

## The Influence of *Kiss and Ride* and *Park and Ride* in Decreasing the Private Transportation by Using the Public Transportation “Transjakarta”

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*Jakarta with a total area of 740.28 square kilometres has a population of approximately 9.607.787 (2012). The number of people using private vehicles is 98% and public transport vehicles is 2% of a total of 17 million people who travel every day. Around 49.7% of the total working population owns a private vehicle compared to 50.3% who don't. The objective of this research is to test the hypothesis of the Kiss and Ride's influence on the Private Transport, the Park and Ride's influence on the Private Transport, the Public Transport's influence on the Private Transport, and the Kiss and Ride, the Park and Ride and the Public Transport's jointly influence the Private Transport. The sampling frame was taken among 300 people, and 30 people for the study sample. In the fourth hypothesis testing relationships between variables Kiss and Ride (X1), Park and Ride (X2) and Public Transport (X3) together with Private Transport dependent variable (Y), has proven that Kiss and Ride, Park and Ride and Public transport together significantly reduced the number of the private transport. This is evidenced by the correlation between the Kiss and Ride, Park and Ride and Public transport with private transport together that resulted in  $F_{count} = 20,872 > F_{table} = 2.98$  at significance level  $\alpha = 0.01$  and  $F_{count} = 20,872 > F_{table} = 4.64$  at significance level  $\alpha = 0.05$ . A conclusion that the decline in private transport users can be increased by improving services of the Kiss and Ride, the Park and Ride, and the Public Transport.*

**Keywords:** Kiss and Ride, Park and Ride, Public Transport, Private Transport.

### 1. Introduction

Jakarta with a total area of 740.28 square kilometres has a population of approximately 9.607.787 (2012), during the working days this number increases due to the arrival of workers from other cities such as Bekasi, Tangerang, Bogor and Depok. The most populous area is East Jakarta with a population of 2.610.267, while The Thousand Islands is the district with the lowest population of 21.645. Growth is often chaotic and as a consequence, changes in land usage are often not in line with regional planning and a lack of public services to the needs of urban infrastructure. Along with the increase in road infrastructure, economic growth and community revenue, the number of vehicles is increasing. Based on the data of The Jakarta Transportation Agency, the comparison of the number of private vehicles and public transport vehicles is 98% and 2% of private vehicles on public transport.

From a total of 17 million people who travel every day, the number of private vehicles to transport passengers is only around 49.7%, while public vehicles have to transport around 50.3% of the working population. The number of motor vehicles by the end of 2011 is about 11.3 million units of which 8.2 million are motorcycles. The total length of

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## Nusraningrum & Isibhi

roads in Jakarta is 7650 kilometers with a total area of 40.1 square kilometers with a 0.01% annual growth rate, while the motor vehicle growth rate is 0.26% per year. The total land for the roads covers up to 6.2% of the area in Jakarta. Ideally, the total road area must be 10% of the total land area. If the increase of vehicles and roads happening now allows to continue, the growth rate of the vehicles remains 9% per year and the growth of the road area remains 0.01%, then by the year 2013 the total area of roads will equal the vast amount of space required for all existing motor vehicles.

Traffic congestion has been the hallmark of Jakarta; through the corridors and commercial areas of the city heavy traffic congestion can be found. This results in economic losses in the form of additional vehicle operating costs, the loss in travel time, losses due to air pollution in the form of increased vehicle emissions, health problems due to stress and fatigue due to driving. The number of private vehicles compare to public vehicles exacerbates more transport complications in Jakarta.

According to the predictions of the previous study, the share of private transport modes will increase rapidly. Prediction of the number of passengers in 2007 and 2010 vary for each route. In 2007 the maximum passenger volume ranged from 900 to 3.800 people to one direction during rush hour. In 2010 the passenger volume increased and ranged from 4.100 to 5.600 passengers to one direction during rush hour. In 2020 the number of residents in the Jakarta area will reach 26 million and the travel demand will increase with 40%.

Some of the factors causing the shift of public transport users to private transport, among others:

1. The economic activity has not been able to be served by adequate public transport.
2. The rising land prices in the city center, causing residential location away from the center of town, or even out of town that are not covered by the public transport network system services.
3. The increasing production of motor vehicles without clear restrictions by the government as well as ease the process of vehicle ownership.
4. The new roads stimulate private transport users, as the new road is usually not provided yet with a public transport network.
5. The unavailability of transportation feeders that can bridge the way from or to the mainstream public transport services.
6. The less ensuring conditions for security and punctuality demanded by passengers in public transport services.

Improvements and additions to facilities and public transport infrastructure especially with increased comfort and security is very necessary to be held in the hope of making the private vehicle users to switch to choose public transport. In an effort to address traffic congestion by pushing the use of private vehicles, Jakarta government has built a facility that allows users to move the private car to public transport modes. *Park and Ride* is a facility that allows the owners of private vehicles such as cars and motorcycles to park his vehicle in a parking lot and move to locations using public transport modes. Given the facility, the users of private vehicles will be motivated to use public transport. *Park and Ride* Is expected to be a good choice to limit the number of private vehicles onto the main roads of the Capital, in addition to the *three-in-one* system that has prevailed until now.

## Nusraningrum & Isibhi

Expansion of the capacity of roads and road barriers can be reduced by pressing the high demand to use the roads, although it has been clear about the need for a wide range of urban public transport. The growth of motorization, which then leads to an increased flow has attracted the attention of the government to increase road capacity. Urban public transport should be accessible to all groups of society, because an urban public transport also needs to guarantee comfort to communities. The high mobility of car users will decrease the mobility of other user, and at the same time the facility of car users reduces other users' facilities.

