

Motorcycles as public transport service based on smart phone android applications

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Abstract. Growth of traffic in the city of Yogyakarta is dominated by private vehicle, while the urban public transport service is not satisfactory for consumer. In November 2015 the transport service based application called Go-Jek began operation in Yogyakarta. This service offers a transportation service that is safe, convenient, fast, cheap and more attractive the interest of consumers to use. The purpose of this study is to evaluate the operating system Go-Jek services, the public interest to this service, the feasibility of Go-Jek services as a mode of transportation in Yogyakarta. This research was conducted in the city of Yogyakarta and Sleman. The research method is done by using a questionnaire to the respondents: the driver and the consumer of Go-Jek. The analysis was conducted to assess the level of satisfaction and expectations of respondents using Importance-Performance analysis methods. Operating system Go-Jek is currently quite good, but needs to be further improved. Ranges of Income from 843.300 3.243.300 Indonesian Rupiah per month be perceived by the driver is good enough, while minimum income of workers on average in 2017 amounted 1.337.645 Indonesian rupiah per month in Yogyakarta Special District. Recommendations to the Go-Jek company in order to implement transparency in setting policies and systems to avoids the problems to the driver Go-Jek

1 Background

Congestion occurs almost everyday in Yogyakarta as a medium city, especially during office hours and on weekends. The condition of Yogyakarta City increasingly jammed and increasingly crowded by private vehicles, making the city of Yogyakarta is now considered to require adequate public transportation, considering the number and variety of public transport in Yogyakarta somewhat compared with other provincial capital.

On November 16, 2015, Go-Jek's transportation service began operations in Yogyakarta by offering safe, convenient, fast, practical, and inexpensive transportation services. PT.Go-Jek Indonesia is the first Indonesian technology company to provide application-based transportation services. In carrying out this business, PT.Go-Jek Indonesia cooperates in partnership with motorcycle and car drivers in major cities of Indonesia. Since application-based transportation services are currently in demand from the public, further study on the

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feasibility of application-based transportation services, especially Go-Jek services, as a mode of transportation in Yogyakarta.

1.1 Online Transportation in Indonesia

Online transport is a transportation based on a particular application, where consumers order a means of transportation through the application system in the smartphone. When customers place an order using an app, order details such as mileage, price, driver's identity, the length of time the driver arrives to the customer's location, and the data of the managing company is directly presented on the consumer smartphone screen. The entire identity of the driver is known for certain because the management company has done the verification process first before doing partnership cooperation with the driver.

With the online transport, passengers now no longer need to approach the motorcycle taxi station or no longer need to wait on the roadside to get a taxi. In addition, the passengers also do not have to be involved in the bargaining process because the tariffs that have been determined based on mileage. In addition to saving time, online transportation can also save money because of the many promos are offered. Simply by downloading the application on the smartphone, then register on the application, then include the location of pick-up and delivery.

1.2 Legalization of Online Transportation in Indonesia

The Ministry of Transportation Republic of Indonesia (Kemenhub RI) formally issues rules for application-based transportation services. The rules are summarized in Ministerial Decree (Permen) of Transportation no. 32 year 2016 on the Implementation of Transport of People with Public Vehicles Not in the Route. One of them mentioned that transport service companies are not in the route, for example taxis, are allowed to use the application. Provision of applications can be done alone or in cooperation with an application company already incorporated Indonesian law. The transport payment system may also be embedded at once in the application, provided that it remains subject to the provisions in the field of information and electronic transactions.

Company applications that provide passenger transport services using motor vehicles are required to follow the provisions of public transport conveyance contained in Articles 21, 22 and 23 of Permenhub. 32 of 2016. The provisions include requesting an application company to establish an Indonesian legal entity. The form of a recognized legal entity is a state-owned enterprise, a regional-owned enterprise, a limited liability company, or a cooperative. The application company is also required to carry out the transport permit of persons not on the route, with the requirement, among others, to have at least five vehicles on behalf of the company, the vehicle must pass the periodic test, have the pool and the workshop, and the driver must have a general driver license.

However, the legalization of online transportation is only valid for four-wheeled vehicles only, while two-wheeled vehicles can not be legalized as public transportation because they are not listed as public transportation in UU no. 22 of 2009. The Ministry of Transportation (Kemenhub) has adopted a policy of allowing motorcycles based on applications to operate as long as public transportation facilities and infrastructure in Indonesia are considered not fully feasible.

