Analysis of Tourists Preferences on Smart Tourism in Yogyakarta (Case: Vredeburg Fort Museum)

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Analysis of Tourists Preferences on Smart Tourism in Yogyakarta (Case: Vredeburg Fort Museum)

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Abstract. Smart tourism is a supporting system of an individual tourism in the terms of a comprehensive and integrated information and technology service. An educational tourist destination such as a museum is expected to present an informative and interactive atmosphere. Vredeburg Fort Museum as one of the tourist destinations in Yogyakarta begins to lose its visitors. The lack of interest of public towards the museum and the assumption that the museum is an ancient, less well maintained, and boring place become main obstacles in attracting tourists. This research aims to find the important factors becoming the preferences of tourists to visit the Vredeburg Museum in Yogyakarta. The research method used is the Principal Component Analysis. The analysis shows there are four main factors with eigenvalue more than 1, i.e. the first factor of 8,623, the second factor of 1,920, the third factor of 1,175, and the fourth factor of 1.082. Those four factors are the result of the grouping of 20 preference determinant variables.

1. Introduction

The large number of users of gadget and internet lead to an opportunity for the government to improve the quality of public services and economic improvement of the tourism sector[1]. The tourism industry itself has implemented the Information and Communication Technology (ICT) to reduce costs, improve service quality and customer quality. The tourism industry has adopted the Information and Communication Technology (ICT) to reduce costs, improve the service quality and customer quality[2]. Due to the economic progress, the ordinary tourism potentially turns into smart tourism, which makes use of intelligent systems [3]. The main objective of smart tourism is to focus on the needs of tourists by integrating ICT with the tourism industry to promote, to improve the quality of services and tourism management, and to enlarge the industrial scale into a wider scope [4]. With the implementation of ICT in tourist destinations, there can be more tourism experience and enhance the competitiveness of the place [5].

Yogyakarta, as the second national tourist destination after Bali, relies on the same tourism destinations such as KeratonYogyakarta , Taman Sari, Malioboro, Vredeburg Fort Museum, Taman Pintar and GembiraLoka Zoo. Most of the tourism destinations in Yogyakarta is a cultural and historical place. It is dominated by the museum (14 museums) [6]. Among the 14 museums in Yogyakarta, Vredeburg Fort Museum is situated in the most strategic location, around JalanMalioboro which is the center of tourism in Yogyakarta. Based on the field observation, the writer chose the Vredeburg Museum of Yogyakarta as the object of empirical research since Vredeburg Fort Museum

has shown progress towards smart tourism. From the data obtained, it is known that Vredeburg Fort Museum has improved its technology system such as the use of a visualization room dioramas with QR code technology to enable visitors to access information about the objects displayed (Figure 1). A screen facility is also provided for visitors as media information and educational games about the history of the struggle for Independence of Indonesia. Audiovisual room for playing movie of the struggle is also available every Friday and Sunday.

Figure 1. Diorama room of Vredeburg Fort Museum.

The city of Yogyakarta has a vision to be a city with quality, character and inclusive education, culture-based tourism, and center of environmentally minded public services and people-based economy[7]. To realize the vision, Yogyakarta government has made smart city roadmap in 2016. In the roadmap, it is mentioned that there are three focuses of smart city development in Yogyakarta : smart culture, smart tourism, and smart education[8]. In smart tourism, Yogyakarta has three variables to be achieved, the number of tourists, length of stay, and the amount of money spent. The number of tourists visiting Yogyakarta during 2016 is 5.5 million people, 2 percents lower than the one in 2015.

A museum is a permanent and non-profit institution, serving the needs of public openly by collecting, conserving, researching, communicating, and exhibiting real objects to the community for study, education, and pleasure[9]. Museum development can be done by cooperation in the educational, social, science and technology, cultural, and tourism field [10]. Vredeburg Fort Museum has covered the three aspects of smart city of Yogyakarta; smart culture to lift the culture, smart education as a means of education improvement, as well as smart tourism as a cultural and historical tourist destinations.

