ANALYSIS OF THE FUZZY ANALYTICAL HIERARCHY PROCESS APPROACH IN DETERMINING HALAL TOURISM INDICATORS IN DKI JAKARTA

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Abstract: *The purpose of this study is to find out the indicators of Halal Tourism in DKI Jakarta based on priority levels. The number of informants in this study is 7 experts including the Ministry of Tourism and Creative Economy of the Republic of Indonesia, the DKI Jakarta Tourism and Creative Economy Office, the National Sharia Council of the Indonesian Ulema Council, academics, sharia travelers, Indonesian halal tourism associations, and sharia hotels. This study uses the Fuzzy Analytical Hierarchy Process (AHP) method. Based on the results of the study, it shows that at the criterion level, the priority of Jakarta's halal tourism indicators that must be prioritized in order is access, environment, service, and communication. Meanwhile, the priorities for the sub-criteria of Jakarta's halal tourism indicators are connectivity, infrastructure, availability of halal dining options, Muslim-friendly accommodation, availability of prayer places and mosques, stakeholders, destination marketing, communication skills, public safety, sustainability, and trust restrictions.*

Keywords: Halal Tourism DKI Jakarta, Fuzzy Analytical Hierarchy (AHP) Process, Halal Tourism criteria and sub-criteria

1.   Introduction

Economic growth is an indicator of the country's welfare1, one of the sectors supporting economic growth that experiences positive growth, namely tourism. The Central Statistics Agency (BPS) and the Ministry of Tourism and Creative Economy in September 2023 recorded the contribution of the tourism sector to GDP of 3.83 percent, this figure is higher than in 2022 which was only 3.6 percent. The high growth is due to an increase in tourist visits. BPS said that the total number of foreign tourist visits to Indonesia from January to September 2023 reached 8,513,505 visits, and in September 2023 foreign tourist visits reached 1.07 million2. Based on nationality, foreign tourists visiting Indonesia as of September 2023 are dominated by Malaysia with 152,210 visits, Australia with 140,057 visits, Singapore with 114,713 visits, and China with 88,758 visits3. The development of tourism has also encouraged the growth of

halal tourism. According to the Ministry of Tourism and Creative Economy, halal tourism is an additional service model aimed at meeting the experience and desires of Muslim tourists.

Globally, halal tourism has its own market share and is a new trend in the global tourism industry4, where the value of global Muslim travel is projected to reach Rp4,200 trillion by 2026, from a literature review it is also stated that interest in halal tourism research in Indonesia and Malaysia is relatively high5. In fact, halal tourism has the potential to be developed in non-Muslim-majority6 countries such as China, the Philippines7, Japan, Taiwan, South Korea8, and Thailand9. This shows that halal values in tourism can be applied in general.

Indonesia, as the largest Muslim population in the world, has high potential as the main destination10. The Global Muslim Travel Index (GMTI) shows that in 2018 Indonesia was ranked second in the world and managed to be ranked first in 2019. The Ministry of Tourism and Creative Economy sees this as a development opportunity and has set the development of halal tourism as one of the priority programs. In 2018, the government set ten National Priority Halal destinations, including: Aceh, West Sumatra, Riau and Riau Islands, DKI Jakarta, West Java, Central Java, Yogyakarta, East Java, Lombok, and South Sulawesi. The latest GMTI 2023 report states that in the category of halal tourist destinations, Indonesia managed to rank first, this shows that Indonesia has many Muslim- friendly tourist destinations for tourists. Referring to the GMTI 2023 report and determined by the Indonesia Muslim Travel Index (IMTI) 2023 report, the ranking of 15 provinces that are included in the category of the best halal tourist destinations, can be seen in table 1.

