Ecotourism e-Commerce through Android-based Marketplace

M Rachmaniah¹*, KSK Zito², IK Dinata³

¹ Senior Lecturer, Department of Computer Science, Faculty of Mathematics and Natural Sciences, Bogor Agricultural University, West Java, Indonesia
², ³ Graduated from Department of Computer Science, Faculty of Mathematics and Natural Sciences, Bogor Agricultural University, West Java, Indonesia

E-mail: titailkom@gmail.com

Abstract. Ecotourism, or green tourism, is a combination of four factors: conservation, community, culture, and commerce. Internationally, ecotourism is defined as responsible travel to natural areas that conserves the environment and improves the welfare of local people. On the other hand, Indonesia ecotourism is defined as activities of responsible travelling in intact areas or in areas which are named according to the role of the nature. These activities are aiming on enjoying natural objects as well as increasing local communities’ income. Indonesia has numerous community-based ecotourism whereby the social, environmental, and economic needs of local communities meet to offer tourism objects. However, the information and the location of these community-based ecotourism are rarely known even for local tourist. This study aimed to applied e-Commerce through the creation of an Android-based marketplace application for tourist on the client side and the community-based ecotourism on the provider side. The scrum process of Android Studio was applied in the development of the application named IndoExplore.id. The main processed of Android-based development was initially began with the product backlogs establishment as a results of system requirement investigation followed with iterative sprint implementation comprised of sprint planning, daily scrum, sprint review meeting, and sprint retrospective. The Android-based IndoExplore.id installed in Android smartphones enabled local tourist in planning their visits including provided choices of ecotourism destinations. Further, using Android smartphones the community-based ecotourism had channels for promoting their ecotourism objects to be visited.

1. Introduction
Indonesia has variety of ethnics, cultures, and rich in natural beauty such as mountains, forests, lakes, rainfall, beaches, sea, and historical relics. The natural beauty of Indonesia has its own uniqueness between one to another and has attract local and international tourist to visit these ecotourism objects. However, micro, small, and medium enterprises (usaha mikro kecil menengah – UMKM) who manage these ecotourism objects are left unknown due to lack of promotion and marketing. Micro enterprise is productive business owned by individual and/or individual business entity with a maximum of IDR 50 million worth of assets and less than IDR 300 million of annual sales. Small-scale enterprise is a productive economic enterprise, conducted by an individual or a business entity that is not a subsidiary or a branch of a company. The small-scale enterprise, range of IDR 50 million to IDR 500 million worth of assets and IDR 300 million to IDR 2.5 billion of annual sales, is not controlled or became
part of direct or indirect business of medium-scale or large-scale enterprise. Whereas, medium-scale enterprise, net worth of assets bigger than IDR 500 million and annual sales bigger than IDR 2.5 billion, is a stand-alone productive economic enterprise, conducted by an individual or business entity that is not a subsidiary or a branch of a company who owned, controlled, or became part either directly or indirectly of the small-scale enterprise or a large-scale enterprise [1].

The advance of information and communication technology applied in marketplace platform of e-Commerce on ecotourism sector was rarely applied. Brunn et al. mentioned that marketplace is a web-based or a mobile-based application where clients and providers meet and conduct their business processes [2]. Triponyou, established in 2015, is one among several existed web-based tourism marketplace aimed to bridge tourists as buyers visiting tourism objects and travel providers as seller promoting and marketing its tourism services [3]. TripVisto [4], Chipago [5], and YellowDoor [6] are also another web-based tourism marketplace offering tourism objects and services. The features contain within these four web-based tourism providers are: (i) register as tourists/clients or providers (travel agents), (ii) book destination, and (iii) order tourism service. In these marketplaces, client pay some down payment prior to having tourism services while travel providers has their share after the services was completed.

