ANALYSIS AND RECOMMENDATIONS FOR REDESIGNING USER INTERFACE IN TRAVELAJA APPLICATION USING THE USER CENTERED DESIGN METHOD

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Abstract
The TravelAja application is mobile commerce that aims to serve online travel booking services. This application has a basket feature that other mobile commerce competitors do not have. This cart feature makes the user's habits in using mobile commerce applications different and makes it easier for users to find out the entire item to be paid for. In addition, this feature can also assist users in making payments simultaneously for several orders. However, the user interface on the TravelAja application is still not good, and improvements are needed so that users will feel comfortable when using the application. The application needs to be analyzed first to find the problem. This is done to improve the user interface of the TravelAja application. This study uses the User Centered Design (UCD) method because this method places the user at the core of the whole process. This method begins with interviews with several respondents who usually use travel applications and have tried the TravelAja application to find out user problems. After the interview, the user is asked to assess the application's usability using the System Usability Scale (SUS). Furthermore, the repair process is carried out, and a prototype is obtained, which is then evaluated. Based on the evaluation results, the results of SUS were obtained with a grade of A+. It can be concluded that the prototype is excellent.

Keywords: Analysis, Improvement, System Usability Scale, User Centered Design, User Interface

Introduction

The internet has become the right place for developing an industry, one of which is tourism. Reservations and marketing such as hotel rooms, airline tickets, and train tickets since the mid-1990s have been made through online media (Xiang, Magnini, & Fesenmaier, 2015). In 2015, mobile applications in the travel and tourism category were ranked the 7th most downloaded, and 85% of users ordered online. Of the 90% of travel companies assessing mobile apps as a strategic plan to maintain the continuity of their company and 53% of travel vendors see the importance of engaging their users through mobile media both before, during, and after traveling (Tak & Gupta, 2021). TravelAja is an e-commerce application or can also be called mobile commerce because it involves

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smartphones and is included in the travel application category because it aims to provide ticket booking services such as planes, trains, hotels, tour packages, and events (Niranjanamurthy, Kavyashree, Jagannath, & Chahar, 2013), (Mamaghani, 2009) and (Smirnov, Kashevnik, Shilov, Teslya, & Shabaev, 2014). The TravelAja application was developed by a private company (PERSERO) PT Telekomunikasi Indonesia Tbk. Based on developers' information, this application's target market is ordinary users who are or will be traveling. This study uses the TravelAja application because the TravelAja application has a feature that competitors do not have, such as traveloka, tiket.com, pegipegi, and agoda. The feature is a basket. With this cart feature, consumers can determine how much will be paid for all items needed. The existence of a cart can also affect consumer buying behavior. In addition, the cart feature can affect customer behavior, namely, when customers still feel they can shop more by adding shopping items (Ameen, Alam, & Hasan, 2018).

The TravelAja application was developed by a private company (PERSERO) PT Telekomunikasi Indonesia Tbk. Based on developers' information, this application's target market is ordinary users who are or will be traveling. This study uses the TravelAja application because the TravelAja application has a feature that competitors do not have, such as traveloka, tiket.com, pegipegi, and agoda. The feature is a basket. With this cart feature, consumers can determine how much will be paid for all items needed (Fleisch, 2010). The existence of a cart can also affect consumer buying behavior. In addition, the cart feature can affect customer behavior, namely, when customers still feel they can shop more by adding shopping items (Ameen et al., 2018).

The user interface is essential in developing a mobile commerce application, so a user interface with a good usability level is needed. For this reason, a search for user interface problems is carried out first on the TravelAja application to find out whether the user interface is good or not because this application is still new, and the developer informs that users have never tested this application. This process begins with initial interviews with people who are used to using travel applications and have tried using the TravelAja application because the market goal of the TravelAja application is users who are accustomed to going on vacation and making reservations through the application. They were asked to give their opinion on the user interface of the TravelAja application. Based on the interview results, it was found that there are still user interface problems, such as the basket feature. This problem is that when the item in the basket runs out, the item does not disappear, so the basket is filled with a list of items that are no longer needed so that the user feels uncomfortable.