This research will summarize the important factors supporting the implementation of smart tourism in Yogyakarta, especially in BentengVredeburg Museum. Existing technology must be available because providing integrated technology is a requirement to make a smart tourism object. Analysis of the preferences of tourists on Museum Vredeburg Fort needs to be done to determine the strengths and weaknesses of this tourist destination in order to facilitate managers in preparing strategies for the realization of smart tourism.

2. Literature Review

2.1. Smart Tourism

The concept of smart tourism is a supporting system of an individual tourism within the terms of a comprehensive and integrated information and technology services[11]. Smart tourism involves several components and elements supported by ICT, as shown in Figure 2[12]. Component of smart experience aims to enhance the experience of the tour by getting updated information, sharing experiences, and doing tourism activities through the media technology[13]. Smart business components have characteristics such as dynamic stakeholder interconnection, core business that have shifted toward digital process, and friendliness to investors[5]. The last component is the smart

destination which is the integration of ICT with physical infrastructure in tourism destinations offering more value than other destinations.

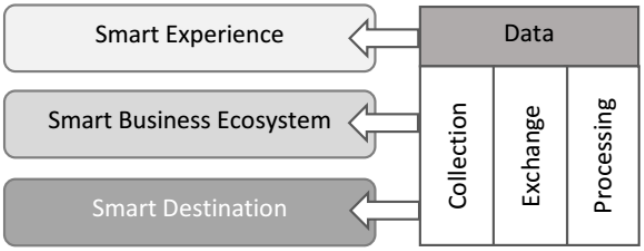

Figure 2. Components dan Elements of smart tourism.

The most important thing of smart tourism is to offer personal service to the tourists by considering some aspect such as access to real-time information to collect user data. According to Zhang et al. [14].There are three technologies supporting smart tourism system: cloud computing, Internet of Things (IoT), and end-user internet service system.

2.2. Vredeburg Fort Museum

Vredeburg Fort Museum is a museum of the Indonesian's people struggle for independence in Vredeburg Fort Museum is a museum of struggle for independence in Yogyakarta. Vredeburg Fort Museum of Yogyakarta is located in the zero kilometer of the center of Yogyakarta city or at the southern end of Malioborostreet. In its service to the community, Vredeburg Castle museum can not be separated from the elements of education because basically the museum has two functions, a recreation and a place of education. Information about the history, culture and noble values of the independence struggle is presented to the young generation in nuances of edutainment, the term derived from the word education and entertainment.

Attractions presented at the Vredeburg Fort Museum are in the form of dioramas or miniatures of the history of the struggle for independence. The diorama of historical events of independence such as the diorama in room I depicts historical events in the Diponegoro war period until the Japanese colonization in Yogyakarta (1825-1942). Diorama room II depicts the events from the proclamation or the beginning of independence until the Military Aggression of Netherland (1945-1947). The diorama room III illustrates the event of the Renville Agreement until the recognition of RIS sovereignty (1948-1949). Diorama room IV describes the history from the period of the establishment of Republic of Indonesia until the New Order (1950-1974).

2.3. Tourist Preferences

Preference is the choices made by tourists regarding the tourism destinations visited. The strength of the tourist preferences will determine what facilities they like in the tourism destinations. Tourist preference is closely related to personal information. Each person has different personal characteristics. In the field of tourism, the data of tourist preference can be used to highlight the advantages possessed by these tourism destinations so that the tourists have the desire to have another visit and recommend it to others.

Garcia et al. in Baggio et al. [15] set up a tourism recommendation system based on tourist preferences on Point of Interest (POI). Preference is used as a tool in making decisions for other tourists to visit a tourist destination.

