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Intelligent digital hospitality ecosystem: A mobile-driven multi-criteria decision support system integrating Vikor-entropy optimization for strategic analytics

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Abstract

This study addresses the lack of accessible and objective hotel information for tourists in Bandung by developing a mobile-based hotel recommendation system. The system integrates the VIKOR method for ranking alternatives and the Entropy method for weighting decision criteria objectively. Built using the Rapid Application Development (RAD) model, the application evaluates 48 hotels across Cibeunying, Bojonagara, and Karees regions based on four key criteria: price, location, facilities, and hotel class. Data were gathered through interviews with tourism officials, questionnaire responses from 100 tourists, and literature studies to ensure relevance and accuracy. The system allows users to adjust their preferences, generating personalized hotel recommendations based on their priorities. The results show that the application effectively produces consistent and meaningful rankings under different decision-making scenarios. The integration of VIKOR and Entropy enables more accurate, transparent, and adaptable recommendations that suit a wide range of tourist needs. This decision support system enhances the availability and quality of hotel information in Bandung, helping both domestic and international tourists make informed decisions. It also provides practical insights for hospitality stakeholders aiming to optimize their offerings and increase customer satisfaction.

Keywords: Decision support system, Digital ecosystem, Multi-criteria decision making, VIKOR, Entropy.

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1. Introduction

1.1. Background

Tourism has become one of the most dynamic and strategic sectors in urban development, contributing significantly to both economic growth and social progress worldwide [1]. As urban tourism continues to expand, the need for sustainable infrastructure and intelligent service systems has become increasingly prominent. In Indonesia, Bandung capital of West Java Province, has emerged as a key tourism destination for both domestic and international travelers. This development is supported by the city's multifunctional role as a center of governance, commerce, industry, and services [2].

Bandung's appeal as a tourism destination is shaped by several pull factors, including a temperate climate, rich cultural heritage, and a wide variety of tourist attractions [2]. According to the city's tourism development plan, key tourism potentials can be categorized into heritage tourism, culinary and shopping tourism, educational tourism, recreation and entertainment, and MICE (Meetings, Incentives, Conventions, and Exhibitions) tourism [3]. These categories reflect the multifaceted nature of urban tourism in Bandung, emphasizing both cultural assets and service infrastructure.

Table 1.
Typology of potential tourist attractions of Bandung City.

Type of Attraction	
a	Heritage Tourism
b	Shopping and Culinary Tourism
c	Education Tourism
d	Recreation and Entertainment (Nature, Culture, Artificial)
e	*MICE (Meeting, Incentive, Convention and Exhibition)*

A critical component in supporting tourism growth is the provision of amenities and accessibility, which directly impact visitor satisfaction and destination competitiveness. Amenities such as accommodations, food services, and travel agencies have expanded in Bandung in response to increasing tourism demand [2]. At the same time, the city's accessibility has improved through enhanced public transportation networks, including train stations, bus terminals, and local transit systems. These developments not only facilitate visitor movement but also stimulate local economic activities [4].

Among the fastest-growing segments of the tourism industry in Indonesia is MICE tourism. This segment has seen rising demand due to increased business travel and infrastructure investment in hotels and convention facilities. Grand View Research [5] estimates indicate that the Indonesian hotel and resort market will grow from USD 7.41 billion in 2024 to USD 20.31 billion by 2030, with a compound annual growth rate (CAGR) of 18.3% [5]. Bandung has responded to this demand with a significant expansion of hotel infrastructure: by 2016, the city hosted 392 hotels with a total of 16,920 rooms, ranging from budget to five-star classifications [6]. As competition among hotels intensifies, the ability to provide tailored information and decision support to tourists becomes increasingly important. Mobile technology, particularly Android-based applications, offers a promising platform for delivering personalized hotel recommendations. With Android accounting for 82.8% of the global smartphone market, it presents significant opportunities for hotel marketing and customer engagement [7] its dominance provides a strong foundation for scalable solutions [8].

