489051	0,06122449	0,057471264	0,088888889	0,25	0,567073694	0,113414739
C5	0,145985401	0,081632653	0,022988506	0,022222222	0,0625	0,335328782	0,067065756

The above is Step 2, which is normalization. Find the average in order to calculate λmax-n, by multiplying table 3 with table 4.

Table 5. Average Value

Step 3	C1	C2	C3	C4	C5	Total	Average
C1	0,409104064	0,49472667	0,815260527	0,453658955	0,201197269	2,373947486	5,802796141
C2	0,204552032	0,247363335	0,326104211	0,453658955	0,201197269	1,432875803	5,792595751
C3	0,081820813	0,123681667	0,163052105	0,226829478	0,335328782	0,930712846	5,70807009
C4	0,102276016	0,061840834	0,081526053	0,113414739	0,268263026	0,627320667	5,531209381
C5	0,136368021	0,082454445	0,032610421	0,028353685	0,067065756	0,346852329	5,171824592
							28,00649595

Calculating λmax = Average/number of Criteria = 28.00649595/5 = 5.601299191

Calculate CI, i.e. $CI = \frac{\lambda max - n}{n-1}$ = 5,601299191/4 = 0,150324798

Calculating CR, namely $CR = \frac{CI}{RI}$ = 0,150324798/1.12 = 0,1034

After calculating with the AHP method, the eigen of each criterion is obtained, which then becomes the weight of each criterion and the following weights are obtained

Table 3. Criteria Weights

Weight	Criteria

C1	0,409104
C2	0,247363
C3	0,163052
C4	0,113415
C5	0,067066
Total	1

Determination of Final Value of Alternatives with WP Method

At this stage the process of calculating the final value of alternatives applies the WP method, so that the alternative value for each criterion will be calculated based on a value scale of 1 to 5.

Table 6. Alternative Values on each Criterion

	C1	C2	C3	C4	C5
A1	4	5	5	5	5
A2	5	5	5	5	5
A3	4	4	4	5	3
A4	4	4	4	5	5
A5	4	4	3	3	3

Calculating the S vector

The vector S is calculated based on equation (4) as follows:

S1 = (4^ 0,41) *(5^0,25)*(5^0,16)* (5^0,11)*(5^0,07) = 2,821576

S2 = (5^ 0,41) *(5^0,25)*(5^0,16)* (5^0,11)*(5^0,07) = 3,091895

S3 = (4^ 0,41) *(4^0,25)*(4^0,16)* (5^0,11)*(3^0,07) = 2,059799

S4 = (4^ 0,41) *(4^0,25)*(4^0,16)* (5^0,11)*(5^0,07) = 2,134785

S5 = (4^ 0,41) *(4^0,25)*(3^0,16)* (3^0,11)*(3^0,07) = 1,460436

The vector value to be used for ranking can be calculated based on equation (5), resulting in the following value:

$$V1 = \frac{2,821576}{(2,821576+3,091895+2,059799+2,134785+1,460436)} = 0,243902$$

$$V2 = \frac{3,091895}{(2,821576+3,091895+2,059799+2,134785+1,460436)} = 0,267269$$

$$V3 = \frac{2,059799}{(2,821576+3,091895+2,059799+2,134785+1,460436)} = 0,178052$$

$$V4 = \frac{2,134785}{(2,821576+3,091895+2,059799+2,134785+1,460436)} = 0,184534$$

$$V5 = \frac{1,460436}{(2,821576+3,091895+2,059799+2,134785+1,460436)} = 0,126243$$

The results of the above calculations are then ranked from highest to lowest to get ranking recommendations, as shown in the following table:

Table 7. Alternative Ranking Results

Alternative Code	Alternative Name	**S**	**V**	**Rank**
A1	Netflix	2,821576	0,243902	2
A2	Youtube	3,091895	0,267269	1
A3	Video	2,059799	0,178052	4
A4	Disney+ Hotstar	2,134785	0,184534	3
A5	Viu	1,460436	0,126243	5

Based on the table of alternative ranking results, it can be explained that the best alternative as an online streaming platform is alternative A2, namely Youtube, then the next alternative is Alternative A1, namely Netflix, and Alternative A4, namely Disney + Hotstar. The 3 best alternatives are the results of alternative rankings from the WP method. So it can be conveyed that the AHP-WP method can be used in selecting online streaming platforms.

5. Conclusion

This research successfully developed an effective decision-making model in determining the best online streaming platform for Generation Alpha using a combination of Analytical Hierarchy Process (AHP) and Weighted Product (WP) methods. The model is based on the evaluation of various criteria such as free nature, flexibility, ease of use, content diversity, and privacy security. The results showed that YouTube was the best choice with the highest ranking based on preference scores, followed by Netflix and Disney+ Hotstar. The use of the AHP method allowed the researcher to determine the relative weight of each criterion, while the WP method was used to perform the final ranking of the alternatives. The combination of these two methods offers an objective and measurable approach to the decision-making process, allowing researchers to produce more accurate recommendations. These results are not only relevant for parents and educators in selecting suitable platforms for Generation Alpha, but also beneficial for platform developers and content providers to understand the needs and preferences of young users. The model can be applied to other contexts that require multi-criteria evaluations, thus making a significant contribution to the field of related research.

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