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The Development of LIDI: A Web-Based Car Rent Marketplace Application in Sidoarjo, Indonesia

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Abstract. The common problem encountered by a car rental company is the transaction inefficiency. Only to know the car's availability, customers need to call by phone or coming directly to the rental company one-by-one. So, it is considered time-consuming. Whereas, the company could make use of the internet to make the transaction simpler. In this paper, a car rent marketplace application which is called LIDI developed to face that problem. To gain the high accessibility, the development of LIDI uses the responsive web principle so that users can access the application, both in a desktop or mobile environment. Its development phase consisting of requirement analysis, system design, implementation, and testing. The requirement analysis is carried out by collecting the rental data and analyzing the user needs. The system design will model the requirements into the diagrams. The implementation will transform the design into runnable codes utilizing an MVC framework. The opportunity is given to the rental companies and the customers in Sidoarjo, Indonesia to try the application as a part of the testing phase. The acceptance test's result shows that the application is feasible to be generally released.

1. Introduction

Sidoarjo is one of the districts of East Java in Indonesia. The total population of Sidoarjo is 2,199,171. It consists of 50.44% male and 49.56% female [1]. There are intangible business sectors or services in Sidoarjo such as a car rental. However, based on the survey and collected information, the car rental services in Sidoarjo are few compared to the one in Surabaya.

The survey's result on the car rental entrepreneurs in Sidoarjo concludes there are obstacles in doing such business. The customer usually does not know the location of the rental owner. The availability of the car is still checked by calling the company again and again, especially for the recurring customer transaction. Moreover, the first option users would do is to come directly to the rental company to check the car condition.

The existence of a system which could face the problem is needed, such as software. Software, or specifically called an application, is the key success of a computerized system [2]. It can be used to do special work and solve a specific problem [3]. For example, a most common application for doing word processing would be Microsoft Word [4]. Anyone in the world has used it as it can help someone in creating the report or other word processing tasks. Another advanced example would be the use of statistical software by the researchers in doing statistical analysis or simulating the model [5]. The development of such an application could also be used to solve the rental company problems.

The possible application platform would be the web platform. The consideration is the rapid growth of the internet users. By December 2017, there are approximately 2 billion people, or 48.7% of all internet users over the world are residing in Asia with the basis of 4,156,932,140 internet users [6].

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It is the biggest one compared to the other region. The full report of the internet users can be looked at Figure 1.

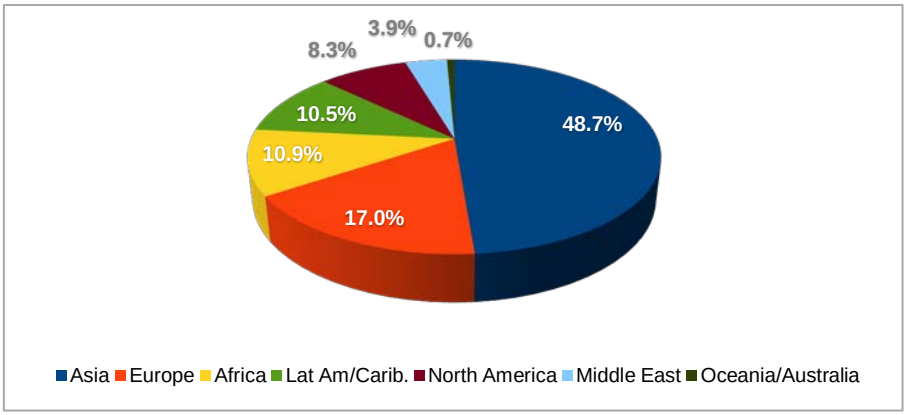


Figure 1. The number of internet users in the world by regions [7].

Following the data on Figure 1, the data centralization concept also considered as a big reason for choosing the web platform for developing the application. The participation level of business could be monitored easily.

Therefore, this paper will show the development process of the car rental marketplace application called LIDI. It will be used to resolve the current car rental company problems, especially in Sidoarjo, Indonesia. The application makes use of the web platform so that it can be in line with the internet users' growth. The similar application would be *BukaLapak*, *Lazada*, and *Tokopedia*, which is also using the marketplace concept. But the existing applications are targeted more on the electronic commerce for buying and selling goods. A Model-View-Controller (MVC) framework also used for standardizing the implementation process as also done by [8]. In the end, this paper will show the testing phase result to know the feasibility of the application to be released.