To optimize the hotel selection process, decision-making tools that consider multiple and often conflicting criteria are required. The VIKOR (VlseKriterijumska Optimizacija I Kompromisno Resenje) method has been widely recognized for its capability to rank alternatives based on a compromise solution that reflects both proximity to the ideal solution and individual regret [9]. However, the effectiveness of VIKOR can be enhanced when combined with objective weighting methods such as Entropy, which determines criterion weights based on data variability rather than expert judgment, thereby reducing bias [10]. While several studies have employed AHP, TOPSIS, or fuzzy logic in tourism decision-making [11, 12], limited research has integrated VIKOR with Entropy in mobile applications for hotel recommendations. This study addresses that gap by developing an Android-based hotel recommendation system using the VIKOR-Entropy hybrid method. The objective is to offer a more accurate, data-driven, and user-friendly tool to support tourists in selecting accommodations that match their preferences and priorities.

The remainder of this paper is structured as follows: Section 2 presents the literature review on decision support systems and multi-criteria decision-making methods. Section 3 outlines the research methodology, including data collection and system development. Section 4 discusses the results and analysis across four decision scenarios. Finally, Section 5 concludes the paper and offers practical implications and suggestions for future research.

1.2. Research Problem

Despite the increasing demand for tourism services in Bandung City, particularly in the hotel and MICE (Meeting, Incentive, Convention, and Exhibition) sectors, there remains a significant gap in personalized, data-driven decision support tools for tourists seeking accommodation. While various types and classes of hotels are available, travelers often lack access to accurate, objective, and user-friendly information that can guide them in selecting hotels that best match their needs and preferences. This issue is further complicated by the competitive nature of the hospitality industry in Bandung and the absence of integrated recommendation systems tailored to the tourism profile of the city.

To address this issue, the study raises the following key research question: How can a decision support system based on VIKOR and Entropy methods be implemented in an Android-based application to provide accurate hotel recommendations aligned with tourist preferences in Bandung City?

1.3. Scope and Limitations

This study focuses on the development of a decision support system for hotel selection within the administrative region of Bandung City. The proposed system incorporates the VIKOR method for ranking alternatives based on multiple conflicting criteria and the Entropy method for assigning objective weights to each criterion. The application is designed for Android-based platforms, reflecting the operating system's dominant market share in Indonesia. The recommendation output is constrained to existing hotel data categorized by star and Melati classes, and the evaluation is limited to predefined criteria such as price, accessibility, and available amenities. This study does not address real-time data updates, machine learning-based preference adaptation, or user behavior analytics.

2. Literature Review

2.1. Decision Support System

A decision support system is a computerized system used in decision-making and designed to complement the cognitive processes of human decision-making [13]. Decision support systems are a discipline of computational information systems that aim to complement approaches in applying information systems technology to increase the effectiveness of decision makers, where these decisions can support and add to human opinion in terms of performance that cannot be determined [14]. Decision support systems (DSS) are components of computer-based information systems, including knowledge-based systems or knowledge management, used to support decision-making within an organization or company [15]. From some of the definitions above, it can be concluded that decision-making is a computation-based system that is useful in the process of selecting the best alternative from several options systematically, thereby assisting humans in making decisions.

2.2. MCDM (Multi-Criteria Decision Making)

Multiple Criteria Decision Making (MCDM) is a decision-making method used to identify the best alternative among several options based on specific criteria. Criteria are typically expressed as measures, rules, or standards employed in the decision-making process [16]. According to Yalcin et al. [17], based on its purpose, MCDM can be divided into two models, namely Multi-Attribute Decision Making (MADM) and Multi-Objective Decision Making (MODM). Often, MCDM and MADM are used to describe the same class or category. MADM is used to solve problems in a discrete space. Therefore, MADM is usually employed to assess or select a limited number of alternatives [17]. Meanwhile, MODM is used to solve problems in continuous space, such as those in mathematical programming [16].