Table 1. Best halal tourist destinations

Rank	Province	IMTI Score
1	West Nusa Tenggara	67
2	Aceh	63
3	West Sumatra	62
4	Jakarta	60
5	Central Java	59
6	West Java	56
7	D.I. Yogyakarta	53
8	East Java	52
9	South Sulawesi	51
10	South Kalimantan	49
11	Riau	48
12	Riau Islands	43
13	Bangka Belitung Islands	42
14	Banten	42
15	South Sumatra	42

Based on Table 1. It can be seen that West Nusa Tengara is the province with the highest IMTI score. One form of policy carried out by several provinces in supporting the acceleration of halal tourism is through governor's regulations. The regulation is carried out in West Nusa Tenggara, Aceh, and West Sumatra. As is known, halal tourism has six principles, namely

convenience, reliability, safety, trust, openness, and comprehensive continuous improvement (*kaffah*) (Manan, Wirianto, Fadhilah, & Kamarullah, 2023).

If several provinces have Regional Regulations (Perda) on halal tourism, but it is inversely proportional to DKI Jakarta. Although it ranks fourth as the best halal tourism destination, DKI Jakarta does not have concrete regulations regulating halal tourism. However, the Jakarta government's support for the development of halal tourism continues to be carried out massively (Cadith et al., 2022). One of them is the statement of the Jakarta Tourism and Creative Economy Office saying that there are nine leading tourist attractions that meet the Muslim-friendly aspect, namely Taman Impian Jaya Ancol, Taman Mini Indonesia Indah, Thousand Islands, Kota Tua, Situ Babakan, Mall Sarinah, Thamrin City, Jalan Raden Saleh and Senayan. In the hotel category, there are at least 510 halal- certified hotels and 5 sharia-type hotels. In addition, data from the Jakarta Micro, Small and Medium Enterprises Office noted that as of 2023 there are 141,671 Micro, Small and Medium Enterprises in the culinary sector that are halal certified. Not only supporting facilities, the halal tourism model is also designed in accordance with sharia in the form of regulations. Government regulations ultimately increase the interest of tourists visiting halal destinations (Ekka, 2024).

Although the data is quite high, in its implementation, it is necessary to identify and determine halal tourism criteria so that regulators can make more appropriate policies, because as is known, issues related to the government are the top priority for optimizing halal tourism (Huda et al., 2021). The determination of criteria indicators adopts the literature of the Fatwa DSN of the Indonesian Ulema Council No. 108/DSN-MUI/X/2016 concerning Guidelines for the Implementation of Tourism based on Sharia Principles(Nurjaya et al., 2021), halal tourism criteria published by GMTI in IMTI(Nasional et al., 2023), governor's regulations on halal tourism in several provinces, and previous research on halal tourism indicators from the perspective of tourists (Ekka, 2024). One of the decision-making methods for determining halal tourism is Fuzzy AHP (Martín et al., 2020). Fuzzy AHP is a decision-making approach to make formulations and strategies for determining the priority of tourist attraction selection, and involves experts and the government (Sahani, 2021), in addition, Fuzzy AHP is the most widely used method for the tourism industry (Liao et al., 2023).

2.   Research Method

The method used in this study is Fuzzy AHP(Guru et al., 2023). Fuzzy AHP is a method developed by Saaty (1980) that allows analysis and decomposition into several separate structures from complex decision-making problems. AHP is a method that is often used to examine complex issues using different criteria. While AHP aims to address expert expertise, modern AHP cannot yet represent the human mindset. Therefore, to solve the problem of hierarchical fuzzy, F-AHP, the fuzzy extension of AHP, first proposed the theory of fuzzy sets to race with the ambiguity of human thought, which is guided through ambiguity or fuzziness to the rationality of ambiguity (Büyüközkan et al., 2019).