2. Development Model

The application development model used is a plan-driven model which also stated in [9]. It consists of some activities, such as requirement analysis, system design, implementation, and testing. The model also can be seen in Figure 2.

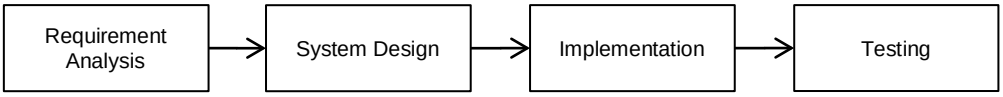


Figure 2. The development model.

Requirement analysis process is done by surveying the several car rentals in Sidoarjo, Indonesia. The existing business process of the car rental is asked. In this process, the user needs can be determined. The system design will utilize the UML to model the requirements into the standardized form. The implementation phase will transform the model into runnable code using responsive web design pattern to make the application accessible in the desktop and mobile environment without losing the user experience side. An MVC framework also implied. It can force the developer to separate the tasks into the three parts so that the application can be developed in more aligned architecture and managed easier rather than the one that does not utilize it. The testing process will be taken by five car rental companies (entrepreneurs) and 30 potential customers. The application will be run and used. The survey then conducted. The elements measured are the application functionalities and information quality in the web. The statement list confirmed could be checked in Table 1. The options are categorized into 4 points Likert scale (strongly disagree, disagree, agree, and strongly agree). The 4 points scale chosen to know also the sentiment of users about the application. The first two options are interpreted as negative, and the last two are interpreted as positive.

Table 1. Statement list to be confirmed by users.

No.	Statements
1	Application Functionalities
1.1	The application menu matches its function
1.2	The application functionalities matched to the user needs
1.3	The application run without error
2	Information Quality
2.1	The chosen font style is good
2.2	The user guides are clearly defined
2.3	The text on the web can be read clearly (without zooming)
2.4	The main menu can be understood
2.5	The car pictures can be seen clearly
2.6	The button and other visual elements are sized correctly

3. Result and Discussion

The discovered results in the preliminary phase of the requirement analysis related to the current car rental business process as follows.

1) The order process is still done by phone by inquiring the car availability before.
2) Customer must come and check the existence and condition of the desired car manually.
3) Rental owners are still using the conventional promotion strategy such as word-of-mouth marketing as a part of the promotional process.
4) Customers could only use manual process or cash to pay the rental service; the bank transfer is currently not available.

In this process, a few things to help car rental owners in promoting and renting a car finally determined. The following are the specifications related to the user needs.

1) Dynamic web applications that accessible via desktop and mobile environment are needed.
2) The application should be able to load text and images for promotional use.
3) The developed application should be able to receive payment by bank transfer.
4) The application should be able to provide information to the customers about the company profile, the car's availability, as well as other information.

The possible users of the application would be the *customer*, *car rental company*, and *application administrator*. The administrator added to the application with the privilege of managing and giving support to the stakeholders.

Modelling the requirements into the UML diagram is done in the system design phase. The LIDI marketplace application features which are modelled using the use case diagram could be seen in Figure 3. The application administrator will have a privilege to manage the web data. Every transaction should be done by login first to the application. The car company and customers will be able to register to the application by themself. The car company will have privileges to manage its company profile and car data. Customers will be then able to rent the car from any company in the marketplace. The application wireframes also created to help the preliminary requirements validation. This sample wireframe could be seen in Figure 4. The wireframe in Figure 4 is the prototype of the main page. The main page will consist of LIDI logo, main menu, search box, car category list, company header, and the main view which will be used to show the car list.

In the third phase, the specifications then transformed into runnable code. The user interface will employ in Bahasa Indonesia as language as it is targeted for the car companies which are resided in Sidoarjo, Indonesia. The coding process emphasizes the use of an MVC framework. The use of such a framework will force in separating the codes into the controller, model, and view. This architecture will make the code maintenance easier than the one which does not implement.

