

Evaluation of Online Motorcycle Taxi Performance in Surabaya and Sidoarjo Area, Indonesia

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Abstract. Surabaya is the second biggest city in Indonesia, and Sidoarjo is a regency close to Surabaya, where many people live in but they work in Surabaya. More and more citizen of Surabaya and Sidoarjo use motorcycle taxi, either conventional service or online service so call as “ojek”, operated by the company called as *GO-JEK*. The purpose of this research is to evaluate the performance of *GO-JEK* in Surabaya and Sidoarjo based on user point-of-view and to observe what factors that influence the users in selecting either conventional or on-line *ojek*. The methods used are the Importance Performance Analysis (IPA) and the Stated Preference Technique. The IPA shows that there are 3 factors that have to be improved: firstly, driving manner, secondly, attention to maximum capacity and thirdly, helmet for the passenger. The Stated Preference Analysis shows that there are two major factors affecting the choice whether *GO-JEK* or conventional *ojek*, these are trip cost and waiting time to pick up by the *ojek*.

1. Introduction

Surabaya is the second biggest City in Indonesia, with the population of 2.5 million. Sidoarjo is a regency that has a borderline with Surabaya, where many people live in but they work in Surabaya. Peoples often use public transportation, especially in the form of two-wheel conventional and online motorcycle taxis. Previous study on online taxi like Uber and Grab has been done [1,2,3], however, only in Indonesia start to operate an online motorcycle taxi, which is operated by the company called as *GO-JEK*. In Jakarta, online motorcycle taxi in considered to be one of the popular public transport mode, since they have met the expectation of most of the people and become the desired mode of society [3]. However PT. *GO-JEK* Indonesia previously do not get the business license, because motorcycle taxi is ilegal following the rule of the Indonesian Traffic Act, so according to the law, motorcycle taxi is not part of the public transport mode [4]. The other constraints felt by some user is also the difficulty to find this online motorcycle taxi at bus terminals, railway stations, tourist attractions, etc. [5,6]. On the other hand, the advantage of *GO-JEK* is easeness of bookings that can be made online using a smartphone and offer the prices that are relatively cheap. Previous research shows that the effect of trip cost on customer satisfaction is the most important key factors [6]. Recently, not only *GO-JEK* but also Uber online motorcycle taxis that have been operated and have been complained by conventional motorcycle taxi, as well as minibus public transport in some cities of Indonesia, as there is higher competition among them [7]. Other research shows that users tend to select *GO-JEK* than Grab motorcycle taxis, with major advantages in terms of comfort and service [8]. The purpose of this study is to determine the existing operational performance of *GO-JEK* in the service area of Surabaya - Sidoarjo, and to determine what factor that is influencing user to select *GO-JEK* better than a conventional motor taxi.

2. Methods

The respondents are those who are the user of both ojek, conventional and on-line, with total number of 220. Data collection was done by distributing a questionnaire on socioeconomic and trips characteristics. Researcher use a method so called as Important Performance Analysis(IPA) for evaluation of GO-JEK performance [8], while Stated Preference Analysis is used to observe the factors affecting the choice between conventional and on-line ojek. The flowchart of this research is shown in Figure 1 hereby.

