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Model of Travel Planning and Tourism Costs with Integration of Creative Industries Information Using Web and Mobile Technology

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***Abstract*— Travel arrangements in tourist activities are necessary so that the execution goes as expected and does not exceed the planned cost. This research provides a model that can use when planning tourist activities so that it can obtain several recommendations that are the total cost required, weather forecast information at the destination tourist destination as well as information a creative industry located around a tourist destination. Android-based web and mobile technology modeled using so that the model in this research becomes a blueprint for system design that is ready to implement. Based on the testing and validation of the user acceptance test model used the Likert scale from the aspect of technology feature assessment, ease of use and completeness of the information provided, it concludes that the model produced in this research obtained a value that was at a reasonable interval. Thus, this model can accept by the community and then implemented into the next stage.**

Keywords— Travel Planning, Tourism Cost, Creative Industry, Android Technology, Weather Forecasting

I. INTRODUCTION

In sightseeing, tourists, especially backpackers, have a universal fundamental principle, which is to get the most pleasure with the expenditure of detail funds. An enjoyable tourist holiday will minimize the expense spent on sightseeing. This is sometimes a matter of less concern, so problems arise when traveling, like running out of funds or spending beyond the estimate.

Based on the results of preliminary observations and interviews with prospective tourists stated that the biggest problem faced by respondents when traveling was not doing tourism planning in terms of costs, which caused an error in the estimated cost of travel. The next problem besides cost planning is that there are doubts about tourist destinations and the question of time to reach places in several tourist destinations in an area. Based on the results of these observations, it found that costs, which are the main subject of tourist problems in travel followed by issues of time and knowledge of the destination. The determination of tourist destinations usually focuses on the growth of the number of visitors and the amount of spending the tourists themselves [1]. Stankovic et al [2] stated that the tourist destination becomes a tourism product, which should be an unreleased unit with other economical products.

Creative industry information used as additional information from tourist destinations so that tourists facilitated to find products from creative industries that used as souvenirs [3]. Thus, the sector of SMEs businesses also can increase revenues [4]. Planning for using budget funds needs to be done in every sector, such as in terms of education [5], health [6] [7] also in the tourism sector [8] [9]. If not planned, it is possible to over-budget when carrying out activities.

In this research, a model created to make it easier for tourists to plan the allocation of funds needed when carrying out tours. Start from the funds for transportation, accommodation, and accessibility of the tourist attraction itself. Thus, it can see whether the allocated funds have sufficient or even less status. The use of funds in terms of tourism transportation can plan by calculating the amount of fuel used by a vehicle, then multiplied by the distance traveled from the first place to the tourist destination, including the distance back from the tourist destination to the return location. In addition to cost planning recommendations and information from tourist attractions and the surrounding creative industries, weather forecast information also needed from the destination tourist sites so that tourists can at least prepare and know the conditions of the destination. Weather estimates can obtain from several trusted sources such as social media, AccuWeather, Meteorology, Climatology, and Geophysics Agency, or even information originating from the smartphone user community [10].

Thus, the model in this research made as an initial step before implemented into application development to facilitate budget planning for travel, as well as to provide additional information for tourists regarding creative industries that locate near tourist destinations, and can provide forecast information weather from the destination. The model created in this research consisted of a system architecture model, the technology model used, a cost calculation model, a software and hardware needs model, a model of the functional requirements of the system, a database model, and a system display model. The model validated to the community of potential stakeholder application users for planning tourism activities using the technique of user acceptance test. With the validation and testing, it can be seen the level of acceptance from the community towards the model created, and known the shortcomings of the model made based on community opinion.

The purpose of this research is to create a travel plan and cost model and to ensure that the model created is valid and as needed when implementing the system at the next research stage.

II. METHODS

The framework method of this research can be seen in Fig.1.

