Web-based Marketplace to Support Ecotourism e-Commerce

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Abstract. There are 50 national parks in Indonesia ranging from rain forests, endemic species, mountain, oceans, and rivers/waterfalls. Of all national parks, six are World Heritage Sites, six are part of the World Network of Biosphere Reserves, and three are wetlands of international importance under the Ramsar convention. Ministry of Tourism and Creative Economy of Republic of Indonesia continually promotes these National Parks as ecotourism sites. On the other hand, there are numerous community-based ecotourism were left alone without any promotion. This study aimed to promote community-based ecotourism through the creation of e-Commerce web-based marketplace, named IndoExplore.id, to raise public awareness of the many products and services of natural ecosystems and biological resources that respect traditional knowledge and practices. The ecotourism web-based marketplace was developed using the Scrum framework to bring together tourist as client and micro, small, and medium community-based ecotourism (travel agent) as providers. The main process of the web-based development initially began with product backlogs establishment followed with iterative sprint implementation comprised of sprint planning, daily scrum, sprint review meeting, and sprint retrospective. This study also incorporated the creation of representational state transfer application programming interfaces (REST API) to enable data transfer between the developed web-based and the Android-based of IndoExplore.id. In essence, the web-based IndoExplore.id application was successfully developed and enabled client select variety of ecotourism objects including providers upload their ecotourism objects and services to be promoted and marketed.

1. Introduction

Unfolding from Sabang to Merauke, Indonesia tropical climate has made this archipelago rich in biodiversity and distinctive cultural life. The Directorate of Environmental Services for Conservation and Protected Area [1] mentioned that the government of Indonesia manages 50 national parks and 113 natural recreational parks inhabited in Indonesian rain forests, endemic species, mountain, oceans, and rivers/waterfalls. Within the last five years, the Central Bureau of Statistics [2] quantified that Indonesia tourism attract more and more foreign tourists to visit various tourism objects (Figure 1). In Java Island itself there are eight national parks and five natural recreational parks namely Ujung Kulon, Kepulauan Seribu, Gunung Gede Pangrango, Gunung Halimun Salak, Bromo Tengger Semeru, Alas Purwo Baluran, Karimun Jawa and Kawah Ijen Merapi Ungup-ungup, Telogo Warno/Pengilon, Angke Kapuk, Panganaran, and Tangkuban Perahu [1].
Figure 1. Indonesia Tourism tends to Increased Significantly [2]

The website of Department of Tourism and Culture of Bogor region [3] expose 38 ecotourism destinations in West Java vicinity clustered into nature tourism, cultural tourism, tourist attraction of art, recreation tourism, and other tourism. Further, the website depict that nature tourism is characterized by south coast, north coast, mountains, forest, river, waterfall, agriculture, lakes, cave, spring, and island. Figure 2 illustrate eight forest type of tourism objects in West Java (left) and description of Tourism Regions of Siliwangi King in Majalengka regency (right). Most tourism objects is managed by private micro, small, and medium travel agents that demand supervisions with regard to ecotourism issue: uniting conservation, communities, and sustainable travel. It means that those who implement, participated, and market ecotourism services should adopt ecotourism principles: minimized physical, social, behavioral, and psychological impacts.

Figure 2. Nature Forest tourism in West Java vicinity [3]

Nevertheless, these private tourism agents are not well known due to lack of marketing and promotions. One solution to overcome this obstacle was to create an online ecotourism web-based marketplace whereby micro, small, and medium scale ecotourism providers gain assistance in promoting and marketing their tourism objects. It is hoped that providers gain more added value as a result of increase demand for such services. In addition, visitors gain sufficient information regarding ecotourism cost, schedule, facilities, and other services prior to visiting tourism objects while on the same time harnessing ecotourism principles. Therefore, the objective of this study was to develop ecotourism web-based marketplace, named IndoExplore.id, and to facilitate local tourists (clients) in
variety selection of tourism objects without having to hassle on searching various websites. In addition, the objective of this study was to enable ecotourism providers upload and promote their tourism objects.

2. Methods
The development of the web-based IndoExplore.id marketplace followed the Scrum framework of Schwaber and Sutherland [4] and research architecture of Fielding and Taylor [5] as depicted in Figure 3. 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 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. The sprints itself consist of sprint planning, daily scrum, sprint review, and sprint retrospective respectively (left Figure 4). Furthermore, by doing repetitive scrum review meetings the team obtain better clarity.

