

# Fuzzy Logic in Determining Hotel Priorities for the Halal Tourism Industry in Garut City

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## Abstract

Garut Regency is one of the 13 districts designated by the West Java Provincial Government as a halal tourist destination because the various tours that Garut Regency has, such as natural, cultural, special interest, and artificial tourism are very supportive of the development of halal tourism in Indonesia, especially Java. West. Moreover, the majority of Garut residents are Muslim (99.77%). Various selected facilities for sharia tourism, such as hotels, continue to be developed based on the Muslim friendly principle. However, the use of sharia in hotels in Garut as promoted by the Garut Tourism Office is a self-declaration until now, there are no hotels in Garut that already have a halal certificate. So that the problem points to be formulated and known in this study is the extent to which hotels in Garut, especially in the tourist area of Cipanas, have fulfilled the Islamic concept based on Regulation of the Minister of Tourism and Creative Economy (Peraturan Menteri Pariwisata dan Ekonomi Kreatif [Permen Paweka]) No. 2 of 2014 concerning "Guidelines for Conducting Sharia Hotel Businesses." The approach used in analyzing the hotel is the fuzzy logic approach, which has the advantage that it can be used to analyze data in both exact and social research. This method is applied by researchers to determine hotel priorities based on the product, service, and management variables that are in the criteria for the hilal-1 sharia hotel. These criteria will be included in the fuzzy system variables so that hotels in Garut can be determined whether they are good, good, standard, or bad.

**Keywords:** Fuzzy Logic, Sharia Hotel, Garut

## INTRODUCTION

The Indonesian nation is a nation with a majority Muslim population. A Muslim believes that his religion is not a religion that only regulates the relationship between humans and their gods, but a faith that also governs the relationship between humans and humans and the relationship between humans and all creatures. So that currently, there is an increasing awareness of Indonesian people who are predominantly Muslim to apply the principles of sharia in various aspects of life, one of which is seen in the development of the world of economy, business, and tourism.

The awareness it is also with a theory called the "creed" theory or "*Shahādah*," presented by Juhaya (2009), is a theory that requires the implementation of Islamic law by those who have pronounced the two sentences creed as



a logical tax of the pronouncement of the philosophy (Muhamad Mas'ud et al., 2020). This theory requires everyone who claims to believe in Allah SWT, then he must submit and obey what Allah SWT ordered in this case, obey the commands of Allah SWT and, at the same time, obey Rasulullah SAW and his sunnah in various aspects of life both deep worship, economy, and education.

As a form of obedience, a Muslim must pay attention to the halal and haram aspects of running his life. Halal products that are already known to the public are only food, beverage, medicinal and cosmetic products that do not contain alcohol or chemicals containing elements of pork, blood, and carcasses. But now there has been an evolution in the halal industry to financial products (such as banking, insurance, etc.) to lifestyle products (travel, hospitality, recreation, and health care). This phenomenon is generally called the "halal lifestyle," which according to Yuswohady (2015), can be seen from several phenomena such as the public becoming increasingly critical in assessing the halalness of the products to be consumed, the development of sharia-based financial institutions, the growth of nuanced Islamic culture and including the growth of the halal tourism industry or tourism. Sharia.

In the last decade, halal-based tourism has become a new trend in developments in various parts of the world, including Indonesia. The country is increasingly aggressively developing the tourism sector, including the Indonesian government—Indonesia as the country with the largest Muslim population. The government does not want Indonesia to be only a market, but also a significant player. Based on the Mastercard-Crescent Rating Global Travel Market Index (GMTI) report in 2019, Indonesia finally managed to be in the top ranking as the best halal tourist destination with Malaysia with 78.