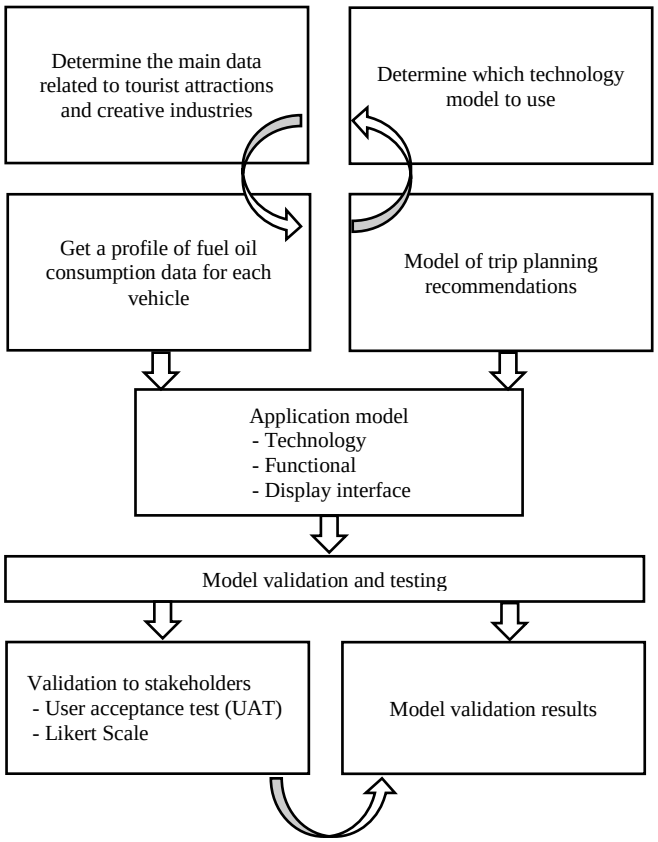

Fig. 1. Research Framework

In the stages of determining the primary data related to tourist attractions, researchers observe any data that needed to know by tourists when planning to travel. Based on the observations of the researchers, the primary data required is the complete address of the tourist attractions, information about tourist attractions, the cost of admission tickets, the cost of ticket facilities, and the rating of tourist attractions.

After data on tourist attractions has obtained, this research provides a model to supplement information about creative industries that are located close to tourist attractions. Thus, tourists can facilitate when they want to find souvenirs of the creative industries that are typical of a tourist place. The creative industry data used as the model of this research are the names of the creative industries, photos, addresses, creative industry descriptions, coordinates of the location of the creative industries that used to determine the distance from the location of tourist attractions.

The model made to estimate the total cost of the trip required obtained from the fuel consumption of the vehicle used. Thus, this model provides information on fuel oil consumption per liter for four-wheeled and two-wheeled vehicles. The data presented is dynamic so that it added, changed, and deleted. They are starting from the information on the type of vehicle, the type of fuel oil, to processing fuel consumption per liter for each vehicle.

Technology models needed the processing of tourist data, creative industries, vehicles, weather predictions of destinations, fuel oil, fuel consumption for every liter, as well as mileage to provide a model related information the necessary travel planning recommendations.

After obtaining the primary data, vehicles, technology, and planning recommendation models that made, then the next continued in making the application model build it. The application model consists of a model specification of software requirements, hardware, and functional requirements of each model. The application design model is also then made consisting of a database model, a data table structure model, and a model from the application interface.

To find out that the public can accept the model proposed in this research as a stakeholder of prospective tourists who will be traveling, it is necessary to test the model to test whether the proposed model is valid and acceptable to stakeholders. The process of validation and model testing carried out using the concept of user acceptance test (UAT) and questionnaires using a Likert scale.

III. RESULTS

A. Model Comparison of Fuel Consumption for Vehicles

This research uses the most widely used fuel consumption comparison in travel activities such as Premium, Petalite, and Pertamax. Premium has an octane value of 88, Pertalite has an octane value of 90, and Pertamax has 92-octane value. According to Pertamina, the higher the value of octane, the more economical the consumption of fuel. The fuel consumption data refers to the experiments made by the Automotifnet team [11], which can see in table I for car vehicles as well as table II for motor vehicles.

