

# Mobile Application For Tracking Angkot And Metromini As Public Transportation In Jakarta

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**Abstract:** Lack of safety and friendly public transportation in Jakarta, make people more inconvenient to use public transportation. In this paper, we proposed a mobile application which can inflame to use public transportation, and at the end of the day, we hope using this mobile application will decrease traffic jam nightmare in Jakarta. Currently, traffic jam in Jakarta is the biggest nightmare problem for people who wants to go. The most reason why people do not want to use public transportation is hot, dirty, smell, need more time, not safe, incorrect information, prestige, and many more. In this proposed mobile application, we name as LANDTIONPUB where have some functions such as user do the registration, do the order, choose transportation, make the payment, and the user will get the points every each transaction.

**Index Terms:** Mobile application for transportation, intelligent transportation system, smart integrated transportation system.

## 1. INTRODUCTION

Jakarta is the capital of the Republic of Indonesia, also known as a metropolitan city. As a big city, Jakarta must have many problems. One of them is a traffic jam. There are many public transportations that we can use to reduce traffic jam, such as Kereta Rel Listrik (KRL), Bus Transjakarta, Taxi, Angkot, Metromini, Bajaj, Ojek, etc. However, many people in Jakarta do not want to use public transportation because it is inappropriate, uncomfortable, lousy accessibility, take more time, unclear information, complicated, and many more. People do not know what time the transportation will come. Moreover, also people do not like to use public transportation because they like to stop carelessly, so the time they have is wasted by waiting for other passengers. Because of the many problems of public transportation, people prefer to use private transportation rather than public transportation. Therefore, we want to make an application that related to public transportation and also to reduce traffic. We will combine payment of public transportation with OVO, Go-pay, DANA by using QR Code that will be given after payment success[11]. Moreover, also user can use NFC by holding their smartphone closer to the NFC sensor that is already available on public transportation. After that, the profit by using this application is when user already using this application every time, the user will get the point. Every user who makes a transaction, then they can get the point and can be exchanged for shopping voucher, travel discount, food discount, etc. Moreover, make user easy to get the information about public transportation, such as route, near location to get the public transportation, an approximate time for the public[8][7].

## 2 PREVIOUS RESEARCH

We often complain about the traffic jam, and we do not care about the availability of public transportation. With our ignorance of public transportation, make the people who use private transportation is increasing every year. BPS (Badan Pusat Statistik) as a body of Indonesian national statistic in 2016, there are 73,92% and 19,58% using motorcycle and

private car respectively. There is also a data increases from each transportation every year, motorcycle (5.30%) and private car (6.48%). According to data on the number of Angkot and Metromini units by BPS in 2017, technology in it shows that Angkot (6.565 units) and Metromini (1.432 units). The most reason why people do not want to use public transportation is hot, dirty, smell, need more time, not safe, incorrect information, prestige, and many more. This becomes a big problem for the Indonesia government to run friendly public transportation. Currently, technology is mainly used for public transportation is minimal. However, over time, technology will surely grow up, and public transportation must follow the flow of the existing technology. So public transportation needs a sensor device to make it easier for a user to make payment. The technology of public transportation now using only cash, paper-based ticket, and electronic card. Therefore, we want to improve the technology public transportation payment to make user easy to make a payment[19]. The list of technology for public transportation payment system [1]are :

- a. Reader/Writer NFC (Near Field Communication)  
Every public transportation must pair with a sensor to read the NFC's system on each smartphone[20][21].
- b. Reader/Writer QR Code (Quick Response Code)  
To make it easier for the user to make a payment, then the user can make payment via their smartphone. Moreover, when the payment is a success, the system will give a QR Code and scan it on the public transportation that we want[4].
- c. GPS (Global Positioning System)  
For make user more accessible to see Public Transportation in where then we will install GPS on every Public Transportation[6]. So the user can track the existence of public transportation close and far distance[12]. Here is the list that connected with GPS[5]:
  - Motion Sensor Monitoring
  - Ultrasonic Sensor Monitoring
  - PIR (Passive Infra Red) Sensor Monitoring
  - Speed Sensor Monitoring

To make the user more natural to make a payment, the user must have technology that connected with the technology of each public transportation, mobile payment[2]. Mobile payment divided into two, such as remote payment and proximity payment. Remote payment is user must connect with payment server and connected with the internet to make a payment with OVO, Go-pay, and DANA. Proximity payment is that the user

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can only make a payment directly between smartphone and reader/writer NFC[22]. Here some list that user needs to make a payment, such as :

- a. NFC (based on a smartphone)  
NFC is a wireless and contactless technology of transmission of radio data over a short distance (max. 5cm), enabling a comfortable and secure either-way communication[3].
- b. Electronic Wallet  
As we know, in Jakarta, many people that already use the electronic wallet. Such as OVO, Go-pay, Dana, etc. This electronic wallet can make the user more access to make payment and no need to bring money anymore because it has been replaced with an electronic wallet[14].

