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AR MBA: Linkage Pattern of Visited Tourism Object

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ABSTRACT

The tour package is one of the tourism products that can be offered as a business and marketing strategy of tourism objects with the aim to attract more tourists. Taking the research object in Yogyakarta, the purpose of this study is to find the relationship between one tourism object with others. By using AR MBA, it can be obtained the tourist traffic patterns on a "what object" that tends to be visited along with other object. Based on 300 historical data of tourists activities in Yogyakarta, obtained eleven patterns of visits tourism objects such as: Malioboro shopping center is a tourist attraction that is visited by all the tourists, if tourists visiting Borobudur Temple then about 70,6% they will also visit the object of Malioboro. The next general pattern is when tourists visit Borobudur then the chances are about 78% this group will also visit natural beach Parangtritis. Based on the information, it is arranged four tour package relevant with the obtained rules. This result can be managed by both government and private tourism business to make Yogyakarta become more delight for tourism.

Keywords: *Tourist, Pattern, AR MBA, Yogyakarta, Association*

1. Introduction

Tourism is an industrial sector that is growing rapidly around the world and has been slowly changing from a secondary requirement (luxury needs) becomes a primary need (staples), which means that at a certain period a person must be able to carry out tourism activities [15] Tourism is a temporary displacement by humans with the purpose out of the routine work and his place of residence, the activities carried out during their stay at the destination and the facilities created to meet their needs [12]. Growth in the industrial sector certainly requires a special strategy concept on how the services supplied travel products could offset the wishes of the consumer as a user of the product. The number of tourists has increased over time and contribute to the cost expenditures. According to the National Economic Survey, the number of tourists reached 100 million people who travel with a total expenditure of IDR 46.10 trillion in 1994. The number of tourists and the amount issued increased by 44.02% in 2000 to 144 million people, thereby expending increased by 68.34% to IDR 77.63 trillion. The amount of tourist expenditure will certainly be able to turn the wheels of the economy in the area of tourist traffic, so it will create employment and improve the income of the people and the area.

Similarly with the the tourist area in Yogyakarta district. DIY is a province known as a cultural center. A number of heritage objects and historical buildings make Yogyakarta become one of the most popular destinations in Indonesia. Potential natural charm is also an attraction for tourists to visit Yogyakarta. Yogyakarta tourism potential is able to attract domestic and foreign tourists to explore natural attractions, history and culture in Yogyakarta. Yogyakarta is still considered safe and comfortable with the hospitality of its people, make Yogyakarta much in demand by tourists for visiting Yogyakarta [7]. There were a lot of effort and strategy to market the attractions, especially for tourists, including the enactment of the Joint Decree of the National Day holiday which came into force in 2002. Government policies have an impact on travel does take advantage of a long holiday (weekend). Nevertheless, the marketing effort is still not optimal [16]. Need to be refocusing these marketing strategy so that its effectiveness becomes better [13]. To optimize marketing of the city of Yogyakarta as a tourism product needs to be studied more deeply on the characteristics the consumer, who in this case tourists visiting, so at the end the management activities of

both government and private tourism can provide in detail all requests related to Yogyakarta tourism activities such as the destination tours, activities (event) tour, facilities, and accommodations are available.

It takes a more depth understanding of the needs of consumers with regard groups of tourists or travelers segmentation. Tourist behavior differences require tourist market division into different groups based on their needs, desires, behavior or tastes for different products or services [14]. Market segmentation in Yogyakarta tourism industry is expected to provide a description of the type of tourists visiting Yogyakarta as a basis to draft tourism products and services in accordance with the desires of tourists. Research for grouping tourist destination has become the focus of research for the last few years [5]. Tourist destination becomes the most frequently analyzed topics in research on tourism. Many research grouping to tourists by travel destination using clustering techniques. As research conducted by Chavan in 2014 [4], is to create a traveler segmentation based on gender, age, occupation, patterns of travel behavior, travel patterns, the average expenditure, which is used to determine the source of a tourist destination, the purpose of tourist visits and the frequency of visits. By segmenting for tourists, research conducted is expected to provide an understanding of the specific market and identify appropriate strategies to gain competitive advantage.

