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SUPPORTING FACTORS AND FACTORY EMPLOYEE'S BEHAVIOUR IN THE USE OF PUBLIC TRANSPORTATION MODE IN JAKARTA

Summary. The tendency for people in Jakarta to use public transportation is still relatively low. A study from Jabodetabek Transportation Management Agency shows that only 24 percent of road users chose public land transportation modes (Transjakarta bus and train) from a total of 47.5 million trips in Jabodetabek by 2015. Public transportation trips in Jabodetabek are all people's journeys or the journey to employee work destination located in buffer towns around Jakarta. Employees are among the elements of society that use public transportation. The economic conditions of factory employees that encourage them to work overtime cause differences in attitudes between factory employees and office employees toward using public transportation modes. This study aims to determine the factors that encourage factory employees to choose the mode of transportation to the workplace and analyze their attitude toward using public transportation mode. The results show that the number of factory employees who prefer public transportation mode is still little. However, their potential to move into public transportation is substantial due to the belief in the commitment of the Jakarta government to fixing the public transportation system. Most factory employees also agree that public transport can reduce congestion in Jakarta. There is a need to apply a strategy of the transit development (TOD) to reach public places and places of work.

1. INTRODUCTION

Traffic congestion is one of the factors causing decrease in the quality of the community's life [1]. Congestion occurs because the number of public transportation modes available cannot keep up with the increasing needs of the community [2]. This ultimately impedes sustainable development objectives due to increased travel costs and worsening air quality [1-3].

Congestion has become a problem for all major cities in the world, even developed countries cannot avoid. The Dutch government also issued a policy to provide incentives for private transport riders who can reduce the frequency of their travel during rush hours [4]. Congestion during peak hours impacts climate change and the sustainability of urban development due to pollution generated [5]. The capital of Asian countries is experiencing severe traffic congestion problems during work hours due to the number of private car users [6]. The issue of congestion in major cities in developing countries is much more severe [7]. Public transportation mode has been agreed as a solution to cope with traffic jams. However, public awareness is needed to promote the usage of public transportation than private transportation [8].

Jakarta is one of the cities in Asia with a high level of congestion [6]. Indonesian government has made various efforts to overcome traffic congestion in Jakarta. These efforts are realized both in the

forms of increasing the number of public transportation modes and the making of policies that encourage Jakarta’s people to choose public transportation modes than private transportation. One example is by increasing the number of bus rapid transfers (Transjakarta buses) and commuter trains [9]. Facilities and infrastructure for fast trains are under construction to facilitate and speed up the travel from Jakarta to provincial capitals [10].

The problems that occur in big cities are many urban people who are not interested in using public transportation modes, including Jakarta’s people [3]. The number of public transport users in Jakarta has been declining year by year [18]. Variation in the number of Transjakarta bus and train passengers in Jakarta from 2011 to 2015 can be seen in Fig. 1. In contrast to the decreasing number of public transport passengers in Jakarta, the number of private transportation modes in Jakarta has increased. Variation in the number of motorcycles and private cars in Jakarta from 2011 to 2015 can be seen in Fig. 2.