One of the factors in the development of halal tourism is the availability of adequate facilities for supporting tourists, both foreign and domestic, which reflect values by Islamic sharia, the availability of halal food and drinks, adequate lodging and hotels. In 2014, the Ministry of Tourism and Creative Economy in a Ministerial Regulation ratified Permen Paweka No. 2 of 2014 concerning "Guidelines for Operation of Sharia Hotels." This guideline contains all the provisions, both musts, and prohibitions if you want to set up a sharia hotel business. In the Permen Paweka, it said that sharia-based hotel business is the implementation that is required to meet the criteria of Islamic sharia.

Garut is a district in West Java has become one of the unique concerns of the West Java government in developing Islamic tourist destinations. Garut has a variety of tourist objects that are very abundant and beautiful, including arts and culture tours, historical tours, nature tours, sports tours, shopping tours, and spiritual and craft tourism. Natural attractions in Garut district

include Cipanas, Canguang temple, Bagendit lake, Sayang Heulang beach, Santolo beach, Rancabuaya beach, Manalusu beach, Mount Geder beach, Karang Paranjén beach, Dukuh village, Papandayan Crater, Orok waterfall, Citiis waterfall, and Sanghyang Taraje waterfall, as well as having arts such as Pencak Ular, Debus, Surak Ibra, Lais, and Raja Dogar. Apart from tourism and arts, Garut Regency also has several handicrafts such as Leather crafts, Fragrant Roots, Garutan batik, and Garut Sheep miniatures.

Of the many tourist attractions in Garut district, Cipanas is a favorite tourist destination for tourists. Because all the potential of the Garut Government was focused on Cipanas tourism. Based on the Garut Regency Regional Regulation Number 2 of 2019 concerning the Regional Tourism Development Master Plan for 2019-2025, Cipanas tourism is the primary tourism in Garut district. Based on these facts, various selected facilities for sharia tourism, such as hotels, continue to be developed with Muslim-friendly principles. Among the many hotels in Garut Regency, especially around the Cipanas tourist attraction, there is not a single hotel that claims to be labeled sharia. This is a challenge as well as an opportunity for all stakeholders to increase the competitiveness of tourism in Garut district, especially to attract local and foreign tourists who are Muslim.

Determination of sharia hotels in accordance with Permen Paweka No. 2 of 2014 requires a method that can select the highest priority in choosing the hotel. Of course, in this case, several variables, such as whether or not a hotel meets the halal criteria required in the regulation, will be very difficult to represent. Therefore, this research applies the concept of fuzzy logic, which is known as the concept of reason, which can define inexact variables (Dian, 2014). In line with what was conveyed by Maria Yus Trinity Irsan et al. (2019), Fuzzy Logic is a development of Binary Logic, which can be used to analyze data in research in both the exact and social fields. In research (Beni, 2017) says that Fuzzy Logic is a methodology that is deemed suitable in problems that arise in the tourism industry, which has unique ideas. Fuzzy logic provides a simple way to describe the exact information that is ambiguous, vague, or imprecise. Such as helping in the selection of halal hotels in Garut, which are still minimally assisted by the criteria for hilal-1, according to Permen Paweka No. 2 of 2014. In connection with these problems, the authors take the title of research: "Fuzzy logic in determining the priority of hotels for the halal tourism industry in the city of Garut."

## **METHOD**

This study uses a descriptive method with a qualitative approach. Data techniques are observation, interviews, literature study, and documentation. The research analysis used the Mamdani fuzzy logic method introduced by