The problem in this study can be identified as follows: The high volume of private vehicles, the low road capacity, and not all TransJakarta Bus lines can be operated. The infrastructure of the Transjakarta parking is still inadequate, the growth of private vehicles is significant 9% annually, the lack of service on public transport, not all Transjakarta paths currently have *park and ride*, and not all Transjakarta paths currently have *kiss and ride*.

Of the various factors that influence the usage of private transport needed answers to complex questions such as those listed above. In this study, researchers focus only on the factor of *Kiss and Ride*, *Park and Ride*, and public transport which is related to the private transport factor. The researcher has defined the independent variables of *Kiss And Ride*, *Park And Ride*, and Public Transport and dependent variable is the Private Transport as follows:

1. How does *Kiss and Ride* influence the Private Transport?
2. How does *Park and Ride* influence the Private Transport?
3. How does *Public Transport* influence the Private Transport?
4. How do *Kiss and Ride*, *Park and Ride* and the Public Transport in conjunction influence the Private Transport?

Section 1 of this paper discusses an introduction, section 2 discusses the theories relevant to the study of the *Kiss and Ride*, *Park and Ride*, Public Transport and Private Transport, section 3 discusses the methodology and model, section 4 discusses the findings and the section 5 discusses the summary and conclusions.

## 2. Literature Review

### 2.1 Kiss and Ride

McKenzie and Mohr claimed that *Kiss and Ride* is the activity involving motor vehicle owners to park temporarily and wait in the vehicle for example, picking up the kids from school or while waiting to continue the journey by train. (2001: 3) *Kiss and Ride* is a mode access towards a public transport for transit passengers who usually use commuter trains and will be directed to the left to stop, then move on to a private vehicle (Glossary, 1989: 1-2) The *Kiss & Ride* is a designated area (identified by signs) for parents picking up or unloading their children by their private vehicle. The area is separated from the bus loading/unloading location so there is no conflict between the two operations. (<http://www.fcps.edu/fts/safety-security>)

While *Kiss and Ride* or drop off is a method that does not need a parking space to access the station, the *Kiss and Ride* is a strategy to promote demand of the parking lot. According to Vukan R. Vuchic *Kiss and Ride* is the transfer station mode. (1981:

## Nusraningrum & Isibhi

432) But Jakob Nielsen says that *Kiss and Ride* is analogous to the *Park and Ride*, where people can park their vehicles for a while and then go on his way back after dropping off its passengers. (1994; 362)

**Figure 1: Traffic Signs Kiss and Ride**



Pincushion underlines that to reduce traffic congestion in a *Kiss and Ride* line-up, this area is intended for 20-30 vehicles, and is the location that is used to pick and drop off passengers. (2003) And Alice Reid says stop and go on (*Kiss and Ride*), in which the wife can drive her husband to take his daily trip to the city by bus in a particular area at the station. (1999 : 140) In *Urban Transportation Systems* *Kiss and Ride* is described as a passenger facility used in activities where they drop off at the station or bus stop to go to the city center (*Sigurd Grava, 2003: 556*).

Also, *Kiss and Ride* is an innovative program designed to tackle congestion in the morning. where the driver remains in the car to drop the kids off at school, this allows the system to stop and drop off passengers for 15 to 20 minutes before the school bell in the morning so as to reduce traffic congestion it is also to reduce some of the demand for parking and the difficulty of parking provision (Joshua Schank L. 2002: 7). And the wikipedia wrote that many railway stations and airports feature an area in which cars can discharge and pick up passengers. These *Kiss and Ride* facilities allow drivers to stop and wait, instead of the longer-term parking associated with *Park and Ride* facilities.

From all of the above theories *Kiss and Ride* can be synthesized, such as a location facility for shuttle passengers of private vehicles to stop for a while and make the shift mode, then the vehicle moves again after passengers have switched modes.

### 2.2 Park And Ride

According to Ahmad Munawar *Park and Ride* is the service facility that provides opportunities to those who have private vehicles to use his vehicle to the bus / train stations, and private vehicles parked at the site, and then continue the journey by bus / train.( 2004:9)

Daisa added that *Park and Ride* is a parking area used by the owner of private vehicles where they use the bus or train. (James M. Daisa, 2004: 113) Stressed by Alice Reid that *Park and Ride* is terminal, where passengers can leave their cars in the morning. (1999 : C. 3)

## Nusraningrum & Isibhi

Figure 2: Traffic Signs Park and Ride



Meanwhile, (Park Wang, *et.al* , 2003) explains that in principle all *Park and Ride* aims to improve the efficiency of the transport network to encourage modal shift from private vehicles with a small capacity (low occupancy) to buses, trains and large capacity (high occupancy). Several studies in the United Kingdom concluded that the facility *Park and Ride* is very effective to reduce congestion.

Figure 3: Traffic Signs Park and Ride



According to (Smith 2000: 167) *Park and Ride* has been introduced since 1930 as part of the strategic management of mobility or known as Management Transport Demand. *Park and Ride* Is a parking facility at transfer station mode, stop and bus stop. Most are located in suburban areas to facilitate transfer modes and driving activities together (*ridesharing*), *carpooling*. Several places are also completed with bicycle parking facilities. On-site parking is mostly done free of charge or when it is charged it is relatively inexpensive compared to parking in the downtown area. (*TDM Encyclopedia*, [www.vtqi.org](http://www.vtqi.org) ). In some cases, sometimes the mall parking area can be used for *Park and Ride* facilities.