In 2017 Emarketer [7] reported that smartphone market in Indonesia shows an increasing trending. International Data Corporation added that the “low-end” category—devices costing between $100 and $200—made up 43% of smartphones shipped for the quarter. That was up from 33% in Q2 2015. The evolution of the smartphone market in Indonesia appears to follow a path in which manufacturers initially gain market share by offering very low-cost devices to appeal the low-income or first-time smartphone buyers. On the other hand, studies on mobile-based marketplaces which bridged ecotourism client and provider were rare. In 2013 Amanta and Indrayana developed mobile travel guide aimed to promote culinary sites in Surabaya area [8]. The development of the system exploited information gathered from 100 respondents aged between 18 to 40 years. The results were further used for predicting users’ interest as foundation on the development of the mobile-based system. Amanta and Indrayana study applied e-Commerce platform offering tour guide on pre-specified culinary sites.

The fact that “low-end” smartphones are very popular and that UMKM ecotourism providers need tools to promote and market ecotourism objects and services became the main reasons of this study. Note that ecotourism UMKM rarely has internet connectivity and desktop computer to manage their services through a web-based marketplace. Therefore, this study aimed to develop Android-based ecotourism marketplace application that linked travelers (client) and UMKM ecotourism travel agent (providers). The objectives on client side were to: (i) ease selection of ecotourism objects using Android smartphone, (ii) obtain detail information on various ecotourism objects offered by UMKM ecotourism providers, and (iii) plan their travel accordingly. On the provider side, the objective of this study was to provide tools for promoting and marketing ecotourism objects and services using providers’ Android-based smartphones. In this case, the study results were the development of client module and provider module application in a marketplace platform named IndoExplore.id. Therefore, the marketplace benefited client on variety of choices on ecotourism objects and services and provider on improving their market share and revenue.

2. Methods
The development of Android-based IndoExplore.id marketplace followed Schwaber and Sutherland Scrum framework [9] and Fielding and Taylor system architecture [10] as depicted in Figure 1. Scrum framework was chosen because it adopts client collaboration over contract negotiation in which Scrum core team (product owner, scrum master, and scrum team) together with ecotourism providers collaborate each other on producing deliverables that add value. Here the developed system was broken up into manageable sprints wherein coding and testing were carried out during each sprint. Furthermore, the repetitive scrum review meetings led the team to obtain more clarity on the problem to be solved. In this study, the scrum framework was executed by researchers acted each as product owner, scrum master, and developer who overseen cycled tasks of product backlogs construction in
each sprint. The sprint itself consisted of sprint planning, daily scrum, sprint review meeting, and sprint retrospective (*left Figure 1*). Product owner itemized the entire product backlogs required for the mobile-based IndoExplorer.id. In this study, product backlogs were defined as features and business process of the Android-based system.

![Figure 1. Scrum Framework (left), Android-based Architecture of mobile-based IndoExplorer.id (right)](image)

The study used system architecture of REST API Node.js to enable the Android-based system accessing data and information stored in the server (*right Figure 1*). Further, the study utilized Whitten and Bentley [11] agile methods that employ various tools and techniques to best accomplished the tasks at hand based on problems and situations. Dennis *et al.* [12] stressed that agile methods enable shorten time requirement of system development. The tools and techniques selected in this research was the unified modeling language (UML) such as use case diagram, activity diagram, sequence diagram, and class diagrams as described by Shelly and Rosenblatt [13]. The development of the mobile-based IndoExplorer.id used Windows 10 Pro 64 bit operating system, Android studio as tool for application development, programming language Java JDK 8, Balsamiq for mock up creation, tools Draw.io and Dia for diagram creation, Atom as text editor, and browser Google Chrome.

### 3. Results and Discussion

The Android-based product backlogs determination for this study utilized various results of the web-based platform [14] as the foundation. These included results of online questionnaire responded by 110 respondents and two local travel agents in Bogor and Sukabumi. In brief, previous web-based results study was depicted in *Table 1*.

| Point of Investigation | Features harvested |
|------------------------|--------------------|
| Travel website: Chipago.com, Triponyou.com, Tripvisto.com, and YellowDoor.co.id | Open Trip, Private Trip, login and register, filter information, booking package, detail package, rating, payment mechanism features, and partnered with others |
| User/Client Respondents (n=110) | Package cost, weather, entrance tickets, tourism object information, facility, transportation, accommodation, culinary, clarity of address, complete facilities, clarity of schedule, clarity of location, and customer testimony |
| Provider Respondents (n=2) | Open trip, private trip, marketing, promotion, marketplace, and hotel and airlines company collaboration |