In this study, the scrum framework was executed by each researcher role as product owner, scrum master, and developer who carried out cycled tasks of implementing product backlogs in each sprint. The scrum framework implementation utilized Whitten and Bentley [6] agile methods that decide on various tools and techniques that best accomplish the tasks at hand based on problems and situations. Dennis et al. [7] describe that agile methods enable shorten time requirement of system development. Whereas, 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 [8].

The study started with assessment of four existing tourism providers i.e. Chipago.com [9], Tripyou.com [10], Tripvisto.com [11], and YellowDoor.co.id [12]. Following that, online questionnaire responded by 110 respondents as client and two local tourism providers in Bogor and Sukabumi were analyzed. The research architecture used consists of three parts, namely data, server, and client (right Figure 3). On the data side the database used was MySQL relational database model; on the server side we created the back-end to link the database and the front-end. The programming language used to build the back-end was PHP with Laravel 5.4 framework. Additionally, the development utilized Windows 10 Pro 64 bit operating system, Atom as text editor, Node.Js 7.1.0 with Express.Js framework, MYSQL DBMS, XAMPP, and Postman as representational state transfer application programming interfaces (REST API) test software. In this study, the used of PHP framework Laravel 5.4 was further replaced with REST API due to data and information transfer problems while developing the Android-based application. Therefore, this study was further developed REST API using Node.Js as programming language, framework Express.Js, and database MySQL. The REST API was required to link the web-based and the Android-based of IndoExplore.id application through request methods of GET, POST, PUT, and DELETE. Note that this study covers the web-based portion only.
3. Results and Discussions

3.1 Product Backlog
The examination on Chipago.com, Triponyou.com, Tripvisto.com, and YellowDoor.co.id indicated that Tripvisto offer services both to local and international tourists while the remaining three tourism providers offer services to local tourist only (Figure 4). In doing their business, Chipago, Triponyou and YellowDoor partnered with others offering Open trip and Private Trip packages, while Triponyou offer private package only. The four providers have login and register, filter information (except Triponyou), booking package, detail package, rating, and payment mechanism features. These four providers however do not show indication on harnessing ecotourism principles in doing their businesses.

![Figure 4. Homepage of Chipago.com (left top), Triponyou.com (left bottom), Tripvisto.com (middle), and Yellowdoor.co.id (right) (1)](image1.png)

Further investigation to help established the IndoExplore.id product backlogs was gained from 110 respondents aged 16-23 year (92% of respondents) and 48-52 year (2% of respondents) (Figure 5, top left). As much of 73% of the respondents said that they had difficulties in selecting tourism objects (middle top) due to budget constraints, lack of information regarding tourism objects, too many attractive sites to choose, lack information on travel time required to the sites, lack information on surrounding facilities and its infrastructure, and unsure of road condition to the tourism objects. Most importantly, 57% of the respondents requested detail tourism objects information (top right) and 76% of respondents demanded clarity of schedule and tourism objects spot (bottom left).

![Figure 5. Various respondents’ perception assembled using online questionnaire (1)](image2.png)
Furthermore, Figure 5 showed that transparency of travel agent address (45%) and customers’ testimonies (39%) were two main criteria they felt important (bottom left). These results revealed that majority of respondents had difficulties in selecting trusted tourism travel agent and the fair price offered. On the other hand, the two tourism providers surveyed, Bogor Tour and Sukabumi Tour, mentioned that their target number of customers were not achieved due to lack of promotions. Sukabumi Tour felt that marketplace was needed including collaboration with hotel and Airlines Company, while Bogor Tour expressed that the marketplace should provide transparency on its transaction flow, payment, and business processes (Figure 5 middle bottom, Table 1).

