Analytical Hierarchy Process (AHP) as an Approach to Sharia Banks

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Abstract— **Analytical Hierarchy Process (AHP) in this study is used as a tool to help find out how to choose Islamic banks. AHP considers factors or criteria based on analysis to solve multi-object and multi-criteria problems based on the comparison of preferences of each element in the hierarchy. The population in this study is the customers of Bank Muamalat and Bank Syariah Mandiri in Garut Regency, with the sample used is simple random sampling and incidental sampling. The number of samples is 40 customers. In addition to AHP, the analysis used in this study is Descriptive Analysis. This research is organized into 3 levels of criteria, the first level answers the formulation of the bank selection problem. The second level analyzes the factors taken into consideration in the selection of banks, which consist of 5 factors, namely religious, mass media, family, location and service quality. The third level is a combination of bank choices with the five factors.** *The results of this study indicate that the bank which is the most choice of customers is Bank Muamalat at 54.8 percent and Bank Syariah Mandiri at 45.2 percent.*

Keywords— Bank Selection, Analytical Hierarchy Process, Criteria.

I. INTRODUCTION

Kotler and Keller (2012) state that consumer perception is a process that makes a person choose, organize, and interpret the stimuli received into a meaningful and complete picture of his world (a stimulant) [1]. The factors that influence decision making are very complex. So it is deemed necessary to identify various important factors and determine the level of influence of one factor on other factors before clear decisions can be made [2]. In the context of Islamic banking, a customer needs to pay attention to the factors that are needed as a consideration in deciding on choosing a bank, so that the decision taken is effective [3]. Therefore, for effective decision making, we can use a decision-making tool in the form of the Analytic Hierarchy Process (AHP).

Analytic Hierarchy Process began to be developed around 1970 by Thomas L. Saaty, which is one of the models for decision making that can help the human thinking framework. AHP is a method that helps solve a complex and unstructured problem into its groups, organize the groups into a hierarchical arrangement, enter numerical values as a substitute for human perception in making relative comparisons and finally with a synthesis determined elements that have the highest priority [4]. Previous studies using AHP as a method of decision making have been carried out including Leny Novianti (2019) who measures the sustainability of Islamic banking in Indonesia [5]; and Ilker Murat A. (2013) who evaluated the relative efficiency of commercial banks in Turkey [6]. This study aims to choose the best Islamic bank, which can provide more value to customers using the AHP method.

II. LITERATUR REVIEW

A. Criteria

Consumer behavior is influenced by thoughts and feelings. This can be triggered by several things that are inside and outside the consumer. External factors that affect consumers can be advertising, price information, packaging, product appearance, blogs, and others. Dynamic consumer behavior becomes very important to be considered by companies to be able to capture market opportunities[7].

In the world of Islamic banking, Awan & Azhar (2014) states that several factors influence consumer behavior in choosing a banking, including [7]: (a) Religion, which is a belief system and practice that is integrated with sacred matters. Islamic principles especially interest-free banking are a source of attraction for consumers to choose Islamic banking; (b) Family is the most influential factor for consumers. Where the indicators here are parents and siblings. Even if buyers don't interact much with their parents, their influence on behavior can be significant. In countries where parents live with older children, their influence can be very large; (c) Promotion carried out through advertisements in all communication media, plays an important role in providing awareness and knowledge about products and services; (d) The image of a bank greatly influences customers who choose the bank. Bank's reputation that influences consumers in choosing Islamic banks is created when customers believe that the operations carried out following the provisions.

Mursid and Suhartono (2014) revealed that customers' perceptions of choosing sharia banking were influenced by several factors including (a) Religious Motives, in which customers believed that in operations, the products offered by banks were free of usury, speculation, and fulfilling Islamic principles. and bank managers and bank employees have good and Islamic morals; (b) Service quality, where customers assume that the bank has quality services, including physician services, reliability, guarantees, responsiveness and care provided by the bank; (c) Technology, meaning that the customer is of the opinion that there is ease, speed, accuracy and security of using information technology at the bank of his choice [7].

Another study put forward by Nazrian & Hidayat (2012) which states that the behavior of customers in choosing a bank is also influenced by several factors: (a) Products, namely offering activities to customers with the aim of satisfying a customer's desires; (b) The strategic location of the bank and the distribution of ATM machines make it easy for customers to deal with the bank; (c) Security, which means the customer is protected from all forms of danger. Security, in this case, is security in transaction and confidentiality of information; (d) Promotion, where promotion is an activity of communicating carried out by banks to further introduce banks to the public at large about

goods and services; (e) Credibility, including service standards and performance of a bank[8].