#### 3.1. Product Backlog of Android-based Ecotourism Marketplace

Following Schwaber and Sutherland Scrum guide [15] and various features harvested from previous study as depicted in *Table 1*, this research developed as much of 17 product backlogs for Client
Module and 16 product backlogs for Provider Module (Table 2 and 3). The level of effort for each product backlog was estimated to range between 2 to 18 hours and the degree of difficulty in the implementation was categorized into low, moderate, and high. During the first sprint planning meeting, the entire product backlogs were clustered into four cycles of sprints to be further adjusted depending on its necessities during the development. In general, the number of product backlogs conducted on each cycle was decided during sprint planning, constructed during daily scrum, and tested during sprint review. Each cycle was ended with sprint retrospective in which completed product backlogs and the remaining product backlogs were monitored and evaluated. The following sub sections described each sprint that exploited agile approach in a more detailed manner.

Table 2: List of Client Module product backlogs of the Android-based IndoExplore.id

| No. | Client Module Product backlog | Level of Effort (hour) | Degree of Difficulties | Sprint Cycle |
|-----|--------------------------------|------------------------|------------------------|--------------|
| 1.  | Use Case Diagram               | 4                      | Low                    | 1            |
| 2.  | Activity Diagram               | 6                      | Low                    | 1            |
| 3.  | Sequence Diagram               | 10                     | Low                    | 1            |
| 4.  | Database development           | 8                      | High                   | 1            |
| 5.  | Entity Relationship Diagram    | 6                      | Moderate               | 1            |
| 6.  | Class Diagram                  | 6                      | Moderate               | 1            |
| 7.  | Mock Up creation               | 6                      | Moderate               | 2            |
| 8.  | Mock up implementation into Android Studio layout | 10 | High | 2 |
| 9.  | Intro App and Splash Screen    | 5                      | High                   | 3            |
| 10. | Home function                  | 3                      | High                   | 3            |
| 11. | Login and Logout function      | 4                      | High                   | 3            |
| 12. | Register function              | 2                      | High                   | 3            |
| 13. | View Detail Trip function      | 4                      | High                   | 4            |
| 14. | Booking Open Trip function     | 8                      | High                   | 4            |
| 15. | Booking Private Trip function  | 8                      | High                   | 4            |
| 16. | History Trip function          | 6                      | High                   | 4            |
| 17. | Upload Payment function        | 8                      | High                   | 4            |
| 18. | Rating function                | 8                      | High                   | 4            |

Table 3: List of Provider Module product backlogs of the Android-based IndoExplore.id

| No.  | Provider Module Product backlog | Level of Effort (hour) | Degree of Difficulties | Sprint Cycle |
|------|--------------------------------|------------------------|------------------------|--------------|
| 1.   | Use case diagram               | 4                      | Low                    | 1            |
| 2.   | Activity diagram               | 6                      | Low                    | 1            |
| 3.   | Sequence Diagram               | 10                     | Low                    | 1            |
| 4.   | Class Diagram                  | 6                      | Moderate               | 1            |
| 5.   | Entity Relationship Diagram    | 6                      | Moderate               | 1            |
| 6.   | Database development           | 8                      | High                   | 1            |
| 7.   | Mock up creation               | 6                      | Moderate               | 2            |
| 8.   | Mock up implementation into layout.xml | 10 | High | 2 |
| 9.   | Register User function         | 5                      | High                   | 3            |
| 10.  | Login and Logout Function      | 8                      | High                   | 3            |
| 11.  | Provider Profile function      | 3                      | High                   | 4            |
| 12.  | Edit Profile function          | 6                      | High                   | 4            |
| 13.  | Register Provider              | 5                      | High                   | 3            |
| 14.  | CRUD Destination               | 10                     | High                   | 4            |
| 15.  | View Destination function      | 6                      | High                   | 4            |
The study employed two types of account i.e. client account and provider account; each account had each own access rights. User that registered into the system automatically considered to be registered as client account. In this study, we decided that provider must first register as client account and updated its role into provider role to be given provider account. In addition, the study divided the trip status into four statuses, i.e. wait, confirmed, finish, and cancel. Wait status was activated once a user ordered ecotourism services and awaited provider response. Confirmed status was given on the condition that the provider organized the service requested, finish status was activated upon service completion, and cancel status was activated when the three previous mentioned statuses encountered constraints. The study also grouped ecotourism services into open trip and private trip. Open trip was predefined trip in which the date, schedule, and the price were regulated by the provider. Private trip was the client who decided the date, schedule, number of participants, and the consequences price that follow.