The aims of this study is to find the other perception of the pattern of tourist groups. The pattern is the relations between one destination to other tourist destinations. Association Rule Mining is the method used to achieve these goals. Association Rule Mining aims to discover the rules of the association between large sets and items in the database transaction [11]. Association in data mining works to determine which attributes would be obtained simultaneously. At present, the correlation technique is widely used in research for the arrangement of a retail store layout, warehouse and other objects related to the layout of facility. Research on the relation of the tourist destinations with other object using correlation techniques AR MBA was rarely used. Tourism research often uses clustering techniques to find relationships with the traveler profile tourist destination visited. Thus, the goal of this research is to find patterns of tourist travel destinations by using algorithms FP-Growth in AR MBA. The final results is the patterns tourist destination to be visited by tourists. It could be information for a travel package that will be offered by the tour agency in accordance with the desire of tourists. This research is also expected to provide benefits and information for the Office of Tourism in Yogyakarta regarding picture of the city of Yogyakarta tourism to be a reference for Yogyakarta tourism marketing.

2. Research Methodology

2.1. Research Purpose

The purpose of this study was to identify patterns of relations between the destinations with other destinations using the FP-Growth algorithm AR MBA. The obtained result through this study can be utilized various stakeholders such as local government, other institutions as a basis for consideration in decision making in the management of the tourism industry in Yogyakarta.

2.2. Research Method

Tourism is the largest and the fastest industry in the world [2]. The tourism industry in Indonesia is an industrial sector that has an important role to increase the country's revenue in addition to non-oil sector [1]. Tourist destination in Indonesia is expected to be managed well in order to attract tourists to spend their time during a visit to the goal area. Tourist behavior is very critical at this time related to the selection, purchase and consumption of goods and services to be able to satisfy their needs [8]. Consumer behavior in meeting their needs vary greatly. In marketing studies, sellers of products and services need to understand the behavior of tourists to determine why customers choose or not choose a product. The Company will be successful if they can identify goods into account the needs of customers and respond to customer demands. According to Kotler [9], globalization changed the behavior of tourists who have an impact on cultural criteria, personal social and psychological. To be able to meet the diverse needs of travelers, the tourism industry needs to do a traveler grouping useful for planning and tourism marketing. Travelers extremely demanding quality products [3]. Travelers do not become passive consumers, they look for information through the internet to plan the trip-tourist.

Masoumeh and Mehregan in 2012 [10] has proposed a recommendation system by using collaborative filtering and clustering techniques. The number of clusters obtained from the K-means algorithm. However, the frequency and parameters of measurement used instead for collaborative filtering techniques so that the information provided to tourists are less precise. Then Gandhi et, al in 2004 [6] conduct research to provide a recommendation to use a mixture of col-

laborative techniques filtering by association rule using boolean logic and fuzzy logic. However, the rules generated from these studies has not been strong for varying attributes. This study implemented one of the other data mining techniques that association rule with Market Basket Analysis methods for finding patterns and correlations between tourists and tourist destinations in Yogyakarta.

3. Result and Discussion

3.1. Profile of Respondent

Collecting data in this study is done through the deployment of 380 questionnaires in several tourist destinations in Yogyakarta. The process of data cleansing conducted on questionnaire data. Cleaning the data is applied to eliminate errors and improve the inconsistencies in the data. Cleaning the data also works in filling missing values, identification or eliminate outliers. After the cleaning process the data obtained 300 data is valid. Profile rating as respondents are presented in the table as follow:

Table 1. Profile of Respondent

No	Variabel	Result of the Survey
1	Gender	Man: 56.2% Women: 43.2%
	Age	15-20 years old: 35.2% >20-30 years old: 54.4% >30-40 years old: 6% >40-50 years old: 2.8% > 50 years old: 1.6%
2	Origin	Midle Java: 37.6% West Java and Jakarta: 24.8% East Java: 14% Outside Java: 19.2% Etc: 4.4%
3	Occupation	Student: 58.8% Civil Staff: 17.2% Trader: 1.2% Bussinesman: 12.8% Etc: 10%
5	Frequency per year	Once: 10.8% Twice: 14.8% Three times: 8.4% Four times: 10.8% Etc : 55.2%
6	Duration of Vacation	< 3 days: 59.2% 1 Week: 25.2% 2 Weeks: 2.8% 1 Month: 2.4% > 1 month: 10.4%
8	Budget	< 2 mil: 62.8% 2 – <3mil: 18.4% 3 - <4 mil: 8.8% 4 – 5 mil: 3.6% > 5 mil: 6.4%