Another problem is the abbreviated list of lodging facilities that users do not understand. In addition, there are other problems with the user interface of the TravelAja application, such as filling in the phone number, and the order has not been paid for but has been entered into the order history. So, the TravelAja application still requires an increase in the user interface. This problem is reinforced by usability testing on ten respondents, namely people who have been interviewed before. With these ten respondents, it is enough to test usability and save time and money because in getting

problem information from an application, five respondents are enough. The more respondents, the problems found will not necessarily increase (Ismail et al., 2021) (Nielsen, 2012). This test uses the System Usability Scale (SUS) because SUS can measure the three aspects of usability: effectiveness, efficiency, and satisfaction (Bangor, Kortum, & Miller, 2009) (Frøkjær, Hertzum, & Hornbæk, 2000).

Moreover, this SUS has other advantages, namely direct testing to end users without needing an expert and does not require many respondents (Ependi et al., 2019). In SUS, the user is given ten questions with a Likert scale of 1 to 5 ranging from Strongly Disagree to Strongly Agree (Bangor et al., 2009). From the initial test results, the average SUS value was 59.75, which was still below the minimum value for the Graphical User Interface (GUI), which should be at least 76.2 (Bangor et al., 2009). The following process is to make improvements to the TravelAja application user interface so that a prototype is obtained. After that, usability testing of the prototype was carried out using SUS, and the results showed good improvement. These results are indicated by the SUS test having a grade of A+.

Research Methods

In this study, the User-Centered Design (UCD) method is used to get a user interface that suits the user. The UCD method is used because this method can analyze user behavior in using the system and identify user needs. The analysis results of this method can then be used as the basis for making designs according to user needs. Furthermore, if the design is inappropriate, it must be repeated from beginning to end, including System Usability Scale (SUS) testing, so that the repair process is efficient, and the final result will follow the user's needs (Mao, Vredenburg, Smith, & Carey, 2005). The process of this UCD method is depicted in Figure 1.
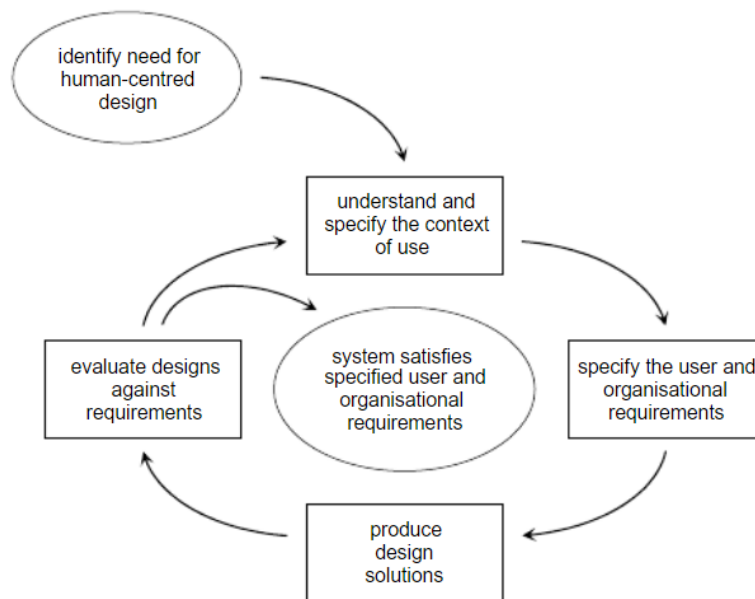

Figure 1: Process in User-Centered Design (Jokela, 2003)

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The UCD method used in this study is as follows:

A. Understand and specify the context of use

At this stage, the target users' interviews and observations were made to determine user behavior, problems, and needs. This stage also includes conducting SUS testing on the initial design.

The next step is to identify user personas which are done qualitatively by interviewing respondents.

B. Specify the user requirements

In this stage, the needs of the users are identified. This identification includes identification of persona needs, mental model design, and task analysis.