3.2. Sprint-I of Android-based Ecotourism Marketplace

Sprint Planning of the Sprint-I selected six product backlogs of client module and six product backlogs of provider module followed with their construction in the daily scrum. The order of development was started with the creation of use case diagram, activity diagram, sequence diagram, and class diagram as depicted in Table 4. In sprint-I the list of product backlogs on Android-based were similar with the web-based list of product backlogs of the previous study [14].

| No. | Client and Provider Product backlog | Level of Effort (hour) | Degree of Difficulties | Sprint Cycle |
|-----|-------------------------------------|------------------------|------------------------|-------------|
| 1.  | Use Case Diagram creation           | 3                      | Low                    |             |
| 2.  | Activity Diagram creation           | 5                      | Low                    |             |
| 3.  | Sequence Diagram creation           | 10                     | Low                    |             |
| 4.  | Database development                | 8                      | High                   |             |
| 5.  | Entity Relationship Diagram development | 6                  | Moderate               |             |
| 6.  | Database design                     | 8                      | High                   |             |

The use case diagrams described the behavior of client as tourist requesting information and ordering tourist attraction (tourism object and services) along with ecotourism provider (small, micro, small, and medium travel agents) offering their services as shown in Figure 2. Here, Client Module use case diagram had 13 use cases, while Provider Module had 10 use cases. The diagram employed <<include>> and <<extend>> symbols. For instance, <<include>> symbol on Review Trip use case applied broken line arrow pointed toward Login use case which meant that the client had to login first prior to reviewing the trip, while the <<extend>> pointed to View Tourist Attraction use case meant that the Client can view ecotourism objects by its category.
The sequence diagram on Figure 3 showed the scenarios of View Detail Destination use case that sent request to application interface (API) controller to view detail destination based on the trip button selected. Further, the API obtained data from the database stored in the server and sent JavaScript Object Notation (JSON) feedback regarding the entire destination information as requested.

Further, during daily scrum we decided to discard Data Access Layer out of the existing three-layer architectural design of Satzinger et al. [16] as depicted in Figure 4. In this study, the Mobile Application of the Presentation Layer was utilized for Client to obtain information through the Web API request on the Business Layer. Here, the Web API acted as connector that governs input and output of data on the Presentation Layer with the database contained in the server of the REST API system architecture. Further, during sprint review meeting we monitored and evaluated the functionalities created, constraint occurred, database developed, scenarios established, technology used, and module reviewed. The meeting came to an agreement that all tasks were accepted and approved with special consideration was given on effective time management improvement.

Figure 2. Use case diagrams of Client Module (left) and Provider Module (right)

Figure 3. Sequence diagram of View Detail Destination scenario
3.3. Sprint-2 of Android-based Ecotourism Marketplace

Sprint 2 began with sprint planning in which the web-based and Android-based Scrum core team met together and discussed tasks to be carried out. The meeting ended with the agreement on product backlogs to be carried out by each core team as depicted on Table 5. Both teams agreed for three weeks of sprint-2 development time which were divided into one week on mockup creation and two weeks on mockup construction.

Table 5. List of Client and Provider Product Backlogs managed in Sprint-2 of Android-based IndoExplore.id

| No. | Client and Provider Product backlog | Level of Effort (hour) | Degree of Difficulties | Remarks |
|-----|------------------------------------|------------------------|------------------------|---------|
| 1.  | Mock Up creation                   | 6                      | Moderate               | Design of the application user interface (UI) based on the activity diagram |
| 2.  | Mock up implementation into Android Studio layout | 10                     | High                   | Implementation of the mockup of the UI designed into Android Studio layout |