2.4. Principal Component Analysis (PCA)

Principal Component Analysis (PCA) is a technique for constructing new factors that are linear combinations of the original variables[16]. The maximum number of these new factors will be equal to the sum of the old variables, and these new factors are not correlated one another. Calculating the

analysis using the PCA method is about solving the eigen equation where the eigenvalues should be more than 1. The PCA algorithm steps in general are: calculating the covariance matrix, calculating the eigenvalues, calculating the eigenvectors, and defining the new variable (principal component) by multiplying the original variable with an eigenvector matrix.

3. Research Methodology

Quantitative method is used to collect data from respondents. The number of tourist populations visiting the museum during the data collection period is unknown (infinite) so that the minimum sample count is calculated using the Lemeshow formula[17], wherein the minimum sample used is 96 respondents. The method of analysis used is Principal Component Analysis because this research uses multi variable. This research uses questionnaires in the form of a set of formal questions to obtain information from respondents. The purpose of the questionnaire is to translate the information needs of the researcher into a set of questions that make the respondent willing and able to answer. To measure the respondent's perception of the questions given, Likert scale with 6 point response is used. According to Chomeya[18], the scale with 6 points of response has a better degree of discrimination and reliability than a scale with a response point of 5 or any other odd number.

This research uses 20 variables to determine the preferences of tourists towards smart tourism in Yogyakarta. The variables used will be adopted from the results of research of Wang et al. [19]and have been adapted to the situation at the Vredeburg Museum of Yogyakarta as shown in Table 1.

Table 1. Smart tourism variables and operational definition.

No.	Variables	Operational Definition
1.	Website of Tourism destination	The tourists make use of digital sources such as websites in searching information and communicating. Their travel intention is reinforced by the website features.
2.	Mobile Apps	Mobile apps can improve the quality of customer service at the desired tourism destination by pointing out the right locations, booking places, and estimating waiting time at various tourist attractions
3.	Free Wifi	It allows tourists to connect their gadget devices to the internet via wireless connections that are widely available in hotels, airports, restaurants.
4.	QR code	Dapat mengakses informasi tentang tempat menarik melalui perangkat mobile dengan scan kode quick response The tourists can access information about interesting places through mobile devices by scanning quick response code
5.	Touch Screen Devices	Touch screen technology can provide services for tourist who needs information, and is used as an interactive medium of educational games
6.	Signal Coverage	Tourists have no difficulty in accessing mobile phone signals and can use the internet connection from a service provider during visit in the tourism area
7.	Service center call	Service center provides useful and timely information for the travel plan of the tourists
8.	Smart Guidance System	It can provide experience and more or different information for tourists
9.	Information Guidance Services	The system combines Geographic Information Systems (GIS) with location-based services to provide a better travel experience for tourists and a deeper understanding of the importance of precious views
10.	Smart Card	It contains personal information attached to an RFID chip.

11.	System of Electronic Entrance Security	A good information system should consist of several IoT information systems, including security systems and ticketing systems with RFID technology
12.	Smart environment	Smart environment is one of the most important dimensions of smart tourism destination, it is related to energy optimization leading to sustainable resource management
13.	Smart education	Smart destinations focus not only on utilizing the new technologies, but also on educating tourists on how to use them.
14.	E-complain	Tourism organizations should have an e-complain handling system to handle complaints and give feedback from travelers
15.	E-Commerce	Buying tourism products through websites and apps is a growing market nowadays since more tourists have mobile devices.
16.	E-Ticketing	Tourism entrance system with modern information system must apply RFID technology
17.	E-parking system	RFID can be used for parking systems, so parking fee is no longer required
18.	Emergency system	It is an IoT-based tourism security platform and cloud computing. This platform connects security equipment with service facilities at the tourism destination via IoT and will detect warnings via wireless sensors
19.	Augmented Reality	Informasi interaktif multi media dengan bantuan smartphone untuk meningkatkan pengalaman berwisata It is a multimedia interactive information by means of smartphone to enhance the travel experience
20.	Tourism Destination Blog	Tourists trust the website with reviews more rather than professional guides and travel agents

4. Findings and Discussion

Demographic data collected from 110 questionnaires that can be analyzed include age, gender, education, occupation, experience of visiting, and the area of origin of the respondents. Most visitors coming to Vredeburg Fort Museum of Yogyakarta are 21-24 years old that (43%). This is because the visitors are mostly students who are studying at universities in Yogyakarta.