1.3 Quality of Service

Service quality is a long-term cognitive evaluation of consumers towards the delivery of a company's services [2]. The quality of service consist of five dimensions [3]:

- a. Tangibles is the ability of a company in showing its existence to external parties.
- b. Reliability is the ability of the company to provide services in accordance with the promised accurately and reliably.
- c. Responsiveness is a policy to help and provide a fast service (responsive) and appropriate to consumers with clear information delivery.
- d. Assurance is ability of company to increasingly consumer confidence to the company.
- e. Empathy is a sincere and individualized or personal giving to the consumer by trying to understand consumer desires.

1.4 Go-Jek Transportation Service

The first step before using Go-Jek service is to register by entering e-mail address, name, phone number, and password. Once registration is successful, users can directly select the services available within the Go-Jek app. After selecting the Go-Jek service, the user then inputs the address of the place of origin and destination address, then the Go-Jek app will display information about the driver's existence, predictions of pick-up time, driver's identity (name, photo, phone number), and price. After the service use process is complete, the Go-Jek app provides an opportunity for users to provide an assessment of the services provided by Go-Jek drivers [1].

2 Operational System

This section will explain more about Go-Jek's operational system, which includes the tariff system, bonus, performance, suspend, guarantee, and Go-Jek driver application system.

2.1 Tariff system

During the Go-Jek operation in Yogyakarta, there are two tariff systems that have been used:

- a. The tariff system is from November 2015 to July 2016
For Go-Ride services, the rate per kilometer is Rp. 2.500 with a minimum payment of Rp. 15.000. In this period, Go-Car service has not been present in Yogyakarta city. Go-Car service began to be present in Yogyakarta in August 2016.
- b. The tariff system for the period of August 2016 to date
Go-Ride: per kilometer Rp. 2.000 with minimum payment of Rp. 4.000.
Go-Car: per kilometer Rp. 4.000 with minimum payment of Rp. 10.000.

2.2 Performance System

Since August 2016, many system changes made by PT.Go-Jek Indonesia. In addition to tariff changes, there is a new system that PT.Go-Jek Indonesia began to implement. The system is a performance system, where the driver's performance is displayed in an updated and continuous manner by this system. Acceptance rate is the level of acceptance of incoming orders to each driver. This acceptance rate shows the comparison between incoming orders automatically to the driver's application and the order the driver takes. If the more orders are taken, the acceptance rate will be higher. Completion rate is the rate of completion of orders taken by the driver. The calculation of driver performance level is not only measured from the acceptance rate, but also from the order completion level.

2.3 Suspend system

The Go-Jek suspend system is a system in which a Go-Jek driver's account is temporarily closed by Go-Jek operational because the driver has committed an offense. If the Go-Jek driver's account is closed, the driver can not automatically accept the order until his account is reopened by the Go-Jek operational. This suspend system consists of two types, namely auto suspend and manual suspend. Automatic Suspend is a suspend that occurs based on the detection of fraud from Go-Jek system towards Go-Jek driver. Manual suspension is a suspend that occurs based on a complaint report from consumers Go-Jek or other parties to the behavior of the driver Go-Jek.

2.4 Application system

In the Go-Jek driver application system, there are some important things related to the process of receiving orders to the way Go-Jek driver in choosing the order in accordance with his wishes. The following will be explained more about the application system.

When there are consumers who make a reservation service Go-Jek, then the consumer order will automatically go into the application of one of the drivers who are located around the consumer location. If the driver within 10 seconds does not take or cancel the incoming order, then the offer of the order will automatically transfer to another driver. Although ignoring incoming orders can decrease the driver's performance level, but drivers prefer this way to get consumers with the desired mileage.

In the Go-Jek driver application there is one button that is the main reason of the many people who choose to work as a Go-Jek driver. The button is the on/off button. When the on button is turned on, then the driver is in active status and ready to receive orders from consumers. If the off button is turned on, then the driver is in the off status so there will be no order coming into the driver's application. With this button, then the driver can freely choose the time to work in accordance with his wishes.

3 Analyses

This section will explain the data from questionnaires distributed to Go-Jek drivers and consumer. These data include driver characteristics, driver operating costs, order characteristics received by the driver, as well as analysis of the satisfaction level and expectations of the driver by using the importance-performance analysis.