However, this success of the implementation of this mobile application will need Jakarta's government in order to make safe and friendly Jakarta public transportation[16].

### 3 PROPOSED IDEA

Our proposed mobile application is named as LANDTIONPUB, and figure 1 shows the tables relationship used in LANDTIONPUB mobile application[9]. There are seven tables, such as user, order, payment, detailOrder, route, transportation, and point. Table user has five attributes where this table is used to saving user's data and has relation to table order. Table order has three attributes where this table is used to save the order's data and has relation to table payment and detailOrder. Meanwhile, table payment has three attributes where this table is used to save payment's data and has relation to table order and point. Table detailOrder has three attributes where this table is used to save the order's data and route's data and has relation to table order and route. Table route has three attributes where this table is used to save the route's data and has relation to table detailOrder and transportation. Table route has four attributes where this table is used to save transportation's data and has relation to table route. Finally, Table point has two attributes where this table is used to save point's data and has relation to table payment.

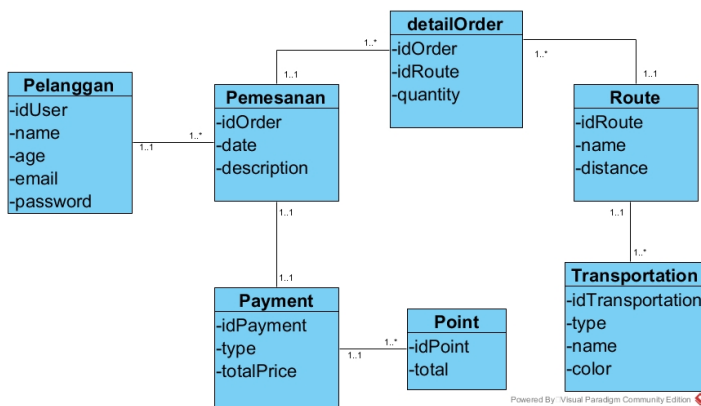


Fig 1. Class Diagram of LANDTIONPUB Mobile

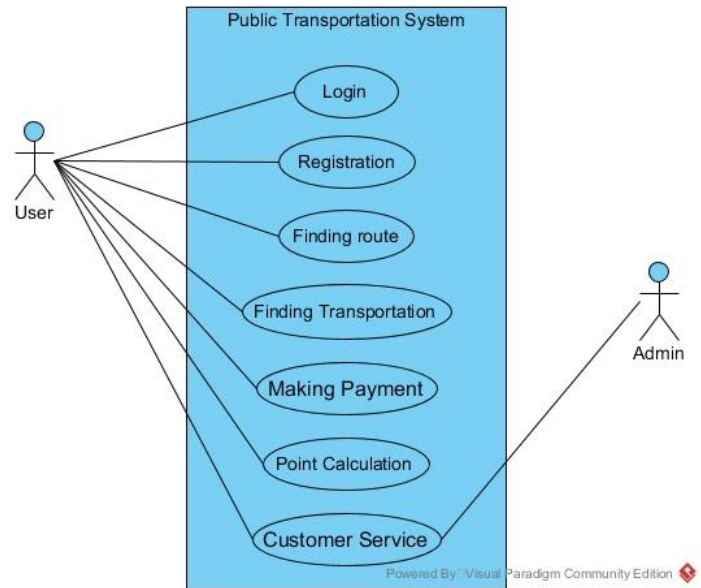


Fig 2. Use Case Diagram of LANDTIONPUB Mobile

Fig 2 shows our proposed LANDTIONPUB application with the main menu User Interface (UI) as seen in Figure 3, where there are some use case activities such as :

1. Login  
The user that want to make transactions on this application must log in first, where they should enter their data such as email and password. The User Interface (UI) for the login can be seen in fig 4 (a).
2. Registration  
The user that wants to use the application must sign up first, where they should enter their data such as full name, email, password, phone number, and address. The User Interface (UI) for the registration can be seen in fig 4 (b).
3. Finding Route  
The user that wants to find a route must fill in his/her starting point and destination. So, user can take to the next step to make an order as shown in fig 5.
4. Finding Transportation  
The user that have to determine their starting point and destination, then the user must choose what transportation they want to use between Angkot and Metromini, as shown in fig 6.
5. Making Payment  
User will use QR Code if they prefer to make their payment with OVO, Go-pay, and DANA. User can also pay with NFC card reader which attached in the public vehicle. Currently, we try to choose those four payment types, and there is the probability of including other financial technology (fintech). The right image in figure 8 shows the journey information such as the day of the journey, route number, departure time, arrival time, the duration, and the points.