And Dewberry says *Park and Ride* is the transfer of the existing facility and is used by passengers to access strategically and to travel comfortably and is designed with enough capacity for future needs. (Dewberry, 2005:2) Facility services *Park and Ride* means that riders will park their vehicles in the parking area and then continue their journey by public transport. *Park and Ride* benefit will be felt by users depending on where the facility is located. In this case the location is a very influential factor. The main obstacle of the *Park and Ride* development is related to the provision of land and cost. (Hooper 1996).

## Nusraningrum & Isibhi

*Park and Ride* is often considered an effective strategy to improve transport to get to the city center (Bucharest, 1995: 85). The system is most often found in the metropolitan area, as well as in some smaller towns by improving tram or rail (e.g. Freiburg, Karlsruhe). The parking area must be relatively close to a bus service that provide transportation to the city center: In many cases, *Park and Ride* is used primarily for long-term parking outside the city center. *Park and Ride* parking is located in the suburbs or outlying areas, starting the garden where they can ride the car and the train / bus / subway into the town. ([http://en.wikipedia.org/wiki/File:Question\\_book-new.svg](http://en.wikipedia.org/wiki/File:Question_book-new.svg)) A mode of operation where passengers will ride the bus drive to the transit area, where their vehicle are parked at the station to continue the journey by bus (Glossary, 1989: 3)

*Transit Oriented Development's* book explained that *Park and Ride* highly effective strategies for parking and riding. Park and Ride is one of the management tools limiting traffic in the crowded city center, to attract people to park with free or low tariffs and then travel by the transit bus / bus way or rail to the city center. (Delft 2003: 3) Many provide a space in displacement or in the suburbs to small retail businesses, or public service center. *Park and Ride* should provide facilities at a suitable location for the push to switch from private cars to public transport modes as well as the quality of bus services improvement by expanding the network bus fleet, a collection of integrated fare scheme will be expanded to cover all major public transport services and passenger information system developed to help make informed choices on the passenger route planning.

And the Wikipedia Indonesia describes *Park and Ride* (or incentive parking) facilities as car parks with connections to public transport that allow commuters and other people heading to city centres to leave their vehicles and transfer to a bus, rail system (rapid transit, light rail, or commuter rail), or carpool for the remainder of the journey. The vehicle is stored in the car park during the day and retrieved when the owner returns. *Park and Ride* are generally located in the suburbs of metropolitan areas or on the outer edges of large cities.

According to some theories above, the *Park and Ride* can be synthesized as a suburban parking facility for private vehicles so that users of private vehicles continue traveling by public transport to the place of work.

### 2.3 Public Transport

Transportation is a displacement activity of passengers and goods from one place to another. In transport there are elements of movement, and physical displacement occuring on goods or passengers with or without means of conveyance to another. Pedestrians are moving people without transportation. Public transportation is the transportation used to transport people and goods normally provided to the public free of charge. (Ministry of Transport 2006:6)

Under Law No.14 Year 1992 about: Traffic and Road Transportation. Public transportation is any motor vehicle provided for use by the public with payment; public transportation is a passenger transport service used by the general public. Public transportation consists of buses, subways, and commuter trains, ferries, taxis, or monorails. And Munawar Ahmad says public transport is any motor vehicle provided for use by the public with charge. (2005: V.45) Public transport is any motor vehicle

## Nusraningrum & Isibhi

provided for use by the public on payment. Nexus Dictionary (2006: 142). Public transport in Jakarta can be categorized as follows: taxi motorcycle, bajaj (13.000 vehicles), taxi (22,000), mini bus (13.000 units), metromini (6000 units), buses (AC, economy, limited-stop, 5000 units), BRT (busway, 230 units) and the electric train.

Nasution explains that public transport is aiming to move / transport goods / passengers from one location to another effectively and efficiently, this means that the employer or the provision of services expecting recompense in the form of tariffs paid by service users. (2003:104 ) Public Transport are all tools of transportation where passengers do not travel using their own vehicles. Public transportation is generally including trains and buses , but also includes service airline, ferry, taxi, etc. Public transport is the main means of transportation on Earth. ( www.wikipedia.org, edit dated 6 March 2009)

Based on the concepts above, it can be concluded that the definition of Public Transport is used by the public to reach to the destination with the specified capacity and to pay the fare.

### 2.4 Private Transport

Private transport as opposed to public transport, is a transportation service which is not available for use by the general public. Private transport is the dominant form of transportation in most of the world. ([http://en.wikipedia.org/wiki/Private\\_transport](http://en.wikipedia.org/wiki/Private_transport))

Raihana explains that private transportation is not commercial that includes cars, motorcycles and bicycles, private vehicle users have the power to determine how to drive a motorcycle and a car, while public transport vehicles meet the economic demand and is part of the economic cycle. (2007: 32) And Munawar adds that transport can be defined as a displacement of people / or goods from one place to another by car, while the private vehicle is any motor vehicle that is used by persons with no payment.( 2005: 45)

Definition Vehicle based on Government regulation (No. 44 of 1993: 2) motor vehicles are vehicles driven by engineering equipment that is on the vehicle. Motorcycles, is a 2 (two) or 3 (three) wheeled motor vehicle without cabins either with or without a side cart. Motorcycles are two-wheeled vehicles that are powered by a machine. The wheels of a motorcycle is in line even at a high speed remains stable due to the gyroscopic force; at low speed handlebars setting sustained by the rider gives stability. A vehicle or transportation is a means of transport other than living beings. They are usually man-made (cars, motorcycles, trains, boats, planes). Private transport or private vehicles are vehicles that are used for private purposes. (Transportation Department, 2006:141)

The use of motorcycles in Indonesia is very popular because the price is relatively low, fuel usage and operating costs are also very low. A car (short of an automobile derived from the Greek 'autos' (self) and Latin 'movére' (move)) is a vehicle with four or more wheels which has an own machine. Types of cars include buses, vans, and trucks. The operation of the car is called driving.