B. Analytical Hierarchy Process

The Analytical Hierarchy Process (AHP) was first developed by Thomas L. Saaty, a mathematician from the University of Pittsburgh, the United States in the 1970s. Analytical Hierarchy Process (AHP) is basically designed to capture rationally the perceptions of people who are very closely related to a particular problem through procedures designed to arrive at a preference scale among various alternative sets [4]. This analysis is intended to create a problem model that has no structure, usually applied to solve measurable problems (quantitative), problems that require an opinion (judgment) or in complex or unequal situations, in situations where data, statistical information is minimal or nothing at all and only qualitative based on perception, experience or intuition [9]. AHP is also used in decisions for many criteria, planning, allocation of resources and determining priorities of the strategies owned by players in conflict situations [10].

Graphically, the AHP decision problem can be constructed as a multilevel diagram (hierarchy). AHP starts with a goal then targets criteria and finally alternatives. There are various forms of decision hierarchy that are tailored to the substance and problems that can be solved by AHP. Thomas L. Saaty (2008) states that three principles in solving problems with explicit logical analysis: (a) Hierarchy preparation is done by identifying the knowledge or information being observed. The preparation starts from complex problems which are broken down into its main elements, these main elements are broken down again into parts, and so on hierarchically. The composition of the hierarchy consists of goals or objectives, criteria, and alternatives; (b) Priority Determination. For each level of the hierarchy, pairwise comparisons are needed to determine priorities. The pairs of elements are compared based on certain criteria and weigh the intensity of preferences between elements, and (c) Logical Consistency. All elements are logically grouped and ranked consistently according to a logical criterion. An assessment that has high consistency is very much needed in the matter of decision making so that the decision results are accurate. In real life, perfect consistency is difficult to achieve.

III. Research Methods

This research method is included in the descriptive research method because it is adjusted to its purpose, which is to get a hierarchical structure of priority order in selecting Islamic banks. Creswell (2014) explains that descriptive methods are methods used to describe or analyze a research result but are not used to make broader conclusions [11].

The population used in this study is the customers of Bank Syariah Mandiri and Bank Muamalat of Branch Offices located in the City of Garut. In this study the population taken is large and the amount is unknown or infinite certainty. An infinite or infinite population, that is, a population whose boundaries cannot be found, so that it cannot be expressed in quantitative terms. According to Sugiono (2013), the determination of sampling less than 100 is better taken all until the research is population research. If a large number of subjects can be taken between 10-15% or

20% -55% or more depending on: (a) The ability of researchers in terms of time, energy and funds; (b) The breadth of the area of observation of each subject, because it involves a lot of funds at least; (c) The size of the risk borne by researchers for researchers whose risks are large, of course, if the sample is large the results will be better [12].

Then for these considerations, the alpha value in determining this sample is equal to 15%. In this study, researchers distributed questionnaires to customers of Bank Syariah Mandiri and Bank Muamalat Sub-Branch Offices located in the City of Garut. If the total population in the study is not known with certainty, then the determination of the sample can use the Lemeshow formula, which is as follows:

$$n = \frac{Z1-a/2P(1-P)}{d^2}$$

Based on the formula above, the number of samples to be taken is:

$$n = \frac{Z1-a/2P(1-P)}{d^2}$$
$$n = \frac{1,96^2.0,5(1-0,5)}{0,15^2}$$
$$n = \frac{3,8416.0,25}{0,0225}$$
$$n = 40$$

From the above calculation, the number of samples obtained was 40 customers. The sampling technique uses simple random sampling. And technically this research uses incidental sampling, which is a technique of determining samples based on coincidences, ie anyone who incidentally meets with researchers can be used as a sample if it is seen that people who happen to be found are suitable as data sources (Sugiyono, 2013) [13].

The type of data in this study uses primary data that is data obtained from the first party obtained by distributing questionnaires to respondents who are considered consumers or customers of the two banks. Data collection techniques in this study are Field Research. Data processing in this study was carried out using the Analytical Hierarchy Process (AHP) program and descriptive analysis. The data will be analyzed to produce a picture of what are the factors in choosing a Sharia Bank. Data analysis is presented in the form of graphs and tables.