This approach is carried out by making a formulation of halal tourism indicators and confirming them to regulators and experts, then testing the results with the Fuzzy AHP method using the Fuzzy AHP output online application. The informants in this study consisted of 7 experts with the following details:

Table 2. Informant Data

No	Position	Agency
1	Adyatama Tourism and Creative Economy First Expert	Ministry of Tourism and Creative Economy of the Republic of Indonesia
2	Head of Data, Information and Destination Development	DKI Jakarta Tourism and Creative Economy Office
3	Secretary for Sharia Industry, Business and Economics	National Sharia Council of the Indonesian Ulema Council (DSN-MUI)
4	Academician in Islamic Economics	University of Technology Muhammadiyah Jakarta
5	General Manager	Indonesian Halal Tourism Association (PPHI)
6	Marketing Manager	Kafila Tourism
7	President Director	Hotel Sofyan

In the Fuzzy AHP model, the researcher determined indicators, criteria and sub-criteria sourced from the study of halal tourism Global Muslim Travel Index in the Indonesia Muslim Travel Index. Based on this, it produces a draft determination of Jakarta's halal tourism indicators as follows.

Table 3. Jakarta Halal Tourism Indicators

Criterion	Sub Criteria	Description of Criteria
Access	Connectivity	Easy acces to the destination
	Infrastructure	
Communication	Communication Skills	Internal and external communication by the destination
	Marketing Goals	
	Stakeholder Awareness	
Environment	General Safety	The overall environment and setting of the destination
	Faith Restrictions	
	Sustainability	
	Accesible Travel	
Services	Availability of Prayer Places and Mosques	The range of services provided by the destination to cater to the needs of Muslim Traveles
	Availability of Halal Dining Options	
	Muslim-Friendly Accomodation	

The next stage is to determine priorities at the level of criteria and sub- criteria. The determination of the level of importance or priority refers to the Saaty scale theory (1980) as shown in the following table.

Table 4. Saaty Scale

Interest intensity	Information	Explanation
1	Both elements are equally important	Both elements have an equally great influence on the goal
3	One element is a little more important than the other	Experience and judgment are a little more important
5	One element is more important than the other	Experience and judgment are very strong in favor of one element over the other
7	One element is clearly more important than the other	One strong element is supported and dominant seen in practice
9	One element is really more important than the other	Evidence that supports one element against another has the highest level of affirmation that might corroborate
2, 4, 6, 8	Doubts between two adjacent values	This value is given when there are two compromises between the two options

3.   Result and Discussion

3.1   Results of Filling out the Questionnaire Stage 1

The first phase of the questionnaire aims to form an assessment hierarchy that will be used in the assessment of halal tourism indicators in DKI Jakarta. The assessment hierarchy consists of 2 levels, namely assessment criteria and subcriteria. The first level of criteria and sub-criteria is determined by the researcher based on references derived from the Mastercard-Crescenrating Global Muslim Travel Index (GMTI) 2024 report and the DSN MUI Fatwa No.108/DSN-MUI/X/2016 concerning Guidelines for the Implementation of Tourism Based on Sharia Principles. The criteria include Access, Communication, Environment and Service. The four criteria have subcriteria. The selection of criteria and subcriteria, the assessment uses a Likert scale of 1 to 5. In the phase 1 questionnaire, the informants who filled out consisted of stakeholders and policymakers related to halal tourism, especially in DKI Jakarta. Expert informants came from the Ministry of Tourism and Creative Economy, the Jakarta Tourism and Creative Economy Office and the National Sharia Council of the Indonesian Ulema Council (DSN-MUI). The following is the average total answer from the expert informants (CrecentRating et al., 2023).

Table 5. Total Criteria and Sub-Criteria According to Informants

No	Criteria and Subcriteria for the Assessment of Halal Tourism Indicators	Average total
1	**Access**	4,0
1.1	Connectivity	4,3
1.2	Infrastructure	4,0
2	**Communication**	4,0
2.1	Communication Skills	4,0
2.2	Destination Marketing	4.0
2.3	Stakeholders	4,7
3	**Environment**	4,0
3.1	General Security	4,7
3.2	Trust Restrictions	4,0
3.3	Sustainability	4,0
3.4	Accessible travel	4,0
4	**Service**	4,7
4.1	Availability of Prayer Places and Mosques	5,0
4.2	Availability of Halal Dining	5,0
4.3	Muslim-Friendly Accomodation	4,0