From the definitions and explanations above, it can be concluded that Private Transport is a form of transportation that is used privately and for private purposes free of charge.

### 3. The Methodology and Model

This study focuses on the influencing variable of Kiss and Ride, Park and Ride, Public Transport and Private Vehicles. The assessment of the above factors used an instrument developed by the researchers to determine Kiss and Ride, Park and Ride, Public Transport and Private Vehicles with a set of questionnaires. From the data of each variable, statistical testing is needed prior to further analysis. So that operational research was conducted with the aim to obtain an overview of the empirical; The influencing variable of Kiss and Ride, Park and Ride, Public Transport and Private Vehicles. This study uses survey with correlational approach and examines four variables, namely the concept of Kiss and Ride, Park and Ride, Public Transport as independent variables and Private Vehicles as the dependent variable.

In conducting the analysis, the private transport sector will be divided into motorcycles and private cars. Furthermore, each transport would be further elaborated in accordance with the existing conditions. In the next stage, the analysis will be performed including the analysis of the characteristics of the traffic, transportation patterns, and the tendency to use private vehicles.

The hypothesis to be tested in this study, 4 (four) statistical hypotheses are to be tested as follows:

$$H_0 : \rho_{x_1y} = 0$$

$$H_1 : \rho_{x_1y} \neq 0$$

$$H_0 : \rho_{x_2y} = 0$$

$$H_1 : \rho_{x_2y} \neq 0$$

$$H_0 : \rho_{x_3y} = 0$$

$$H_1 : \rho_{x_3y} \neq 0$$

$$H_0 : \rho_{x_{123}y} = 0$$

$$H_1 : \rho_{x_{123}y} \neq 0$$

Notes:

$\rho_{x_1y}$  = The influence coefficient between Kiss and Ride and Private Transport.

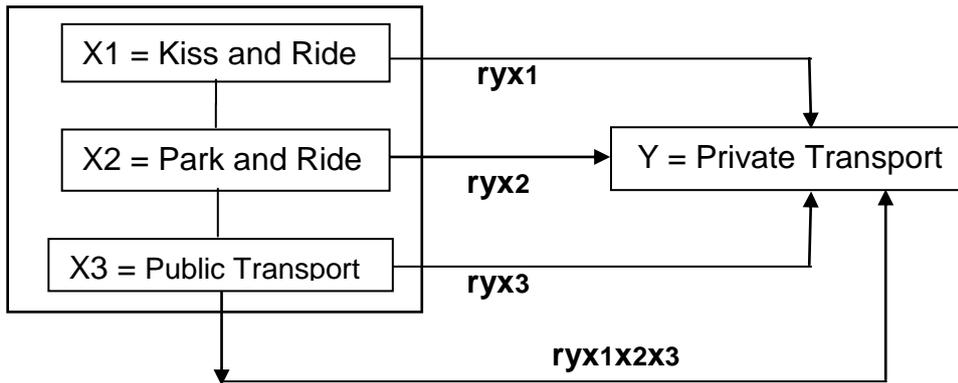
$\rho_{x_2y}$  = The influence coefficient between Park and Ride and Private Transport.

$\rho_{x_3y}$  = The influence coefficient between Public Transport and Private Transport.

$\rho_{x_{123}y}$  = The influence coefficient among Kiss and Ride, Park and Ride, and Public Transport Jointly and Private Transport.

# Nusraningrum & Isibhi

## Study Constellation



The study was conducted in Jakarta in particular on a segmented road; Lieutenant General Soetoyo, Cililitan, East Jakarta. This research was carried out in March 2009.

The population is all research subjects who have a common characteristic that is expected to produce an accurate conclusion. In this study, the sample is people who use public transport and private transport. The observation field calculated the volume of private vehicles, public transport volume, the number of parked vehicles, and the number of on-off passengers.

The sampling method used is the method of observation. The sample in this study was observed in the volume of private transport traffic, the number of public transport, the number of on-off passengers and the number of private parked transportation, the observation was conducted for 6 (six) consecutive days ie from 07.00 to 08.00 A.M.

Sustrisno Hadi says that data collection techniques use the method of observation. (1986) Observation is a complex process, a process that is made up of two of the most important processes; the processes of observation and memory.

In terms of the implementation process of data collection, observation was conducted nonparticipant, where the researcher was not directly involved and acted as an independent observer. The researchers noted these observations, and analyzed the required data. Data objects in this observation are private transport, public transport, on-off passengers as well as the number of vehicles parked permanently. Observations made on the Lieutenant General Soetoyo road, Cililitan, East Jakarta. Primary data were obtained including information relating to the number of vehicles passing during peak hours or the volume of private vehicles, the number of passengers who disembarked from public transport (feeder), passengers who transfer to public transport modes as well as the number of private transport parked.

Kiss and Ride is a location facility for shuttle passengers of private vehicles to stop for a while and make the shift mode, then the vehicle moves again after passengers have switched modes. The Kiss and Ride analysis is the data obtained from observation of the number of passengers to and from public transportation.

Park and Ride is a suburban parking facility for private vehicles so that users of private vehicles continue traveling by public transport to the place of work. Park and Ride

## Nusraningrum & Isibhi

analysis is the data obtained from observations of the number of private transport parked.