3.1 Driver Satisfaction and Expectation

A Go-Jek driver needs an operational cost in his work. Operating expenses consist of vehicle tax, fuel costs, and telephone call charges. In this study, taken the 43 drivers of respondents drivers Go-Ride (motorcycle), and 20 drivers Go-Car (car). The majority of the number of orders a driver can reach per day is about 10-15 orders, and the trip distance 5-10 km per order then the driver can earn 1.5 points per order. So only with 12 orders a driver can collect points as much as 18 points. Thus, the majority of Go-Jek drivers in Yogyakarta can achieve a daily bonus of Rp. 100,000. About 47% of respondents say that the time they take to complete each order is about 15-25 minutes, and 31% of respondents said that they have travel time per order for 10-15 minutes.

When under normal conditions, ie when it is not in the holiday season and also not in a rain condition, then the time required by the driver to get an order that is about 10-15 minutes. However, if it is in the holiday season then the driver only takes about 1-2 minutes to get an order, while if it is raining, especially for drivers Go-Ride must be willing to wait

for orders entered up to over 1 hour. For the average value of expectations, performed with the same calculation with the average value of satisfaction.

Table 1. Order Trip Distance

Trip Distance (km)	% respondent
<5	22
5 – 10	47
10 – 12	11
12 – 15	11
>15	9

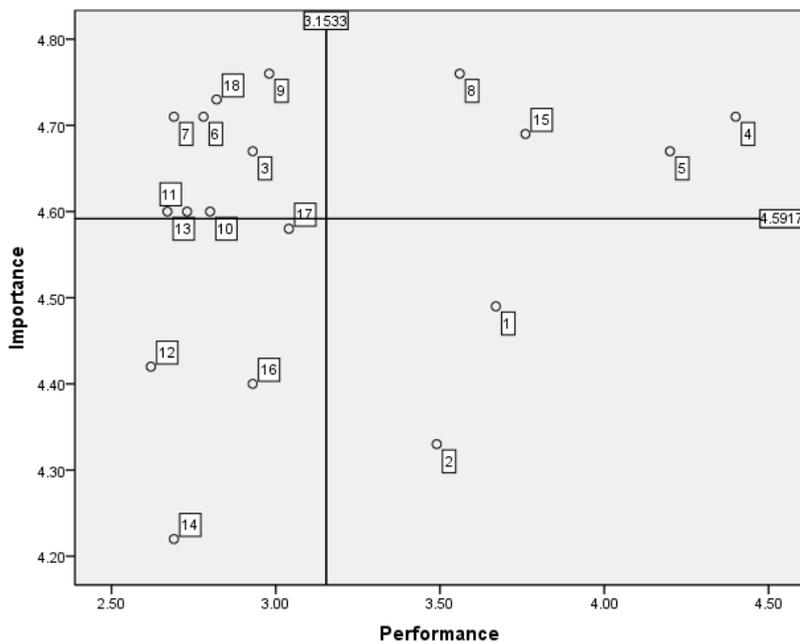


Figure 1. Importance-Performance of Go-Jek Driver

Table 2. Driver Satisfaction and Expectation

Quality	Satisfaction	Expectation	Gap
Tangibles	3.36	4.50	-1.13
Reliability	3.44	4.72	-1.29
Responsiveness	2.72	4.54	-1.82
Assurance	3.01	4.48	-1.47
Empathy	2.93	4.66	-1.72

3.2 Consumer characteristics

The majority of respondents Go-Jek user are students, about 71% of undergraduate students and 13% graduate students. About 82% of respondents are 20-25 years old. This is related to the majority of the Go-Jek consumer profession of students, who are generally aged between 20-25 years.

Table 3. Frequent Using Go-Jek

Trip Frequent	%
1 – 3 times	51
1 time/week	15
2 – 3 times/week	11
3 – 5 times/week	11
> 5 times/week	11

The consumer use Go-Jek service more often in the afternoon and afternoon. There are 26 respondents said that they usually use Go-Jek service during the day at 10:00 to 14:00 pm, while 20 respondents also said that they use the service Go-Jek in the afternoon at 14:00 to 18:00 pm. In Table 4 it can be seen that the distance they usually travel by using Go-Jek is 5-10 km.

Table 4. Trip Distance Using Go-Jek

Trip Distance (km)	%
<5	31
5 – 10	51
10 – 12	13
12 – 15	4

The majority of Go-Jek consumers have an income of 1-2 million rupiah per month, where the income comes from money that provided by their parents. PT.Go-Jek Indonesia has been quite successful in attracting the public by offering convenience in ordering transportation services.