TABLE I. COMPARISON OF CAR FUEL CONSUMPTION

Type of Fuel	Fuel Consumption (Km / Liter)	Comparison
Premium	11 Km/L	1
Pertalite	13 Km/L	1,18
Pertamax	14 Km/L	1,27

To find out the total estimated amount of fuel consumed by the car, it must first know the fuel consumption for each type of car from various vendors.

For example, the Nissan Grand Livina 1.5 AT known for its fuel consumption when using premium is 13 Km / L. Therefore, to find out fuel consumption when using Pertalite and Pertamax, the formula used is:

Premium = 13 x 1 = 13 Km/L

Pertalite = 13 x 1.18 = 15.34 Km/L

Pertamax = 13 x 1.27 = 16.51 Km/L

Comparison of motor vehicle fuel consumption, based on experiments from the automotive team [11] obtained a comparison of fuel consumption as in Table II:

TABLE II. COMPARISON OF MOTOR FUEL CONSUMPTION

Type of Fuel	Fuel Consumption (Km / Liter)	Comparison
Premium	40 Km/L	1
Pertalite	41,67 Km/L	1,04
Pertamax	41,67 Km/L	1,04

With the same formula with the ratio of car fuel consumption, obtained an example of a comparison of Honda Revo FI motorcycle fuel is:

Premium = 57.3 Km/L

Pertalite = 59.6 Km/L

Pertamax = 59.6 Km/L

B. Technology Model Used

Some of the technologies used in this research are the A-GPS global positioning system, the weather forecast API from open weather, the Google Maps Android API, and the Google Places API.

B.1. Global Positioning System A-GPS

A-GPS global positioning system technology will determine the position of the smartphone with high accuracy. The reason for this high accuracy is the basis of the researchers choosing A-GPS as a GPS used in applications that built. The use of A-GPS is useful for getting smartphone locations faster because it supported by telecommunications operators used on smartphones. The use of A-GPS certainly involves high costs because it uses an internet connection to use it.

B.2. Open Weather API

Online services Open Weather API technology that provides an API for weather data, including weather data, predictions, and historical data for web service developers and mobile applications. As a data source, Open Weather processes broadcast meteorological services, raw data from airport weather stations, raw data from radar stations, and raw data from other official weather stations so that it can provide accurate weather and weather maps online. This service focus on social aspects by involving weather station owners to connect them to services to improve the accuracy of weather data. In the system model built, the weather forecast uses five days and 3 hours, where the weather forecast will display for the next five days in a time interval of 3 hours.

B.3. Google Maps Android API

The API (Application Programming Interface) that is built by Google will use in the system built. The usefulness of this API is to get digital map services that will use in the application. In this API, services that can use in addition to displaying digital maps in the application are the use of markers, polygons, and overlays to the base map, as well as changing the appearance of certain map areas to users. All of these objects provide additional information about the location of the map and allow user interaction with the map. Researchers to support system requirements use these features.

The Google Maps Android technology API will be useful in functional system building that relates to the location of an object within a digital map. Researchers are always using this technology to support the functionality of the system built later.

B.4. Google Places API

The next technology that utilizes in applications that built in the Google Places API. The Google Places API used to get requests for information about places around the location we are initializing. This technology used by researchers to find places around tourist destinations such as the nearest ATM, the closest mosque to a radius that dynamically set by the user.

C. Tourism Cost Calculation Model

As an example of a case when a tourist will plan a trip to a place by driving a private vehicle, be it a car or motorcycle, as follows. In this case, it assumed that the initial initialization of tourists' plans is as in Table III.