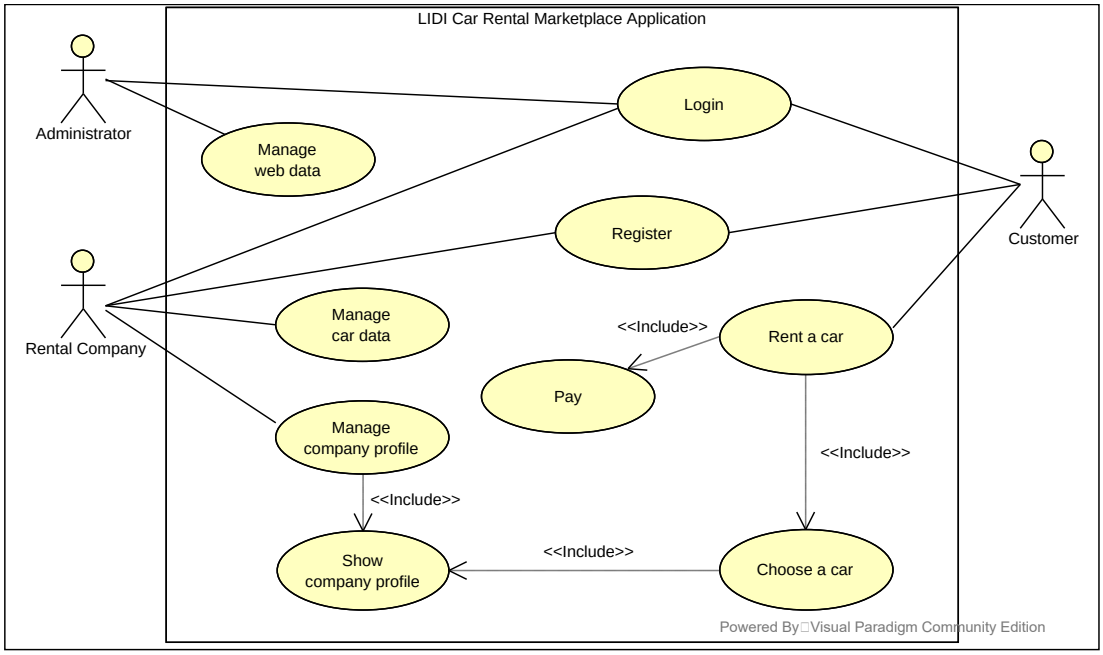


Figure 3. The use case diagram of LIDI car rental marketplace application.

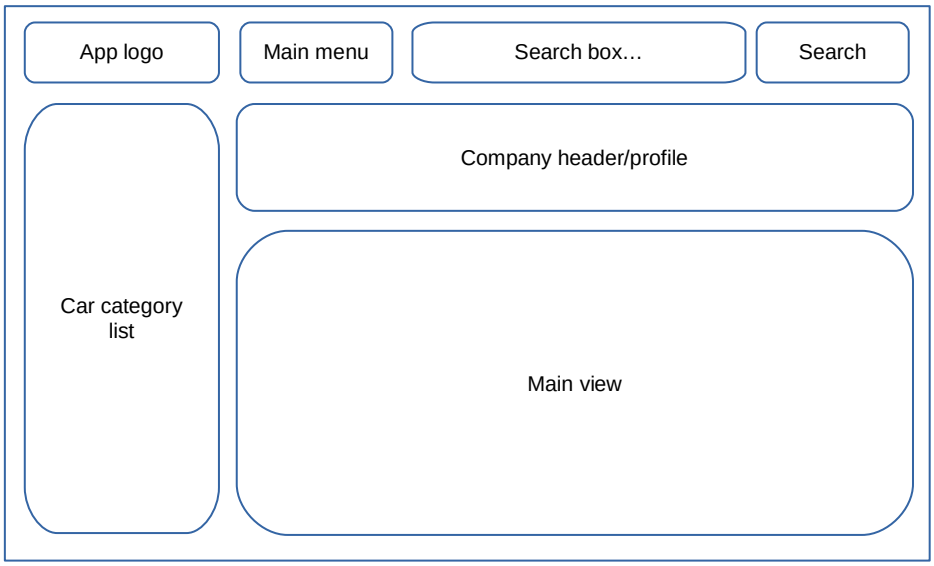


Figure 4. Wireframe of LIDI marketplace main page.

