Discrepancy of Home-Based School Regulation in West Jakarta
Study Case of Student High School of 78 and 16

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Abstract—**The Local Government has been limiting prospective students by implementing home-based school regulations since 2013. The study highlights the spatial pattern of trip distribution of Student High School of 78 and 16 in which both are located near the west border of Jakarta as the impact of government regulation. Primary data were collected using questionnaires and GPS receiver used to capture the coordinate points of schools and students' home address. Secondary data included Administrative and Road Network Map. The methods applied involved Mapping Network Analysis and Statistical Cross Tabulation. Network analysis was performed to evaluate nearest school to student and a set of origin-destination (OD) matrix. Cross tabulation was applied to evaluate the frequency of student travel pattern. The analyses showed that Student High School of 78 trip distribution was widen and widespread than of Student High School 16.**

Keywords— **Spatial, Trip Distribution, Network Analysis, Travel Pattern, Student**

I. INTRODUCTION

Trip generation is a model for predicting the number of movement for a given purpose or land use system while the generated trip from each zone is then distributed to all other zones based on the choice of destination which is called as trip distribution [1]. In recent years, studies of student travel patterns have evolved. However studies on reviewing regional government regulation on school zoning is relatively limited.

Trip generation and distribution models are fundamental tools in the transport planning processes of urban and interurban areas [2]. Spatial pattern of student trip distribution is formed naturally. However, The Jakarta Region Local Government has limited prospective students by implementing home-based school regulations since 2013. School zoning aims to supporting active transportation, bringing the accessibility of student residence with educational facilities, taking into account the distance and travel time from home to school [3].

Sub-district administrative limitations have been enforced, however, it has also limited students residing in neighboring sub-districts with accessibility has the restriction to enroll in the desired school. SMAN 78 and SMAN 16 are located in Palmerah Sub-district with different prospective student passing grade. As a leading school, with curriculum semester credit system, SMAN 78 is able to attract students more than SMAN 16.

The study therefore highlights Student High School 78 and Student High School 16, hereinafter referred SHS 78 and SHS 16, especially on their spatial trip distribution as to check the level of effectiveness of 2016 Jakarta local government home-based school regulation.

A. A literature review on Trip Distribution

The literature has identified that there are three key causal factors in people's use of public transport in Indonesia: travel intention, family income level, private vehicle availability, land use at home, distance, long journey, travel mode, land use, and travel time [4]. Travel patterns considered based on the origin and purpose of travel and travel behavior that included mileage, mode, travel frequency, travel time and travel costs [5].

In 2013, Beassuow conducted a study of the relationship between school-location placement and distance of school to house trips undertaken in Flandria, Belgium. The research method was by measuring the spatial distribution of school sites based on the Euclidean distance method [6]. The results show that clustered cities do not affect the distance of home-school travel. In addition, the spatial distribution of primary schools in Flandria is closely related to the distribution of housing stock as well as non-spatial factors.

Meanwhile, Khalil undertook a study of the impact of urban form on the distance between settlements and educational centers affecting primary school students in choosing home-school transportation modes by using network analysis in Geographic Information System (GIS). Based on the criteria of diversity of socioeconomic status and urban form, the study was conducted at Lefler Middle School and Scott Middle School, Lincoln, Nebraska, USA [7]. Lefler Middle School is conveniently located close to the city center with a high form of road network connectivity and Scott Middle School is located in the

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urban fringe area. Survey analysis shows that 21.8% of students of Scott Middle School students are active in transportation while no students attend school at Lefler Middle School and only 6.7% of students are cycled.

Temporarily, College students are considered inclined to use a variety of modes of transportation, including active travel, which is more frequent than primary and secondary school students. Whalen used a case study of McMaster University, in Hamilton, Canada [8]. The multinomial logit method was used for the selection of modes consisting of many modes of transport. The results of this study indicate that the choice of modes of transportation is influenced by the combination of costs, individual attitudes, and environmental factors such as road density and sidewalks, especially that the travel time-campus factor affects the level of student satisfaction.

In addition, Yoppy examined the development of urban transport by measuring index walkability or transportation convenience index on foot in University of Indonesia area [9]. Field observation analysis on service level and pedestrian characteristics showed an average walking comfort index value of 32.5 with an A for service level.

Moreover, Rumanga in the Study of Vehicle Pull Model at Private Schools in Makassar Suburbs analyzed the volume of movement of vehicles going to school during school hours against the background of many introductory and student pickup modes has caused congestion problems, particularly during school hours because schools in general do not have a special place / line to lower and raise passengers, so that vehicle delivery and pick up students will not stop or park on the road and reduce road capacity [10]. This research used volume and mathematical analytic survey where there is a relationship between the independent variable and the dependent variable.