The calculation point will be calculated with equation(1).

$$P = D * PT * R \tag{1}$$

Where :

P = Point Score  
 D = Duration Time (in minutes)  
 PT = Peak Time  
 R = Route Number

- a) The PT variable has two score condition, where time departure between peak and non peak time, where peak time between 7am to 9 am and 4pm to 7pm will have score 0.25. Meanwhile, the non peak time if the time departure not between 7is to 9am and 4pm to 7pm and they will have score 0.5. The assign scores 0.5 for non peak time beyond between 7am to 9am and 4pm to 7pm in order to stimulate the user to get more higher point score when using public transportation in nonpeak time.
- b) The R variable has score 0.5 for selected route number public vehicle and scores 0.25 for non selected route numbers public vehicle. The assign 0,5 for selected route number has a purpose of giving higher score point calculation for the sleepy route.

the For example, as shown in the right figure in figure 8, the user gets 4 point score because they have 15 minutes journey (D = 15) because the user has time departure on 12.45 and recognized as non peak time then will have non peak time PT score = 0.5. Moreover, because the route number "Angkot 06A" as sleepy route number, then will have R score = 0.5 as selected route number. Then as seen in equation (1)  $P=D*PT*R=15*0.5*0.5=4$ .

6. Point Calculation

The user who has made a transaction will get the point. The points will be held up and can be collected and redeemed for available coupons, as shown in fig 9.

7. Customer Service,

The user that has a problem with the application, they can report their problem and make conversation to customer service. The UI can be seen in fig 10 (a).

Figure 10 (b) shows the UI for Customer Care, which shown the admin can reply to the chat if the user has a problem.

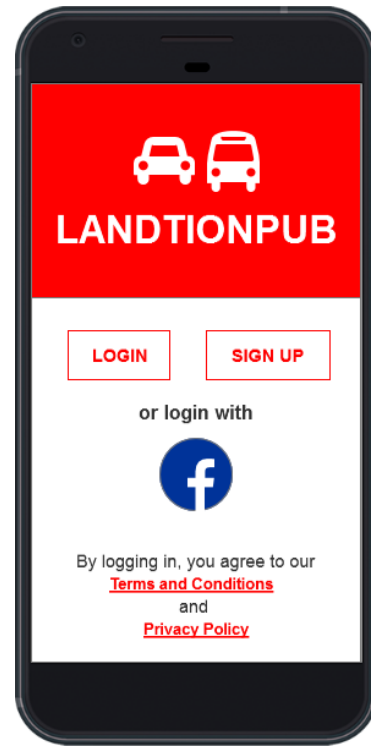
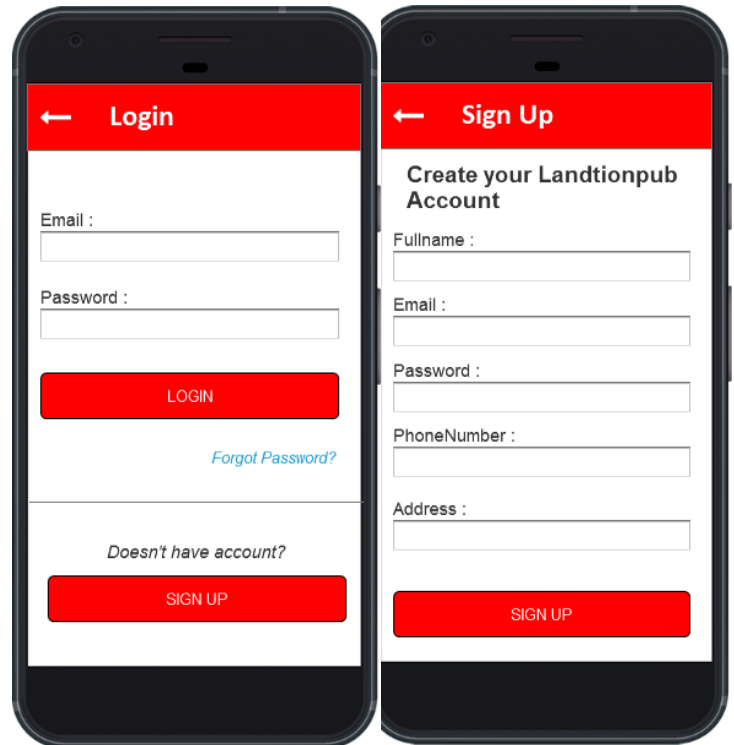