Number of Transjakarta and train passengers in Jakarta

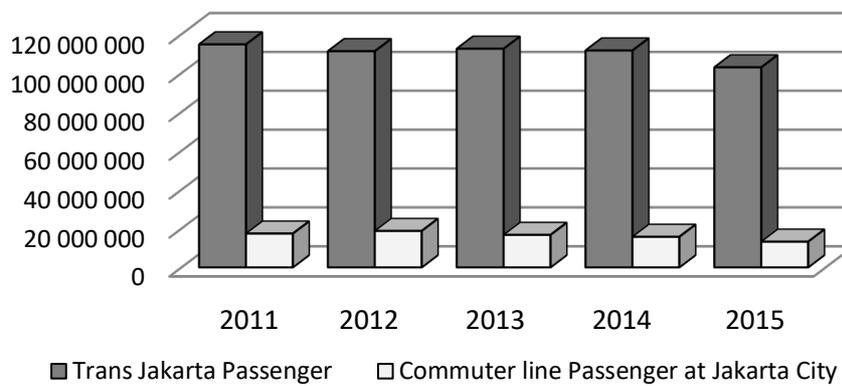


Fig. 1. Number of Transjakarta and train passenger in Jakarta

Number of motorcycles and private cars in Jakarta

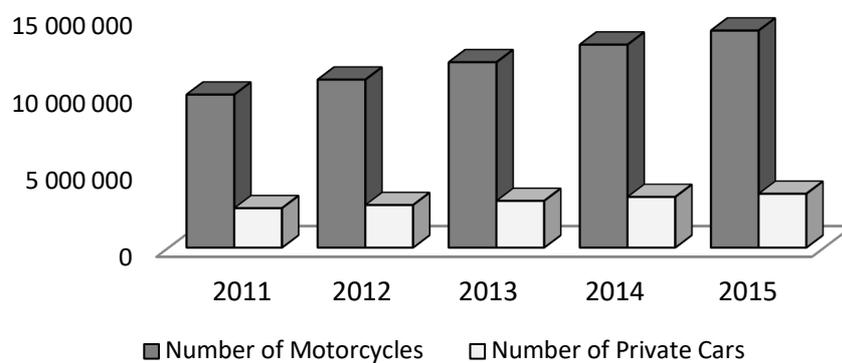


Fig. 2. Number of motorcycles and private cars in Jakarta

Government’s efforts that are not balanced by public awareness in the use of public transport cause various losses. Increased congestion becomes a direct loss. Besides, government revenue through public transport services is decreasing. Revenue from the use of Transjakarta buses has decreased by Rp 44,366,987,500.00 during five years (2011–2015) [18].

The discomfort in using public transportation causes the difficulty for people and encourages them to switch from private vehicles to public transportation. A study conducted in Shanghai and Chengdu shows that several factors make people uninterested in using public transportation, such as the waiting time for public transport, ticket prices, and inadequate public transport capacity. [8]

The use of public transportation in Jakarta is still relatively low. On the basis of the results of the Jabodetabek Transportation Management Agency study, of the total 47.5 million trips in Jabodetabek (Jakarta, Bogor, Depok, Tangerang, and Bekasi) in 2015, only 24 percent of road users decided to use public transportation modes, such as Transjakarta buses and/or commuter trains [11]. Public transportation trips in Jabodetabek include journeys of people and employees to buffer towns around Jakarta.

The journey of residents in Jakarta becomes one of the disadvantageous because of the constant congestion. Jakarta residents allocate more time for travel, both for daily activities (e.g. work and school) and for occasional activities (e.g. vacation). The average time contributed by Jakarta resident to the trips is approximately 82.31 minutes per day [13]. Surveys show that students and staffs in Jakarta move more frequently than other people in communities, i.e., students take as many as 2.32 trips and employees 2.28 trips per day [14].

Indonesia is a country with a sufficient labor force. This reason has led to the development of many industries and factories in Indonesia [15]. The state's condition with abundant labor causes no significant increases in the wages of factory employees [15]. Unreasonable factory employee wages cause these employees to rely on overtime pay to earn extra income.

Factory employees have an exchange or shift working system. The condition of factory employees working in shift and overtime is different from that of office employees [16]. Office employees in Jakarta usually work on fixed locations and work schedules. They leave for work every morning and come back home in the evening [13].

Work environment affects the employee attitudes [25-26]. The decision of employees to move from the use of private transportation to public transportation can make it easier for the government to cope with congestion in a city [12].

This study aims to determine the factors affecting factory employees' choice of transportation modes for travelling to work and vice versa and to analyze their attitude towards the use of public transportation modes. The purpose behind the use of public transport modes in this study is limited to its application to move from the employee's residence to the work site and vice versa.