Table 1. Tourism provider interview results

| Question Item                        | Provider at Sukabumi | Provider at Bogor |
|--------------------------------------|----------------------|------------------|
| Timestamp                            | 10/5/2016 13:49:52   | 8/9/2017 1:10:35 |
| Travel Name                          | Sukabumi Tour        | Bogor Tour       |
| Year Established                     | 2015                 | 2014             |
| Location                             | Sukabumi             | Bogor            |
| Travel Package                       | Tour Guide, Open and Private packages | Open trip package |
| Email                                | -                    | bogortours       |
| Constraints encountered              | Marketing            |                  |
| Last Month targeted order fulfilled? | No                   | No               |
| Promotion Media/Effectiveness        | Social media         | Not many         |
|                                     | Not effective        | Not effective    |
| Media Limitation                     | No sufficient social media link to their travel agent | Not many promotion and visitor in social media |
|                                     | Their account was not well known | |
| Were you involved with Marketplace?  | No                   | None available   |
| Was Marketplace needed?              | Yes                  | Yes, aimed to improved revenue |
| Was there customer complaint about the reservation issue? | None | None |
| Marketplace requirement?             | Collaborated with hotels and airlines | Clarity on transaction flow, payment, and its business process |

Following clients and providers’ examination study and Schwaber and Sutherland Scrum guide [13], this study developed as much of 28 product backlogs for the intended web-based IndoExplore.id marketplace (Table 2). The level of effort for each product backlog was estimated to range between 2 to 12 hours and the degree of difficulty in the implementation was categorized into low, moderate, and high. In this study, three roles scrum core team of Schwaber and Sutherland Scrum guide [13] were applied on the development of web-based IndoExplore.id marketplace. The roles were product owner, scrum master, and web-based developer. The role of product owner was to be responsible for the quality of the whole development of the application including establishment of product backlogs. Product backlog was defined as system format, entire functionality/requirement, and features to be constructed. The Scrum Master was responsible for quality assurance i.e. to ascertain that the whole team followed the theory, practices, and role of the main scrum (sprint planning, daily scrum, sprint review, and sprint retrospective). Finally, web-based developer role was to construct and implement each product backlogs to be successfully released at the end of each sprint and to be agreed and approved by the scrum core team. In other words, role of product master, scrum team, and web-based developer played an important role during sprint planning, daily scrum, sprint review, and sprint retrospective cycles.
Table 2. List of web-based IndoExplore.id product backlogs

| No. | Product backlog                                      | Level of Effort (hour) | Degree of Difficulty |
|-----|-----------------------------------------------------|------------------------|----------------------|
| 1.  | Use Case Diagram of Client and Provider             | 3                      | Low                  |
| 2.  | Activity Diagram of Client and Provider             | 5                      | Low                  |
| 3.  | Sequence Diagram of Client and Provider             | 10                     | Low                  |
| 4.  | Class Diagram of IndoExplore.id system              | 6                      | Moderate             |
| 5.  | Entity Relationship Diagram of IndoExplore.id system| 6                      | Moderate             |
| 6.  | Database design of IndoExplore.id system            | 8                      | High                 |
| 7.  | Client Register                                     | 5                      | Moderate             |
| 8.  | Login and Logout of Client and Provider             | 6                      | High                 |
| 9.  | Client Profile                                      | 2                      | Low                  |
| 10. | Update Client into Provider                         | 5                      | Moderate             |
| 11. | Provider Profile                                    | 2                      | Low                  |
| 12. | CRUD Destination for Provider                       | 10                     | High                 |
| 13. | Client Register for Destination                     | 3                      | Moderate             |
| 14. | Client View Destination                             | 3                      | Moderate             |
| 15. | Client Booking Destination                          | 4                      | High                 |
| 16. | Client Booking Payment                              | 4                      | High                 |
| 17. | Homepage                                            | 12                     | High                 |
| 18. | Home                                                | 10                     | High                 |
| 19. | Login                                               | 2                      | Low                  |
| 20. | Register                                            | 3                      | Moderate             |
| 21. | Open Trip                                           | 8                      | High                 |
| 22. | Private Trip                                        | 6                      | Moderate             |
| 23. | User Profile                                        | 10                     | High                 |
| 24. | Add Trip                                            | 3                      | Moderate             |
| 25. | Edit Trip                                           | 3                      | Moderate             |
| 26. | Selection of Tourist Destination                    | 5                      | Moderate             |
| 27. | Booking Tours and Review                            | 6                      | High                 |
| 28. | Validation Form                                     | 5                      | Moderate             |

During sprint planning we decided the number of product backlogs to be carried out in each sprint based on its urgencies. Further, Daily Scrum carried out the tasks to be done in a specific sprint. Sprint Review meeting discussed its achievement in a specific sprint including demonstration and testing of the completed tasks. Lastly, sprint retrospective reviewed and approved all achievement relevantly. In this study, the product backlogs depicted on Table 2 were then divided into four sprints four weeks each depending on its necessity of development. The following sub sections described each sprint exploited agile approach in a more detailed manner.