C. Produce design solutions

The next step is to produce design solutions where in this step, create a design solution in a designed way. Thus, the basic design formed from the previous steps is needed. The initial stage is making a conceptual model determine the design of all tasks. It is then formed into a wireframe to reflect the system's function.

After making the wireframe, we enter the mock-up stage. The mock-up stage aims to enhance the wireframe by providing colors, icons, images, and typography that visualize the entire system. Furthermore, this mock-up is equipped with the flow to become a prototype.

D. Evaluate Design

If all processes have been carried out, then usability testing is carried out on the prototype. The usability testing method used is quantitative using SUS because the purpose of this test is to evaluate the prototype (Budiu, 2017).

Results and Discussion

A. Understand and specify the context of use

Based on the results of observations and interviews with users of the TravelAja application, the results were obtained in the form of user interface problems such as the distinguishing feature, namely the cart. When the time for the items in the basket runs out, the items do not disappear so that the basket is filled with the list of items that are no longer needed so that the user feels uncomfortable. Besides, the abbreviated list of lodging facilities causes the user not to understand, and the selection of words on the button to enter the order into the cart is inappropriate, so the user does not know if the item has been added to the cart. In addition, in the telephone number field, there are two numbers 62, resulting in data that cannot be stored, and the phone number becomes invalid. Another thing that is obtained is that there are buttons to save data and continue, which have the same function. Furthermore, there is another problem in terms of flow where when the checkout button is selected and the user has not made a payment, but the order has been entered into the order history.

After that, SUS testing was carried out on the initial design of the TravelAja application. This test found that the average value of SUS was 59.75, which was still

below the minimum value for Graphical User Interface (GUI), which was 76.2 (Bangor et al., 2009). The test results can be seen in table 1.

Table 1SUS Test Results against design beginning

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	TOTAL	TOTAL x 2.5
R1	2	3	3	4	2	1	2	2	3	1	23	57.5
R2	2	2	2	2	2	2	2	2	2	2	20	50
R3	2	1	2	2	1	3	1	2	1	2	17	42.5
R4	4	3	3	4	4	0	4	4	4	0	30	75
R5	1	3	4	4	1	1	4	3	1	3	25	62.5
R6	1	1	1	2	2	2	1	1	2	1	14	35
R7	4	3	3	3	3	4	3	4	4	3	34	85
R8	2	3	3	4	3	4	4	4	3	0	30	75
R9	1	2	1	3	2	2	3	3	1	3	21	52.5
R10	2	3	3	3	2	1	2	3	3	3	25	62.5
Average												59.75

The results of the qualitative identification of user personas (Laubheimer, 2021) by interviewing 14 respondents were divided into two categories: Family Traveler with eight respondents and Non-Family Traveler with six respondents. These results can be seen in table 2 for Non-Family Travelers and table 3 for Family Travelers.

Table 2Persona Non-Family Traveler

NON-FAMILY TRAVELER	
Profile	1. Age: 19-22 Years 2. Male gender 3. Occupation: Students, BUMN employees, private employees
Travel Behavior	1. Looking for free time together to vacation with friends 2. Considering which friends to take on vacation 3. Discuss with friends 4. Looking for lodging, transportation, tourism, culinary information in tourist destinations you want to visit and cheap 5. Prepare funds 6. Planning transportation 7. Schedule a trip

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	8. Prepare the equipment that needs to be brought according to the travel agenda
	9. Buy souvenirs typical of tourist destinations for friends and family
Travel Attitude	1. Appreciating togetherness succumbs if the destination recommendation is not approved by friends
	2. Receive the results of discussions with friends
	3. Save as much as possible when traveling
Needs	1. Access roads that are safe and comfortable to pass
	2. The perfect place to share moments with friends on social media
	3. A place that is still beautiful and not crowded
	4. Cheap, comfortable lodging, and complete facilities
	5. There is information on cheap tourist attractions