Following sprint planning agreement, we carried out daily scrum tasks focusing on user interface (UI) creation. Here, the implementation of the UI employed extended markup language (XML) layout of Android studio. The color of the Home page was generated using palette color available on Balsamic application. The results of Sprint 2 Daily Scrum were depicted in Figure 5 and 6. The left side of Figure 5 showed View Detail Trip of Client Module mockup and its implementation that contain trip information, its price, trip description, photos of activities, and other information as necessary. The page was activated once a client selected and viewed availability of trip offered. The right side of Figure 5 showed Register Travel of Provider Module mockup and its implementation wherein a client role updated into provider role that further led into provider page.
Figure 5. Client’s View Detail Trip mockup and its implementation (left) and Provider’s Register Travel mockup and its implementation results (right)

Overall, Figure 6 showed Client Module mockup and its implementation which exhibited the flow of activity of booking tourism objects using Home, View Detail Trip, Booking, Detail Booking, and Payment features respectively. In addition, Figure 7 showed mockup and implementation of Provider Module features and its flow of activity consecutively. Note that on Provider Module, ecotourism provider must first register as Client and then updated its role into Provider. Once provider role was awarded then the provider granted privileges to Add Destination, Edit Destination, fill in Provider Profile, and monitor Order Status.

Figure 6. Sample of Client Module Mockups (top) and its results (bottom) of Sprint-2 Daily Scrum
Figure 7: Provider Module Mockups (top) and Implementation results (bottom) of Sprint-2 Daily Scrum

During Sprint review meeting we concluded that in general the Android layout was completed and accepted. However, we agreed that the implementation of the UI needed more perfection. Further, during Sprint Retrospective we approved and settled on remaining product backlogs to be done for the next sprint.

3.4. Sprint-3 of Android-based Ecotourism Marketplace

Upon product backlogs inspection, we decided that the sprint planning conducted four product backlogs of Client Module and three product backlogs of Provider Module as depicted in Table 6. These product backlogs required codings construction. We also estimated one week of efforts each on the average. In addition, this study agreed that each provider account applied solitary to one travel agent. Detail descriptions of daily scrum on each product backlog were described in the following paragraphs.

Table 6: List of Client and Provider Product Backlogs managed in Sprint-3

| No | Client and Provider Module Product Backlog | Level of Effort (hour) | Degree of Difficulties | Remarks |
|----|-------------------------------------------|------------------------|------------------------|---------|
| A. Client Module | | | | |
| 1. Intro App and Splash Screen | 5 | High | Development of Intro App and Splash Screen to be displayed on the Android smartphone |
| 2. Home function | 3 | High | Development Home display |
| 3. Register function | 2 | High | Development of list of accounts registered into the Android-based system |
| 4. Login and Logout function | 4 | High | Development of function to access and log out of the Android-based system |
| B. Provider Module | | | | |
| 1. Register User function | 5 | High | Development of function to register user account into the Android-based system |
| 2. Register Provider | 5 | High | Development of Update Client account into Provider account |
| 3. Login and Logout Function | 8 | High | • Development of function to login and logout • Development validation of Provider account using its password and email address |

Intro App and splash screen of the Client Module was displayed the first time a user installed IndoExplore.id marketplace application into their Android smartphone. Intro app was developed as
slider to show general information of the ecotourism marketplace followed with splash screen of ecotourism photo of activities. Segment code for the splash screen was depicted in Figure 8. Further, coding was carried out for the Home function to enable users view tourism object options and select current tourism object offered. Daily scrum continued with the coding of Register function to establish client name, email, and password of the client account to be entered into the Client Module application. These registration data were further employed on Login function of each client to produce a token as authentication to be stored in the database and client to Logout from the Client Module application.

Figure 8. Segment code of Intro App and Splash Screen of the Android-based application

The study developed two role types of user, i.e. client role and provider role. Hence, the Login and Logout functions were maneuvered following its role. Here, user that login as client progressed into client main page and user that login as provider progressed into provider main page. This function was made possible by using Register Provider function. Once a user became a provider then the provider further used Register Provider function to enable provider updating their ecotourism objects.

The entire coding developed for the two modules was tested in sprint review meeting and the results were depicted in Table 7. Further, during sprint retrospective we studied that the process of uploading traveler or provider personal identity card (kartu tanda penduduk – KTP) was not as flowing as expected. Also, we found out that not many ecotourism UMKM providers had logo to represent their branding. The study further agreed to create company logo using Base String64 to be handled in the next sprint iteration.