Validity and reliability tests have been done towards questionnaire items with 30 samples. The validity test is carried out to know how good the questionnaire is to precisely be used as survey instrument in this research. This test is done by comparing r obtained and r table. If r obtained is higher than r table, so the item is said to be valid. On the contrary, if r count is lower than r table, so the item is considered invalid. Based on the result of validity test, it is known that the 20 questions tested are considered valid with r table above 0,361. Therefore, the questionnaire can be used as research instrument. The test reliability is done by using Cronbach's Alpha. The score of Cronbach's Alpha is assumed to be reliable if it is higher than 0.7 and can be considered good if it is higher than 0.8 [20]. The reliability test result shows that Cronbach's Alpha score is 0.953, so it can be used as instrument in this research.The assumptions to be met in the PCA analysis are the correlation matrix score, Kaiser Mayer Olkin (KMO), Anti Image Matrix, and the score of Communalities.

4.1. Matriks Korelasi

The correlation matrix table contains correlation scores among variables to be analyzed. The correlation among independent variables must be strong enough (higher than 0.5). One of matrix correlation result of tourism destination website variable with mobile apps variables shows a score of 0.667 indicating that there is a strong correlation. The correlation between the variable of tourism

destination website and mobile application is significant. It can be seen from the p-value score of 0 (<0.005) meaning that there is a correlation between the variables.

4.2. Uji Kaiser Mayer Olkin (KMO)

In this research, Kaiser-Meyer Olkin (KMO) test is a method to see the adequacy of data for factor analysis. This KMO method measures the adequacy of sampling thoroughly and the adequacy of sampling for each variable. The score of KMO obtained from this test result is 0.867 which can be categorized as good data.

4.3. Anti Image Matriks

Besides checking the KMO, the Anti-Image Matrices is also checked to determine whether the variables are partially feasible to be analyzed and not issued in the test. Based on Anti Image Matrices, it is known that all 20 variables to be analyzed have Measure Sampling Adequacy (MSA). In this research, all variables are higher than 0.5, so the variables are considered eligible to be included in the factor analysis.

4.4. Communalities

Communalities are used to see the closeness of the correlation between variables and factors formed. From the total scores in communalities table, it is found that 19 variables have large communalities (> 0.5). One variable has a communalities score of 0.379 (emergency response system variable) meaning that it must be taken out for further analysis.

4.5. Total Variance Explain

Total Variance Explained shows the percentage of total diversity that can be explained by the diversity of factors formed. To determine how many factors are used in order to explain the total diversity, it is done by considering how large the eigenvalue. The component with eigenvalue > 1 is the component to use. The result of analysis shows that there are 4 variables with eigenvalue value> 1. In the table, there is also an eigenvalue value of each factor formed. It is known Factor 1 with eigenvalue of 8.355, Factor 2 with eigenvalue of 1.876, Factor 3 with eigenvalue of 1.175, and Factor 4 with eigenvalue of 1.079.

4.6. Interpretaion of Final Result

The factors generated from factor rotation are seen from the loading values of each variable as shown in Table 2.

Table 2. Rotated component matrix.