3.2. Sprint-1 of Web-based Ecotourism Marketplace

Sprint Planning of the Sprint-1 phase selected five product backlogs followed with their construction in the daily scrum. The order of development was started with use case diagram, activity diagram, sequence diagram, and the class diagram creation as depicted in Table 3. These diagrams were applied for two types of users, i.e. Client and Provider.

The use case diagrams described the behavior of client as tourist requesting information and ordering tourism objects along with provider as micro, small, and medium tourism travel agents offering their services as shown in Figure 6. Here, the Client Module had thirteen use cases, while the Provider Module had ten use cases. The diagram employed <<include>> and <<extend>> symbols. For instance, <<include>> symbol on Review Trip use case with broken line arrow pointed toward Login use case meant that the client needed to login first prior to reviewing the trip, while the <<extend>> pointed to View Tourist Attraction use case meant that Client could view tourist attractions by its category.
Table 3. List of Product Backlog managed in Sprint-1 of web-based ecotourism marketplace

| No. | Product backlog                                      | Level of Effort (hour) | Degree of Difficulty | Remarks                                                                 |
|-----|-----------------------------------------------------|------------------------|----------------------|-------------------------------------------------------------------------|
| 1.  | Use Case Diagram of Client and Provider             | 3                      | Low                  | Definition of the functions created on the IndoExplore.id system. Actors on this system were client and provider |
| 2.  | Activity Diagram of Client and Provider             | 5                      | Low                  | Definition of the process performed by the actor within the system based on the use case diagram created |
| 3.  | Sequence Diagram of Client and Provider             | 10                     | Low                  | Definition of the dynamic collaboration between a number of objects to show the interaction between objects |
| 4.  | Entity Relationship Diagram of IndoExplore.id system| 6                      | Moderate             | Description of the relationship between data in a database that showed relationship on each entity |
| 5.  | Database design of IndoExplore.id system            | 8                      | High                 | Designed database to agree with user and system information needs        |

During sprint review meeting we discussed the progress in the sprint by demonstrating the completed work and agreed that the results fulfilled the requirements. Lastly, in the sprint retrospective we decided that the sprint had been completed and notified the list of remaining product backlogs to be done in the next sprint.

3.3. Sprint-2 of Web-based Ecotourism Marketplace

On sprint planning, we selected eight product backlogs to be further developed (Table 4). On the daily scrum, the first coding developed was the Client Register function followed with the Login and the Logout functions that exploited the Auth function of the Laravel framework. Except for class diagram creation, all remaining seven product backlogs required mock ups creation as a guide for its coding and implementation. Figure 7 illustrated the mock up and implementation of the Home page.
Table 4. List of Product Backlog managed in Sprint-2

| No. | Product backlog                                      | Level of Effort (hour) | Degree of Difficulties | Remarks                                                                 |
|-----|-----------------------------------------------------|------------------------|------------------------|-------------------------------------------------------------------------|
| 1.  | Class Diagram of IndoExplore.id system              | 6                      | Moderate               | Described classes relationships within IndoExplore.id                   |
| 2.  | Client Register                                     | 5                      | Moderate               | Function for system account registration                                |
| 3.  | Login and Logout                                   | 6                      | High                   | Function to access or exit the client account using validated email and password |
| 4.  | Client Profile                                      | 2                      | Low                    | Function to input or modified client profile details                      |
| 5.  | Update Client into Provider                         | 5                      | Moderate               | Function to convert client account into provider account                 |
| 6.  | Home                                                | 10                     | High                   | Creation of Home user interface application based on its mockup            |
| 7.  | Login                                               | 2                      | Low                    | User form to input username and password                                 |
| 8.  | Register                                            | 3                      | Moderate               | User registration form                                                   |

The client and provider product backlogs developed during daily scrum, especially the four functions constructed, were further demonstrated and tested during the sprint review. The backlogs were tested using relevant scenarios as applicable and the results were successful (Table 5). However, during the discussion and demonstration, several feedbacks occurred. These feedbacks requested that Login and Client Register function had to include validation as relevant, whereas the remaining product backlogs carried out were approved. Further, the sprint retrospective stage discussed limitation of Laravel 5.4 framework on transferring data that were requested by the Android-based application. Sprint-2 was then ended with the agreement that there were remaining 15 product backlogs to be done including feedbacks and Laravel 5.4 limitation to be resolved in Sprint-3.

