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Strategic Location Selection for Johnny Andrean Outlets Using AHP-TOPSIS Method

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ABSTRACT

Johnny Andrean Group operates in the food and beverage (F&B) sector and has been motivated to expand by opening new branches in order to meet public demand. Through the expansion of its outlets, the Johnny Andrean Group aims to satisfy public demand and provide better services to the community. The Johnny Andrean Group's expansion uses a variety of methods to expand and open new branches. The Johnny Andrean Group is trying to expand its network by opening a number of outlets at certain locations. The Analytical Hierarchy Process (AHP)-TOPSIS method is used, which is part of a Decision Support System (DSS). The AHP-TOPSIS method is also used in conjunction with the selection of strategically appropriate locations. It uses five criteria and three options. According to the AHP-TOPSIS method's results, the Bekasi location is the greatest option for opening a new Johnny Andrean Group store. It received the highest score of 0,594. The Bogor area had the second-highest score 0,542 while the East Jakarta area received the lowest score 0,328

Keywords *: AHP, Food and bavarage, Decision Support System, TOPSIS*

ABSTRAK

Pesatnya industri makanan dan minuman dengan bertumbuhnya jaringan di industri membuat *Johnny Andrean Group* bergerak dibidang *Food and Bavarage* harus berekspansi membuka cabang guna memenuhi kebutuhan masyarakat. Ekspansi pembukaan outlet *Johnnya Andrean Group* bertujuan memenuhi keinginan masyarakat dan meningkatkan pelayanan kepada masyarakat.. Metode yang digunakan menggunakan metode AHP-TOPSIS merupakan dalam *Decision Support System* (DSS). Metode AHP-TOPSIS dikombinasikan dengan memilih lokasi yang sangat tepat dan strategis. Menggunakan 5 kriteria dan 3 alternatif. Hasil kombinasi Metode AHP-TOPSIS bahwa alternatif terbaik berada di wilayah Bekasi menghasilkan nilai tertinggi yaitu 0,594 sekaligus sangat direkomendasikan untuk dipilih menjadik keputusan yang sangat bagus dalam membuka outlet baru *Johnny Andrean Group*. Disusul nilai tertinggi kedua adalah wilayah Bogor dengan nilai 0,542 dan nilai terendah adalah wilayah Jakarta Timur dengan nilai 0,328.

Kata Kunci: *AHP, Food and bavarage, Pengambilan Keputusan, TOPSIS*

INTRODUCTION

Food marketing has long been known to have an impact on consumers' tastes and consumption habits (Elliott et al., 2023). It might be difficult to decide where to open a new store because key locations are often chosen incorrectly, which can result in mistakes that cost the business money. Transportation expenses, labor shortages, lost competitive chances, a lack of public enthusiasm, and an unsupportive environment that impedes the company's operations and results in low profitability are some of the variables that could cause mistakes when choosing a location for a new store (Andri et al., 2022). PT JCO Donuts and Coffee, PT Royal Panca Persada Anugerah, and PT Harmoni Mitra Jaya are just a few of the subsidiaries that are managed by the holding firm Johnny Andrean Group. The opening of a new store is driven by the potential for high public interest in the products offered by the company, the convenience of the service, and a location that is easily accessible and well-known to the community (Zulfitriana, 2019).

The regularity and homogeneity that characterize each region are reflected in its unique features. Based on market and economic potential, the Greater Jakarta area's regions were picked to open multiple outlets across different branches (Achmad and others, 2021). Due to the high level of public passion and interest in the company's brand, location is a crucial aspect in determining the success of profit or revenue growth from sales, which is why this study attempts to find advantageous locations for opening new stores (Alva et al., 2022). A suitable approach is required to solve the problem of choosing a location for a new shop branch, which necessitates the application of several factors to enable optimal decision-making. The AHP-TOPSIS approach is employed (Nuari et al., 2019).