2. METHODS

The research was conducted in November 2017 in an oil palm industry located in the international port area of Tanjung Priok, Jakarta. Respondents in this study were determined based on purposive sampling, i.e., employees who work in the production department.

The production department was chosen based on the consideration that employees in the unit had the most number of overtime hours each week compared to the employees of other departments. Employees who worked in the production department numbered to be 121 people, consisting of 101 employees who worked in shifts and 20 employees as part of the administration.

Data were collected in two stages. The first stage was data collection through a group discussion (Forum Group Discussion) with five employees from the production department who served as the head section. The group discussed on factors that encourage production employees to use public transport, factors that promote the usage of private transportation, and the type of public transport preferred by the employees. The results of this group discussion were then used in the second stage of data collection. In the second stage of data collection, questionnaires were distributed to 121 employees. In the first section, respondents chose one of the available options on factors that encourage production employees to use public transport, the factors that encourage employees to use private transportation, and the type of public transport preferred by production employees.

The second part of the questionnaire contained five questions about employee attitudes determined using a Likert scale. The items asked in the second part of the questionnaire were:

1. I prefer to use public transportation rather than private transportation.
2. My family often uses public transportation.
3. The choice of public transportation in Jakarta is quite a lot.
4. I am convinced by the government's seriousness in fixing the public transportation system in Jakarta.
5. I think the existence of public transportation will reduce congestion in Jakarta.

3. BACKGROUND THEORY

One of the most significant environmental domains that contribute to climate change is the more sustainable use of private vehicles [30]. The use of private transport contributes to environmental pollution, decreased air quality, greenhouse gas emissions, and fossil fuel consumption, than the most appropriate alternative of public transport [30].

Transportation nowadays is a fundamental necessity for people, especially people living in urban areas [27]. Transportation can be divided into two parts: private and public transportations. Private transportation is a tool used to help the mobility of only users, whereas public transportation is a mode used to support the human movement and is very important for the country because it reflects the economic equality and social life of its citizens [28].

In general, cars are the most attractive mode of transportation. Comfort, speed, and individual freedom are well-known advantages [31-33]. This means that public transport needs to adapt to various attributes and services required by consumers to be more attractive and influence capital shifts [34]. Service's quality is an important determinant for road users [35]. It can be used to improve the use of public transport and the sensitivity of the average public transport tariff and service mileage which may be used to predict the use of public transport in the area [36].

People need public transportation to help facilitate daily activities. The choice of this transportation mode is influenced by the factors such as which route is the shortest, the fastest, and the cheapest [29]. To measure the public transport facility services is must because the lack of service can impact the welfare of the community. The welfare of the population means providing equal opportunity across the society (rich and poor) to enjoy effective traveling.

The quality of public transport depends on several service (attribute) factors: some are quantitative (e.g., average travel time and reliability, transit timeout, and monetary costs), whereas others are qualitative, which impact user behavior more (e.g., ride comfort, information, and personal security). A study by the Department of Transportation, Regional and Local Government [37] in the UK shows that convenience, flexibility, and proximity are among the leading factors underlying transportation mode choices. Other studies based on consumer segmentation also indicate that the selection of the mode of transportation is governed by four factors: travel costs, services provided (reliability and comfort), duration of travel (travel time and waiting time), and the availability of vehicles [38-39]. Additionally, habitual factors have been found to be very important for the identification of behavior performed on a regular basis, including pro-environment behavior [40] and the choice of transportation mode [41, 42]. With the lack of proper transportation services available to all classes, especially to the middle and lower classes, an opinion is generated that the transportation system policy tends to be more favorable to certain classes, especially to private vehicle users, mostly from middle and upper classes [21].