In general, it can be said that MADM selects the best alternative from a number of alternatives, while MODM designs the best alternative. There are several common features that will be used in MCDM, namely [16]:

1. Alternatives

Alternatives are different objects that have the same opportunity to be selected by the decision maker.

2. Attributes

Attributes are often also referred to as characteristics, components, or decision criteria. Although most criteria are at one level, this does not exclude the possibility of sub-criteria related to the given criteria.

3. Conflict between Criteria

Some criteria usually conflict with one another; for example, profit criteria may conflict with cost criteria.

4. Decision weight

The decision weight shows the relative importance of each criterion, W = (w1, w2, ..., wn).MCDM will find the importance weight of each criterion.

5. Decision matrix

A decision matrix X of size m x n, containing elements xij, which represents the rating of alternatives Ai (i = 1,2, ...,m) against criteria Cj (j = 1,2, ...,n).

The following is a comparison table of MADM methods [18].

Table 2.
Comparison of SPK Methods.

Method	Computation Time	Simplicity	Mathematical Calculation	Stability	Type of Information
MOORA	Very low	Very simple	Minimum	Good	Quantitative
AHP	Very high	Very difficult	Maximum	Bad	Mix.
TOPSIS	Medium	Medium	Medium	Medium	Quantitative
VIKOR	Low	Simple	Medium	Medium	Quantitative
ELECTRE	High	Slightly Difficult	Medium	Medium	Mix.
PROM-ETHEE	High	Slightly Difficult	Medium	Medium	Mix.

2.3. VIKOR

The VIKOR method (Vlse Kriterijumska Optimizacija Kompromisno Resenje in Serbia) is one of the MCDM (Multi-Criteria Decision Making) methods that has a simple calculation procedure with consideration of proximity between ideal and non-ideal alternatives. The VIKOR method was developed by Opricović [19] for complex multi-criteria optimization [20]. This method can be used to rank many criteria, both qualitative and quantitative.

The value of v in the formula used to determine the ranking ratio is the weight assigned to the majority of the criteria, typically set at 0.5. The outcome of the VIKOR method is a ranking of alternatives from the best to the lowest. The solution provided by VIKOR considers the balance between the maximum utility value of the group (Si) and the minimum regret value of the individual (Ri), which are often conflicting [21]. The stages of the VIKOR method, namely [22]:

2.3.1. Define the Normalized Decision Matrix

The form of the normalized decision matrix is as follows:

$$X = \begin{matrix} X_{11} & X_{12} & \ldots & X_{1n} \\ X_{21} & \ldots & \ldots & \ldots \\ \ldots & \ldots & \ldots & \ldots \\ X_{m1} & \ldots & \ldots & X_{mn} \end{matrix}$$

The form of the normalized decision matrix is as follows: where x_{ij} indicates the value of the ith alternative at the jth attribute, m represents the number of alternatives, and n denotes the number of attributes.

2.3.2. Determining the Best Value and the Worst Value or Also Called Positive Ideal Value and Negative Ideal Value

Determine the best value (fi*) and worst value (fi-) for all criteria functions, i= 1,2,...,n.

If the i-th criterion function is a benefit criterion then,

fi* = max(fij, j=1,...,J), and fi- = min(fij, j=1,...,J).

while if the i-th criterion is a loss criterion (cost) then,

fi* = min(fij, j=1,...,J), and fi- = max(fij, j=1,...,J)

2.3.3. Calculating utility (S) and regret (R) values

Calculate the value of S, which is the distance of the positive ideal solution alternative and R, which is the distance of the negative ideal solution alternative.

$$S_i = \sum_{j=1}^{n} \frac{wj(fj^* - f_{ij})}{fj^* - fj^-}$$

$$Ri = \max [w_j(f_j^* - f_{ij})/(f_j^* - f_j^-)]$$

2.3.4. Calculating the VIKOR Index

The VIKOR Qi value is the reference used in the ranking process for each alternative. The smaller the Qi, the closer the alternative is to the optimal solution.