Fig 3. UI for Homepage



(a) (b)  
 Fig 4. (a) UI for LoginForm, (b) UI for SignUpForm

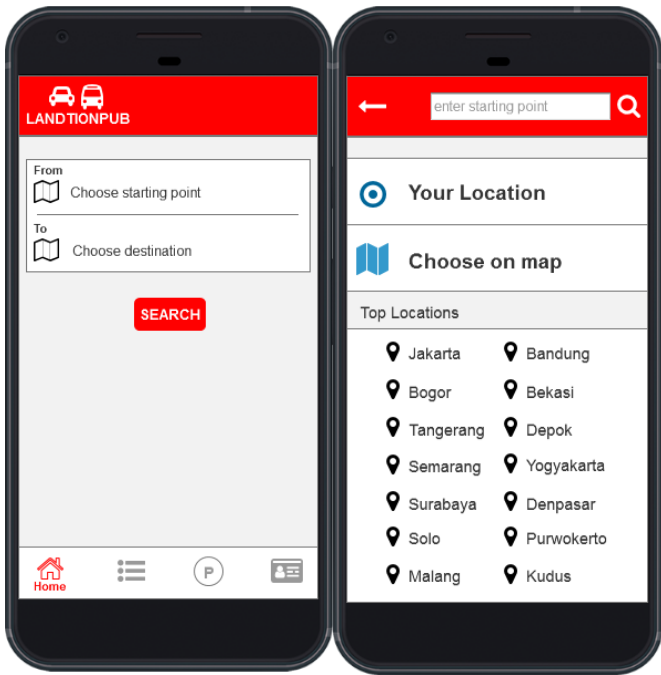
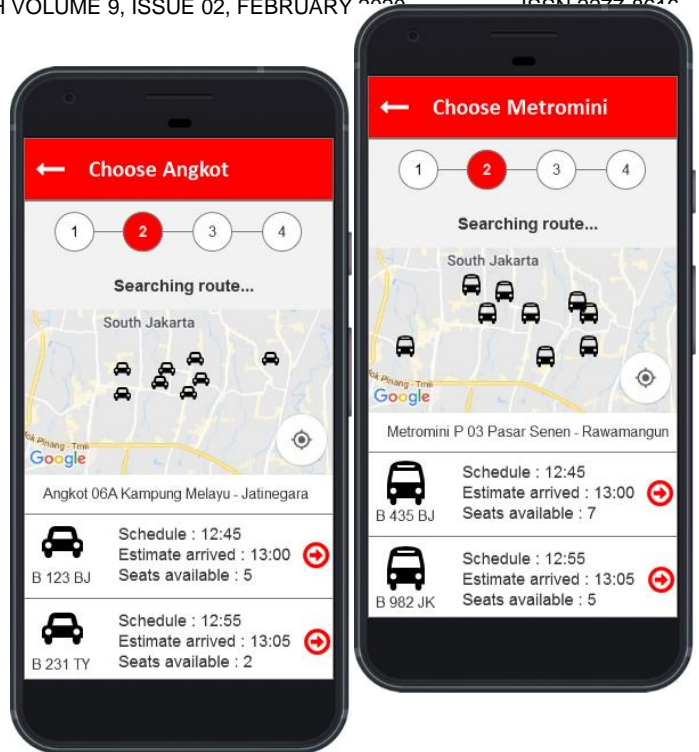