Whereas in Latin America has a different spatial arrangement resulting in geographical differences and social status. Therefore, an assessment of the quality of service provided by public transport is assumed to satisfy the needs of all people in Latin America. Improvements in the quality of public transport services are described. Proper service or reduction in travel time may improve the quality of work in the long run [19].

Public transport in London (UK) plays an essential role in facilitating access to the workplace for workers but the impact is not too significant. There is a significant and negative relationship between the travel time of public transport and employment, which varies depending on the urban type. Large

urban areas have a great relationship value because they have more excellent transport links and higher utilization [20].

Some of these studies outline that the main problem lies in the management of services in public transport, where the level of service is determined by government policy. There are several other factors mentioned that affect one's attitude toward using public transportation. The number and condition of public vehicles affect one's opinion on using public transportation [21]. Due to increasing congestion, especially in big cities that make the travel time comparatively longer, people prefer convenient and safe transportation. Beside congestion, a surge of passengers at the busy hour, increased number personal vehicle on roads, and the absence of schedule certainty also affect one's attitude toward choosing the type of transport [22]. However, lately, there is a perception that public transport provides no or less security, affordability, and convenience. The growth of this perception leads public transport to incur high social and economic costs [24]. However, some studies are also not able to reveal the factors that affect the attitude of choosing the mode of transportation. There is custom behavior behind the choice of transport modes regarding scripts [43]. Script action is often difficult to solve, even in life-threatening conditions [44]. This is unlikely to appeal to moral norms or information about the environment will have a significant impact on people's behavior. The results of this study indicate that along with the difficulty of solving established scripts, to change habits, it may first need to expose people to alternative behavior.

Infrastructure development can also motivate a person to switch from public transport to private transportation. Lack of availability of public transport service in the areas with new roads or lack of availability of feeder transportation leading to the main line of public transport services encourages the choice of private transportation more and makes it more convenient choice than public transport [25]. The high value of a region such as the high price of land in the city center discourages urban settlement, which is also considered as one of the reasons behind the selection of private transportation, especially if the public transport service network is not available in the region [25].

In Jabodetabek, especially DKI Jakarta, public perception toward public transportation condition is neutral. It is not particularly judged as good or bad. Because of this particular reason, people tend to use private vehicles rather than using public transportation [23].

One method of developing improved public transportation facilities is the introduction of real-time transport information system. The real-time transport information system is a tool that provides information about vehicle arrival time, service availability updates, current traffic flows, alternative modes of transportation, and the current weather. This transport information system can be either digital (mobile transport applications) or non-digital (billboards).

The provision of real-time information can attract the attention of passengers, increase the revenue of managers, and obtain a positive image of the public transportation system. The public likes a clear information on the arrival time of vehicle, predicted travel time, etc. Real-time information systems can encourage people to prefer public transportation mode rather than private transportation [26]. The appearance of well-organized transport information can provide precise and reliable information that can satisfy the users of public transport services.

4. RESULTS

The first stage of data collection through group discussion with five heads of the section resulted in three factors that encourage employees to use private transportation, three factors that can help employees to use public transportation and four types of public transportation modes of interest by production employees.

Factors that encourage employees to use private transportation include cheaper travel costs and the less estimated time from the place of origin to the destination, which is more appropriate and easier to reach without having to transit or walk first.

Factors that encourage employees to use public transportation include cheaper travel costs, the interaction with fellow passengers, and comfort during the trip.

The types of public transportation that employees of production department are interested in are commuter trains, Transjakarta buses, and public transport online.

The second stage of data collection was carried out by distributing questionnaires to the employees of the production plant. The total employee numbered to be 121 people, and the number of questionnaires filled and returned to researchers was 115.

On the basis of the results of the questionnaire, it was found that 27, 29, 33, 15, and 11 employees had travelling distance of <2 km, 2–5 km, 6–15 km, 16–30 km, and >30 km, respectively. In addition, 9, 33, 43, 26, and 4 employees worked for 0 hours, 1–4 hours, 5–8 hours, 9–16 hours, and >16 consecutive hours each week.