IV. Results

From the results of distributing questionnaires to 40 respondents of Bank Muamalat and Bank Syariah Mandiri customers in Garut Regency, then analyzed using the Analytical Hierarchy Process (AHP) method, the hierarchical structure is divided into 3 levels as follows:

a. First Level (Goal Decision / Goal). The first level hierarchy is the top-level hierarchy which is the problem of this research, namely the selection of Islamic banks.
b. The second level (Criteria). The second level is the criteria or factors of customer consideration in choosing an Islamic bank. There are five criteria in this second level including (1) Religious, (2) Mass Media, (3) Family, (4) Location and (4) Service Quality. The

following is a sequence of results of processing with the AHP method that a customer chooses an Islamic bank influenced by several factors including:

TABLE I.   SEQUENCE OF SHARIA BANK SELECTION CRITERIA

Rank	Criteria	Priority Value
1	Religious	23,80%
2	Mass media	23,40%
3	Family	21,00%
4	Location	20,40%
5	Quality of service	11,40%

Source: Data processed

These criteria also have their respective sub criteria, namely:
1. Family Sub Criteria: From the results of processing by the AHP method, obtained the following sequence of family sub criteria:

TABLE II.   SEQUENCE OF FAMILY SUB CRITERIA FOR ELECTION OF ISLAMIC BANKS

Rank	Criteria	Priority Value	Inf.
1	Recommendations from parents	0,175	R1
2	Recommendations from family	0,035	R2
	Total	0,21	

Source: Data processed

2. Religious sub-criteria: From the results of processing with the AHP method, obtained the order of religious sub-criteria as follows:

TABLE III.   SEQUENCE OF RELIGIOUS SUB CRITERIA FOR ELECTION OF ISLAMIC BANKS

Rank	Criteria	Priority Value	Inf.
1	Distribution of investment funds must be halal and benefits	0,054	K1
2	The revenue system is profit sharing, margins and fees	0,043	K2
3	The principle of channeling funds: (1) buying and selling, (2) leasing, and (3) profit sharing	0,042	K3
4	Fund raising: (1) wadiah, (2) mudharabah	0,024	K4
5	Managers run Islamic law	0,021	K5
6	The bank has a Sharia Supervisory Board	0,021	K6
7	Employees behave Islamically on a daily basis	0,019	K7
8	Employees run Islamic law	0,014	K8
	Total	0,238	

Source: Data processed

3. Mass Media Sub Criteria: From the results of processing with the AHP method, obtained sequence of mass media sub criteria as follows:

TABLE IV.   ORDER OF SUB CRITERIA FOR MASS MEDIA SELECTION OF ISLAMIC BANKS

Rank	Criteria	Priority Value	Inf.
1	Advertisement	0,119	M1
2	Brochure	0,058	M2
3	Website	0,032	M3
4	Social networks (Instagram. Twitter, Facebook and others)	0,025	M4
	Total	0,234	

Source: Data processed

4. Service Quality Sub Criteria: From the results of processing with the AHP method, obtained order of service quality sub criteria as follows:

TABLE V.   TABLE 4.5 SEQUENCE OF SHARIA BANK SERVICE SELECTION SUB CRITERIA

Rank	Criteria	Priority Value	Inf.
1	Employees always be polite to customers	0,024	L1
2	Employees are always willing to help customers	0,021	L2
3	Physical facilities in accordance with the services offered	0,019	L3
4	The company gives personal attention	0,017	L4
5	The appearance of the employees is Islamic	0,014	L5
6	Feeling safe, trusting, when making transactions	0,012	L6
7	Operating time that suits the customer	0,008	L7
	Total		

Source: Data processed

5. Location Sub Criteria: From the results of processing by the AHP method, obtained sequence of location sub criteria is as follows:

TABLE VI.   SEQUENCE OF SUB-CRITERIA LOCATION SELECTION OF ISLAMIC BANKS

Rank	Criteria	Priority Value	Inf.
1	ATM machines are everywhere	0,165	P1
2	Strategic location (close to public facilities)	0,004	P2
	Total	0,205	

Source: Data processed

To simplify the problem in the selection of banks can be done by calculating the weight of preferences against priority needs criteria by conducting a pairwise comparison.

c. Third Level (Alternatives). The third level is the level of hierarchy that is used as an alternative to several banks selected based on existing criteria, namely:

TABLE VII.   ALTERNATIVE ORDER OF ISLAMIC BANKS

Rank	Criteria	Priority Value
1	Bank Muamalat	0,548
2	Bank Syariah Mandiri	0,452
	Total	1