Furthermore, Mahmudah identified the origin and destination of student travel and built a trip generation model for students in Sleman District,Yogyakarta. Both in the form of trip generation model and trip attraction using data obtained through household interview survey (home interview survey) in District Seyegan, Tempel and Turi [11]. The model of trip generation generated in this research is spatial distribution of trip generation and the pull of movement and numerical model generated through data processing with SPSS program. The independent variable that influences the student's travel generation is the population, while the variable that influences the pull of movement is the number of students.

II. METHOD

With this background literature in mind, the study aim to address how school zoning could turn the student trip distribution pattern spatially by reviewing West Jakarta Local Government Regulation. Although there are 17 Public Senior High Schools located at west Jakarta, the students referred to this study were SHS of 78 and 16 with some characteristics. First, according to home-based school regulation, both schools should serve 90% of potential students residing in School Zonation that is Palmerah, Kebon Jeruk and Kembangan Sub districts. Whereas the remaining 10% of potential students residing outside the school zoning hereinafter referred Non-School Zonation, were still served. Second, the location of both schools were in Palmerah sub district that its accessibility was surrounded by freeway, arterial, collector, and local roads

The students mentioned were those who enrolled as X grade student registered on both schools 2016/2017 academic year administration book. Primary data was collected using questionnaire and GPS receiver used to capture the coordinate points of schools and students' address. Secondary data include Administrative and Road Network Map. The data analysis was carried out using Mapping Network Analysis and Cross Tabulation.
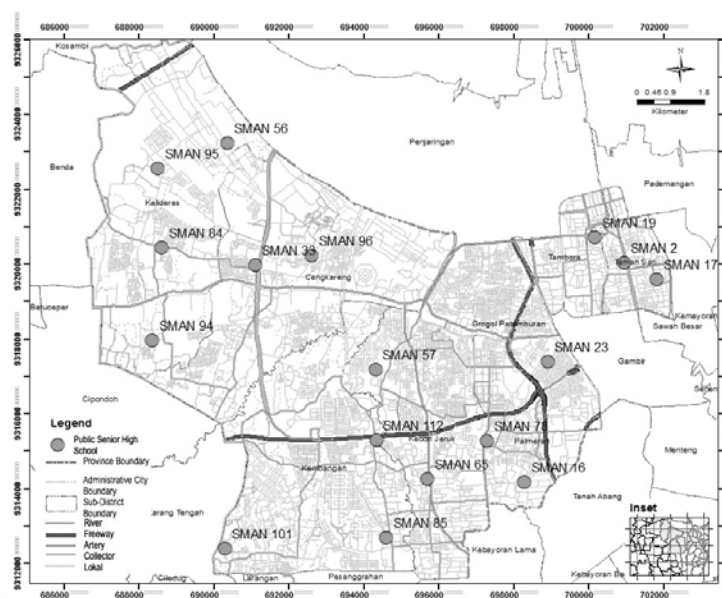
Picture 1. Public Senior High Schools located at West Jakarta
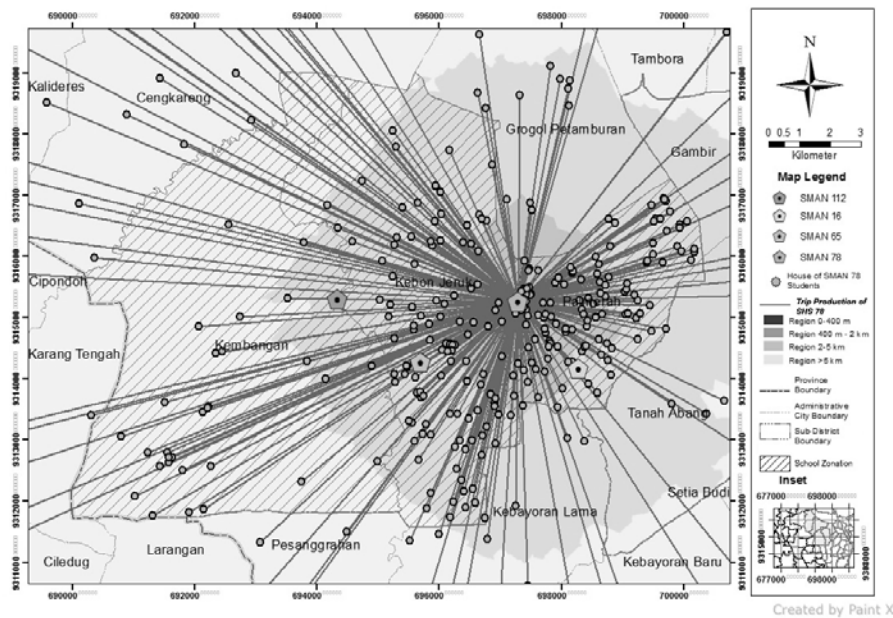
Picture 2. Spatial Trip Distribution of SMAN 78, West Jakarta.