Researchers and decision-makers frequently employ the Analytic Hierarchy Process (AHP). Important phases in this approach to assessing options are defining the criteria and determining their weights (Henny Pratiwi, 2020). AHP is also a multivariate optimization and decision-making method used in policy analysis. Additionally, AHP is a thorough decision-making model that considers both qualitative and quantitative aspects (Fentahun and others, 2021). Starting with objectives, criteria, subcriteria, and options, this approach to tackling complicated decision-making problems is basically presented in a hierarchical structure (Jasim et al., 2018). According to the TOPSIS (Techniques for Order Preference by Similarity to Ideal Solution) technique, the chosen option must be the furthest away from the negative ideal solution and the closest to the positive ideal solution. Ali and colleagues, 2023 According to the TOPSIS approach, each criterion tends to either increase or decrease utility monotonically. The positive and negative ideal solutions are therefore simple to identify. Benefit and cost information are used in the TOPSIS technique. A negative ideal solution in this study is the option with the highest cost and the lowest benefit, whereas a positive ideal solution is the option with the lowest cost and the highest benefit (Abdullah et al., 2023)

The objective of this study is to determine an alternative for starting a new Johnny Andrean Group store that has comparatively low costs but produces comparatively high advantages or profits (Jasim et al., 2018). In order to improve services and meet community needs, the Johnny Andrean Group's study aims to expand by opening new store branches in a number of potential areas. As a result, it is necessary to choose a number of potential areas based on criteria and alternatives identified by experts using the AHP-TOPSIS method.

AHP-TOPSIS was used in the multi-criteria approach of the research methodology. There are two steps in the process. A flowchart utilizing the TOPSIS and AHP techniques is available. Figure 1 illustrates the AHP method's definition of objectives, criteria, subcriteria, and alternatives. With an emphasis on the weights of the criteria and alternatives, phase two defines the primary criteria, solutions, alternatives, and criterion weights. The geographical prices, degree of competitiveness, accessibility, security, and environment make up the five criteria. Three options are taken into consideration: Bogor, East Jakarta, and Bekasi. 1. Very Poor, 2. Poor, 3. Fair, 4. Good, and 5. Very Good make up the grading system. To decide which option is best for starting a Johnny Andrean Group branch, three experts were given the criteria and alternative facts. The following is the decision-making process using AHP:

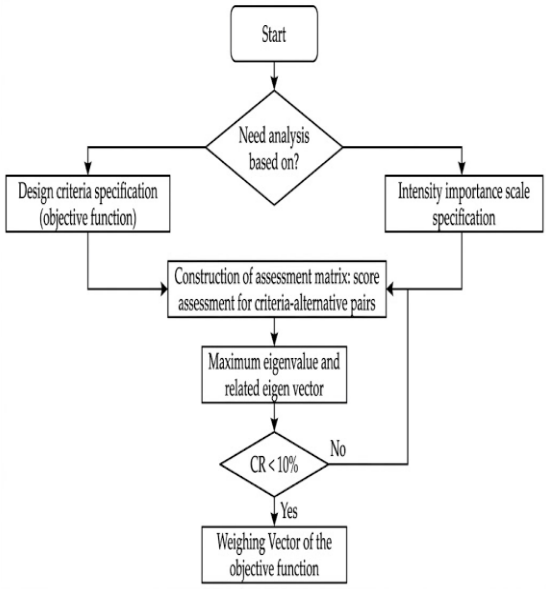

Figure 1. AHP Flowchart

Figure 2 illustrates the TOPSIS method's definition to determine alternative. Then, using a mix of AHP and TOPSIS, the rankings were established based on the assessments of the three experts.

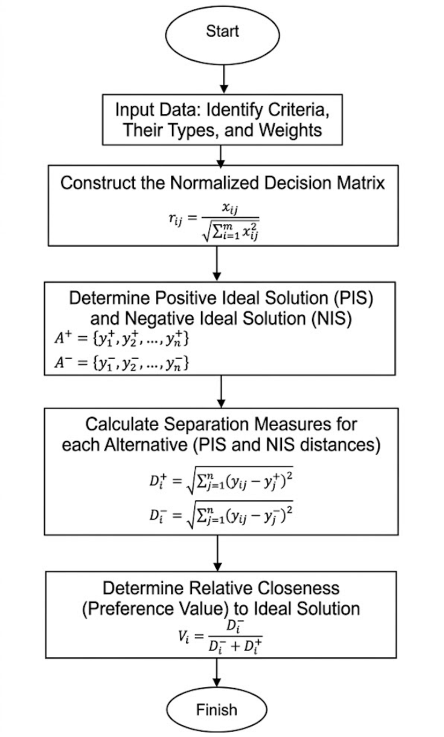

Figure 2. TOPSIS Flowchart

The method employed involves combining the AHP-TOPSIS method to determine the best alternative, as illustrated in Figure 3 (Magableh et al., 2022)