Table 3 Persona Family Traveler

FAMILY TRAVELER	
Profile	1. Age: 21-40 Years
	2. Type Gender: Male and Female
	3. Occupation: Students, entrepreneurs and housewives
Travel Behavior	1. Manage vacation time
	2. Looking for a vacation spot that is not too far away and safe for children and maintain health protocols
	1. Discuss with family
	2. Planning a detailed safe travel route
	3. Planning accommodation and transportation suitable for families
	4. Planning a comfortable stay for children, in the middle of the city or close to tourist attractions
	5. Looking for a place to eat that is typical of tourist destinations

	6. Preparing supplies for a vacation with family
	7. Buy souvenirs typical of tourist destinations for friends and family
Travel Attitude	1. Appreciate time with family
	2. Maintain health protocol
	3. Protective against children
	4. Ensuring tourist destinations are suitable for families and children
Needs	1. Hotels and tours that are comfortable and suitable for families and children to visit
	2. Routes of tourist attractions that are convenient and easy to reach
	3. Hotels and tours that maintain good health protocols
	8. Convenient transportation

B. Specify the user requirements

From the previous results, namely the user persona, what needs are needed by the user. Thus the requirements according to user requirements are summarized as follows:

1. There is tourist information that is suitable for traveling with children
2. There is a button to access the maps application
3. There is information that ensures the hotel is clean
4. There is health protocol information on tourism
5. Transportation information suitable for families
6. There is the cheapest transportation order
7. There is information on tourist attractions that are suitable for taking pictures
8. There are previews in the form of photos from tourist attractions and information on beautiful places
9. There is an order of the cheapest hotels
10. There is the cheapest tour order

