

# Maintenance Application for Motorcycle: Case Study Ride-Hailing in Indonesia City

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## Abstract

Preventive Maintenance (PM) is planned maintenance that prolongs the lifespan of an asset. In this paper, the authors conducted a survey of public transportation, such as Ride-Hailing riders regarding their habits in caring for their motorcycles. Preventive maintenance includes adjustments, cleaning, lubrication, repairs, and replacements. We are comparing habits between ride hauling and common citizens using a survey method that includes 58 respondents. Finally, some table examples are given to illustrate the differentiation of this PM scheduling approach between the Ride Hauling user and a common citizen.

## Keywords

Maintenance, Policy, Motorcycle, Survey, Transportation

## 1. Introduction

The development of transformation and digitalization in all corners of the country is very fast, including in Indonesia in the last few decades. It has greatly influenced developments in transportation which is an important part in accelerating economic and social interaction (Button and Hensher, 2001), in terms of the transportation economy. Motorcycles began to go digital with the start of Ride-Hailing by GO-JEK in 2010. However, the rise of mobile-based ride-hailing began in August 2014 when Uber introduced car ride-hailing in limited areas in Indonesia. Jakarta (Almunawar, et al'2020).

The sharing economy in the transportation industry is often referred to as Ride Sharing, or so-called ride-sharing services, which have had a significant impact on public transport in many countries in recent times (Lee, 2017). Ride-Sharing has many services that are part of the new business model of the sharing economy, which has become an increasingly popular mode of transportation (Woskko, 2014)., the services offered are very diverse and very fast and aggressive in various countries (Allen and Berg, 2014; Clewlow and Mishra, 2017; Deloitte, 2017; Zhu et al., 2017); Google et al., 2019; Cheah et al., 2020; Jang et al., 2020) such as Uber, Didi, Lyft, Grab, Ola, and BlaBlaCar (Wirtz et al., 2019; Jang et al., 2020). In Southeast Asia, ride-hailing applications can be accessed in more than 500 cities and are regularly used by more than 35 million users (Google and Temasek, 2018), in Indonesia alone population growth and smartphone users make digital-based Ride Sharing or commonly called "Ojek Online" a very lucrative business (Fauzi, 2018)

In Indonesia, "online ojek" services are starting to exist and are developing. People have many choices in using public transportation, one of which is "ojek" services that can take passengers to various destinations for short distances including remote areas that cannot be served by four people. -wheeled vehicles. The "Ojek Online" service is one of the public transportation services with privately-owned motorbikes to serve transportation requests individually. However, the development of technology, information, and digitalization as well as the level of traffic congestion has made some investors such as Grab and Gojek seize business opportunities by establishing transportation service companies. "online ojek" ( Kuswanto, et al. 2019), the number of "ojek online" is more than 4 million drivers Combined Two-Wheel Action (GARDA, 2020) which consists of several companies service, with this number is important to maintain the performance of vehicle each a driver provides service to customers (Gong and Yi, 2019) (Parasuraman, Zeithaml, and Berry (1988).

Traffic congestion in Indonesia's big cities is a common problem, not least for the government to immediately find a solution. However, this situation becomes a business opportunity for business people.

In the Decree of the Minister of Transportation of the Republic of Indonesia on March 31 of the Minister of Transportation, 2017, through the policy 26/2017 (Permendag 26/2017), the Indonesian Ministry of Transportation has given an operating license but must obtain a business license, obtain a license as a public transport operator, pass a driving test, and are covered by insurance. Second, under the regulation, online transportation companies must partner with transportation companies that have permits from the ministry or apply for their transportation company permits. required to build maintenance facilities and comply with regular roadworthiness tests., of course, this is an opportunity for driver service actors to provide services to consumers in terms of satisfaction in the field of vehicle performance, especially motorcycles that are used in good condition by carrying out periodic maintenance, especially motorbikes, is an important thing for "Ojek Online" drivers because good vehicle performance will have an impact on service performance to consumers (Saiful Anham, 2019) and productivity and profit (Fatoni, 2018), Therefore, This article will present maintenance application for the motorcycle in Indonesia:

- a. How is maintenance application for ride hailings in Indonesia
- b. What kind of maintenance that ride-hailing use in Indonesia and the role of their organization to maintain their riders

The results of the survey research will describe the habits and methods used by drivers. The research method was carried out by interview, data collection, and processed quantitatively.

## 1.1 Objectives

Conducted a survey of motorcycle riders from online transportation organizations regarding their habits in caring for their motorcycles

## 2. Literature Review

### 2.1. Maintenance

Maintenance has an important role in operating a complex system. According to BS EN 13306:2017, "maintenance is a combination of all technical, administrative, and managerial actions during the life cycle of an item intended to retain it in, or restore it to, a state in which it can perform the required function. Proper maintenance can reduce the number of sudden failures and in the end save time and budget (Alimian et al., 2020). As a result, it can contribute to overall

business performance through its impact on the quality, efficiency, and effectiveness of a company's operation (Alsyouf, 2009).