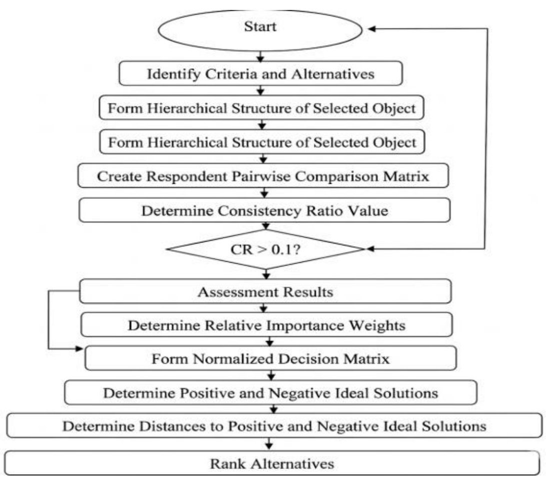

Figure 3. AHP-TOPSIS Flowchart

RESULT AND DISCUSSION

The AHP-TOPSIS approach was used in a study published in this publication. The results of the AHP-TOPSIS technique computations are as follows. Three area managers from the Johnny Andrean Group make up the panel of specialists, who act as assessors and/or responders.

1. AHP Methode

When opening an outlet in the Greater Jakarta area, the following five factors are taken into account: location prices, level of competition, accessibility, security, and surrounding environment. Bekasi, East Jakarta, and Bogor are the chosen substitutes. Each criterion has a certain weight, as shown by the lines that link "Goal" to each "Criterion" and the lines that are formed from each criterion to identify the most suitable site alternative as a figure 4. This makes it possible to calculate in the following step.

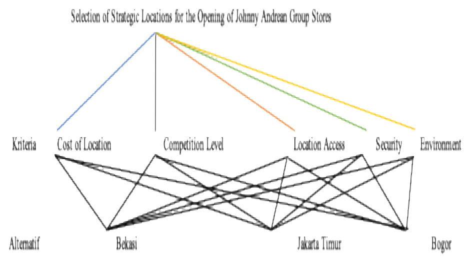

Figure 4. Hierarchical Structure

The three specialists were shown the responders. The vector scores for each criterion were established using the findings of the assessments carried out by the three experts as a Tabel 1 until Table 3.

Table 1 Results from the first expert respondent

Criteria	Cost Location	Competition Level	Location Access	Security	Environment

Cost Location	1	5	3	0,33	7
Competition Level	0,20	1	0,20	0,33	3
Location Access	0,33	5	1	3	5
Security	3	3	0,33	1	7
Environment	0,14	0,33	0,20	0,14	1

Table 2 Results from the second expert respondent

Criteria	Cost Location	Competition Level	Location Access	Security	Environment
Cost Location	1	5	0,20	3	0,33
Competition Level	0,20	1	0,25	0,33	0,14
Location Access	5	4	1	3	3
Security	0,33	3	0,33	1	3
Environment	3	7	0,33	0,33	1

Table 3 Results from the third expert respondent

Criteria	Cost Location	Competition Level	Location Access	Security	Environment
Cost Location	1	0,25	0,33	3	5
Competition Level	4	1	0,25	0,33	5
Location Access	3	4	1	3	5
Security	0,33	3	0,33	1	3
Environment	0,20	0,20	0,20	0,33	1

The vector score for each criterion from each expert is determined using the individual scores for each criterion, which represent the findings from the three experts. Each expert's vector score was calculated by compiling the responses from the three experts as a table 4 until table 6.