The first part questionnaire asked about the driving factors in using different modes of transportations and the type of public transportation in demand. The results of this questionnaire can be seen in Figs. 3, 4, and 5. Employees using personal transport consider it because of the two main reasons, namely, it reduced transit or walking distance (50%) and produced more appropriate estimated time of travelling (45%). Only 5% employees thought about low costs. This situation explains that personal transport will produce higher costs than public transport.

Advantages of Using Personal Transport

■ Low Cost ■ More Appropriate estimate time ■ Without transit or walking



Fig. 3. Advantages of using personal transport

Advantages of Using Public Transportation

■ Low Cost ■ Interaction with passengers ■ Convenience

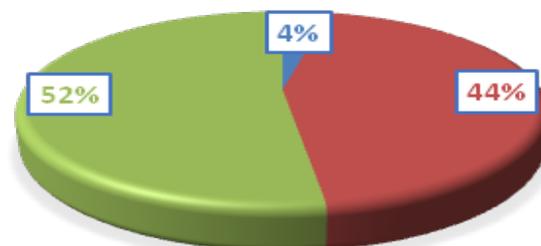


Fig. 4. Advantages of using public transport

The main reasons for employees behind choosing public transportation were related to convenience (52%) and interaction with other passengers (44%). Only 4% of employees considered low costs for daily activities.

The types of public transportations that were preferred by employees were online public transportation (48%) and commuter lines (37%). However, only 15% employees chose Transjakarta

Bus service. Online public transport is currently the main choice for employees to reach offices from the commuter line transit point.

The results of the second part questionnaire show about employee attitude in the use of public transportation mode. The results of this questionnaire can be seen in Figs. 6–10.

Type of Preferred Public Transportation

■ Commuter Line ■ Transjakarta Bus ■ Online Public Transportation



Fig. 5. Types of preferred public transportation

I Preferred to use the public transportation than private transportation

■ Not Agree ■ Less Agree ■ Agree ■ Very Agree

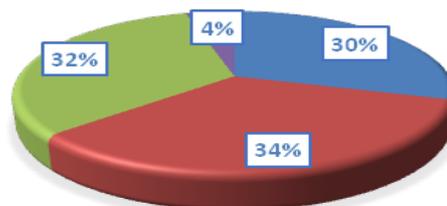


Fig. 6. Employees preferred to use public transportation than private transportation

Employees seemed uninterested in choosing public transportation. We can observe this from Figure 6, which shows that only 32% and 34% of employees agreed and less agreed to use public transport, whereas 30% employees did not agree. However, employees very much agreeing were only 4%. In this case, there is not much difference between employees who agree and disagree, and still there are employees who have benefited from using public transportation and who still choose private transportation.

In my opinion, there are many options for public transportation in Jakarta

■ Not Agree ■ Less Agree ■ Agree ■ Very Agree

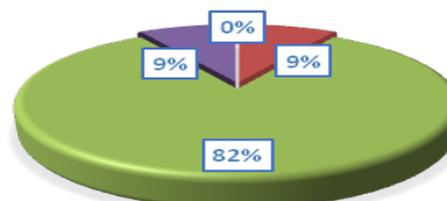


Fig. 7. Employees' opinions about options for public transportation in Jakarta

The employee's opinion about the availability of many options of public transportation in Jakarta was very strong, as 82% agreed. Only 9% of answers were very agreeing and less agreeing, whereas none of the employees disagreed, 0%. Employees believed that public transportation in Jakarta is varied and can be used in daily life.

The employee's opinion about their family preferences was also very strong as 46% agreed to the preferred use of public transportation. In addition, 22% and 21% of employees answered as very agree and less agree, respectively, whereas only 11% of employees disagreed. These results are different from the attitude of employees who go to the office in or prefer the use of private transportation. Hence, employees' families preferred public transportation compared to private transportation.