Source: Data processed

From the results of combining each level of the hierarchy above, you will get a hierarchical form, as in Figure 4.1 below:
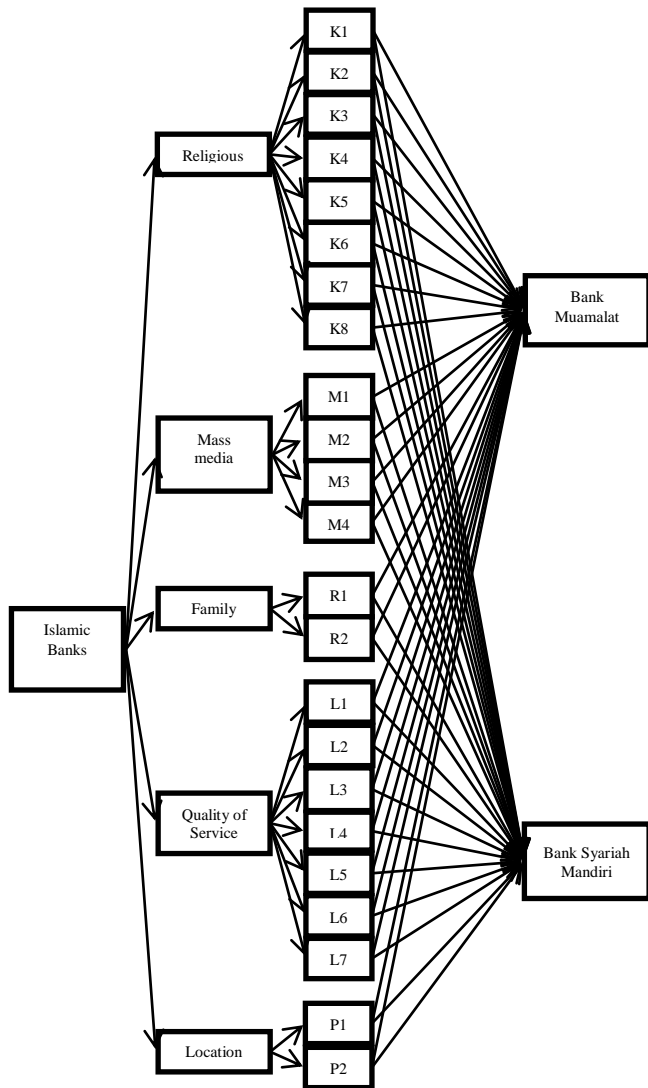
Fig. 1. Hierarchical Structure

The inconsistency ratio shows how much the consistent weighting value is in pairs between one element and another. The inconsistency ratio in this study is around 0.04 (less than 0.1). This shows that the weighting values between paired elements in the comparison matrix have been quite consistent [10]. Other results show that the preference for Bank Muamalat is 54.80%, while Bank BSM is 45.20%. This means that many customers choose Bank Muamalat compared to Bank Syariah Mandiri. Although Bank Syariah Mandiri Bank is superior in 3 factors, this does not affect the overall value obtained by Bank Muamalat in terms of family and religious criteria which is the highest preference compared to other criteria.

V. CONCLUSION

From the results of research using the AHP (Analytical Hierarchy Process) method, it is found criteria or factors with the highest to lowest preferences are religious, mass media, family, location and service quality. For the sub criteria of these factors, the highest to lowest preferences are obtained as follows: (a) The highest to lowest religious preference sub-criteria are the distribution of mandatory halal and benefit investment funds, the revenue system is profit

sharing, margins and fees, the principle of channeling funds for sale and purchase, rent buy, and share the results, the principles of raising wadiah and mudharabah funds, the manager runs Islamic law, the bank has DPS, employees behave in Islamic behavior on a daily basis and employees run Islamic law; (b) Sub criteria for the highest to lowest mass media preferences are advertisements, brochures, websites, and social networks (Twitter, Instagram, Facebook etc.); (c) The highest to lowest preference family sub criteria are recommendations from parents and siblings; (d) The highest to lowest preference location sub-criteria are the distribution of ATM machines everywhere and strategic locations (near public facilities); (e) Sub criteria for quality of service preference highest to lowest are employees who are always polite to customers, employees who are always willing to help customers, physical facilities in accordance with the services offered, the company pays personal attention, the appearance of employees nuanced in Islam, a feeling of security, trust when conducting transactions with employees and operating times that are suitable for customers.

In choosing a bank, with the AHP (Analytical Hierarchy Process) approach, the best alternative is based on the highest preference level, namely Muamalat Bank at 54.8 percent, and Bank Syariah Mandiri at 45.2 percent.

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