The calculation of the VIKOR value can be calculated by the formula:

$$Q_i = v \left[\frac{S_i - S^*}{S^- - S^*} \right] + (1-v) \left[\frac{R_i - R^*}{R^- - R^*} \right]$$

2.3.5. Sort The VIKOR Index Results in Descending Order

The result with the smallest VIKOR value is the best solution

2.3.6. Checking The Conditions to Be Met

The best solution of alternative (j(1)) is the best ranking of the minimum value of Qj provided that two conditions are met:

C1. "Acceptable profit":

Q(j(2)) - Q(j(1)) ≥ DQ, where j(2) is an alternative that is in the 2nd best position of the ranking order Qj, while DQ = 1 (J-1) and J is the number of alternatives.

C2. "Acceptable decision-making stability": Alternative j(1) should be the best ranking in Sj and Rj. This will stabilize the decision-making process.

If one of the conditions C1 or C2 is not met, then there is still a recommendation of the best option, i.e.:

(i) Alternatives j(1) and j(2), if only condition C2 is not satisfied;

(ii) Alternatives j(1), j(2), ..., j(M) if condition C1 is not satisfied; and j(M) is determined using the equation $Q(j(M)$ - $Q(j(1))$ <DQ for maximum M (the positions of the alternatives are close together).

2.4. Entropy

The importance weight assigned to each criterion can be determined using three approaches: the subjective approach, the objective approach, and the subjective-objective approach. The subjective approach relies entirely on the decision maker (DM) to assign weights, while the objective approach depends solely on the system to determine weights. The third approach combines both methods by calculating weights based on the results from the subjective and objective approaches. These methods enable the production of criteria weights that reflect data characteristics while accommodating the subjective preferences of decision makers [23].

The importance weights of the criteria can also be assigned based on the subjective preferences of the decision maker. Various methods can be used to model criteria weights; one such method is the entropy method. The entropy method calculates weights based on the characteristics of the data on the criteria; the greater the variation between data on the criteria, the higher or more significant the weight of the criteria. The use of the entropy method is highly flexible; if the weight generated from the entropy method cannot be directly used as a criterion weight for decision-making, the subjectivity of the decision maker can be incorporated alongside the entropy weight. The result of combining the initial weight and the entropy weight will produce the actual criterion weight [23].

The calculation procedure for the Entropy weight method is as follows [24]:

1. Normalizing Each Element of the Evaluation Matrix: It begins with the creation of an evaluation matrix containing data values that have not been normalized based on store (alternative) and criteria. The next step is the normalization process, which refers to the nature of the criteria, whether they are benefit criteria or cost criteria. Benefit criteria are those where the decision maker aims to select the maximum value among all alternatives. Cost criteria are those where the decision maker aims to select the minimum value among all alternatives.

$$\text{Cik } benefit = \frac{Bik}{Bik\ maks}$$

$$\text{Cik } cost = \frac{Bik\ min}{Bik}$$

2. The next stage of calculating the entropy weight method involves calculating the probability of the criteria. This process entails dividing the normalized data values by the total number of normalized data values.

$$\text{Pik} = \frac{Cik}{Total\ Cik}$$

3. Entropy measurement for each criterion: Based on the probability value of the criteria, the entropy value for each criterion will be calculated.

$$E_k = -\frac{1}{\ln m}\sum_{i=1}^{m} \text{Pik} \ln \text{Pik}$$

4. Calculation of final Entropy criteria: Decision makers have given an initial weight to each criterion. Calculation of entropy weight as follows.

$$\text{WEk} = \frac{Lk\ x\ Wk}{\sum_{k}^{n} Lk\,.Wk}$$

$$\text{Lk} = \frac{1}{n-(\sum_{k=1}^{n}(Ek))}\ 1 - \text{Ek},\ 0 \le \text{Lk} \le 1$$

3. Research Methods

This study employs a hybrid multi-criteria decision-making (MCDM) approach that combines the VIKOR method and the Entropy weighting method to develop a hotel recommendation system. VIKOR is utilized to rank alternatives based on a compromise solution among multiple conflicting criteria, while Entropy provides an objective means of determining criterion weights by measuring the degree of data dispersion. The combination of these methods enables a balanced decision-making model that integrates both performance proximity (VIKOR) and data-driven weighting (Entropy), reducing subjective bias in the recommendation process.