My family prefer to use public transportation than private transportation

■ NotAgree ■ LessAgree ■ Agree ■ VeryAgree

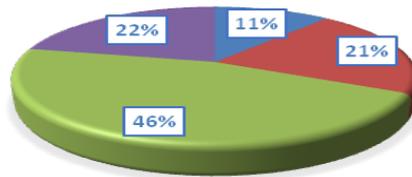


Fig. 8. Employees’ opinions about their family consideration to use public transportation

I convinced on the government's sincerity in fixing the public transportation system

■ NotAgree ■ LessAgree ■ Agree ■ VeryAgree

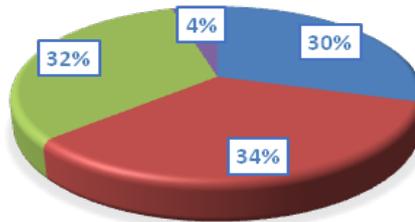


Fig. 9. Employee trust related to the government's commitment in fixing the public transportation system

Most employees answered as less agree (34%) and agree (32%) to the government commitment in fixing the public transportation system, whereas employees who disagreed were 30%. Employees who answered as very agree were only 4%. This case explains that the percentage of employees who trust and who do not trust in the government commitment in fixing the public transportation system is almost balanced.

I think the existence of public transportation will reduce congestion in Jakarta

■ NotAgree ■ LessAgree ■ Agree ■ VeryAgree

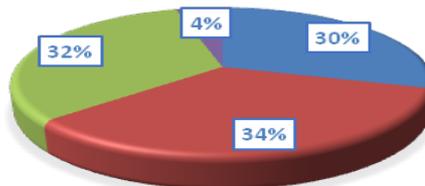


Fig. 10. Employees’ opinions about the existence of public transportation will reduce congestion in Jakarta

The employee's opinion on will the existence of public transportation reduce congestion in Jakarta spreads evenly as 34% answered as less agree, 32% as agree, and 30% as not agree. Employees who answered as very agree were only 4%. This result explains that employees who agreed and who did

not agree with the statement that the existence of public transportation will reduce congestion in Jakarta are almost balanced.

All employees with <2 km travelling distance choose public online transport as a preferred type of public transportation, and the reason behind using private transportation is to travel without having to transit or walk. Three out of 27 employees with <2 km travelling distance choose public transportation because of convenience, whereas the rest enjoy interaction with fellow passengers.

All employees with >30 km travelling distance choose private transportation because of convenience. Among employees with >30 km travelling distance, 1 out of 11 choose private transportation because of the low cost, whereas the rest of the preferences are based on a more precise time estimation. Among employees with >30 km travelling distance, 1 out of 11 chooses Transjakarta bus service as the preferred type of public transportation, whereas the rest prefer commuter trains.

The results related to questionnaires on driving factors in using different modes of transportation and the type of public transportation of interest are based on distance of working site and the total number of overtime hours, as shown in Fig. 11.