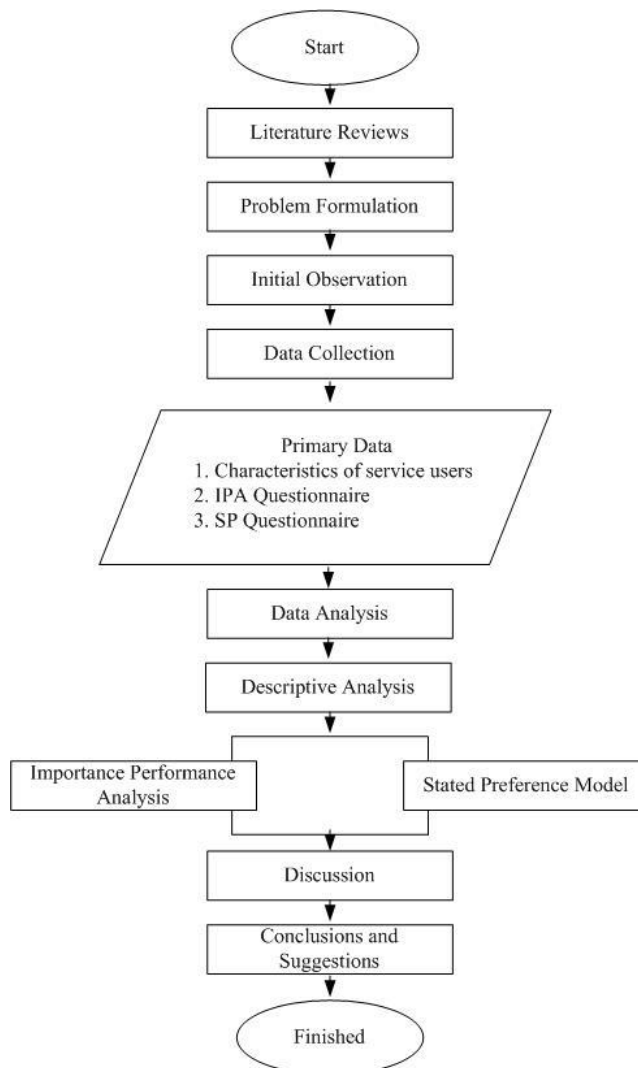


Fig.1. Research Flow Chart

3. Result and Discussion

3.1. Characteristics of Passengers

At first, researcher explore the social economic and travel characteristics of passengers in order to facilitate the researchers in analyzing condition of study area, data collected includes: educational

level, occupation, total monthly income and expenditure, trip purpose, frequency and payment types. Table 1 shows the major social economic and travel characteristics of 220 respondents in study area.

Table 1 Characteristics of Motorcycle Taxi Users in Study Area

No	Respondent Criteria	Item	[%]
1	Education	Bachelor	45
2	Occupation	Private Company	44
3	Monthly Personal Income	3-5 Million	43
4	Monthly Family Income	3-5 Million	41
5	Monthly Family Expenditure	3-5 Million	44
6	Trip Purpose	Business	45
7	Trip Frequency	Twice a week	40
8	Who Pay the Cost	Personal	66

It can be summarized that user of motorcycle taxi in study area is mostly graduate that work on private company, with one person work in the family that earn and expenditure about 3-5 millions rupiah. The travel characteristics shows that they use motorcycle taxi mostly for business trip, on average twice a week, and pay by their own personal expenditure. Based on this survey results, it can be seen that the user are middle income people, who consider time is important therefore they use motorcycle taxi in order to reach their destination on-time.

3.2. The Result of the Importance-Performance Analysis

The Importance Performance Analysis method is consider one of the effective method to evaluate the existing services of GO-JEK, it can described importance and satisfaction level. In this study the service that has been evaluated are on 12 attributes; these are (1) GO-JEK identity on motorcycle, (2) driver identity and phone number, (3) maximum passengers/goods capacity, (4) driving manner, (5) helmet for passenger, (6) insurance, (7) waiting time, (8) raincoat for passenger, (9) trip fare, (10) booking systems, (11) passenger complaints mechanism, and (12) travel time. The analysis based on interview with respondents then be plotted in the IPA diagram (Figure 1) and give result on indicators scattered on 4 quadrant (Table 2).

Table 2 The Result of IPA on Attributes of GO-JEK user in Study Area

Quadrant	Information	Attributes
I	Services need to be improved	<ol style="list-style-type: none"> 1. Driving manner (4) 2. Maximum passengers/goods capacity (3) 3. Helmet for passenger (5)
II	Services need to be maintained	<ol style="list-style-type: none"> 1. GO-JEK identity on motorcycle (1) 2. Waiting time (7) 3. Trip fare (9) 4. Travel time (12) 5. Booking system (10)
III	Services that less priority to be improved	<ol style="list-style-type: none"> 1. Insurance (6) 2. Raincoat for passenger (8) 3. Passenger complaints mechanism (11)