TABLE III. INITIALIZATION OF TRAVELERS PLAN

Budget	Rp. 700.000	
Date of Departure	June 7, 2019	
Travel Time	1 day	
Number of people	3 people	
Location Departure	UNIKOM (-6.8868635, 107.6153092)	
Destination	Kampung Gajah (-6.832587, 107.593971)	
Tourist facilities to be used	Facilities	Amount
	1. Bumper boat 2. Child Playground 3. Mini ATV	3 3 3
Transportation type	Car	
Number of vehicles	1	
Vehicle Brands	Nissan	
Vehicle Type	Grand Livina 1.5 AT	
The type of fuel used	Premium	

Based on the plan in Table III, tourists use a system that built and the system will make three estimated costs, namely:

1. The cost of travel tickets

Based on the tourists' plan in Table IV, an estimate of the cost of tourist tickets can generate, as shown in Table IV below:

TABLE IV. TOURIST TICKET COST PLAN

Information	Calculation
Ticket price	Rp.150.000
Number of people	3
Subtotal ticket prices	Rp.150.000 x 3 = Rp. 450.000

2. Cost of travel facilities

Based on the traveler's plan in table IV, the estimated cost of tourist facilities generated, as shown in Table V below.

TABLE V. PLAN OF TRAVEL FACILITES COST

Facility	Amount	Price	Total Price
1. Bumper boat	3	40.000	120.000
2. Child Playground	3	20.000	60.000
3. Mini ATV	3	20.000	60.000
Sub total cost of the facility			240.000

3. Travel Costs for Fuel Consumption

The estimated cost of travel, in this case, is fuel consumption, as shown in Table VI below:

TABLE VI. TRAVEL COST PLAN

Information	Content
Vehicle	Mobil Nissan Grand Livina
Transportation type	Car
Vehicle Brands	Nissan
Vehicle Type	Grand Livina 1.5
Fuel price	6450
Fuel consumption Km / l	13 km/l
Departure location	UNIKOM
Destination	Kampung Gajah Wonderland
Mileage	3.86 Km
Round trip distance	3.86 Km x 2 = 7,72 Km

Calculation of the total distance to be traveled from the starting point is UNIKOM with coordinates (-6.8868635, 107.6153092) towards the destination, namely "Kampung Gajah Wonderland" with coordinates (-6.832587, 107.593971). For the calculation of total distance traveled, the system utilizes Google Maps Direction API technology.

The formula for calculating the estimated fuel cost of the total route distance in the Table is.

$$\text{Premium cost} = premium\ price\ per\ liter * \frac{total\ distance}{consumption\ per\ liter}$$

$$\text{Premium cost} = 6450 * \frac{7{,}72}{13}$$

Premium cost = Rp. 3.830
Sub total cost of fuel consumption = Rp. 3.830

After obtaining the estimated cost of the ticket, facility costs, and travel costs (fuel consumption), the system will calculate the total cost of the tourist plan carried out by the formula:

Total costs = subtotal ticket prices + subtotal cost of facilities + subtotal trip cost
Total costs = Rp. 450.000 + Rp. 240.000 + Rp. 3.830
Total costs = Rp. 693.830

Based on the estimated total cost of the plan carried out by tourists and the planned initial cost of tourists, it can conclude that the costs owned by tourists meet the total planned costs estimated by the system with the results as shown in Table VII below:

TABLE VII. TOTAL OF TOURISM COST

Information	Contents
Costs owned	Rp. 700.000
The total cost of the plan	Rp. 693.830
Status	**Costs are met**
Margin	Rp. 6.170

D. User Model

Users who can use the tourist planning system modeled into three, namely administrators, MSME administrators, and tourists. An administrator has the characteristics of being able to operate a computer well and can process databases.

An MSME administrator must be able to account for the proposed MSME data to the system. A tourist user who is the main object in this tourist planning application model must be able to operate an Android smartphone and understand essential English words.