Mapping network analysis was firstly conducted to show the school services area. The range of school services area in this study was divided by a distance of less than 400 m, 400 m-2 km, 2 km-5 km, and more than 5 km measured from each school as a central point.

The analysis then was used to perform the students' origin-destination movement. The movements were analyzed based on the center point of each school to students' residence. A number of points centered on the two schools would illustrate the conditions of SHS 78 and SHS 16 service coverage and represented its' trip distribution spatially.

Non-spatial student travel pattern characteristics considered the use of transportation modes, transportation costs and travel time. Factors influencing internal travel patterns such as sex-based differences, family economic background and a number of nuclear families used in this study.

Cross-tabulation analysis was used to see the characteristics of student travel pattern in each region 0-400m, 400m-2km, 2-5km and> 5km. Travel patterns included the use of transportation modes from home to school and from school back home, the tendency of student departure time, time to arrive at school, activity after completion of school learning that would be cross tabulated with school analysis unit and service area coverage.

III. RESULT AND DISCUSSION

The spatial trip distribution of SHS 78 is shown at Figure 1. As seen on the map that SMAN 78 is located at eastern part of west Jakarta near Jakarta-Banten Provincial border. SMAN 78 School Zonation was represented by shaded area thus those areas un-shaded represented as Non School Zonation administration. Nodes represented SHS 78 student address. The lines represented SHS 78 trip generation. These lines spread expansively. Nevertheless, the length of the lines had shown that the student origin-destination movements' distance was relatively stretched.

When it is associated with school service area coverage, the nature trip distribution of SHS 78 was equally expansionary diffusion far over than 5km. The movement of origin-destination SHS 78 in the region was more than 5 km reached 23% with the length of traction, which was very far beyond the boundary of the sub district zonation even beyond Jakarta-Banten provincial boundary. The diffusion concentrated on region 2km-5km, as there was 46% of movements came this area then followed by 5% of movements came from region 0-400m. This shows the school could attract more than student trip distribution from Non-School Zonation.

TABLE 1.
SHS 78 TRIP DISTRIBUTION BY SCHOOL ZONATION

School Zonation	Sub District	SHS 78
School Zonation	Kebon Jeruk	31%
School Zonation	Kembangan	8%
School Zonation	Palmerah	38%
Non Zonation 7		22%
Total		100%

Home-Based School regulation enacted to student enrolment academic year 2016/2017 had shifted trip distribution of SHS 78. Table 1 shows the regulation had encouraged student origin-destination movement, which came mostly from within school zonation. There was 8% of trip distribution of SHS 78 came from Kembangan then 31 % from Kebon Jeruk and 38% from Palmerah. The threshold limit stated in the technical guidance for the admission of potential student at academic year 2016/2017 was 10% of the total number of learners coming from Non School Zonation. But it turned out that SMAN 78 met overflow of serving Non School Zonation potential students with excess up to 12% of the terms imposed. It was

interesting to note that as a leading school, with curriculum semester credit system, SMAN 78 had been able to attract students across the boundary.

The spatial trip distribution of SHS 16 is shown at Figure 2. SMAN 16 School Zonation was represented by shaded area thus those areas un-shaded represented as Non School Zonation administration. Nodes represented SHS 16 student address. The lines represented SHS 16 trip generation.