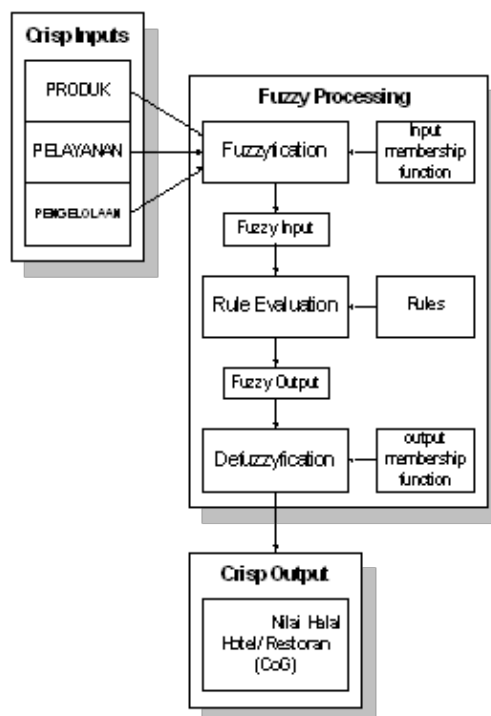


Mamdani and Assilian (1975). There are four stages in the operation of the fuzzy system in Mamdani inference, these stages: Ordering fuzzy sets (fuzzification), applying implication functions, composition (merging) of rules. Confirmation (defuzzification) with the Centroid method (Center of Gravity). Fuzzy variables consist of 3 variables, namely product (X1) with 14 attributes, service (X2) with eight attributes, and management (X3) with two attributes taken from the Multlak Hilal-1 Criteria according to Permen Paweka No. 2 of 2014.

## RESULTS AND DISCUSSION

In analyzing the fuzzy logic in this study using Matlab software tools. The process carried out on the input that produces the output contains a fuzzy method flow. The following is a flow diagram of the fuzzy logic process, which can be seen in Figure 1. Three crisp inputs: Product, Service, and Management, are used as input in the fuzzification process to produce fuzzy input according to the membership function input created. The results of the fuzzification process are then used as input to the rules of the evaluation process, to produce fuzzy output in accordance with predetermined rules. Furthermore, the fuzzy output will be inputted into the defuzzification process to produce fresh output; in this case, the value of Halal Hotels in Garut.

Picture-1  
Fuzzy Logic Flow of Diagram



The process of the fuzzy system has four stages, namely:

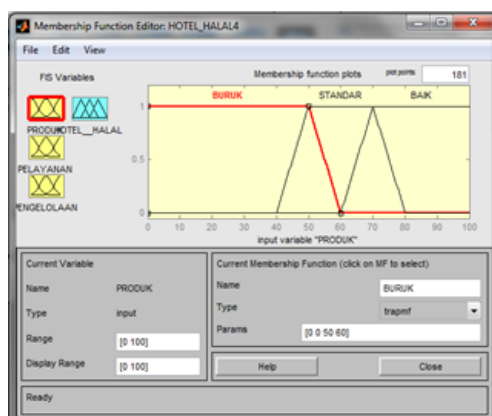
1. Formation of fuzzy sets (fuzzification). The input and output variables are divided into one or more fuzzy sets. The following is a Fuzzy Interference System (FIS), where there are three hotel inputs, which include: products, services, and management.

**Table-1**  
**Fuzzy Set Formation**

<b>Product set / FIS STAGE-1</b>		
<b>Input Variables</b>	<b>Fuzzy set</b>	<b>Domain</b>
Hotel Product	Bad	[0-60]
	Standard	[40-80]
	Good	[60-100]
<b>Service set / FIS STAGE-2</b>		
<b>Input Variables</b>	<b>Fuzzy set</b>	<b>Domain</b>
Hotel Services	Bad	[0-60]
	Standard	[40-80]
	Good	[60-100]
<b>Service set / FIS STAGE-3</b>		
<b>Input Variables</b>	<b>Fuzzy set</b>	<b>Domain</b>
Hotel Management	Bad	[0-60]
	Standard	[40-80]
	Good	[60-100]
<b>Hotel Output set /FIS STAGE-4</b>		
<b>Output Variables</b>	<b>Fuzzy set</b>	<b>Domain</b>
Halal Hotel	Bad	[0-60]
	Standard	[40-70]
	Good	[50-80]
	Very Good	[60-100]

Based on the criteria given by the next step is to make the FIS of the input variables shown in yellow. The fuzzy set consists of three, namely Bad, Standard, and Good. The following is a display of the FIS input variables in the Matlab software, which can be seen in Picture-2.