Table 4 Vector Score from first expert

Criteria	Cost Location	Competition Level	Location Access	Security	Environment	Priority Vector Value
Cost Location	0,214	0,349	0,634	0,069	0,304	0,314
Competition Level	0,043	0,070	0,042	0,069	0,130	0,071
Location Access	0,071	0,349	0,211	0,624	0,217	0,295
Security	0,642	0,209	0,070	0,208	0,304	0,287
Environment	0,031	0,023	0,042	0,030	0,043	0,034
					Total	1

Table 5 Vector Score from second expert

Criteria	Cost Location	Competition Level	Location Access	Security	Environment	Priority Vector Value
Cost Location	0,105	0,250	0,094	0,391	0,045	0,177

Competition Level	0,021	0,050	0,118	0,043	0,019	0,050
Location Access	0,524	0,200	0,472	0,391	0,401	0,398
Security	0,035	0,150	0,157	0,130	0,401	0,175
Environment	0,315	0,350	0,157	0,043	0,134	0,200
					Total	1

Table 6. Vector Score from third expert

Criteria	Cost Location	Competition Level	Location Access	Security	Environment	Priority Vector Value
Cost Location	0,117	0,030	0,157	0,391	0,263	0,192
Competition Level	0,469	0,118	0,118	0,043	0,263	0,202
Location Access	0,352	0,473	0,472	0,391	0,263	0,390
Security	0,039	0,355	0,157	0,130	0,158	0,168
Environment	0,023	0,024	0,094	0,043	0,053	0,048
					Total	1

The next stage is to determine each expert's consistency score after computing their vector scores, if the priority vector score is less than 1. Consistency scores as shown in the table 7.

Table 7 Consistent Results from Expert

First Expert Repondent		First Expert Repondent		First Expert Repondent	
CI	CR	CI	CR	CI	CR
3,978	0,036	4,186	0,037	4,214	0,037

The first expert's scores are shown in Table 7 with a consistency index of 3.987 and a consistency ratio of less than 0.1 (10%); the second expert's consistency index value is higher than the first expert's, at 4.186, but the consistency ratio is still less than 0.1; and the third expert's consistency index value is 4.214 with a consistency ratio of less than 0.1 (10%). The relative importance scores are determined by compiling the ranking scores provided by each expert. The relative importance scores are shown in the table 8 below .

Table 8. Relative importance scores

Criteria weights	Cost Location	Competition Level	Location Access	Security	Environment
Bekasi	0,15	0,02	0,06	0,17	0,26
East Jakarta	0,12	0,08	0,03	0,08	0,06
Bogor	0,03	0,06	0,19	0,06	0,14

According to Table 8, Bekasi is the best in terms of safety and the environment, East Jakarta is very competitive in terms of cost, and Bogor is the best in terms of accessibility.

Table 9. Values of the Ideal Solution: Positive and Negative

Criteria weights	Cost Location	Competition Level	Location Access	Security	Environment
Positive	0,15	0,02	0,19	0,06	0,26
Negative	0,03	0,08	0,03	0,17	0,06

According to Table 9, access to the place and the environment have the poorest conditions and the lowest positive ideal solution values, while location cost and degree of competition have the highest positive ideal solution values. The region with the highest positive ideal solution value for the environment and a location cost that is far from the negative ideal

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solution is the best and most highly advised based on the positive and negative values of each criterion.

Table 10 Solution distance

Region	D+	D-
Bekasi	0,168	0,247
East Jakarta	0,268	0,131
Bogor	0,178	0,211

These figures indicate how far a location is from the "ideal conditions" and the "worst-case scenario". Table 11's preference findings show the ranking.

Table 11 Preference Scores and Rankings

Alternatif	Preferensi	Rangking
Bekasi	0,594	1
West Jakarta	0,328	3
Bogor	0,542	2

According to preference scores and rankings, Bekasi is the finest option chosen as a reference for opening a new retail branch, with a score of 0.594. Bogor comes in second, while East Jakarta is the final option.

CONCLUSION AND RECOMMENDATION

CONCLUSION

Based on a number of important factors, the locations for the establishment of new Johnny Andrean Group stores have been reduced to East Jakarta, Bekasi, and Bogor. AHP-TOPSIS is the method used to identify the ideal site for a new Johnny Andrean Group store. An ideal position can be found using AHP-TOPSIS. Based on review criteria such as site costs, degree of competitiveness, accessibility, security, and environment, three regions were chosen. Bekasi had a preference value of 0,594 out of these three options, Bogor received a score of 0,542 and East Jakarta received a score of 0,328.

RECOMMENDATION

This study is a useful benchmark for regional selection despite its limited accuracy. The primary flaw in the approach is that it relies primarily on subjective expert evaluations and ignores actual cartographic data. To provide more accurate mapping results, the combined GIS-MCDM with AHP-TOPSIS system must be rigorously validated.

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