Public transportation is used by the public to reach to the destination with the specified capacity and to pay the fare. The analysis of public transport is the observation of data obtained from observations of the number of public transport crossing the street Soetoyo Cililitan in East Jakarta.

Private transport is transportation that is used privately and for private purposes free of charge. Private transportation is a data analysis of observations obtained from observations of the amount of private transportation across the street Soetoyo Cililitan in East Jakarta.

### 3.1 Instrument

Field studies, the observation conducted straight on the field using data collection tools such as form data.

The literature research is conducted to support the theoretical or conceptual ideas regarding the research variables, which in this case is supported by the data collection tool through text books or literature that can be used as study material in this study.

## 4. The Findings

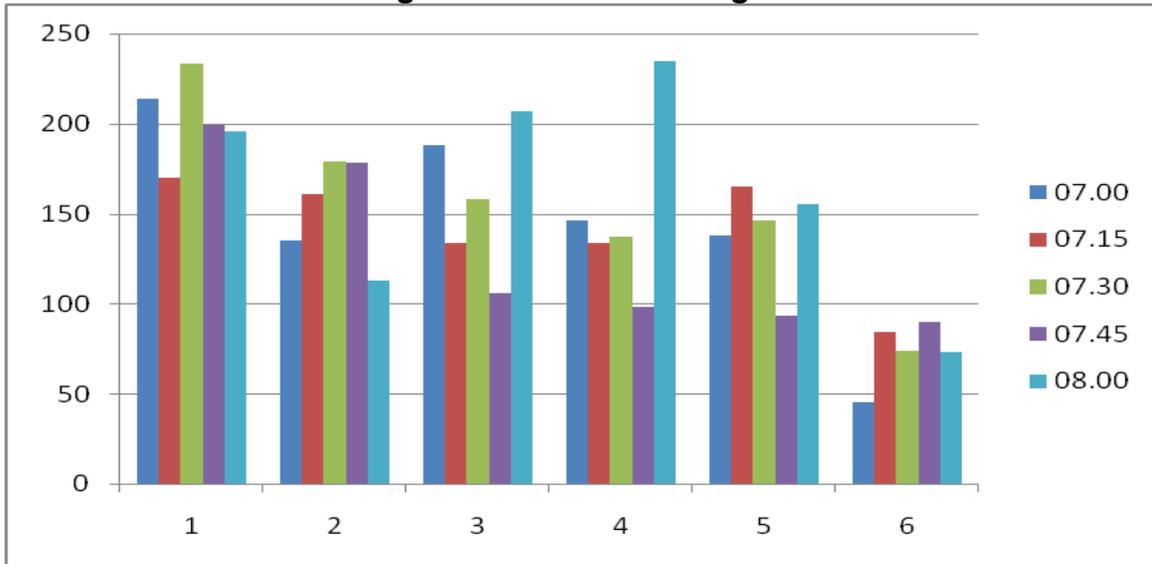
**Table 1: Statistic Description On-off Passengers (n = 30)**

Average	Deviation Standard	Median	Modus	Minimum Value	Maximum Value
146,13	49,29	146	146	45	235

Table 1 shows that the standard deviation score of 49.29; indicating deviation scores *Kiss and Ride* from the average value. Furthermore, the distribution of scores of on-off passengers above can be illustrated in the following graph:

## Nusraningrum & Isibhi

**Figure 4: On-off Passengers**

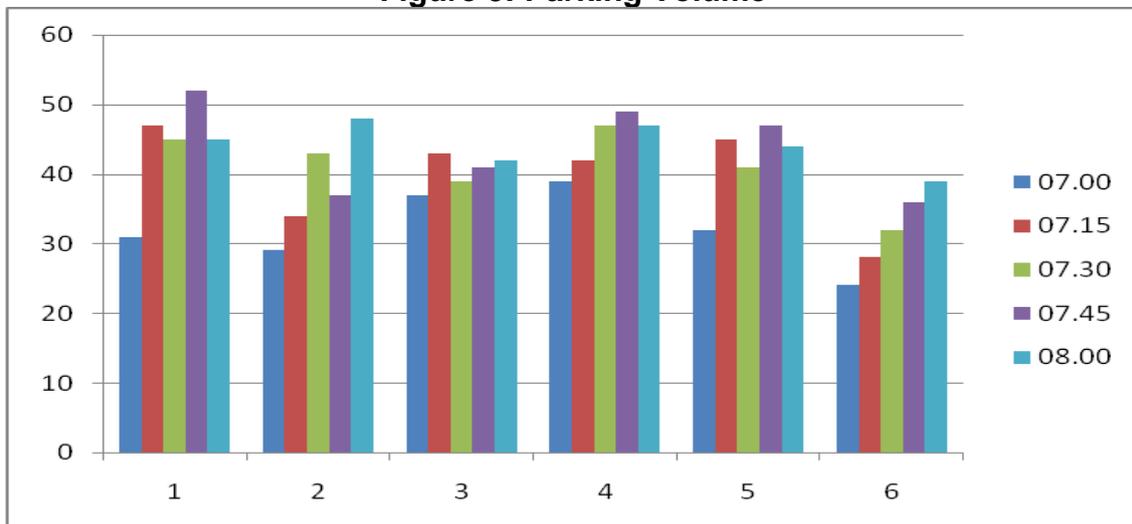


**Table 2: Statistics Description Vehicle Parking (n = 30)**

Average	Deviation Standard	Median	Modus	Minimum Value	Maximum Value
40,16	6,96	41.5	47	24	52

Table 2 shows that the standard deviation score of 6.96; indicating deviation scores of private transport volume average value. Furthermore, the distribution volume of private vehicles mentioned above can be illustrated in the following graph:

**Figure 5: Parking Volume**



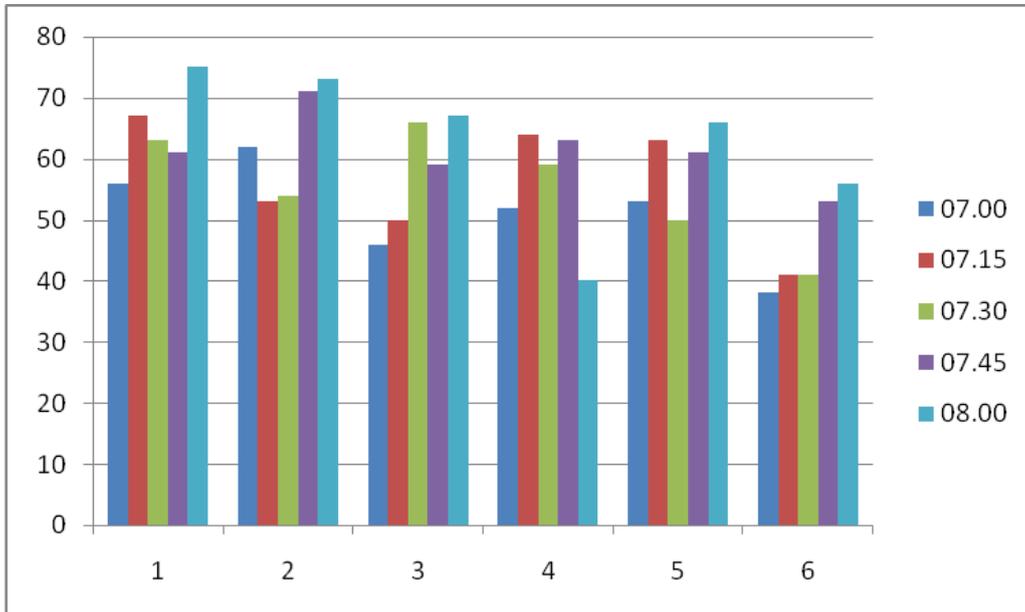
**Table 3: Description of Public Transport Statistics (n = 30)**

Average	Deviation Standard	Median	Modus	Minimum Value	Maximum Value
57,43	9.85	59	53	38	75

## Nusraningrum & Isibhi

Table 3 shows that the standard deviation score of 9.85; indicating deviation score volume public transport from the average value. Furthermore, the distribution volume of public transport vehicles mentioned above can be illustrated in the following graph:

**Figure 6: Public Transport Volume**

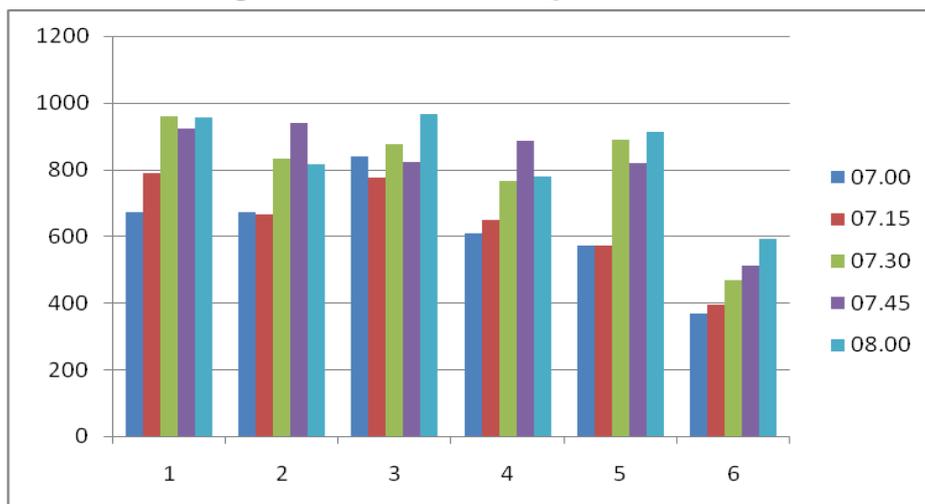


**Table 4: Description of Private Transport Statistics (n = 30)**

Average	Deviation Standard	Median	Modus	Minimum Value	Maximum Value
742,7	172,211	785	673	367	967

Table 4 shows that the standard deviation score of 172.211; indicating deviation scores of private transport volume average value. Furthermore, the distribution volume of private vehicles mentioned above can be illustrated in the following graph:

**Figure 7: Private Transport Volume**



To determine the significance of the relationship among these three variables, namely Kiss and Ride ( $X_1$ ), Park and Ride ( $X_2$ ) and Public Transport ( $X_3$ ) on the regression

## Nusraningrum & Isibhi

equation, it is necessary to have a t-test. In the Kiss and Ride variables of the calculation results obtained a t-count of 3.377 so therefore  $t = 3.377 > t\text{-table} = 2.045$  at significance level  $\alpha = 0.05$ . Thus the regression equation has been presented, Kiss and Ride ( $X_1$ ) has a significant relationship with the private transport (Y).

Park and Ride on the variables of the calculation results obtained a t-count of 2.097 so therefore  $t = 2.097 > t\text{-table} = 2.045$  at significance level  $\alpha = 0.05$ . Thus the regression equation presented Park and Ride ( $X_2$ ) has a significant relationship with Private Transport (Y).