Maintenance may be performed according to various actions to assure maximum availability and reliability of an asset (Rastegari et al., 2013). Maintenance actions are usually classified into two maintenance types: preventive maintenance (PM) and corrective maintenance. Corrective maintenance is performed after a failure is triggered, while preventive maintenance is performed before a failure is triggered to prevent a breakdown (Yang et al., 2017).

## 2.2. Motorcycle Maintenance

Maintenance in a motorcycle is an important thing and is a real activity in keeping the vehicle operating in maximum condition in accordance with the manufacturer's standards in terms of safety, performance, reliability, and optimal efficiency. Simplicity in daily maintenance and ease in periodic maintenance both technical and financial aspects affect the operational quality of a vehicle (Gabriel, Habiburrahman, and Nurtjahjo, 2018). Defense Safety Oversight Council (DSOC) Motorcycle Mentorship Modules mention some items that need more attention on motorcycle maintenance: tires, all control, fluids, frame, and suspension. DSOC suggest those items to be checked in a pre-ride checklist. Compared to automobiles that used to have indicators and warning alerts the driver when maintenance is required, motorcycle drivers need to give more attention to several items before riding a motorcycle.

## 2.3. Online Transportation

Technological advancement has increased the popularity of online-based transportation. Online transportation has become a common means for people to fulfill their commuting needs (Silalahi et al., 2017). The hype of online transportation in Indonesia started when GO-JEK was founded in 2010. Now GO-JEK has more than 200 thousand drivers in several cities. The GO-JEK application was launched in early 2015 and continuously upgraded. In 2014, UBER joined the Indonesian online transportation segment and GRAB followed in 2015. They are now the top three Indonesian online transportation companies. However, GO-JEK has the largest users and drivers in many Indonesian cities.

The difference between current online transportation and existing approved land transportation operators (taxi, bus, charter service) in Indonesia lies in the arrangement of the driver and fleet organization. On an approved land transportation operator, the driver has an employment contract with the operator. The fleet (motorcycle, car, bus, etc) maintenance must follow the company regulations that are based on the regulation from the manufacturer and the government. Meanwhile, online transportation sees their driver as a "partner". The partner has their motorcycle or car and has to be responsible for their vehicle. The regulation on online transportation roadworthy is still on a continuous improvement process,

## 3. Methods

This Research Methodology uses a Mixed (Quantitative and Qualitative) method from surveys and some were taken from collections of pre-existing papers based on case studies related to the written theme. The Survey can be compared in research to get conclusions. In this paper, the author summarizes and classifies them. The references are divided into several categories in motorcycle, maintenance, and online transportation.

## 4. Data Collection

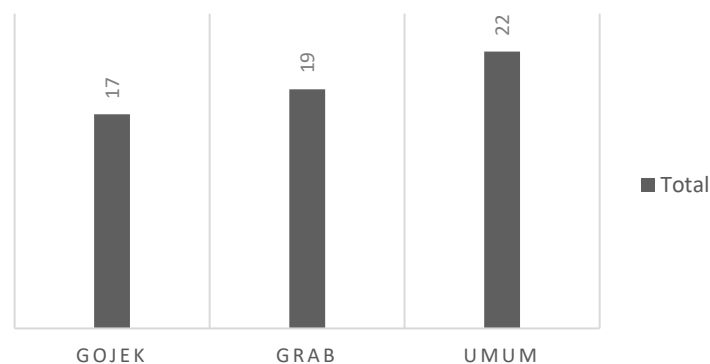
All data use Quantitative data from surveys about maintenance and secondary data from several review papers. The authors want to find out the maintenance carried out on several organizations in carrying out maintenance activities for the motorcycle rider by mapping questionnaires about maintenance to get the data from the riders.

No	Maintenance Characteristics	Questions
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1	Maintenance Approach	Q1. Is vehicle maintenance important in your opinion? Q2. How to determine when the vehicle should perform routine maintenance?
2	Predetermined Maintenance Interval	Q3. Does the maintenance follow the manufacturer's guidelines or not?
3	Failure and Maintenance Downtime	Q4. How long does it take to carry out one-time vehicle maintenance? Q5. Have you ever postponed routine maintenance due to maintenance time considerations?
4	Spare parts & Material	Q6. Have you ever had difficulty finding spare parts? Q7. What decisions are taken when it is difficult to find spare parts? Q8. What do you replace during periodic maintenance?
5	Maintenance Performance Measurement	Q9. How would you rate the success of the maintenance carried out? Q10. Did you decide on maintenance based on the success of previous maintenance?
6	Monitoring and Inspection	Q11. Do you carry out routine vehicle inspections? Q12. Does your organization have rules regarding periodic maintenance?