Then determining the mental model to describe how the user is using the application is presented in the form of activity diagrams. Moreover, the mental model is divided into two according to the persona previously created. Figure 2 shows a mental model activity diagram for the Non-Family Traveler persona. Figure 3 shows a mental model activity diagram for the Family Traveler persona.
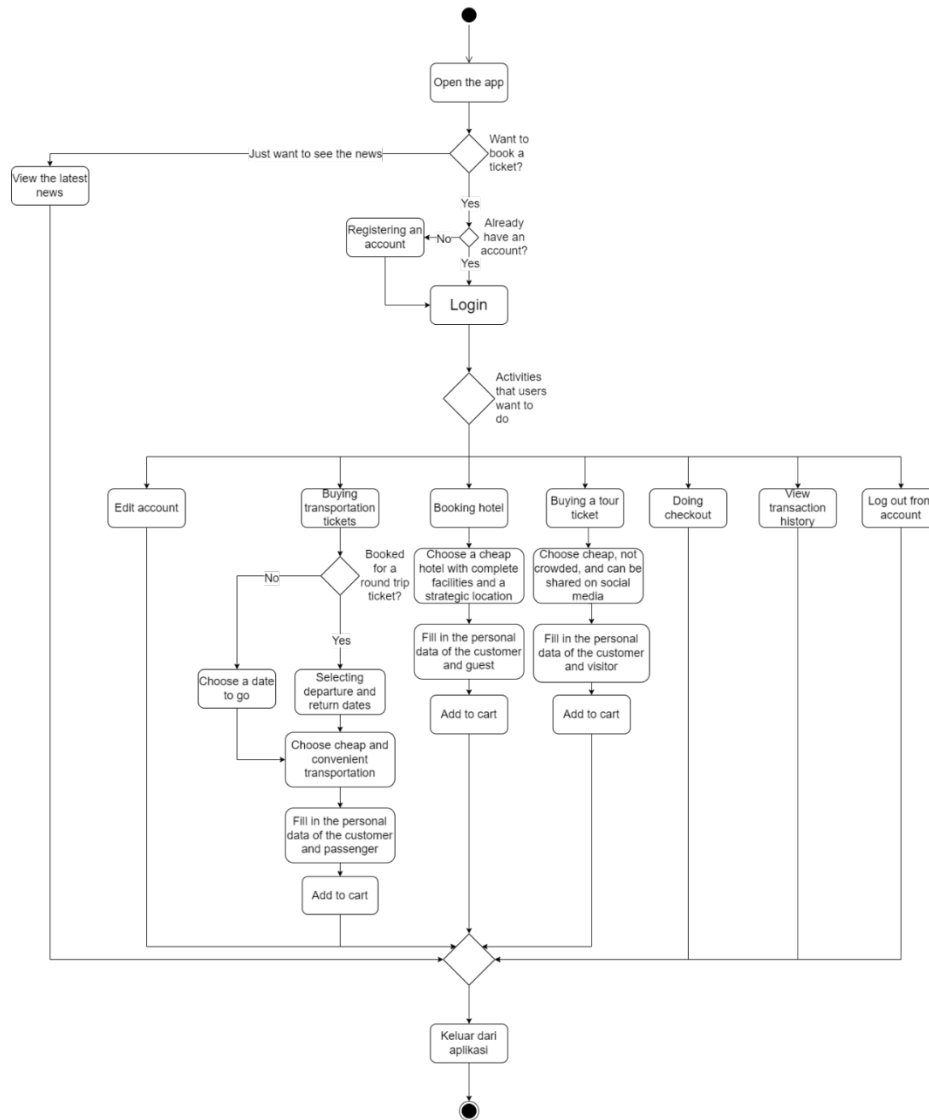
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Figure 2
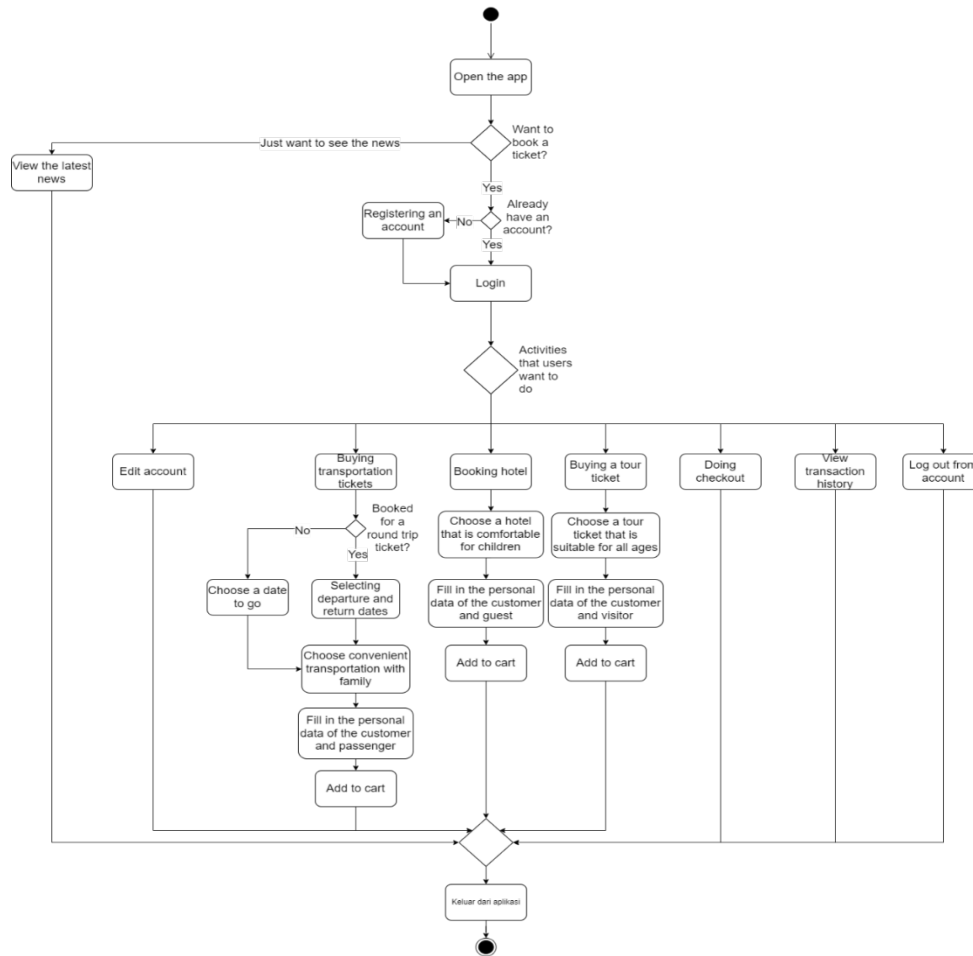**Activity Diagram of Non-Family Traveler Mental Model**