Figure 5. UI for OrderForm



(a) (b)  
Fig 7. (a) UI for ChooseAngkot, (b) UI for ChooseMetromini

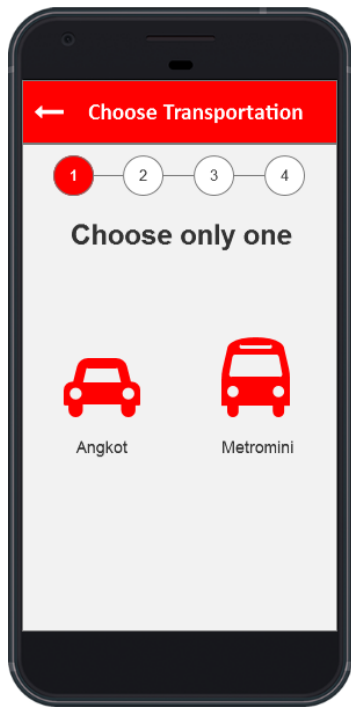


Fig 6. UI for ChooseTransportation

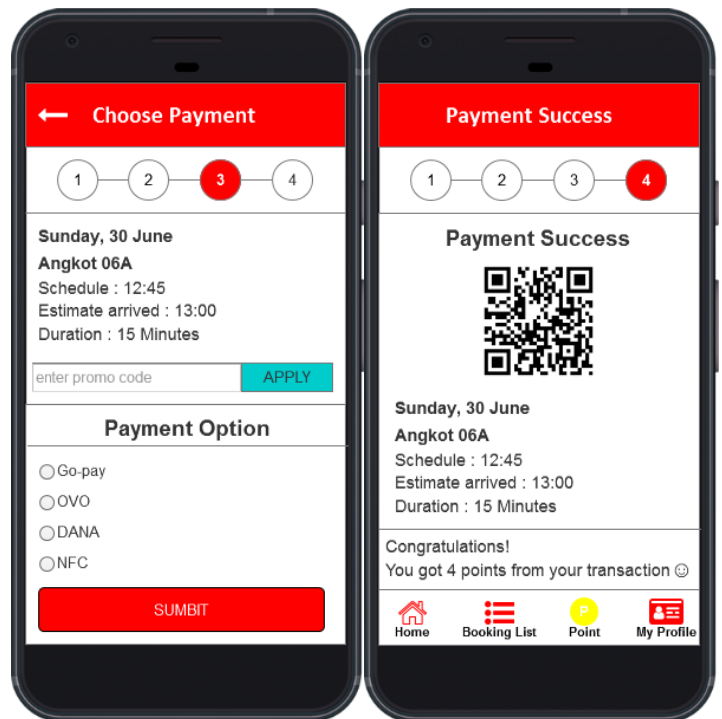
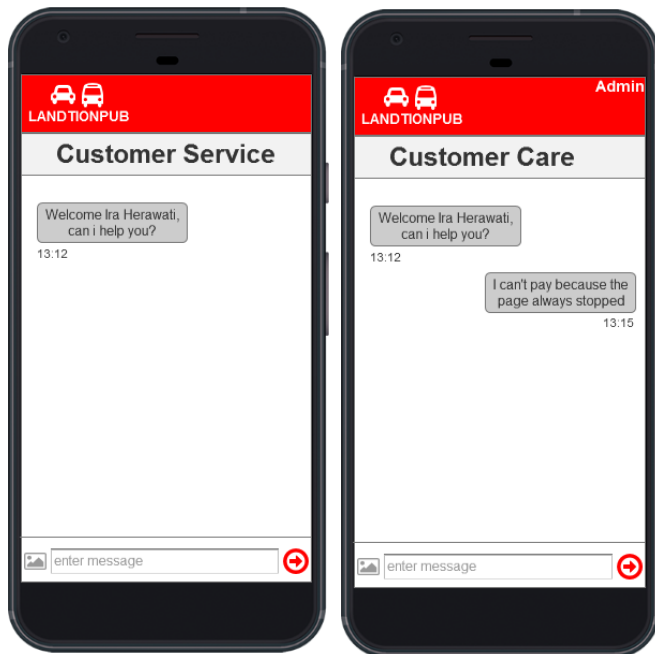


Fig 8. UI for ChoosePayment



Fig 9. UI for Payment Success



(a) (b)  
Fig 10. (a) UI for User, (b) UI for Admin

#### 4 CONCLUSION

In the future, we extend this application for all land public transportation in Jakarta to make the user interested in using public transportation[15], where we also provide points for each user who has made the transactions on this application. With the awareness of people to change private transportation into public transportation, then will decrease traffic jam nightmare in Jakarta. Currently, most people like to bring their

smartphone anywhere and anytime. So it makes the user more comfortable to use this application because if they need Angkot or Metromini, they need to open the application, make an order and make the payments with scan QR Code or only tap their smartphone into reader/writer NFC. After the payment success, they will get the point and can redeem it with coupon discount.

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