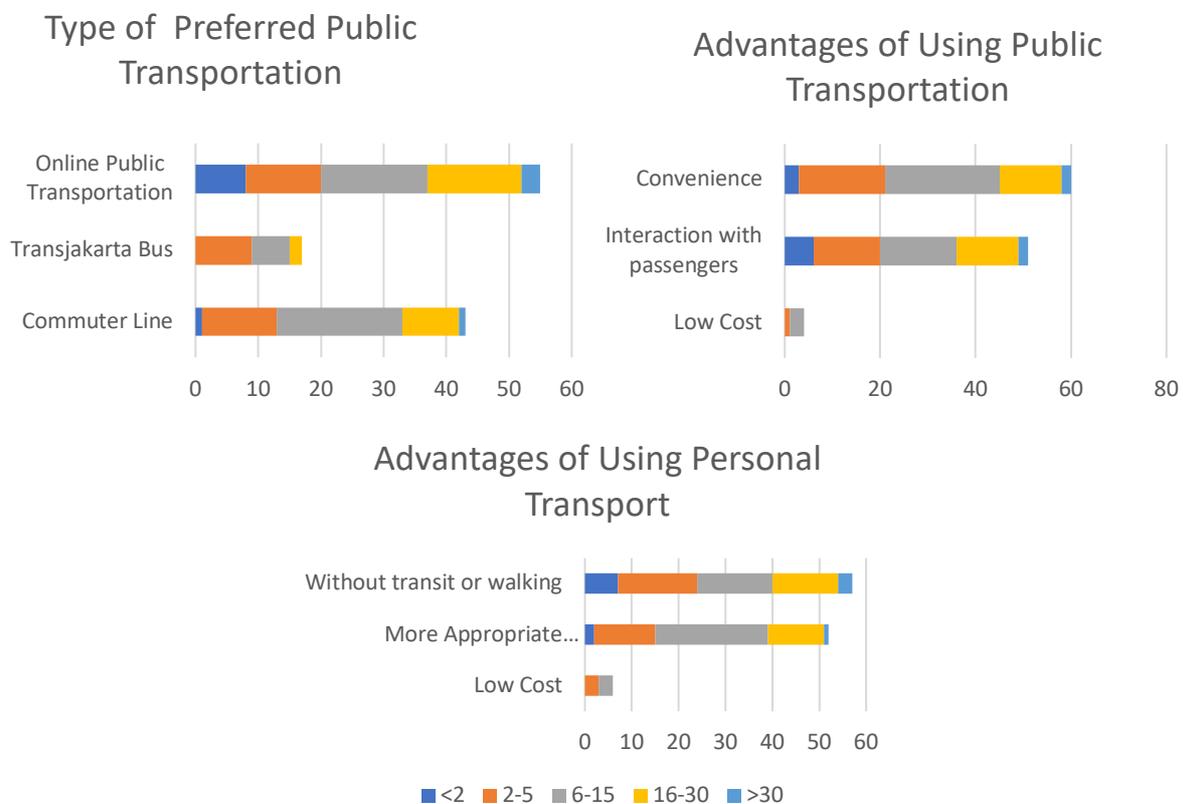


Fig. 11. Factors that drive the use of different transport modes and the type of public transport of interest based on overtime hours

5. DISCUSSION

A total of 57 respondents (49.6%) argued that the driving factor behind the use of private modes of transportation is that they do not have transit or walk from the mode of transportation to the workplace. This is either due to inadequate proper infrastructure for pedestrians or the nature of the pedestrian itself [17].

A total of 52 respondents (45.2%) argued that by using private transportation, the estimated travel time from home to work and vice versa is more appropriate. This fact is closely related to the congestion factor. Due to congestion, employees take longer time to travel than the actual time during the trip from home to work and vice versa [13]. The use of private vehicles causes employees to

manage their own travelling time, whereas the use of public transport mode includes waiting time and the time taken to transit or walk, which cannot be accurately determined [8].

Convenience is the driving factor behind the use of public transportation as answered by the most respondents, 60 respondents (52.2%). This result is in contrast to studies conducted in Shanghai and Chengdu, which reported that public discomfort is the main reason inhibiting people from switching from private transportation to public transportation [8]. It also proves that the government of Jakarta succeeded in increasing the convenience of using public transportation. However, it remains incapable of completely changing employee attitudes in choosing the modes of transportation they use.

Interaction with passengers became the second strong driving factor behind the use of public transport (44.3%). It is unique and can be characterized in Indonesia. Indonesian people are familiar with the speech and share the same culture, providing a strong foundation for interacting with other passengers while using public transport. This driving factor is a distinct advantage observed in Indonesia.