Figure 3
Activity Diagram of Family Traveler Mental Model

Next is Hierarchical Task Analysis, which reduces the task to subtasks obtained from mental models and scenarios. Figure 4 shows the form of Hierarchical Task Analysis.
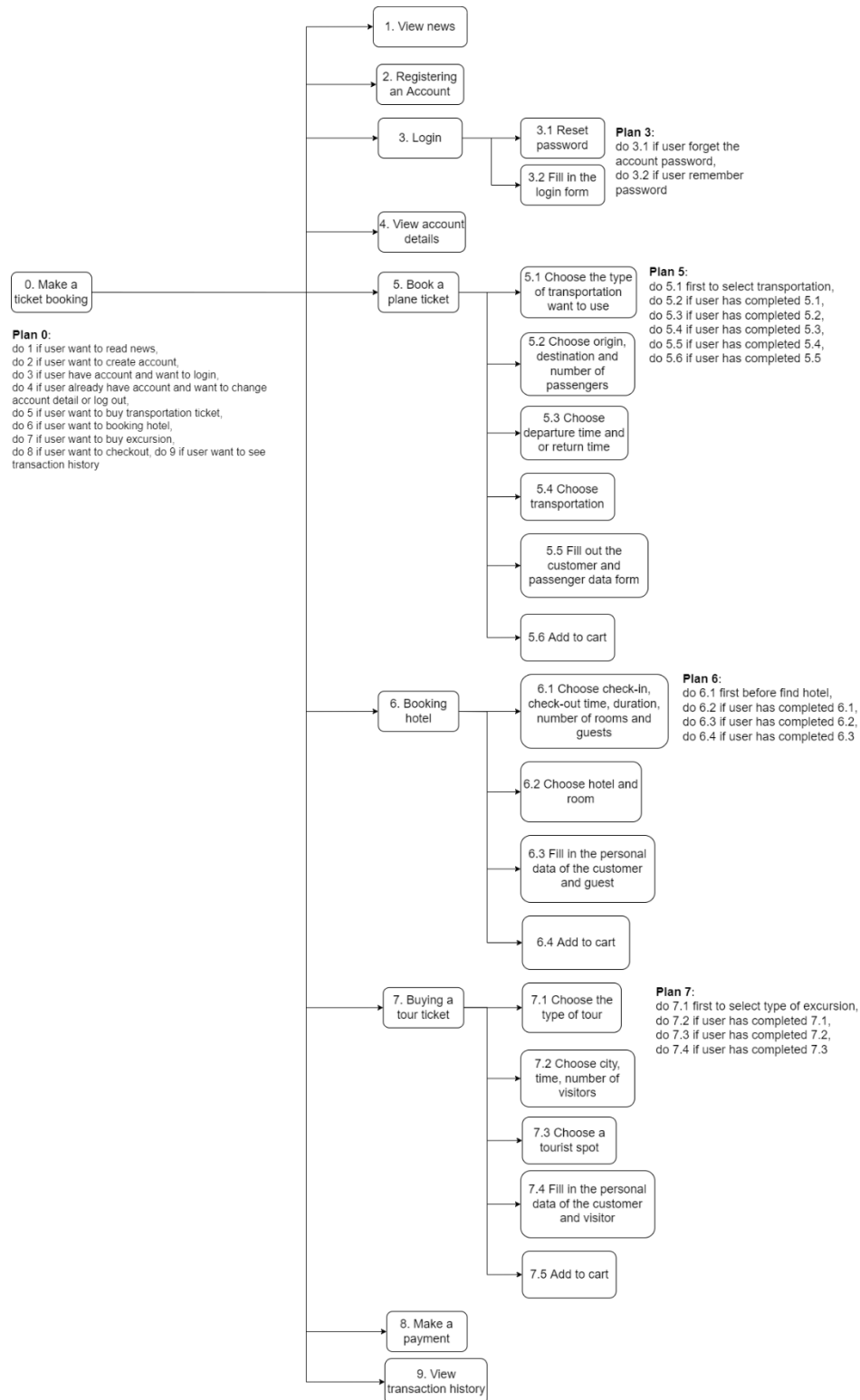
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Figure 4 Hierarchical Task Analysis

C. Produce design solutions

The next step is to produce design solutions where in this step, create a design solution in a designed way. Thus, the basic design formed from the previous steps is

needed. The initial stage is making a conceptual model determine the design of all tasks. It was then formed into a wireframe to reflect the system's function.