E. Application Functionality Model

Some functionalities in the system designed for the mobile subsystem can be seen in Fig. 2 below:

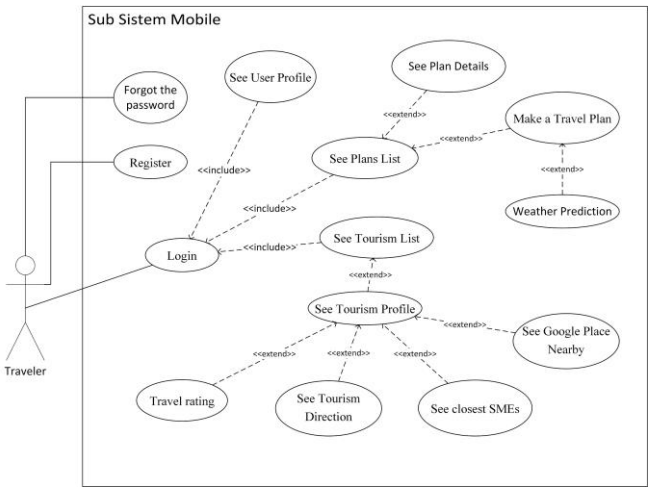

Fig. 2. Application Functionality Model

An overview of the whole system, both its input-output, can be seen in the diagram model, as shown in Fig. 3 below:

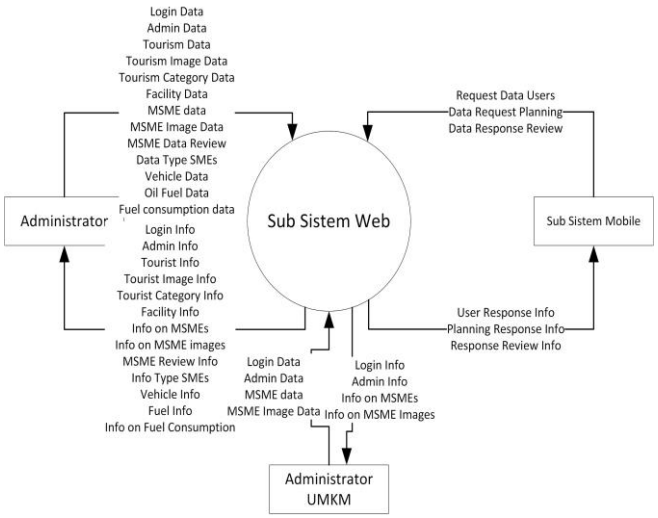

Fig. 3. Model of The Entire System Diagram

F. *Display Model of Mobile Applications*

Examples of mobile application display models that use in the tour plan process can see in Fig 4.

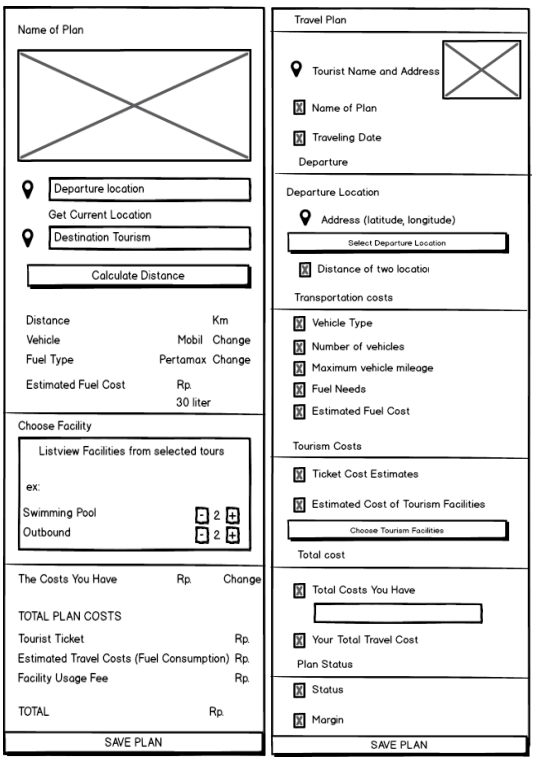

Fig. 4. Model for Displaying Travel Plans

G. *Model Display of Website Dashboards*

The display model for the administrator website in this research show in Fig. 5.