Table 7. Sprint Review scenario and testing results for product backlogs developed in Sprint-3

| No | Client and Provider Module Product Backlog | Scenarios | Testing Results |
|----|------------------------------------------|-----------|----------------|
| A. Client Module | Intro App and Splash Screen | Following its installation, IndoExplore.id marketplace was accessible | Success |
| 2. | Home function | User accessed IndoExplore.id marketplace | Success |
| 3. | Register function | User type in username and password in the provided form and pressed Register button | Success |
| 4. | Login and Logout function | User type in username and password, pressed Login button to access application, and then pressed Logout button to exit the application | Success |
| B. Provider Module | Register User function | User filled user identification information in the provided form | Success |
| 2. | Register Provider | User updated client role into provider role and typed in travel information in the provided form | Success |
| 3. | Login and Logout Function | • User type in password and email address and then pressed Login button • User pressed Logout button | Success |
3.5. Sprint-4 of Android-based Ecotourism Marketplace

In this sprint, we decided that the sprint planning carried out the entire remaining product backlogs left either on the Client Module or Provider Module as shown in Table 8. Daily scrum, sprint review, and sprint retrospective for each product backlog were described in the following paragraphs.

The View Detail Trip function was constructed by employing the REST API developed in the web-based IndoExplore.id marketplace [13]. The REST API exploited hyper-text transfer protocol (HTTP) request of GET, PUT, POST and DELETE web services. In this case, data was obtained by utilizing the created web service as relevant to be further shown in the Android smartphone screen. The data were price, trip schedule, trip description, trip photos, and other necessary information related with the trip. The Open Trip and Private Trip options were constructed to deal with user trip selection. On Open Trip option the user entered name list joining the trip, whereas the Private Trip option requested user to entered date of the trip, name list, and other special requested service as applicable. The History Trip function was created to stored photos taken during the trip into the database to be further displayed for viewing. Currently, this study did not make any collaboration with any banking entities; therefore we developed a function to enable client upload payment receipt into the system. Segment code for Upload Payment was shown in Figure 9.

Table 8: List of Client and Provider Product Backlog managed in Sprint-4

| No | Client and Provider Module Product Backlog | Level of Effort (hour) | Degree of Difficulties | Remarks |
|----|------------------------------------------|------------------------|------------------------|---------|
|    | A. Client Module                          |                        |                        |         |
| 1. | View Detail Trip function                 | 4                      | High                   | Function Get detail trip data to be displayed |
| 2. | Booking Open Trip function                | 8                      | High                   | Function to order Open Trip |
| 3. | Booking Private Trip function             | 8                      | High                   | Function to order Private Trip |
| 4. | History Trip function                     | 6                      | High                   | Displayed history of previous trips conducted |
| 5. | Upload Payment function                   | 8                      | High                   | Function to upload payment receipt |
| 6. | Rating function                           | 8                      | High                   | Function to rated trip conducted |
|    | 1. Provider Profile function              | 3                      | High                   | Provider typed in its profile such as travel name, contact number, slogan, travel description, and uploaded copy of KTP and branding (logo) on provided form |
|    | 2. Edit Profile function                  | 6                      | High                   | Provider edited its profile on provided form |
|    | 3. CRUD Destination:                     | 10                     | High                   | Create, read, update, and delete destination using the provided form |
|    | a. Add (create) Destination              |                        |                        |         |
|    | b. Edit Destination                      |                        |                        |         |
|    | c. Delete Destination                    |                        |                        |         |
|    | 4. View Destination function             | 6                      | High                   | Provider viewed destination registered into IndoExplore.id marketplace |
|    | 5. Scheduling Activity                    | 18                     | High                   | Provider created trip schedule to be offered |

Figure 9. Upload Payment segment code

The last product backlog of the Client Module was the Rating of the trip whereby client pressed the star symbols as many as they desired on the smartphone screen. The flow of activity for viewing trip history and the given rating was depicted in Figure 10. The accomplishment of product backlogs developed for Provider Module was recapitulated in Table 9.
The entire Provider Module functions accomplishment as depicted in Table 9 operated properly on the condition that the token created during Login were stored and retrieved using getHeader successfully. This particular token was required by each provider’s function. 