3.2 Stage 2

The results of the research in the second stage are to make the Fuzzy AHP framework based on predetermined criteria, the results of the framework modeling are:
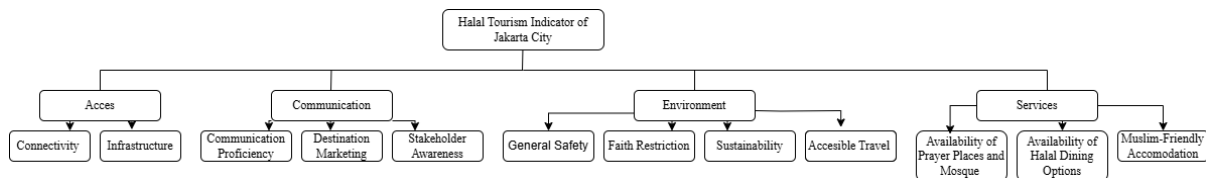

Figure 1: Framework Output of the AHP Fuzzy Model

Figure 1 shows the output framework of the Fuzzy AHP model from the DKI Jakarta Halal Tourism Indicator which was formed based on the verification of the answers of 3 experts, namely from the Ministry of Tourism and Creative Economy of the Republic of Indonesia, the DKI Jakarta Tourism and Creative Economy Office and the National Sharia Council of the Indonesian Ulema Council. The details of halal tourism indicators include access, communication, environment and services. Access indicators consist of connectivity and infrastructure, communication includes communication skills, destination marketing, stakeholders, the environment consists of public safety, restrictions on trust, sustainability and accessible travel, while services consist of the availability of prayer places and mosques, the availability of halal dining and Muslim-friendly accommodation. The next stage is to determine priorities at the level of criteria and sub-criteria from 1 to 9 referring to the Saaty scale (1980).

Table 6. Scoring Table

Jakarta Halal Tourism Indicators																		
Criterion	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Criterion
The left side is more important <									> The right side is more important									

3.3 The Consistency Test

The consistency test was carried out to see the consistency of the informants' answers. The consistency test on the paired comparison matrix is said to be consistent if the value of Consistency Ratio (CR) ≤ 0.10, the assessment results are consistent and acceptable or accountable. On the other hand when the value Consistency Ratio (CR) ≥ 0.10, there is an inconsistency or there is a problem or invalid(Liao et al., 2023). Here are the results of the consistency test.

Table 7. Consistency Test

No	Level	CR Score
1	Level 1: Criteria	0.078
2	Level 2: Access	0.001
3	Level 2: Communication	0.049
4	Level 2: Environment	0.061
5	Level 2: Service	0.003

In general, based on the criteria consistency test table and the paired matrix sub-criteria above, it shows that the CR value ≤ 0.10, then it can be described that all the informants' answers are in the consistent or valid category.

3.4 The Result of Criteria and Sub Criteria

3.4.1 Priority Level of Halal Tourism Indicator Criteria in Jakarta City

This section results in a ranking of Jakarta's halal tourism indicator criteria, as seen in the table below.

Table 8. Priority of Jakarta City Halal Tourism Criteria Indicators

Ranking Order	Criterion	Weight
1	Access	0.282
2	Environment	0.253
3	Service	0.251
4	Communication	0.231

As shown in the table above, Based on the Jakarta City Halal Tourism Indicator Target, Access is the first priority. The next priority is the environment, service, and communication according to the weight obtained.

3.4.2 Access Category Priority Level Subcriteria

Table 9. Access Sub-Criteria Priority

Ranking Order	Criterion	Weight
1	Connectivity	0.522
2	Infrastructure	0.478

As shown in the table above, By access category, Connectivity is the first priority, followed by infrastructure in second place with a weight of 0.478.

3.4.3 Communication Sub-criteria Level Priority

Table 10. Communication Sub-Criteria Priority

Ranking Order	Criterion	Weight
1	Stakeholders Awareness	0.35
2	Marketing Destination	0.33
3	Communication Proficiency	0.32

As seen in the Table 10, based on the communication criteria, stakeholders awareness are the first priority, followed by marketing destination and communication proficiency.