3.2. Tourist Destination

A tourist destination is unique area attractions, supported by infrastructure complete tourism and hospitality by the people who have an attraction for tourists visiting the area. There are so many tourist destinations located in Yogyakarta and surrounding areas. It includes the object natural attraction, cultural, historical attractions until shopping object. Among others, are presented in the following table:

Table 2. Tourism Object

Tourism Object in Yogyakarta	
Kaliurang	Merapi
Pelangi park	Parangtritis/South Beach
Palace/Keraton	Prambanan temple
Beringharjo	Merapi
Malioboro	Tugu/Monument
Pasar Kembang	Alun-alun
Ulen Sentalu	Beringharjo
Borobudur temple	Baron

Respondents were asked to write down the attractions they visit during their visit. Because the calculation of the association intended to seek Attraction relations with one another then only fill one respondent attractions are removed from the data set. Sample results fields of respondents can be seen in the following table:

Table 3. Respondent Response

Respondent	Visited Object			
1	Keraton	Parangtritis	Merapi	
2	Kaliurang	Merapi	Parangtritis	Pasar Kembang
3	Taman Pelangi	Parangtritis	Alun-alun	Keraton
4	Keraton	Prambanan	Malioboro	
5	Beringharjo	Merapi	Tugu	Keraton

Data transformation was done to convert the binary data in the form of a matrix that is using the number 1 (one) and 0 (zero). The digits 1 (one) symbolizes the election at the travel destination, while the number 0 (zero) is the absence of elections at the travel destination. At first responder seen that only the palace, Parangtritis and Merapi is selected to be a tourist destination to be visited while in Yogyakarta. Then at the tourist destination filled with the number 1. While on the other tourist destinations loaded with the number 0 (zero) as a tourist destination is not selected by first responders. The sample of transformation data is shown as the table below:

Table 4. Transformation Data

Keraton	P.Selatan	Merapi	Kaliurang	T.Pelangi	Tugu	Beringharjo	Alun	Malioboro	Prambanan	P.kembang
1	1	1	0	0	0	0	0	0	0	0
0	1	1	1	0	0	0	0	0	0	1
1	1	0	0	1	0	0	1	0	0	0
1	0	0	0	0	0	0	0	1	1	0
1	0	1	0	0	1	1	0	0	0	0

Further processing of association rules in this case is assisted by the application of data mining software RapidMiner. Searches association rules obtained by using FP-Growth algorithm. FP-Growth algorithm is used because it is shorter compared to using other search algorithm association rules. The use of FP-Growth algorithm makes it easier to search the rules of association, produced faster and easier to analyze. Searching on the association rules require five computational processes, namely the process of select attributes, numerical-to-binominal, binomial remap, FP-Growth and create association rule as shown in the following figure:

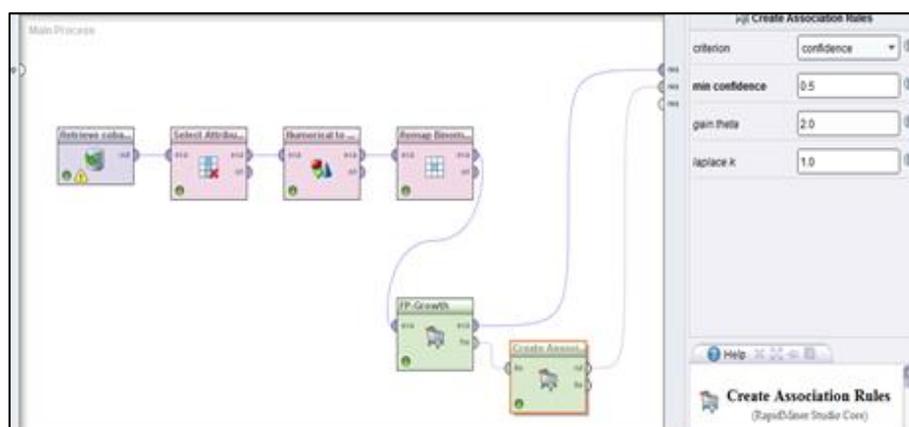


Figure 1. RapidMiner Interface

3.3. Resulted Rules

From the results of data processing, obtained 23 rules of association between the objects of a tourist destination. The association rules have been provisionally selected such that a rule can result in the better tourist destination. Association rules will be the reference for the design of these travel packages. Some requirements for the selection of a good association rules are there is only 1 (one) attribute on the premises and the conclusion, the lift value ratio of more than 1 (one) as well as the support and confidence have the highest percentage. Here given in following table 11 rules associations that contain the highest support value.

Table 5. Assosiation Rules with Hingest Support Value

No.	Premises	Conclusion	Support	Confidence	Lift Ratio
1	Alun-alun	Prambanan	0.047	0.500	1.500
2	Malioboro, Borobudur	Prambanan	0.080	0.500	1.500
3	Alun-alun	Keraton/Palace	0.053	0.571	2.484
4	Borobudur	Prambanan	0.133	0.588	1.765
5	Prambanan, Pantai Selatan	Borobudur	0.053	0.640	2.824
6	Pantai Selatan, Borobudur	Prambanan	0.053	0.696	2.087
7	Borobudur Temple	Malioboro	0.160	0.706	1.031
8	Tugu/Monument	Malioboro	0.047	0.737	1.058
9	Alun-alun	Malioboro	0.070	0.750	1.077
10	Beringharjo Market	Malioboro	0.060	0.783	1.123
11	Mall of Jogja	Malioboro	0.053	0.800	1.148

For example, if you see rule No. 1, if Alun-alun is elected, the Prambanan be elected simultaneously (support) amounted to 4.7% of the total value of choice with confidence (confidence) a combination of both by 50% and has a validity of association rules (lift ratio) 1,500 in other words it can be stated that if the tourists visiting the square, it can be believed by 50% that travelers will also visit the temples of Prambanan. It is obtained from approximately 4.7% incidence of excursions in Yogyakarta. From the rule number 7, if Borobudur is elected, then Malioboro would be elected simultaneously (support) of 16% of the total value of choice with confidence (confidence) a combination of both 70.6% and has a validity of association rules (lift ratio) 1.013 or can stated that if tourists visiting Borobudur, it can be believed by 70% that travelers will also visit Malioboro. It is obtained from the ap-

proximately 16% incidence excursions in Yogyakarta.

3.4. Route Package

The determination of these proposals made travel packages based on the results of association rules that have been made of the software RapidMiner. Tourist destinations behavior patterns that are formed from the output RapidMiner stated that most tourists choose Malioboro as a travel destination you want to visit while in Yogyakarta. It can be seen from the results of RapidMiner output indicating that Malioboro is a tourist location that most often appears in the results output association rules. So that any proposed travel package contains Malioboro as one tourist destination. For example, the formation of two travel packages, from the rule number 6, about 69% confidence that if tourists visiting Borobudur and Prambanan then definitely visit Parangtritis. So that Borobur, Parangtritis, Prambanan, and Malioboro can be proposed to be one travel package. Following the proposals of other tour packages are offered based on the results of the selected association rules:



Figure 2. Tour Package Based on Obtained Rules

Proposed tour package is a package for a day. It is formed by the information from the questionnaire received, that majority of tourists visiting Yogyakarta has a budget of less than 2 million dollars and long been no more than 3 days. Package tours are offered to the private tour package, are the number of tourists only 2-6 people.

4. Conclusion

From the calculation it is known that there are 11 qualified rule that has a lift value ratio of more than 1 (one), the highest value of support and confidence. The most commonly visited tourism objectives in Yogyakarta is Alun-alun, Prambanan, Borobudur, Palace, Monument, South Beach, Palace, Beringharjo, and Malioboro Mall. From the output, Malioboro is a tourist attraction that most often appear in association rules. From the 11 elected rule, made into four proposed travel package as a representation of the most attraction most visited by tourists..

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