While the calculation of multiple correlation between variables Kiss and Ride ( $X_1$ ) Park and Ride ( $X_2$ ) and Public Transport ( $X_3$ ) with Private Transport (Y), produced multiple correlation coefficient  $r_{yX_1X_2X_3}$  by 0.841. Furthermore, the calculation of the multiple correlation coefficients are summarized in the following table.

**Tabel 5: Summary Correlation X1, X2 and X3 with Y**

Model	R <sub>yX<sub>1</sub> X<sub>2</sub> X<sub>3</sub></sub>	r <sup>2</sup>	Adjusted r <sup>2</sup>	Std. Error of the Estimate
1	0.841(a)	0.707	0.673	98.51598

The coefficient of determination  $r^2$  obtained from calculations with SPSS (Statistical Software for Social Science) obtained coefficient of determination for 0.707. This illustrates that the rise and fall of the conditions Kiss and Ride, Park and Ride and Public Transport affect the rise and fall of 70.7% Private Transport together.

With the analysis of the scores Kiss and Ride, Park and Ride and Public Transport scores together can predict the score of Private Transport by 70.7% while the remaining 29.3% is influenced by other variables that are not tested in this study.

Based on the collected data Private Transport variables obtained the lowest score of 367 and the highest score of 967. Price scores average to 742.7 Private Transport while the average price was 785. The score indicates that the average value of Private Transport was above average. Based on these scores it can be said that the number of private transport is relatively high.

From this study can be understood that there is a significant effect of the Kiss and Ride to Private Transport, there is a significant effect between the Park and Ride and Private Transport and there is a significant effect between Public Transport to Private Transport the fourth significant relationship exists between the Kiss and Ride, Park and Ride and the Public Transport together and Private Transport.

In the first test of the hypothesis the independent variables tested the *Kiss and Ride* ( $X_1$ ) with the dependent variable *Private Transport* (Y), the test results show that *Kiss and Ride* turned out to have significant impact on private transport. This was proved by the results of the t-test where a t-count of 3.377 is greater than the t-table 2.045 at significance level  $\alpha = 0.05$ . The test results proved that *Kiss and Ride* has a significant effect on the Private Transport.

The value of the coefficient of determination  $r^2$  is equal to 0.393. This illustrates that the on-off of *Kiss and Ride* service will take effect for 39.3% of the on-off of private

## Nusraningrum & Isibhi

transport by the equation  $Y = 422.684 + 2.190 X_1$ . It also shows that the better the Kiss and Ride, the better the Private Transport (can be reduced).

The second hypothesis of the independent variables tested the *Park and Ride* ( $X_2$ ) with private transport dependent variable (Y), the test results indicate that *Park and Ride* has a significant effect on the number of private transport.

This is evidenced by the results of the t-test where a t-count of 2.907 was greater than 2.045 t-table at significance level  $\alpha = 0.05$ . The test results proved that the Park and Ride has a significant influence on the amount of the decrease in Private Transport.

The value of the coefficient of determination  $r^2$  is equal to 0.643. This illustrates that the on-off of the application of Park and Ride will take effect for 64.3% of the on-off of Private Transport by the equation  $Y = -2.098 + 1.500 X_2$ . It also shows that the better the implementation of Park and Ride, the better the reduction in the number of Private Transport.

The third hypothesis of the independent variables were tested, namely Public Transport ( $X_3$ ) with Private Transport dependent variable (Y), the test results apparently showed that Public Transport has a significant effect on the number of Private Transport. This is evidenced by the results of the t-test where a t-count of 2.539 was greater than 2.045 t-table at significance level  $\alpha = 0.05$ . The test results proved that the Public Transport has a significant effect on the decline in the number of Private Transport.

The value of the coefficient of determination  $r^2$  is equal to 0.643. This illustrates that the on-off of the Public Transport services will take effect for 64.3% of the on-off of the number of the Private Transport users through the equation  $Y = -2.098 + 13.086 X_3$ . It also shows that the better the Public Transport service, the better the decline in the number of users of Private Transport.

In the fourth hypothesis testing relationships between variables Kiss and Ride ( $X_1$ ), Park and Ride ( $X_2$ ) and Public transport ( $X_3$ ) together with Private Transport dependent variable (Y), was Kiss and Ride, Park and Ride and Public Transport together have a significant amount in the decline in the Private Transport. This is evidenced by the correlation between the Kiss and Ride, Park and Ride and Public Transport with Private Transport together they produce F count = 20,872 > F table = 2.98 at significance level  $\alpha = 0.01$  and F count = 20,872 > F table = 4.64 at significance level  $\alpha = 0.05$  with a regression equation as follows:

$$Y = -150.787 + 1.636 X_1 + 9.303 X_2 + 5.582 X_3$$

Based on these equations, it shows that Kiss and Ride, Park and Ride and the Public Transport have positive effect on decreasing the number of Private Transport. Of the three independent variables, the variables Park and Ride and Public Transport are the independent variables which show the most dominant influence on the decrease in private vehicle users. With the analysis of the scores Kiss and Ride, Park and Ride and Public Transport scores together can predict the score of Private Transport by 70.7% while the remaining 29.3% is influenced by other variables not examined in this study.