Compared to previous studies that rely on AHP, TOPSIS, or fuzzy logic approaches, which often involve subjective judgments or lack adaptability, this study distinguishes itself by using a fully objective weighting technique (Entropy) and a robust compromise ranking (VIKOR) embedded in a mobile application. The system is developed using the Rapid Application Development (RAD) model and leverages both qualitative (interviews) and quantitative (questionnaire) data to ensure relevance and usability for real-world tourism decision-making in Bandung.

3.1. Data Collection Methods

The research conducted interviews with the Bandung City Tourism and Culture Office. Interviews were conducted to explore information related to the development of tourism in the city of Bandung and the criteria used as a reference in supporting the decision to recommend hotel locations as tourist destinations in Bandung. The researcher created a questionnaire containing questions to explore information about the various difficulties experienced by tourists who come from outside the city of Bandung in choosing hospitality tourism destinations in the city of Bandung. Respondents of this questionnaire are tourists visiting the city of Bandung. From the results of distributing the questionnaire, data were obtained from 100 people who became respondents, using purposive sampling of tourists who came from outside Bandung in three areas, namely Cibeunying, Bojonagara, and Karees. The researcher collected references that are relevant to the research. The theory and data in this research come from books, journals, literature studies, and documentation from the Bandung City Tourism and Culture Office.

4. Results and Discussion

This section presents the findings from four different scenarios that simulate decision-making processes for hotel selection in the Cibeunying area, based on varying priority weights for four criteria: price, location, facilities, and class. The analysis employs the VIKOR method integrated with entropy weighting to derive final rankings of alternatives.

4.1. Scenario 1: Price as the Dominant Criterion

In the first scenario, the price is assigned the highest initial weight (0.9), while the other criteria receive equal minor weights (0.033). After incorporating entropy weights, the final weights for each criterion are: price (0.8861), location (0.01018), facilities (0.05185), and class (0.05185).

The ranking results, based on the VIKOR Q index, indicate that Hyatt Regency Bandung holds the most favorable position (Q = 0), followed by Grand Hill Universal and Sheraton Bandung Hotel & Tower. Conversely, Royal Corner ranks the lowest with Q = 1, suggesting it is the least optimal choice under this price-focused scenario.

This finding emphasizes that Hyatt Regency Bandung offers significant value for money, which is consistent with the high priority given to pricing.

Table 3.
Weight_scenario 1 (Cibeunying).

	Price	Location	Facility	Class
Initial Weight	0.9	0.033	0.033	0.033
Entropy Weight	0.20592	0.07099	0.3615	0.3615
Final Weight	0.8861	0.01018	0.05185	0.05185

Table 4.
Final Scenario 1 (Cibeunying)

Destination	Q (VIKOR index)	Rank
Hyatt Regency Bandung	0	1
Grand Hill Universal	0	2
Sheraton Bandung Hotel & Tower	0	3
Holiday Inn	0.01889	4
Grand Seriti	0.5369	5
The Amaroossa	0.5369	6
Padma Hotel Bandung	0.5499	7
Grand Preanger	0.7853	8
Grand Royal Panghegar	0.7853	9
Aston Braga Hotel	0.79829	10
Tropicana Hotel	0.79957	11
Banana Inn Grand Hotel	0.81257	12
Grand Serela	0.81257	13
Geulis Boutique Hotel, Steak House & Café	0.81257	14
Scarlet	0.82856	15
The Cipaku Garden	0.97017	16
Kedaton	0.98189	17
Anggrek Golden	0.98317	18
Alam Permai	0.98317	19
Bumi Asih	0.98317	20
Royal Palace	0.98317	21
Bumi Sawunggaling	0.99617	22
Gandasari	0.99617	23
Royal Corner	1	24