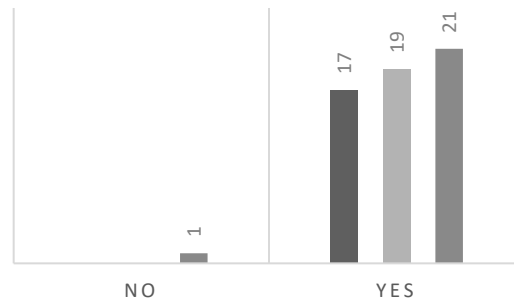
Table 2. Questionnaire table

## RESPONDENT ORGANIZATION



Graph 1. Questionnaire Respondent

However, since the authors want to know about the maintenance from the organization's segment, from the respondent size in Graph 1, we can see that GOJEK and GRAB are currently one of the largest online transportation companies in Indonesia, with 17 and 19 respondents respectively. Meanwhile, the UMUM (general public PB ) is not included in the criteria in this study.

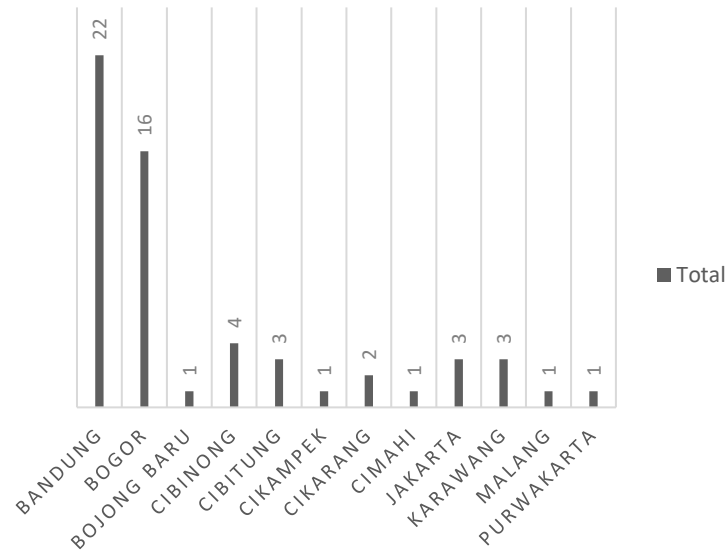


Graph 1. Q1 Vehicle maintenance importance

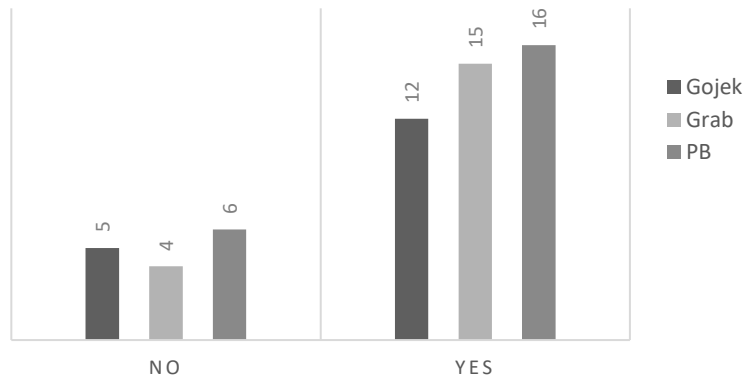
Row Labels	Gojek	Grab	PB
Every 3 Month / 3000km	-	1	2
Every 2Month	5	5	1
Every Month	5	1	7
Follow Service Authorize	1	3	6
When there is a complaint	5	4	4
Twice a month	1	5	3
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 3. Q2 How to determine when the vehicle should perform routine maintenance, by GOJEK riders

### RESPONDENT AREA



Graphic 2. Ride-Hailing Area



Graphic 3. Q3 Maintenance following manufacturer's guidelines

Row Labels	Gojek	Grab	PB
1 - 3 months	7	5	10
1 once a month	2	3	
3 - 6 months	5	8	8
according to the service book	3	3	4
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 4. Q4 Carrying out one-time vehicle maintenance