**Picture-2**  
**Display FIS of Input Variables in Matlab Software**



2. Application of implication function. The implication is fuzzy rules to produce the output of each fuzzy logic rule. The general form of the practices used in the implication function:

IF x is A, THEN y is B.

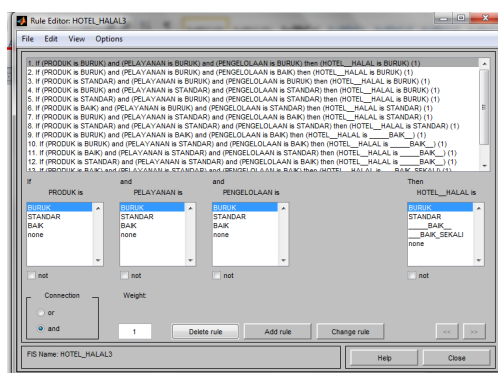
Where x and y are scalars A and B are fuzzy sets. The propositions that follow IF are called antecedents, while the recommendations that follow THEN are called consequences. In FIS Phase 1 from the observation results, the value for the hotel product variable A = 90% (Good), hotel services A = 84 (Standard) and Hotel Management A = 100% (Good), then the Rule can be made: Rule 1: IF (Product is Good) and (Good service) and (Good Management) then (Very Good Hotel). In the implication rules, several rules can be made to create fuzzy output, which can be seen in the following table-2:

**Table-2**  
**Fuzzy Implication Formation Rules**

No.	FIS Variable			Output
	Product	Service	Management	
1.	Bad	Bad	Bad	Bad
2.	Bad	Bad	Bad	Bad
3.	Standard	Bad	Bad	Bad
4.	Bad	Standard	Standard	Bad
5.	Standard	Bad	Standard	Bad
6.	Bad	Bad	Standard	Standard
7.	Bad	Standard	Good	Standard
8.	Standard	Standard	Standard	Standard
9.	Bad	Good	Good	Good
10.	Bad	Good	Standard	Good
11.	Good	Standard	Standard	Good
12.	Standard	Standard	Good	Good
13.	Good	Standard	Good	Very Good
14.	Standard	Good	Good	Very Good
15.	Good	Good	Good	Very Good

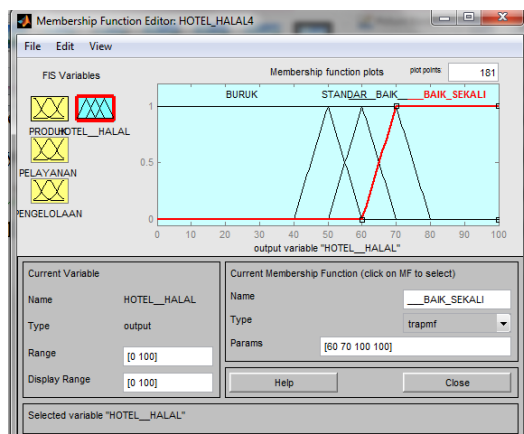
(source: developed in this study, 2020)

**Picture-3**  
**Rule of Fuzzy Logic**



3. Composition (merging) of rules. Fuzzy sets can be operated in several kinds. Researchers use the intersection mode of operation with the minimum operator expression  $\mu_{A \cap B}(u) = \min \{\mu_A(u), \mu_B(u)\}$ , based on AND logic.
4. Affirmation (defuzzification). Defuzzification is a process to change the fuzzy output value to a crisp value, which in this study uses the defuzzification method: centroid (Center of Gravity). The set fuzzy output consists of four, namely Bad, Standard, Good, and Very Good. The following is a FIS display of the output variables in the Matlab software, which can be seen in Picture-4.