Figure 7. Mock up and resulted Home of IndoExplore.id (top left and right) Update Client role into Provider role menu (bottom left) and Register menu (bottom right)

Table 5. Sprint 2 Testing Results

| Function                  | Scenario                                           | Testing Results |
|---------------------------|----------------------------------------------------|-----------------|
| Client Register           | Client registered using the registration menu      | Success         |
| Login and Logout          | User Login using their email and password and then Logout | Success         |
| Client Profile            | Client added and edited profile                    | Success         |
| Update client role into provider role | Client updated role into Provider role | Success         |
3.4. Sprint-3 of Web-based Ecotourism Marketplace

The sprint planning selected eight product backlogs to be further developed in Sprint 3 (Table 6). Here, daily scrum started with the development of Provider Profile to contain travel name, contact number, company logo, identity card, company slogan, and company descriptions. Prior to its coding, mock up were first created as a guide for the implementation. Note that User Profile developed in this sprint could change its role from client into provider. Next coding was conducted for CRUD Destination which was the menu for provider to register, update, and delete ecotourism objects offered. The remaining product backlog as depicted in Table 6 also required coding. Note that mock ups for all product backlogs of Sprint-3 were created prior to its construction. The daily scrum results for Sprint-3 product backlogs were shown in Figure 8.

Table 6. List of Product Backlog managed in Sprint-3

| No. | Product backlog                   | Level of Effort (hour) | Degree of Difficulty | Remarks                                                      |
|-----|----------------------------------|------------------------|----------------------|--------------------------------------------------------------|
| 1.  | Provider Profile                 | 2                      | Low                  | Function to complete Provider Profile                       |
| 2.  | CRUD Destination of Provider     | 10                     | High                 | Function to create, read, update, and delete                |
|     |                                  |                        |                      | ecotourism destination offered by a provider                 |
| 3.  | Client Registered for Destination| 3                      | Moderate             | Function to view client that registered                      |
|     |                                  |                        |                      | ecotourism objects                                           |
| 4.  | View Destination                 | 3                      | Moderate             | Function for Client to browse availability of                |
|     |                                  |                        |                      | ecotourism objects                                           |
| 5.  | User Profile                     | 10                     | High                 | Mock up construction for User Profile                       |
| 6.  | Add Trip                         | 3                      | Moderate             | Provider form to add ecotourism objects offered              |
| 7.  | Edit Trip                        | 3                      | Moderate             | Provider form to edit ecotourism objects offered             |
| 8.  | Validation                       | 5                      | Moderate             | Function to validate entire forms                           |

Figure 8. Various Sprint 3 Daily scrum results: Trip Menu (top left), Add Trip (middle top), Edit Trip (right top), Provider Profile (middle left), User Profile (middle right), CRUD Destination (bottom left), and Add Trip (bottom right)
Upon sprint review, one product backlog i.e. Client Registered for Destination, was not successfully tested during the sprint review (Table 7) and hence was carried over into the next sprint. Therefore, the sprints retrospective agreed to revise this function together with seven remaining product backlogs in Sprint-4.

Table 7. Sprint 3 Testing Results

| Fungsi                  | Skenario                                                                 | Testing Results |
|-------------------------|---------------------------------------------------------------------------|-----------------|
| Provider Profile        | Provider edited its profile                                                | Success         |
| CRUD Destination of Provider | Provider carried out CRUD of ecotourism objects                           | Success         |
| Client Registered for Destination | Provider view client registered for ecotourism objects                  | Not Success     |
| View Destination        | Client view detailed destination                                          | Success         |

3.5. Sprint-4 of Web-based Ecotourism Marketplace

The sprint planning settled on conducting seven remaining product backlogs plus one product backlog carried over from Sprint-3 (Table 8). As with the previous sprint, Sprint-4 also followed scrum guide: sprint planning, daily scrum, sprint review, and sprint retrospective. The entire remaining product backlogs conducted in the daily scrum was created successfully. Figure 9 depicted sample of product backlog constructed in Sprint 4.