3.4.4 Priority Level of Environmental Sub-criteria

Table 11. Environment Sub-Criteria Priority

Ranking Order	Criterion	Weight
1	General Safety	0.259
2	Accesible Travel	0.256
3	Sustainability	0.243
4	Faith Retrictions	0.242

As seen in the table above, according to the environmental sub-criteria, general safety is the first priority. The next priority is given to accesible travel, sustainability and faith retrictions.

3.4.5 Service Sub-Criteria Level Priority

Table 12. Environment Sub-Criteria Priority

Ranking Order	Criterion	Weight
1	Availability of Halal Dining Options	0.347
2	Muslim-Friendly Accommodation	0.324
3	Availability of Prayer Places and Mosques	0.328

As seen in the table above, in the sub-criteria of Service Availability of Halal Dining Options is the first priority, then Muslim-friendly accommodation and the availability of prayer places and mosques.

3.4.6 Overall Result of Weighting Criteria and Sub-criteria

The weighthing and overall level of importance as shown in the following table.

Table 13. Result of Weighting Criteria and Sub-Criteria

Criterion	Heavy	Criterion Inconsistency Ratio	Sub-Criteria	Weight of Sub-critera	Sub-Criteria Inconsistency Ratio	Sub-Criteria Overall Weight
Access	0.282		Connectivity	0.522	0.001	0.147
			Infrastructure	0,478		0.135
Communication	0.213		Communication Proficiency	0.320		0.068
			Marketing Destination	0.330	0.049	0.071
Environmental	0.253	0.078	Stakeholder Awareness	0.350		0.075
			General Safety	0.259		0.066
			Faith Retrictions	0.242	0.061	0.061
			Sustainability	0.243		0.062
			Accesible Travel	0.256		0.065
Service	0.251		Availability of Prayer Places and Mosques	0.324		0.081
			Availability of Halal Dining Options	0.347	0.003	0.087
			Muslim-Friendly Accomodation	0.328		0.082

As seen in tabel, in the Jakarta City Halal Tourism Indicator, Connectivity is a top priority. Priority is further given to Infrastructure, Availability of Halal Dining Options, Muslim-Friendly Accommodation, Availability of Places of Prayer and Mosques, Stakeholders, Destination Marketing, Communication Skills, Public Safety, Accessible Travel, Sustainability and Faith Restrictions according to the weight obtained.

Connectivity and infrastructure, which are sub-criteria of access, occupy priority 1 and 2. This means that adequate connectivity and infrastructure play an important role in the development of halal tourism in Jakarta, meaning that it must be maintained.

3.5   Discussion

The process of determining the weight of each criterion and sub-criteria of the Jakarta halal tourism indicator is carried out using the Fuzzy AHP method. This weighting is needed to determine the level of importance of each criterion that has been set by the previous researcher and the subcriteria of the results of the respondents' assessment in the first stage of the questionnaire. The higher the weight of the criteria and sub-criteria shows that the more important and priority these criteria are in the perspective of determining Jakarta's halal tourism indicators. The weighting process was obtained from the level of importance assessed by 7 experts as respondents.

The results of data processing using the Fuzzy AHP method produced a value of importance level weights that could be sorted from the highest weight to the lowest. The total number of weights from the level of importance of each criterion or sub-criterion amounts to 1. In addition, the weight of the global criteria is also generated by multiplying the weight of each criterion by the weight of each sub-criterion. The total weight of the sub-criteria globally is 1. The results of the global weighting are mapped into a hierarchical structure as shown in Figure 2. Measurement of the level of consistency will show how consistent the assessment of each respondent is shown with a ratio consistency value of less than 0.1.