Only a few respondents choose the cost factor as the driving force. Only six respondents (5.22%) said private transportation is less costly, whereas only four respondents (3.48%) reported public transportation is less costly. This report suggested that costs are not a significant factor in the selection of different transport modes by employees. The results of this study also contradict with the research conducted in Shanghai and Chengdu where the price of public transport tickets became one of the obstacles causing people in the city to not to choose public transports [8].

The most popular type of public transportation was online public transport (47.8%). The commuter train became the second most popular public transport (43 respondents), whereas the Transjakarta bus was the least desirable (17 respondents). These results explain that transit is not necessarily one of the drivers behind private transportation use. Although classified as public transportation, the online public transport does not make passenger transit and takes passengers directly to the intended location. This option can be a convincing reason why employees choose online public transport as the most popular type of public transport. Meanwhile, commuter trains increase transit time and estimated travel time compared to Transjakarta buses. This is in line with the theory that variations in travel time can be more important than the length of the trip itself [33-34].

The classification of employees based on the distance of the worksite further clarifies this description. Employees with a travelling distance of less than 5 km are likely to vote not having to transit or walk as the driving factor behind the use of personal transportation and interaction with fellow passengers as a driving factor behind using public transportation. These employees also tend to choose online public transport as the most popular type of transportation.

Employees with a travelling distance of more than 5 km are more likely to choose a more precise time estimate as a driving factor for using personal and leisure modes as a driving factor for using public transportation. The type of public transportation that is in demand by employees with a travelling distance of more than 5 km is the commuter train and online public transport. These things indicate that employees are interested in using public transportation because of the convenience of traveling from residence to work site and vice versa. However, a more precise time estimate ultimately leaves the employee with the option of using private transportation.

On the basis of the results of the questionnaires, 32.2% of respondents agreed to choose public transportation compared to private transportation, whereas 33.9% less agreed and 29.6% disagreed in this regard. A total of 46.1% and 21.7%, respectively, agreed and very agreed that their families prefer the use of public transport compared to private transportation. These results indicate that employees are more reluctant to use public transport than their family members. These results indirectly also suggest that the reluctance of employees in using public transport is not due to their families but derived from the employees' nature or the work environment. A total of 82.6% agreed that the number of public transportation modes in Jakarta is overwhelming. This indicates that the limited choice of public transportation in Jakarta is not the primary cause of employees reluctant to use public transportation.

About 53% agreed and 39.1% very agreed with the belief in the seriousness of the government in fixing the public transportation system. A total of 63.5% agreed that public transportation could reduce congestion in Jakarta. This is a very productive capital for the government of Jakarta. Employees have

indirectly demonstrated a supportive attitude and support the government to make public transportation the primary solution to reduce congestion in Jakarta. Governments can exploit this potentiality to continually strive to increase employee interest to move from private mode to public transportation mode.

6. CONCLUSION

In this study, factory employees tended to use private vehicles to reach their destinations in more precise time and without having to walk. Although some used public transport, the frequency of employees using public transport was very high especially for those with the travelling distance of <2 km with interaction with fellow passengers being a factor, and those with the travelling distance of 2–5 km were more influenced with the comfort factor.

The potential for the factory employees to move to public transportation mode is significantly high. This is reflected from the attitude of those who believe in the seriousness of the government in fixing the public transportation system. Most of the employees of this plant also agreed that public transportation can reduce congestion in Jakarta.

With this explanation, this research is expected to be a consideration for the government of Jakarta in designing the strategy of public transport facilities and services. Besides, the transit of development (TOD) strategy needs to be implemented to reach the different destinations, as it aims to pursue safe and comfortable public transport and have optimal operations and agile technical services and precise travel time; hence, factory employees can easily move from the use of private transportation to public transportation modes.

The existence of this type of online public transport has become one of the favored means of transportation by factory employees; however, its licensing issues are still in debate. Online public transport combined with public transport can potentially reduce congestion and, therefore, introducing TOD for connecting a particular destination to far destinations with public transportation access.

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