	Component			
	1	2	3	4
V1	0,112	0,324	0,739	0,107
V2	0,081	0,440	0,682	0,093
V3	0,134	0,061	0,766	0,136
V4	0,359	0,134	0,648	0,436
V5	0,545	0,105	0,315	0,428
V6	0,055	0,584	0,186	0,433
V7	0,083	0,191	0,200	0,850
V8	0,462	0,223	0,263	0,604
V9	0,358	0,639	-0,036	0,390
V10	0,619	0,121	0,051	0,499
V11	0,650	0,343	0,180	0,243

V12	0,310	0,571	0,257	0,335
V13	0,206	0,775	0,274	0,013
V14	0,335	0,700	0,286	0,032
V15	0,828	0,240	0,142	0,050
V16	0,758	0,094	0,147	0,055
V17	0,729	0,231	0,106	0,130
V18	0,587	0,048	0,343	0,240
V19	0,743	0,225	-0,014	0,068

The result of grouping of factors formed determines the main priority of the tourists' preference towards smart tourism according to the predetermined variable.The four factors formed can be named according to the variables contained in it. The naming of each factor formed is according to the name of the forming variable as shown in Figure 3.

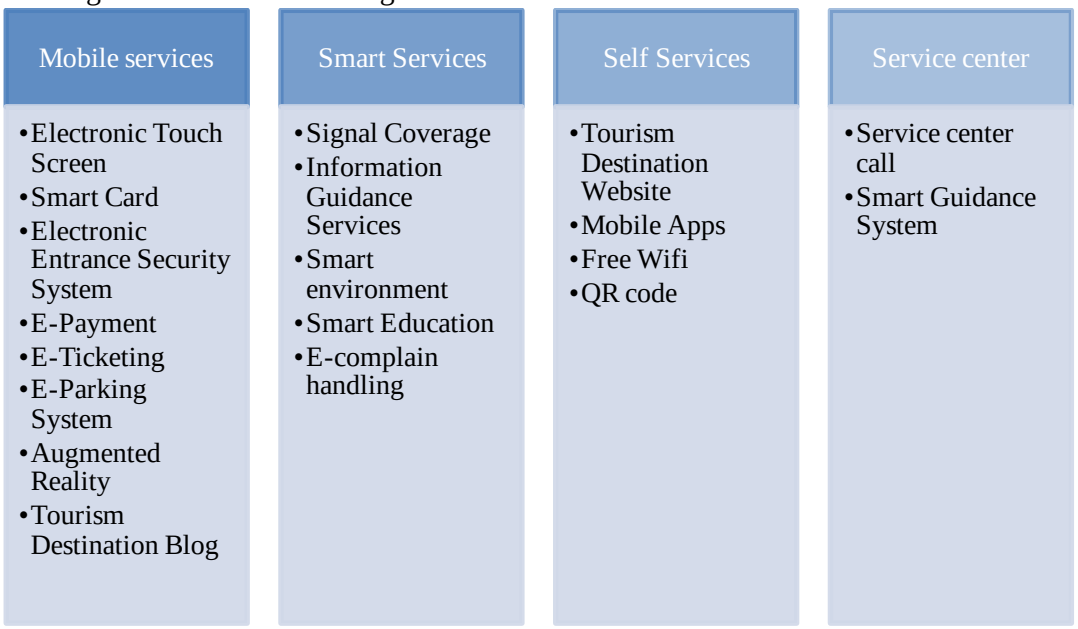

Figure 3. Preferences factors oftourists.

5. Conclusion

Based on the results of the research on Tourist Preferences towards Smart tourism at Vredeburgfort Museum some conclusions can be drawn as follows:

1. There are 20 assessment variables used to measure the preferences of tourists at Vredeburg Fort Museum Yogyakarta. These variables have been tested through the field observation and the adoption of previous research conducted by Wang et al.[19];
2. From the process of clustering factors by using Principal Component Analysis, 4 main factors are formed which determine the preferences of tourists towards Smart tourism in Vredeburg Fort Museum. Those factors formed have eigenvalue higher than 1. Factor 1 has eigenvalue of 8.623, Factor 2 has eigenvalue of 1.920, Factor 3 has eigenvalue of 1.175, and Factor 4 has eigenvalue of 1.082. Based on the grouping, a name of the factor formed is given based on the forming variables. These factors are mobile service (consisting of 8 variables), smart service (consisting of 5 variables), self service (consisting of 4 variables), and service center (consisting of 2 variables).

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