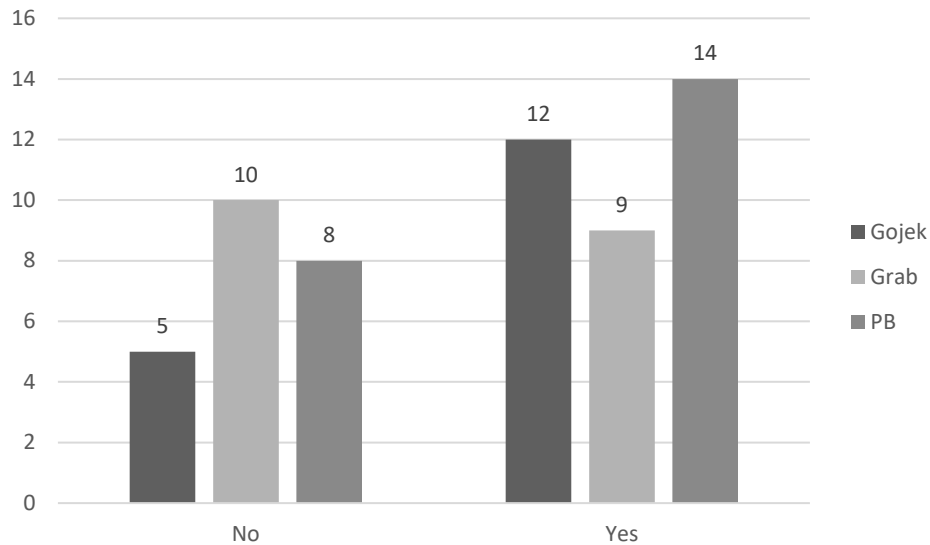


Table 5. Q5 Postponed routine maintenance due to maintenance time considerations

Row Labels	Gojek	Grab	PB
No	14	17	13
Yes	3	2	9
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 6: Q6 Difficulty in finding spare parts

Row Labels	Gojek	Grab	PB
Buy common items that can be used	4	2	3
Look for other workshops	-	1	3
Search online	7	7	9
Look for grade Imitation Pars	-	3	1
Look for local/used brands	1	4	-
Change the vehicle, until spare parts are obtained.	2	-	1

Repair	1	1	1
original	2	1	4
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 7: Q7 Decisions when it is difficult to find spare parts

Content	Oil	Oil Filter	Spark Plug	Oil Brake	Brake	Lamp	Engine Function	Battery	Tire	Total
Gojek	28.6%	6.3%	11.1%	12.7%	19.0%	4.8%	6.3%	4.8%	6.3%	100%
Grab	39.1%	2.2%	15.2%	15.2%	19.6%	2.2%	2.2%	0	4.3%	100%
PB	31.2%	10.4%	11.7%	15.6%	19.5%	9.1%	2.6%	0	0	100%

Table 8: Q8 Replace during periodic maintenance

Row Labels	Goiek	Grab	PB
Safe while performed on schedule	1	-	1
Safe while driving	3	-	3
By feeling the performance of the vehicle	1		
Vehicle better	2	4	5
Vehicle seems normal	2	12	10
Longer Lifetime	1	3	3
result after service	1	-	-
Monthly services aren't necessary	-	-	1
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 9: Q9 Measurement of previous maintenance effectiveness

Row Labels	Goiek	Grab	PB
No	2	4	4



Yes	15	15	18
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 10: Q10 Maintenance plan schedule based on previous maintenance effectiveness

Row Labels	Gojek	Grab	PB
No	4	1	4
Yes	13	18	18
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 11: Q11 Behavior to do routine maintenance

Row Labels	Gojek	Grab	PBI
Follow The Service Authorized by Ownselft	1	5	4
No Rules Regarding PM	14	13	18
<b>Grand Total</b>	<b>17</b>	<b>19</b>	<b>22</b>

Table 12: Q12 Organization rules regarding periodic maintenance

## 5. Results and Discussion

This study has some limitations. First, the number of literature that is studied is *limited to Ride Hauling*. Because we are using the subjective method, there is a possibility of bias. Also, the respondents are limited to only 58 respondents. Some table examples are given to illustrate the differentiation of this PM scheduling approach between the Ride Hauling user and a common citizen. For future research, we are hoping the author uses objective methods so we can minimize the bias.

## 6. Conclusion

Based on the research table above, it can be concluded that there has been awareness from motorists that maintenance is important for vehicles, seen in Table no. Q3, seen that they take care of the vehicle based on their individual needs. As we look into table Q8, the result is that Ride Hauling and general users do Preventive Maintenance focusing on changing oil more often than changing the other parts. seen in table Q12 that they take care of the vehicle based on their individual needs. and 77.58% of users do not follow the regular service book to do preventive maintenance on their vehicles.

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### **Biography / Biographies**

**Andy Kresna, Davis Belmiro, Diaddra Pramudito, and Naldo Badriansyah** are M.Eng students of Industrial Engineering of the Universitas Indonesia. Their main aim in this research was to highlight the maintenance taken by the Indonesia Ride-Hailing Organisation to maintain their riders' motorcycles.