![Figure 10. Flow of activity of View History and client rated the trip](image)

**Table 9:** Daily scrum results of Sprint 4 Provider Module product backlogs

| No. | Function                  | Development Results                                                                 |
|-----|---------------------------|-------------------------------------------------------------------------------------|
| 1.  | Provider Profile          | Provider profile comprised of travel name, contact number, photocopy of KTP, travel branding (logo), slogan, and travel description was created |
| 2.  | Edit Provider Profile     | Edit Provider Profile was enabled                                                    |
| 3.  | CRUD Destination:        | Destination addition was enabled                                                    |
|     | a. Add (create) Destination | Destination addition was enabled                                                    |
|     | b. Edit (update) Destination | Destination update was enabled                                                     |
|     | c. Delete Destination    | Destination deletion was enabled                                                    |
| 4.  | View (read) Destination  | Provider viewed registered destination was enabled                                   |
| 5.  | Scheduling Activity      | Provider scheduled activity on a particular tourism objects was enabled             |

![Snippet of code: getHeader call](snippet)

**Figure 11.** The getHeader call in function to retrieve token stored in the database

During the sprint review meeting all results of the above product backlogs developed was further monitored and tested (Table 10). Further, the study carried out the last step on the 4th sprint which was the sprint retrospective. During sprint retrospective, the study reviewed all tasks and agreed that all achievements were accepted and approved. The study also acknowledged that development of Client
and Provider modules of the Android-based ecotourism marketplace had been accomplished successfully and therefore concluded.

**Table 10:** Sprint Review scenario and testing results for product backlogs developed in Sprint-4

| No | Client and Provider Module | Scenario | Testing Results |
|----|-----------------------------|----------|----------------|
| A. Client Module | | | |
| 1. | View Detail Trip function | User selected trip type or category and selected a particular trip | Success |
| 2. | Booking Open Trip function | User selected a particular trip offered on Open Trip, typed in requested data, and pressed Submit button | Success |
| 3. | Booking Private Trip function | User selected a particular trip offered on Private Trip, typed in requested data, and pressed Submit button | Success |
| 4. | History Trip function | User pressed Booking tab and pressed History Trip button | Success |
| 5. | Upload Payment function | User pressed Confirm Payment button, browse and select receipts image, and pressed Upload button | Success |
| 6. | Rating function | Upon trip completion, user pressed Give Rating button, pressed the star symbols, and pressed Submit button | Success |
| B. Provider Module | | | |
| 1. | Provider Profile function | Provider entered their profile accordingly | Success |
| 2. | Edit Profile function | Provider edit/update their profile | Success |
| 3. | CRUD Destination: | | |
| | a. Add Destination | Provider added destination offered and typed in destination information in the provided form | Success |
| | b. Edit Destination | Provider edited destination information registered on the main page | |
| | c. Delete Destination | Provider deleted destination registered | |
| 4. | View Destination function | Provider viewed destination booked on each of destination registered | Success |
| 5. | Scheduling Activity | In the course of destination addition, provider entered activity schedule | Success |

In conclusion, the Android-based ecotourism marketplace named IndoExplore.id application was successfully developed in four sprints of the Scrum framework as depicted in Figure 12. The application is available to be used by ecotourism client and provider. The study had employed two types of account i.e. client account and provider account, each account had each own access rights. Benefited the Android mobile smartphone, the IndoExplore.id marketplace was successfully fulfilled clients’ need for detailed information on ecotourism objects provided by ecotourism UMKM. Further, the study had clustered ecotourism services into Open Trip and Private Trip. Open trip was predefined trip in which the date, number of participants, the schedule, and the price were regulated by the provider. Private trip was client who settled the date, the schedule, number of participants, and the consequences price that follow. In essence, the developed Android-based ecotourism IndoExplore.id marketplace helped micro, small, and medium ecotourism providers in marketing and promoting their services in the IndoExplore.id application and hence applying e-Commerce concept.
## Figure 12. Development resume of Android-based Indo Explore.id using Scrum framework

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