Quadrant	Information	Attributes
IV	Services that better than expected	1. Driver's identity and phone number (2)

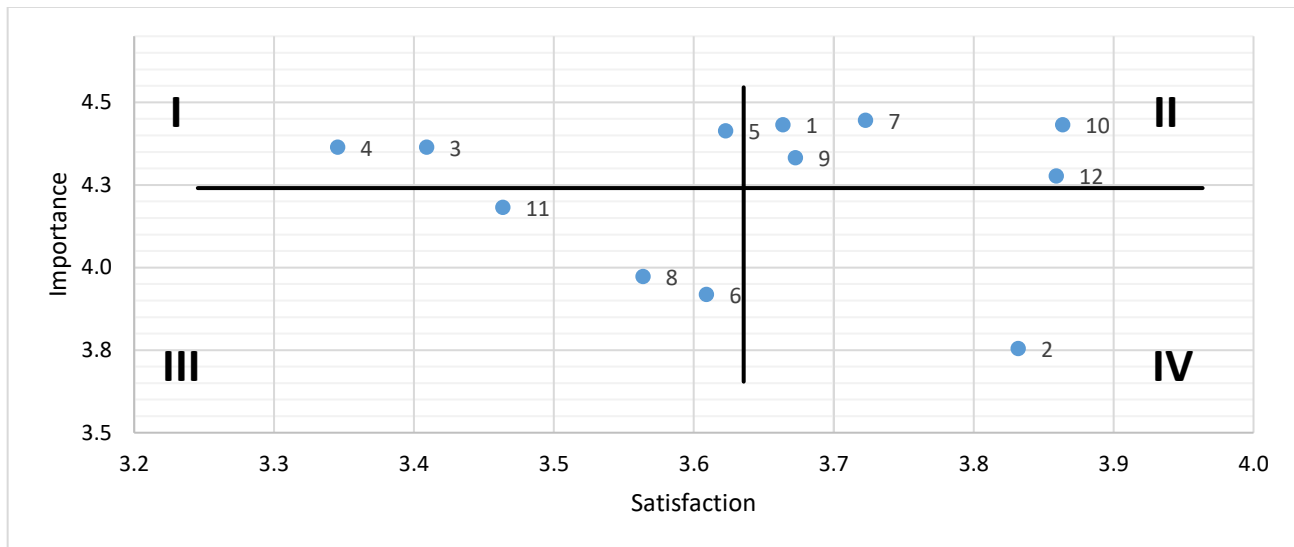


Fig. 2. IPA Quadrant Analysis based on GO-JEK Evaluation in Study Area

Based on IPA, there were 3 indicators that need to be improved, these are:

- (1) driving manner, since GO-JEK driver sometimes break traffic rule for example red lights runner and driving through the middle of big heavy trucks.
- (2) maximum passengers/goods capacity, in some cases, driver give a service to more than 1 passengers or bring goods heavier or larger than the capacity.
- (3) helmet for passenger, as driver sometimes did not bring additional helmet that provided for passenger.

Therefore in the future, GO-JEK driver shall put more attention on this 3 attributes to be improved. The company shall put their driver into more discipline behavior, and giving punishment for driver who break the rule, especially traffic rule.

3.3. Stated Preference Modelling

Stated Preference modelling is one of the approach that was done to see what factors that influences on choosing ^{3.636}GO-JEK or conventional ^{3.964}motorcycle taxi. Several analyses have been done on some factors, however, two main factors are trip cost and waiting time. The analysis results show model as follows:

1. Based on trip cost (ΔX_1):

$$(U_{OL}-U_{OK})= 0.813- 0.00004606 (\Delta X_1) \tag{1}$$

2. Based on waiting time (ΔX_2):

$$(U_{OL}-U_{OK})= 0.149 - 0.322 (\Delta X_2) \tag{2}$$

$(U_{OL}-U_{OK})$ = Utility of online GO-JEK minus utility of ordinary Ojek

The Stated Preference modeling based on trip costs, it can be concluded that:

- a) If the conventional motorcycle taxi cost is getting higher, the $(U_{OL} - U_{OK})$ value will be increased. This will result in increasing the *GO-JEK*'s probability value (P_{OL}) and decreasing the conventional motorcycle taxi's probability value (P_{OK}). It means that the probability for the respondents who choose to use *GO-JEK* is getting higher. On the other hand, if the conventional motorcycle taxi cost is getting lower, the $(U_{OL} - U_{OK})$ value will be decreased. This will result in increasing for conventional motorcycle taxi's probability value (P_{OK}) and decreasing the *GO-JEK*'s probability value (P_{OL}). It means that the probability for the respondents who choose to use conventional motorcycle taxi is getting higher.
- b) The constant value in this mode choice model is 0.813. It means that if both modes have the same trip costs, the difference of $(U_{OL} - U_{OK})$ utility is 0.813, so in this situation where there is no difference in cost of *GO-JEK* and conventional motorcycle taxi, the respondents will use *GO-JEK* instead of conventional motorcycle taxi.

Furthermore, based on the stated preference modeling based on waiting time, it can be concluded that:

- a) If the waiting time to get a conventional motorcycle taxi is getting longer, the $(U_{OL} - U_{OK})$ value will be increased. This results in decreasing the conventional motorcycle taxi's probability value (P_{OK}) and increasing the *GO-JEK*'s probability value (P_{OL}). Thus, the probability for the respondents to choose *GO-JEK* is higher. On the other hand, if the waiting time to get a conventional motorcycle taxi is getting less (faster), the $(U_{OL} - U_{OK})$ value will be decreased. This results in increasing conventional motorcycle taxi's probability value (P_{OK}) and decreasing the *GO-JEK*'s probability value (P_{OL}). It means that the probability for the respondents to choose a conventional motorcycle taxi is getting higher.
- b) The constant value in the mode choice model is 0.149. It means that if both modes (*GO-JEK* and conventional motorcycle taxi) have the same waiting time, the difference of $(U_{OL} - U_{OK})$ utility is 0.149. Therefore, in this circumstance, where the time difference to get transport of *GO-JEK* and conventional motorcycle taxi is equal, the respondents will use *GO-JEK*.

4. Conclusions and Suggestions

4.1 Conclusions

After a study on the *GO-JEK* performance has been done, some conclusions obtained are as follows:

1. On the basis of the *Importance-Performance Analysis* method, it can be found that there are 3 improvements that in the near future the *GO-JEK* management shall be done. First is driving manner, that some *GO-JEK* drivers are driving carelessly, so that the passengers felt uncomfortable. Second, the drivers of *GO-JEK* put less attention on the maximum capacity of persons and weight of goods that the motorcycle could afford. The last is the availability of helmet for passengers, since some drivers of *GO-JEK* do not bring additional helmets for passengers, they give their helmet to the passengers, as a result, the drivers do not wear any helmet.
2. Based on the *Stated Preference* method, there are 2 models that have been developed:
 - a) Trip Cost Attribute

The utility model of respondent in using online motorcycle taxi of *GO-JEK* is as follows:

$$(U_{OL} - U_{OK}) = 0.813 - 0.00004606 (\Delta X_1)$$

It is found that in terms of the trip cost, *GO-JEK*'s probability is mostly higher, so that people prefer *GO-JEK* because in most cases it is cheaper than a conventional motorcycle taxi.

b) Waiting Time Attribute

The utility model of respondent in using online GO-JEK is as follows:

$$(U_{OL} - U_{OK}) = 0.149 - 0.322 (\Delta X_2)$$

It is found that waiting time will influence the choice, if waiting time of *GO-JEK* is less than a conventional motorcycle taxi, eventually people will select *GO-JEK*, and vice versa.

4.2 Suggestions

This research gives some suggestions hereby:

1. Due to the limited time of the interview, for the future study, it is suggested that the surveyor accompany the respondents in filling out the questionnaires, to avoid mistakes in understanding the question, so that the data will be more accurate.
2. The results of this research can be used as input for service providers of *GO-JEK* and any other online motorcycle taxi in improving and enhancing the services to the passengers in Surabaya-Sidoarjo service areas.

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