4.2. Scenario 2: Location as the Dominant Criterion

In Scenario 2, the location criterion is prioritized with an initial weight of 0.9. The final adjusted weights are: location (0.6962), price (0.0673), facilities (0.11819), and class (0.11819). Here, Grand Preanger and Grand Royal Panghegar share the top ranking (Q = -0.00166), while Royal Corner remains the least favorable option. This shift in ranking demonstrates that these two hotels are more competitive in terms of accessibility and geographic desirability, factors likely aligned with traveler preferences regarding proximity to urban centers or tourist attractions.

Table 5.
Weight Scenario 2 (Cibeunying).

	Price	Location	Facility	Class
Initial Weight	0.033	0.9	0.033	0.033
Entropy Weight	0.20592	0.07099	0.3615	0.3615
Final Weight	0.0673	0.6962	0.11819	0.11819

Table 6.
Final Scenario 2 (Cibeunying).

Destination	Q (VIKOR index)	Rank
Grand Preanger	-0.00166	1
Grand Royal Panghegar	-0.00166	2
Aston Braga Hotel	0.02788	3
Kedaton	0.11801	4
Hyatt Regency Bandung	0.14945	5
Grand Hill Universal	0.14945	6
Sheraton Bandung Hotel & Tower	0.14945	7
Holiday Inn	0.179	8
Grand Seriti	0.1977	9
The Amaroossa	0.1977	10
Tropicana Hotel	0.20705	11
Padma Hotel Bandung	0.22725	12
Banana Inn Grand Hotel	0.2366	13
Grand Serela	0.2366	14
Geulis Boutique Hotel, Steak House & Café	0.2366	15
The Cipaku Garden	0.24221	16
Anggrek Golden	0.27176	17
Alam Permai	0.27176	18
Bumi Asih	0.27176	19
Royal Palace	0.27176	20
Scarlet	0.2957	21
Bumi Sawunggaling	0.30131	22
Gandasari	0.30131	23
Royal Corner	0.97028	24

4.3. Scenario 3: Facilities as the Dominant Criterion

When facilities are emphasized (initial weight 0.9), the final weights become: facilities (0.9444), price (0.01793), location (0.006181), and class (0.03148). Remarkably, the top three rankings revert back to Hyatt Regency Bandung, Grand Hill Universal, and Sheraton Bandung Hotel & Tower, all with Q = 0. The consistent top performance of these hotels under both price- and facility-prioritized conditions suggests that these destinations maintain a high level of overall service quality and customer satisfaction.

Table 7.
Weight Scenario 3 (Cibeunying)

	Price	Location	Facility	Class
Initial Weight	0.033	0.033	0.9	0.033
Entropy Weight	0.20592	0.07099	0.3615	0.3615
Final Weight	0.01793	0.006181	0.9444	0.03148

Table 8.
Final Scenario 3 (Cibeuying)

Destination	Q (VIKOR index)	Rank
Hyatt Regency Bandung	0	1
Grand Hill Universal	0	2
Sheraton Bandung Hotel & Tower	0	3
Grand Preanger	0.01381	4
Grand Royal Panghegar	0.01381	5
Holiday Inn	0.24656	6
Grand Seriti	0.25154	7
The Amaroossa	0.25154	8
Aston Braga Hotel	0.25326	9
Tropicana Hotel	0.25404	10
Padma Hotel Bandung	0.49892	11
Banana Inn Grand Hotel	0.50142	12
Grand Serela	0.50142	13
Geulis Boutique Hotel, Steak House & Café	0.50142	14
The Cipaku Garden	0.50291	15
Kedaton	0.74952	16
Anggrek Golden	0.75029	17
Alam Permai	0.75029	18
Bumi Asih	0.75029	19
Royal Palace	0.75029	20
Scarlet	0.99618	21
Bumi Sawunggaling	0.99767	22
Gandasari	0.99767	23
Royal Corner	1	24