The result of developed application screenshots could be seen in Figure 5. The application could show the list of cars rented by a company as seen in Figure 5. Customers will be able to get the car's availability by just looking at the car status in the car detail page as seen in Figure 6. The page will also inform the price tag of the rent service related to the shown car. If there is a discounted price, the customers will also be able to check in that page. The application also provides the cashless payment mechanism. The customers could pay its transaction by bank transfer as can be seen in Figure 7. Customers could finish its transaction by confirming that the payment has been transferred to the provided bank account number.

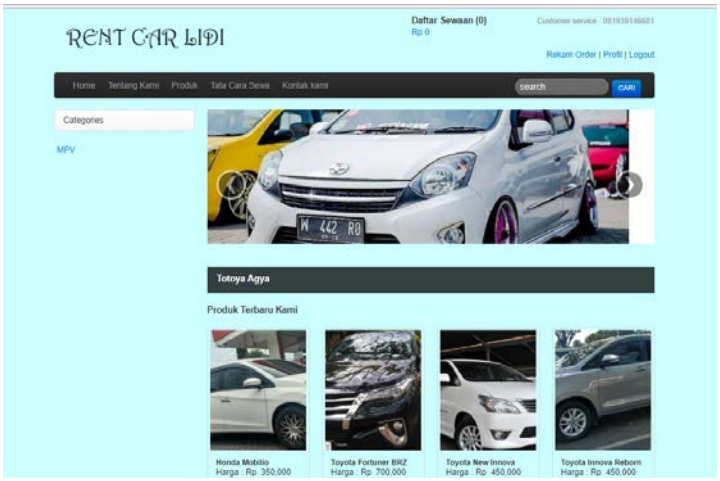


Figure 5. A car for rent listed in the LIDI marketplace.

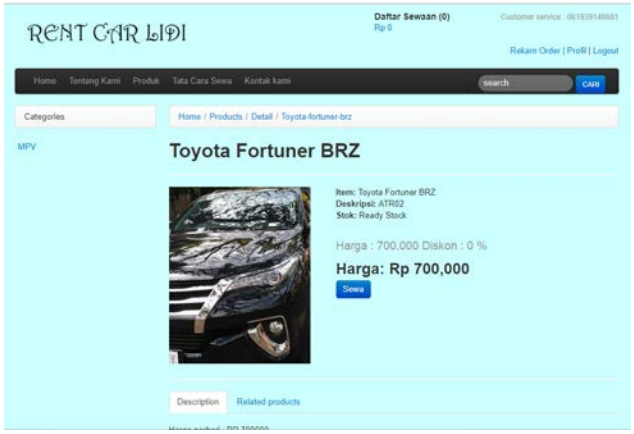


Figure 6. A car detail page with the price tag.

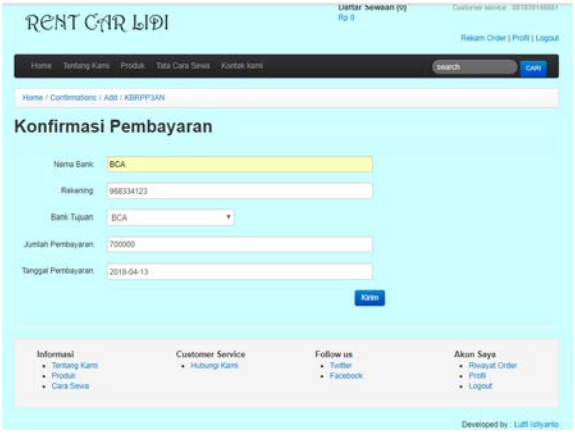


Figure 7. Payment confirmation page.