These lines spread expansively but not even beyond its school zonation at the eastern part that is East Jakarta City Administrative. Nevertheless, there was a lack of SMAN 16 student origin-destination movement on the eastern part of its service area. Spatially, despite the distance and accessibility that was very close to SMAN 16 but the area was not part of West Jakarta School Zoning Regulation but Central Jakarta and South Jakarta Administration City.
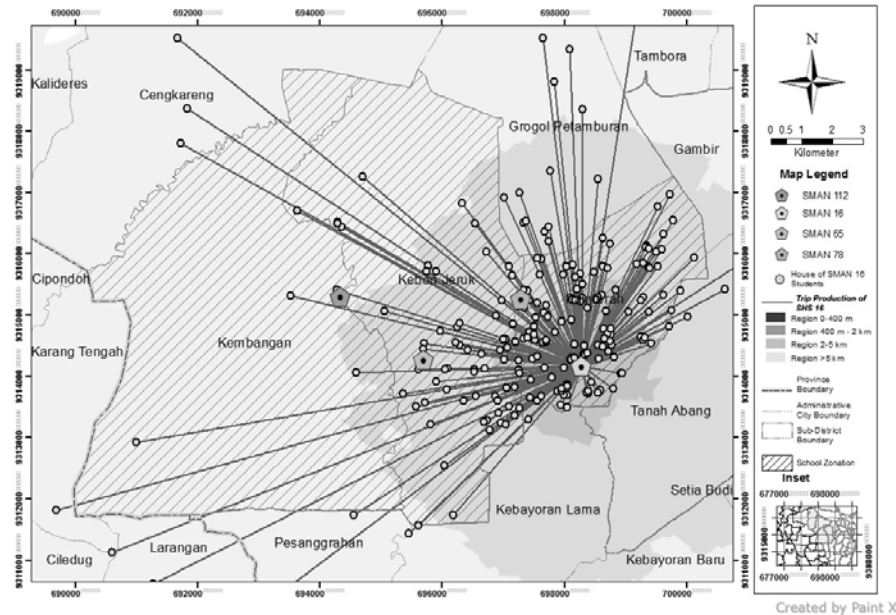
Picture 3. Spatial Trip Distribution of SHS 16, West Jakarta.

When it is associated with school service area coverage, the nature trip distribution of SHS 16 was equally expansionary diffusion. The movement of origin-destination SHS 16 in the region was more than 5 km reached only 10% with the length of traction, which was quite far beyond the boundary of the sub district zonation. The diffusion concentrated on region 2km-5km, as there was 45% of movements came this area then followed by 40% of movements came from region 400m-2km. Only 10% of movement came from area 0-400m.

Home-Based School regulation enacted to student enrolment academic year 2016/2017 had shifted trip distribution of SHS 16. Table 2 shows the regulation had encouraged student origin-destination movement, which came mostly from within school zonation. There was only 2% of trip distribution of SHS 78 came from Kembangan then 25 % from Kebon Jeruk and 38% of most movements came from Palmerah. SMAN 16 met overflow of serving Non School Zonation potential students with excess only 3% of the terms imposed.

This indicates that the 2016 PPDB zoning regulation has managed to restrict prospective learners from outside the zoning and impact on the spatial trip distribution pattern of SHS 16.

The student socio economic background at SHS 78 and SHS 16 is examined from several variables that are sex-based difference, family structure, and family-owned vehicles. Female students are majority in each region. The common family structure type for SMAN 78 and SMAN 16

students is nuclear family that consists of 4 to 5 members. Generally, the families residing in the 400m-2km area have two units of motorcycles while families residing in area 0-400m, 2km-5km, and> 5km have one. Ownership of cars in all regions is as much as one unit.

Most of students got their parents escorting (ride and drive) them to / from School around 06.15-06.30 AM. On the other hand, the return trip pattern is contrary to house to school trip. Transportation mode that is walking. Majority students residing in region 400m-2km, 2km-5km, and area > 5km choose to ride ojek online while Students residing at area 0-400m were choosing active transportation.

TABLE 2.
STUDENT TRIP DISTRIBUTION BY SCHOOL ZONATION

School Zonation	Sub District	SHS 16
School Zonation	Kebon Jeruk	25%
School Zonation	Kembangan	2%
School Zonation	Palmerah	60%
Non Zonation 7		13%
Total		100%

IV. CONCLUSION

As discuss above, several points are worth nothing. Firstly, The spatial trip distribution of SHS 78 and SHS 16 is expansionary diffusion. Secondly, based on regulation, each of SHS has a certain hinterland coverage area in terms of home-based school and the nature trip distribution is

shown from SHS 16. Beyond the regulation in fact, due to its attractiveness by favorite school, the trip distribution of SHS 78 even wider than normal expected. A particularly novel contribution of our research is that it has empirically demonstrated the school zooning for favorite school can't be restricted by regional regulation, as there is a disguise pattern of spatial distribution of SHS in West Jakarta. Lastly, student from home to school shows going pattern for both SHS is slightly different compared to student coming home pattern.

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