The results of the respondents' analysis of the level of importance of the four criteria set showed that the access criterion had the highest level of importance or priority, while communication had the lowest level of importance. This value shows that access criteria are an aspect that needs to be considered from the perspective of halal tourism indicators in DKI Jakarta. Access is an indicator related to the ease of tourists going to tourist sites. Good accessibility conditions in DKI Jakarta are in line with the perspective of the importance of halal tourism indicators, so access criteria need to be prioritized. In addition, the accessibility of halal tourism in Jakarta is considered good because Jakarta has adequate infrastructure, the beauty of the city, and the natural charm of the Thousand Islands which improves the affective image of tourist destinations so that it can attract visitors to travel to DKI Jakarta(Widjaja et al., 2020).

Meanwhile, the value of the level of importance or the weight of the sub- criteria of the access criteria shows that connectivity occupies the highest level of importance compared to infrastructure. Connectivity is related to the availability of a road network that can increase the smoothness of tourists in accessing halal tourist destinations in DKI Jakarta.

Meanwhile, for the criteria that occupy the second priority, namely the Environmental criteria. Based on AHP's fuzzy analysis, the importance level of the Environmental criteria sub-criteria shows that the general security sub- criteria occupy the first priority, while the trust restriction occupies the last priority. This shows that the safety aspect is the most important thing compared to other sub-criteria related to environmental aspects. Public safety in tourist attractions is an important thing that must be considered by tourist destination managers and the government. The security and safety of tourists is a form of responsibility of tourist destination managers, and is also one of the benchmarks for whether tourist destinations are worth visiting(Fauzi & Battour, 2024). This is also in line with previous research which found that security and safety have a positive effect on the image of tourist destinations(Fian Damasdino, Dian Afrini, & Prihatno, 2021).

The third priority in the halal tourism indicator related to service criteria is the sub-criterion of the availability of halal dining options as the sub-criterion with the highest level of importance. The highest level of importance on halal dining options is closely related to the DKI Jakarta government program, especially to micro and small business actors related to halal certification. The Jakarta Department of Industry, Trade, Cooperatives, Small and Medium Enterprises recorded a total of 1,075 halal certificates for micro businesses as of August 2023. Other research corroborates that micro and small businesses are indirectly involved in the promotion of halal tourism through culinary and service businesses(Babolian Hendijani & Sanny, 2021).

Meanwhile, in the service aspect related to the sub-criteria for the availability of prayer places and mosques, it occupies the last priority. The level of importance with the last priority on the halal tourism indicator in DKI Jakarta is Communication, with the stakeholder sub-criteria occupying the highest priority compared to the destination marketing and communication skills sub- criteria. This shows that in the communication criteria, information disclosure and access to communication channels from stakeholders are important things that need to be considered in halal tourism in DKI Jakarta. Another factor is in terms of regulations, the results of an interview with the DKI Jakarta Disparekraf stated that until now the DKI Jakarta province has not had a Regional Regulation (Perda) on halal tourism. This is in line witprevious research which explained that local government regulation issues are the main priority that must be prioritized in the development of halal tourism(Huda et al., 2021). In addition, the role of stakeholders in synergizing with halal tourism support business actors such as restaurants, travel, and sharia hotels needs to be improved(Cadith et al., 2022).

4.   Conclussion

Based on the results and discussion, it can be concluded that at the criterion level, the priority of Jakarta's halal tourism indicators that must be prioritized in order is access, environment, service and communication. The ranking order of the sub- criteria of Jakarta's halal tourism indicators is connectivity, infrastructure, availability of halal dining options, Muslim-friendly accommodation, availability of prayer places and mosques, stakeholders, destination marketing, communication skills, public safety, sustainability, and trust restrictions.

Connectivity and infrastructure, which are subcriteria for access, show the importance of optimizing access to and from halal tourist attractions, such as connecting existing public transportation routes and offering tour packages in collaboration with travel business actors. The availability of halal eating options is also a priority, so the Government is expected to boost the issuance of halal certification for MSME actors around tourist areas. As a Muslim-friendly global city, DKI Jakarta needs to have a Regional Regulation as a legal umbrella and reference for stakeholders in running its business.

5.   Acknowledgments

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