After making the wireframe, we enter the mock-up stage. The mock-up stage aims to enhance the wireframe by providing colors, icons, images, and typography that visualize the entire system.

Figure 5 shows the improvement of the user interface according to user needs where there is tourist information suitable for traveling with children, buttons to access maps application, there is information on health protocols on tourism, and there is a preview in the form of photos of tourist attractions and information on beautiful places.

Figure 5User Interface of selected tourist information

Figure 6 shows user requirements where there is information that ensures a clean hotel.

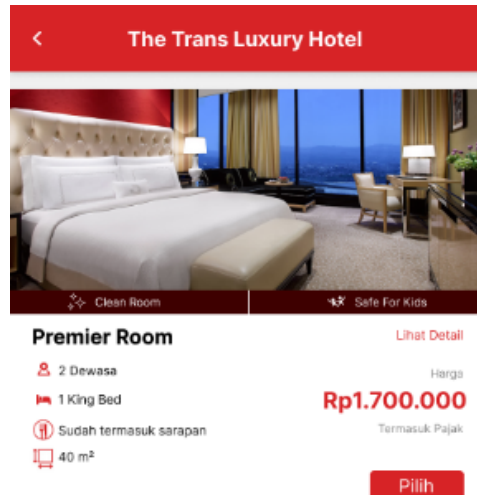Fairuz Abid Insanullah[1], Mira Kania Sabariah[2], Veronikha Effendy[3]

Figure 6Hotel room information user interface

Then the following requirement is the sort feature from cheapest to most expensive can be seen in Figure 7.

Figure 7User Interface for sorting

Then figure 8 shows transportation information that is suitable for families.

Figure 8Airplane detail user interface

D. Evaluate Design

The test was conducted on 30 respondents. Respondents were given ten tasks to complete. The tasks are in the form of:

1. Task 1: View News
2. Task 2: Registering an Account
3. Task 3: Login and view account details
4. Task 4: Book a plane ticket
5. Task 5: Book train tickets
6. Task 6: Hotel booking
7. Task 7: Book venue & attraction tickets
8. Task 8: Book a tour package
9. Task 9: View cart
10. Task 10: View history

Based on the test results, it was found that none of the respondents failed. Then proceed with an assessment of the prototype using SUS. Table 4 is the category of values for each range of values in SUS.

Table 4 Grade SUS

Letter grade	Numerical score range
A+	84.1–100
A	80.8–84.0
A-	78.9–80.7
B+	77.2–78.8
B	74.1–77.1
B-	72.6–74.0
C+	71.1-72.5
C	65.0–71.0
C-	62.7–64.9
D	51.7–62.6
F	0–51.6

Source: Klug, 2017

Table 5 Usability Prototype Test Results

Score	Grade
83.3	A+

Source: Processed data of research results

Table 5 is the SUS prototype data obtained from usability testing using SUS on the prototype. Based on these results, it is found that each persona has a grade of A+, so it can be concluded that the prototype is excellent.

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Conclusion

The user interface is essential in developing a mobile commerce application, so a user interface with a good usability level is needed. The TravelAja application has an advantage that competitors do not have in the form of a basket feature. The TravelAja application still has shortcomings in its user interface. After improvements were made to obtain a prototype using the UCD method and usability testing using the SUS measurement tool, the results showed that the prototype already had an excellent user interface. This result is indicated by the SUS result, which has an A+ grade.

In this study, feedback from respondents can be used for further improvements, such as fonts and images on the menu that are too small to read and improvements to the order form page. Further research can be done by improving the prototype based on the feedback.

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