Table 8. List of Product Backlog managed in Sprint-4

| No. | Product backlog                    | Level of Effort (hour) | Degree of Difficulty | Remarks                                                                 |
|-----|-----------------------------------|------------------------|----------------------|-------------------------------------------------------------------------|
| 1.  | Client Registered for Destination | 3                      | Moderate             | Function for Client browse tourist attraction availability              |
| 2.  | Booking Destination               | 4                      | High                 | Function for Client ordering tourist attraction                         |
| 3.  | Booking Payment                   | 4                      | High                 | Function for Client paying tourist attraction ordered                   |
| 4.  | Homepage                          | 12                     | High                 | Main page of the IndoExplore.id                                        |
| 5.  | Open Trip                         | 8                      | High                 | Implementation of Open Trip following its approved mock up             |
| 6.  | Private Trip                      | 6                      | Moderate             | Implementation of Private Trip following its approved mock up          |
| 7.  | Select Tourist Destination        | 5                      | Moderate             | Viewing selected tourist attraction and its detailed information        |
| 8.  | Booking Tours and Review          | 6                      | High                 | Viewing ordered tourist attraction and its review                       |

Figure 9. Private Trip (top) and Open Trip (bottom)

Even though the web-based of IndoExplore.id product backlogs were all completed, however the study found out that the Android-based could not accessed the data stored in the server that was developed using Laravel 5.4. This led to the urgency of redesigning the system architecture on the
server side as depicted in Figure 10. In this case, framework PHP Laravel 5.4 was replaced with Node.Js using framework Express.Js.

![Figure 10. REST API connected client data to the Android](image)

REST API was a web service utilizing hypertext transfer protocol (HTTP) using extensible markup language JavaScript object notation (JSON). The REST API was accessed via https://yippytech.com:3000 using the unified resources locator (URL) as depicted in Figure 11. These URLs was used to request services for the web-based and Android-based using GET, POST, PUT, and DELETE methods to enable the server acknowledged client requests. This was applied to seven classes of the IndoExplore.id: User, Provider, Auth, Booking, Destinasi (Destination), Review, and Diskusi (Discussion).

![Figure 11. REST API for IndoExlorld.id](image)

As the consequences, the class diagram was remodeled into seven classes as depicted in Figure 12. Five classes, i.e. Provider, Auth, Diskusi, Review, and Destinasi classes made association relationship with User class while the remaining two classes, i.e. Booking and Destinasi classes made association relationship with Provider class. This class diagram was used as a guide in the development of the REST API. Here, the Auth function was added into the class diagram because it was needed by the web-based or the Android-based Login function to validate email and password entered into the system.
Figure 12. New Class Diagram developed to enable web and Android data communication

Figure 13.a showed JSON web token (JWT) for authentication and information exchange. JWT was a token of random long string usually used for login and sent request to the server which will be further validated through the token existence. Figure 13.b showed REST API of URL https://yippytech.com:3000/auth output using POST request method by providing email and password inputs. The output of JSON comprised of status, message, and data. All product backlogs accessed through the URL shown in Figure 11 was successfully tested during sprint review and product owner declared that all product backlogs were fulfilled during sprint retrospective. The REST API solved data and information exchange between the web-based and the Android-based of IndoExplore.id application.

```javascript
// --- JWT Validation ---
app.use(function (req, res, next) {
  if (req.headers.authorization) {
    var token = req.headers.authorization.split(' ')[1];
    jwt.verify(token, config.secret, function (err, decoded) {
      if (err) {
        return res.json({
          success: false, message: 'Failed to authenticate token.'
        });
      } else {
        ...
      }
    });
  }
});
```

Figure 13. a. Segment code for validating JWT (left); b. Output of REST API in JSON format (right)
In conclusion, web-based ecotourism marketplace IndoExplore.id application was successfully developed in four sprints of the Scrum framework as depicted in Figure 14. The IndoExplore.id marketplace was successfully associated clients’ need on ecotourism objects detail information provided by micro, small, and medium ecotourism providers accessed through a single website (the marketplace). The REST API for web-based marketplace IndoExplore.id employed the Node.JS using framework express.js, Bootstrap, database MySQL, and the REST API had helped data stored in the server to be accessed from the Android-based system. The IndoExplore.id marketplace helped micro, small, and medium ecotourism providers promote and market their services in the IndoExplore.id marketplace and hence applying e-Commerce.

![Figure 14. Development resume of web-based Indo Explore.id using Scrum approach](image)

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