The last phase is the feasibility test of the LIDI marketplace application by surveying the users based on the statements listed in Table 1. The result could be checked in Figure 8 and Figure 9. From the Figure 8, it can be seen that only one person who is stating disagree with every statement and no one stating strongly disagree. It can be stated that the application functionalities are in a good acceptance rate. As can be seen in Figure 9, users who choose to select the disagree option are very few with the maximum of 5 respondents compared to the users who choose to select the agree and strongly agree on options. Based on this condition, it can also be stated that the information quality provided by the application is in a good acceptance rate. From the results, it can be concluded that the application is feasible to be used and generally released.

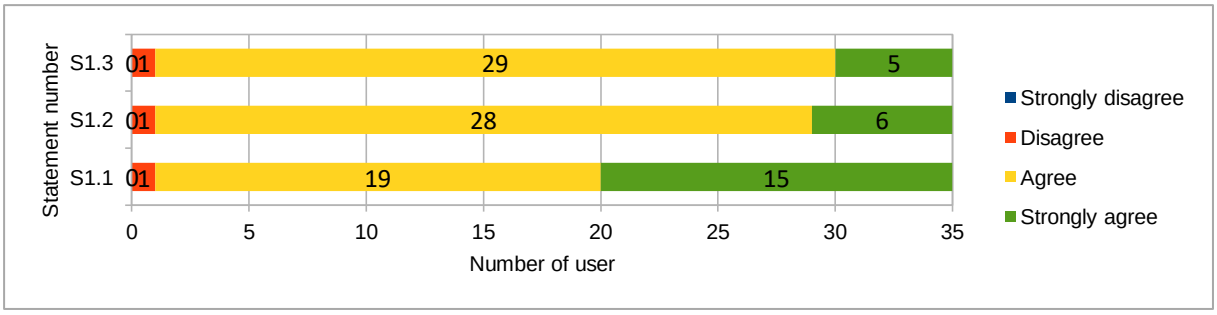


Figure 8. Application functionalities check result.

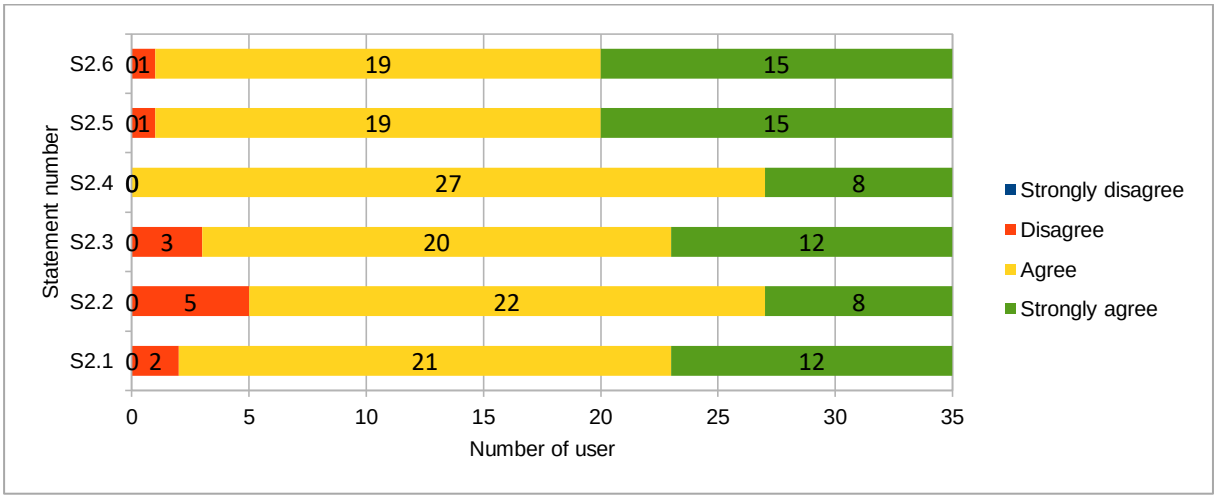


Figure 9. Information quality check result.

4. Conclusions

Based on the good acceptance rate of the application, it can be concluded that the car rental company problems in Sidoarjo, Indonesia could be solved by utilizing the LIDI marketplace for its business. The future work could be improving the two tests result by looking more at the requirements analyzed.

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