**Picture-4**  
**Display of Output Variable FIS in Matlab Software**



Based on the results of the defuzzification calculation using the Central of Gravity method, the output set classification is as follows:

**Table -3**  
**Results of Fuzzy Logic Hotel in Garut**

No	Hotel Name	X1	X2	X3	COG (%)	Output set classification
1	Hotel Cahaya Vila	97,14	80	90	82.6	Very Good
2	Hotel Harmoni Garut	88,57	82,5	70	82.6	Very Good
3	Hotel Santika Garut	90	82,5	70	82.6	Very Good
4	Favehotel Cimanuk	90	82,5	80	82.6	Very Good
5	Hotel Danau Dariza	82,86	82,5	80	82.6	Very Good
6	Hotel Tirta Gangga	97,14	82,5	80	82.6	Very Good
7	Hotel Sabda Alam	82,86	77,5	80	82.6	Very Good
8	Hotel Sumber Alam	78,57	77,5	80	81.6	Very Good
9	Hotel Kencana	68,57	77,5	60	60	Standard
10	Hotel Augusta	60	72,5	60	55	Standard

(source: developed in this study, 2020)

Based on the results of the defuzzification, the weight of 82.6% was obtained for the priority criteria, namely Hotel Sabda Alam, Hotel Tirta Gangga, Hotel Danau Dariza, Hotel Fave, Hotel Santika, Hotel Harmoni, Hotel Cahaya Villa. Hotel Sumber Alam is in the criteria for the second priority hotel with a weight of 81.6%, Hotel Kencana for the third priority selection with a value of 60%. Hotel Augusta received an underweight score of 55%.

From the research results, it can be concluded about the implementation of products, services, and management of hotels in Garut, especially in the tourist area of Cipanas Garut, most of them have implemented sharia principles specified in the absolute criteria of Hilai-1 in the Regulation of the Minister of Tourism and Creative Economy. No. 2 of 2014 concerning Guidelines for Hotel Business Operation.

Based on the results of observations of several things that are following the absolute criteria of Hilai-1 in the Minister of Tourism and Creative Economy Regulation No. 2 of 2014, including in terms of products, no access to pornography, and immoral acts of any kind, and a kitchen that only processes halal food and drinks. Services, providing information on the closest mosque to the hotel, only serving halal food and drink options, and the spa only doing health massage and beauty treatments, visible transparent spa facilities.

However, you can still find some of them in terms of products, inadequate provision of prayer mats, no proper and special equipment for ablution in hotel rooms. Services, there is no information on fixed prayer time schedules, the use of religious recorded music is still diverse, and there is no halal certificate for food, and a halal guarantee management system. This is very reasonable because these hotels do not specifically label or are not imposed as sharia hotels.

## CONCLUSION

Based on the explanation above, it can be seen that hotel accommodation in Garut to be used as a halal tourism destination is ready and supports the development of the halal tourism industry. However, formal hotels in Garut should be encouraged to have a halal certificate, as legal legality, to gain public trust. The Ministry of Tourism should carry out several recommendations:

1. Infrastructure, it is appealing to hotels in Garut to be more Muslim friendly by providing proper worship facilities. Such as giving unique

ablution places in hotel rooms, providing separate and closed toilets for men and women, and there are dividers between urinal and hotels that provide a barrier between the prayer rooms for men and women.

2. Institutional, there is support from the Provincial/Regency Government to help develop sharia hotels, in the form of certificate funding assistance, licensing training or training, etc. The Minister of Tourism Regulation No.2 of 2014 needs to become a regional regulation by designing and compiling the content of Islamic hotels in the tourism Regional Regulations and developing organizations that are halal tourism related to the field of sharia hotels by establishing a Sharia Supervisory Board, improving the quality and quantity of human resources who have competencies that are competent for sharia hotels in tourism development efforts, coordination between institutions that are directly involved with the provision of sharia hotels, and assistance for actors. Tourism industry in West Java to benefit from obtaining a halal certificate.
3. Trust and information Dissemination of the concepts and objectives of developing sharia hotels to government officials, the community, and Garut tourism (industry) business actors through printed and brave media, travel guides available for tourists who buy halal tourism products or halal hotels, increasing research oriented towards developing halal tourism destinations and Islamic hotels.

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