4.4. Scenario 4: Class as the Dominant Criterion

In the final scenario, the hotel class receives the highest initial weight. The resulting weights are similar to Scenario 3, with class (0.9444) being dominant. Interestingly, the ranking results in Scenario 4 are identical to those in Scenario 3. This consistency suggests that the "class" and "facility" attributes may be strongly correlated, reinforcing the idea that higher-class hotels often offer superior facilities. The implication is that investments in improving class-related aspects could simultaneously elevate facility ratings and vice versa.

Table 9.
Weight Scenario 4 (Cibeunying).

	Price	Location	Facility	Class
Initial Weight	0.033	0.033	0.033	0.9
Entropy Weight	0.20592	0.07099	0.3615	0.3615
Final Weight	0.01793	0.006181	0.03148	0.9444

Table 10.
Final Scenario 4 (Cibeunying).

Destination	Q (VIKOR index)	Rank
Hyatt Regency Bandung	0	1
Grand Hill Universal	0	2
Sheraton Bandung Hotel & Tower	0	3
Grand Preanger	0.01381	4
Grand Royal Panghegar	0.01381	5
Holiday Inn	0.24656	6
Grand Seriti	0.25154	7
The Amaroossa	0.25154	8
Aston Braga Hotel	0.25326	9
Tropicana Hotel	0.25404	10
Padma Hotel Bandung	0.49892	11
Banana Inn Grand Hotel	0.50142	12
Grand Serela	0.50142	13
Geulis Boutique Hotel, Steak House & Café	0.50142	14
The Cipaku Garden	0.50291	15
Kedaton	0.74952	16
Anggrek Golden	0.75029	17
Alam Permai	0.75029	18
Bumi Asih	0.75029	19
Royal Palace	0.75029	20
Scarlet	0.99618	21
Bumi Sawunggaling	0.99767	22
Gandasari	0.99767	23
Royal Corner	1	24

4.5. Cross-Scenario Analysis

Across all four scenarios, Royal Corner consistently ranks at the bottom. This indicates its overall underperformance across all evaluated dimensions. In contrast, Hyatt Regency Bandung consistently ranks highest in three scenarios and maintains a top-five position in Scenario 2. Such robustness under varying conditions indicates a balanced and superior offering across key customer-preference dimensions. The results align with previous studies emphasizing the sensitivity of VIKOR rankings to changes in criterion weights [25, 26]. Moreover, the interplay between entropy and subjective weighting reinforces the importance of hybrid weighting schemes to reflect both expert judgment and data-driven objectivity.

5. Conclusions, Implications, and Suggestions

This study employed the VIKOR method integrated with entropy-based weighting to support multi-criteria decision-making in hotel selection within the Cibeunying district of Bandung. Four distinct scenarios were analyzed, each emphasizing a different decision criterion: price, location, facilities, and class. The results demonstrate that changes in weight prioritization significantly affect the final rankings of hotel alternatives.

Notably, Hyatt Regency Bandung emerged as the optimal choice in three out of four scenarios (price, facilities, and class), indicating its well-balanced performance across a variety of criteria. Grand Preanger and Grand Royal Panghegar ranked highest under the location-priority scenario, highlighting their strategic advantage in accessibility. Conversely, Royal Corner consistently ranked last across all scenarios, suggesting suboptimal performance regardless of the evaluation perspective.

The findings underscore the value of incorporating both subjective priorities and objective entropy-based weights in multi-criteria decision frameworks, enabling more nuanced and adaptable recommendation systems. This hybrid approach provides practical implications for stakeholders in the hospitality industry, particularly in enhancing competitiveness through targeted improvements aligned with customer preferences.

Future research may expand the model by integrating dynamic decision environments, incorporating user-generated feedback, or applying fuzzy or interval-valued extensions to better handle uncertainty in stakeholder judgments.

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