Table 5. Waiting Time for Arival of Go-Jek Driver

Waiting time (minutes)	N
<3	3
3 – 5	19
5 – 10	14
10 – 15	9

The length of waiting time for the arrival of Go-Jek drivers based on Table 5 is between 3-5 minutes. This arrival time is usually influenced by the distance between the pick-up location and the spreading area of the Go-Jek driver, as well as the pick-up time. The location of the most frequent pickup of consumers is the area of residential, while the location of delivery is most often done is the university. In contrast, the second order pickup location that consumers often do is the university, while the second order delivery location is residential.

3.3 Consumer Satisfaction and Expectation

For the average value of expectations, performed with the same calculation with the average value of satisfaction, so that the results obtained as in Table 6.

Table 6. Consumer Satisfaction and Expectation

Quality	Satisfaction	Expectation	Gap
Tangibles	3.91	4.37	-0.46
Reliability	4.10	4.39	-0.29
Responsiveness	4.15	4.39	-0.24
Assurance	3.58	4.12	-0.54
Empathy	3.94	4.39	-0.45

In figure 2, Quadrant I shows variables that are considered important by Go-Jek's customers and are well implemented by Go-Jek companies. The highest value of satisfaction and expectation in this quadrant is about ease of getting or downloading application, with value of satisfaction equal to 4,58 and expectation equal to 4.73.

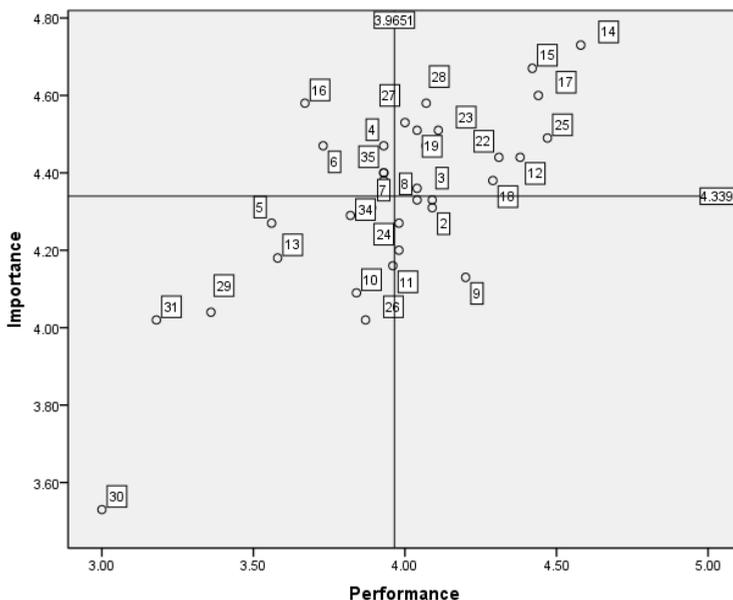


Figure 2. Importance-Performance Go-Jek Consumer

Quadrant II shows variables that are considered important by Go-Jek consumers but have not been well implemented by Go-Jek companies. There are 3 variables: timing of pick-up, the attitude of the driver when greeting the consumer, and customer complaints service. All three variables have a satisfaction level of 3.93 and expectations of 4.40.

Quadrant III shows variables that have not been implemented well by Go-Jek companies but are not very important for Go-Jek consumers. In this quadrant there is one variable that intersect with quadrant intersection line, that is variable about vehicle comfort with satisfaction level equal to 3.96 and expectation equal to 4.16.

Quadrant IV shows the variables that have been implemented well by Go-Jek company but not too important for consumers Go-Jek. In this quadrant there is one variable with positive gap value, that is variable about driver's travel speed.

4 Discussion

In this section will be discussed further on the problems occurring with the Go-Jek operational system, the level of Yogyakarta's interest in Go-Jek services, an analysis of the Go-Jek service feasibility level, and the comparison of transportation costs between Go-Jek and private vehicles.

4.1 Go-Jek Consumer

The 23 respondents as a new consumer of Go-Jek service just use 1-3 times, while only 10 respondents use Go-Jek routine every day. Therefore, it can be said that the people of Yogyakarta have not used Go-Jek service regularly every day. Usually Go-Jek service is used at certain times only, for example when going to the station or shopping center.

Go-Jek driver population in August 2016 is about 1.500 people. Although in August 2016 the presence of Go-Jek in Yogyakarta was only 9 months old, but the people of Yogyakarta already quite a lot who worked as a driver of Go-Jek. This proves that the presence of Go-Jek in Yogyakarta received a positive appreciation from the people of Yogyakarta.

4.2 Feasibility analysis

In this study, feasibility analysis is reviewed in terms of Go-Jek driver's revenue. Based on the data in Table 7 explain that income of driver per day is Rp. 100.000 to Rp. 200.000.