## Nusraningrum & Isibhi

1. Based on the coefficient of determination  $r^2$  of 0.393 which illustrates that the on-off of the Kiss and Ride service is influential for 39.3% of the on-off of the use of Private Transport, through the equation  $Y = 422.684 + 2.190 X_1$ . This means better Kiss and Ride service, decreases private vehicle users. Thus, the Kiss and Ride is considered as one of the important factors in addition to other factors that must be considered in increasing the decline in Private Transport users.
2. Based on the statistical analysis of the value of the product moment correlation stated  $ryx_2 = 0.634$ , there is a positive and significant correlation between the Park and Ride and the Private Transport. When viewed from the coefficient of determination  $r^2$  for 0.643 which illustrates that the on-off of Park and Ride is affected by the on-off of the 64.3% reduction in Private Transport users through the equation  $Y = -2098 + 1500 X_2$ . This means that the better the implementation of Park and Ride, the higher the decrease in the use of Private Transport. Thus, the Park and Ride is considered as one of the important factors in addition to other factors that must be considered in increasing the decline in Private Transport users.
3. The statistical analysis of the value of the product moment correlation stated  $ryx_3 = 23,369$ , there is a positive and significant correlation between the Public Transport and the Private Transport. When viewed from the coefficient of determination  $r^2$  for 0.643, it illustrates that the on-off of users affected by Public Transport is 64.3% of the on-off of private transport users decreased by the equation  $Y = -2098 + 13.086 X_3$ . This means the better the application of Public Transport services, the higher the decrease in the use of Private Transport. Public Transport is thus regarded as one of the important factors in addition to other factors that must be considered in increasing the decline in Private Transport users.
4. According to the statistical analysis of the value of the product moment correlation of  $ryx_1x_2x_3 = 0.707$ , it can be stated that there is a positive and significant relationship between Kiss and Ride, Park and Ride and the Public Transport together with the user of Private Transport. When viewed from the coefficient of determination  $r^2$  for 0.707 illustrates that the on-off of Kiss and Ride, Park and Ride and the Public Transport effect of 70.7% together against the on-off of the use of Private Transport through multiple regression equation  $Y = -150.787 + 1.363 X_1 + 9.303 X_2 + 5.582 X_3$ . This means that the better the Kiss and Ride, Park and Ride, the better the Public Transport services, the more it will decrease the Private Transport users. Thus Kiss and Ride, Park and Ride and the Public Transport service are important to note to increase the decline in Private Transport users.

## 5. Summary and Conclusions

From the analysis in this study, a conclusion can be drawn that the decline in private transport users can be increased by improving services of Kiss and Ride, Park and Ride, and Public Transport.

The formulation of the implications of this study emphasize on service efforts Kiss and Ride, Park and Ride services and improved Public Transport services so that reduction can increase the number of Private Transport users well. Development services Kiss and Ride, Park and Ride and Improved Public Transport services are key in reducing the number of Private Transport users. Therefore, the parties to the policy makers in the field of urban transport services need to be aware of the public transport service

## Nusraningrum & Isibhi

user's needs, so that efforts can be improved in order to reduce private transport users. The decline in private transport users does not involve just one factor, but many factors. But among these factors in the context of this study, the service factor Kiss and Ride, Park and Ride and the Public Transport Service are all factors studied. Therefore, efforts to reduce private transport can be made by the three factors.

The development efforts and the increase of Kiss and Ride services will decrease the number of Private Transport users. The results of the analysis and conclusions of the study state that there is a positive and significant correlation between the decrease in Kiss and Ride and Private Transport. This gives the sense that the Kiss and Ride service will increase the decrease in the number of Private Transport users. Therefore, the improvement and development of Kiss and Ride service are also an attempt to lower private transport users. Based on these results Kiss and Ride is an important factor in increasing the decline in Private Transport users this is a factor in reducing Private Transport, operating on the main road during rush hours.

Efforts to develop and increase the Park and Ride services reduce the number of Private Transport users. The results of the analysis and conclusions of the study states that there is a positive and significant correlation between the Park and Ride and the Private Transport. This gives the sense that an increase in Park and Ride service will increase the decline in Private Transport users. Therefore, the improvement and development of Park and Ride service is also an effort to reduce the use of Private Transport. Based on these results Park and Ride is an important factor in increasing the decline in the use of Private Transport. Park and Ride is one of the prerequisites for the decline in the use of private transport in increasing the number of transport smoothly, effectively and efficiently.

Improving Public Transport services reduces the number of Private Transport users. The results of the analysis and conclusions of the study states that there is a positive and significant relationship between Public Transport and Private Transport. This gives the sense that an increase in Public Transport services will increase the decline of Private Transport users. Therefore, the improvement and development of Public Transport services is an effort to reduce the use of Private Transport. Based on these results Public transportation is an important factor in increasing the decline in the use of private transport. Public transport is always used, and therefore the increase in public transport services should be at the right level in order to reduce the use of private transport.

Efforts to increase the Kiss and Ride, Park and Ride and the Public Transport together in order to improve the decrease of the use of Private Transport stated that there are positive and significant results among the Kiss and Ride, Park and Ride and Public Transport are jointly equal to Private Transport. This gives a sense that the promotion and development of Kiss and Ride, Park and Ride and the Public Transport jointly will be able to reduce the use of Private Transport. Therefore, the development efforts of Kiss and Ride, park and Ride and Improved Public Transport Services together are also an effort to reduce the use of Private Transport.

Based on the research that has been concluded, and the implications outlined above, it may be submitted on the following research: 1. The government should carry out the construction and development services Kiss and Ride, Park and Ride and improvement of Public Transport services in order to reduce the use of Private

## Nusraningrum & Isibhi

Transport and in order to reduce the volume of vehicles on the highway, it has not only impact on the highway congestion but also reducing exhaust gas emissions. 2. The government should provide facilities for users of Private Transport to park in the outskirts of the city so private transport users can park safely and can continue their journey by public transport. 3. The government needs to develop policies in barring the use of Private Transport in order to anticipate worse congestion. 4. It is recommended to other researchers to conduct more specific and technical factors that can affect the decreased use of private transport, especially in Jakarta.

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