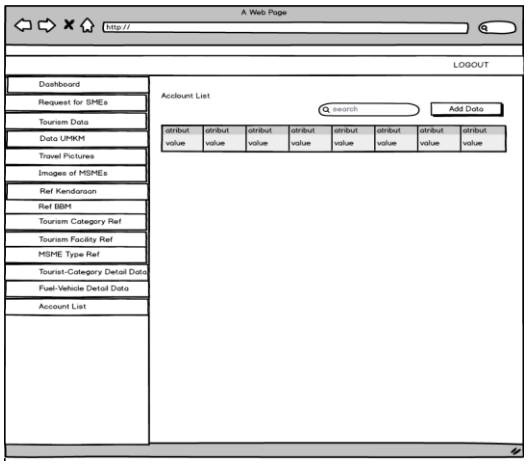

Fig. 5. Model for The Administrator Website

H. *Validation and Testing of Acceptance Models*

Validation and testing needed to find out whether the model proposed in this research was accepted or not by the prospective community of application users. Questions asked to 30 respondents who distributed using a questionnaire with a Likert scale assessment.

The questions asked focused on features and use that exist in the tourism-planning model, namely conformity with needs, technology features used, information completeness, ease of understanding. The question was assessed using ratings by respondents with a Likert scale, namely strongly disagree (SD) with a value of one, disagree (D) with a value of 2, neutral (N) getting a value of 3, agree (A) obtaining a value of 4 and strongly agree (SA) get a value of 5.

TABLE VII. RESULT OF TESTING ACCEPTANCE MODEL

Q1 : Assessment of the suitability to the needs				
SA	A	N	D	SD
10	12	3	5	0
Q1 Average = (117 / 150)*100% = 78				
Q2 : Assessment of available technology features				
SA	A	N	D	SD
5	20	5	0	0
Q2 Average = (120 / 150)*100% = 80				
Q3 : Assessment of the completeness of the information				
SA	A	N	D	SD
2	13	8	7	0
Q3 Average = (100 / 150)*100% = 66.6				
Q4 : Assessment of the ease of the model to be understood				
SA	A	N	D	SD
9	17	4	0	0
Q4 Average = (125 / 150)*100% = 83.4				
Final Average = (78+80+66.6+83.4) / 4 = 75				

Based on the results of testing in Table VII, the total acceptances from respondents obtained from the tourism-planning model made obtained a total value of 75 from a maximum of 100. Completeness of information obtained the lowest value from the other criteria. This is because the model proposed this time has not provided information regarding the closest lodging from the destination tourist destination.

IV. DISCUSSION

This research has created a model used by tourists when planning tourism activities. Estimated costs are advantageous to minimize the lack of costs provided. Weather prediction in tourist destinations also needs to know before departure, so that potential tourists can decide whether to continue to travel or delay their departure according to the desired weather.

Information related to the creative industry that is located close to tourist attractions, well received by prospective tourists because it can make it easier when looking for souvenirs from a tourist place.

The model in this research obtained a value of acceptance from the community of 75 out of 100. Prospective tourists need information related to lodging closest to tourist attractions. Thus, there are additional features that must hold when implementing the model into application creation. However, other features contained in this model has accepted by the community.

In general, this tourist-planning model focuses on planning costs based on entry tickets, travel costs, weather prediction results, and the existence of creative industries around tourist attractions. It is different from other studies that provide a travel recommendation model based on traffic conditions [12], information from social media [13] and based on one's interest in the criteria of tourist attractions [14].

V. CONCLUSION

A tourism activity needs to plan well in terms of costs, time, weather, and transportation. Without planning, the activities carried out will not run well and can even become chaotic because it is not following the wishes. The model produced in this research can then implement into the application that carried out in the next research.

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