Table 7. Go-Jek Driver Nett Income, in Rupiahs (Rp.)

Income (/day)	Work Time	Loan (/month)	Tax (/month)	Fuel (/month)	Phone (/month)	Nett Income (/month)
100.000	24 days	700.000	16.700	480.000	360.000	843.300
200.000	24 days	700.000	16.700	480.000	360.000	3.243.300

Description of table 7.:

- Work time is assumed to be 6 days a week, so in 1 month the driver's working time is 6 days x 4 weeks = 24 days.
- The majority of Go-Jek driver's vehicle credit costs are 500-700 thousand rupiah per month, so the maximum value of Rp. 700.000 per month is obtained.
- Vehicle tax about 100 to 200 thousand rupiah per year, (Rp. 16.700 per month).

- d. The majority of Go-Jek driver's fuel cost is 10-20 thousand rupiah per day, so the maximum value of Rp. 20.000 per day (Rp. 480.000 per month) is calculated.
- e. Go-Jek driver's phone call charges Rp.10-15 thousand/per day (Rp. 360.000 /month). If the driver earns 100-200 thousand per day, then the driver will earn net income of about Rp. 843,300 to Rp. 3.243.300 per month. If the value is compared with the value of Minimum Salary of In Yogyakarta Province 2017 amounting to Rp. 1.337.645.

4.3 Comparison of transportation costs between Go-Jek and private motorcycle

Based on 30 respondents statements that have a private motorcycle it is necessary to calculate the cost of transportation between Go-Jek with a private motorcycle. About 51% of consumer respondents say that the distance they usually travel by using Go-Jek is about 5-10 km. If the tariff of Go-Ride service in Yogyakarta is Rp. 2.000 per km, then consumers have to spend transportation costs of Rp. 20.000.

Table 8. Transport Cost Using Go-Jek

Distance (km)	Respondents	%	Fuel Cost (Rp/km)	Total Cost (Rp)
<5	14	31,11	2.000	10.000
5 – 10	23	51,11	2.000	20.000
10 – 12	6	13,33	2.000	24.000
12 – 15	2	4,44	2.000	30.000

If the consumer traveled a distance of 10 km, then the consumer must spend fuel costs of Rp. 2.180. Although the cost of fuel for private motorcycles is much cheaper than Go-Jek transportation costs, but if using private vehicles there are still many other costs that must be incurred such as vehicle taxes, maintenance fees, and depreciation value of vehicle.

Table 9. Transport Cost Using Motorcycle

Distance (km)	Fuel Consume (km/lt)	Fuel Fare (Rp/lt)	Fuel Cost (Rp/km)	Total Cost (Rp)
<5	30	6.550	218	1.090
5 – 10	30	6.550	218	2.180
10 – 12	30	6.550	218	2.616
12 – 15	30	6.550	218	3.270

5 Conclusions and suggestions

5.1 Conclusions

The conclusions for this research are:

1. Go-Jek service is interesting for many people although those has not been used routinely by the people of Yogyakarta

2. Net revenues of the Go-Jek is approximately Rp. 843,300 to Rp. 3.243.300 per month, while the value of Minimum Salary in Yogyakarta Province 2017 is Rp. 1.337.645 quite feasible for the driver.
3. Although Go-Jek fare is Rp. 2,000/km and transport costs using private motorcycles is only Rp. 218/km, but by using Go-Jek services there are no other operational costs.
4. Go-Jek transport services are more suitable for non-routine travel (temporary travel) such as shopping, go to/from the station/airport/terminal.
5. Go-Jek's services can reduce dependence on private vehicles.

5.2 Suggestions

Some suggestions about operational systems and Go-Jek services are:

1. Go-Jek's company is expected to implement transparency in establishing policies and systems, so that when there is a change of policy/system does not cause turmoil to Go-Jek drivers and policy changes can be received by Go-Jek driver.
2. Should the problem of error/error that often occurs in the Go-Jek driver application immediately addressed well, and also preferably in the GPS applications Go-Jek more enhanced accuracy to make it easier for consumers and drivers of Go-Jek.
3. We recommend that the problem of fictitious order immediately addressed thoroughly.

References

1. F. D. Amajida, J. Kaj. Kom. **46**, 1, (2016)
2. C. H. Lovelock, L. K. Wright, Pen. Indeks, (2007)
3. Z. Parasuraman, and Berry, J. Retail, **1**, 64, (1988)