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HIGH SCHOOL ZONING POLICY IMPACT ON TRANSPORTATION IN BANDUNG CITY WEST JAWA PROVINCE

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ABSTRACT *The enactment of the zoning policy through the Minister of Education and Culture Regulation (Number 14/2018) concerning the Admission of New Students states that the admission priority would be given to those who live within the radius of the closest zone from the school. From a transportation perspective, this policy has a potential positive impact in creating a more balanced school trip distribution pattern, and would further reduce the total trip length and improve transportation performance. Taking Bandung City as a case, this study aims to evaluate the impact of the Penerimaan Peserta Didik Baru/PPDB (New Student Admission) based on zoning system policy on the travel distribution patterns of high school students in this city. The method used in this research is spatial distribution analysis and qualitative descriptive analysis. The research performs a before-after analysis of comparison to analyze the impact of the policy on schooling trip distribution. The results show that the zoning policy stimulates the total change of the average schooling trip length of high school students in Bandung by 35%. This research also concludes that the schooling trip distribution pattern is no longer centered in the city center where favorite schools were located.*

Keywords: *Government Policy, School Zoning, Bandung City Transportation.*

DAMPAK KEBIJAKAN ZONASI SEKOLAH TERHADAP TRANSPORTASI KOTA BANDUNG PROVINSI JAWA BARAT

ABSTRAK. Pemberlakuan kebijakan zonasi melalui Peraturan Menteri Pendidikan dan Kebudayaan (Nomor 14/2018) tentang Penerimaan Peserta Didik Baru menyebutkan bahwa prioritas penerimaan akan diberikan kepada mereka yang tinggal di radius zona terdekat dari sekolah. Dari sisi transportasi, kebijakan ini berpotensi memberikan dampak positif dalam menciptakan pola distribusi perjalanan sekolah yang lebih seimbang, dan selanjutnya akan mengurangi total panjang perjalanan serta meningkatkan kinerja transportasi. Mengambil kasus Kota Bandung, penelitian ini bertujuan untuk mengevaluasi dampak Penerimaan Peserta Didik Baru/PPDB (Penerimaan Siswa Baru) berdasarkan kebijakan sistem zonasi terhadap pola sebaran perjalanan siswa SMA di kota ini. Metode yang digunakan dalam penelitian ini adalah analisis distribusi spasial dan analisis deskriptif kualitatif. Penelitian ini melakukan analisis perbandingan sebelum-sesudah untuk menganalisis dampak kebijakan terhadap distribusi perjalanan sekolah. Hasil penelitian menunjukkan bahwa kebijakan zonasi mendorong perubahan total rata-rata lama perjalanan sekolah siswa SMA di Bandung sebesar 35%. Penelitian ini juga menyimpulkan bahwa pola sebaran perjalanan sekolah tidak lagi terpusat di pusat kota tempat sekolah favorit berada.

Kata Kunci: Kebijakan Pemerintah; Zonasi Sekolah; Transportasi Kota Bandung.

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INTRODUCTION

This paper discusses the evaluation of the impact of government's policy to improve public service quality by taking transportation sector as the selected case. Transportation is chosen due to this sector strategic role to support city social-economic activities. Policy itself refers to the actions of government and the intentions that determine those actions. It is whatever governments choose to do or not to do (Dye, 1992). Policy also defined as "a set of inter-related decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where those decisions should, in principle, be within the power of those actors to achieve". Meanwhile, evaluation refers to the production of information about the value or worth of policy outcomes. Characteristics of evaluation includes: value focus: focus on judgments regarding the desirability or value of policies and programs, fact-value interdependence: evaluation claims depend as much on "facts" as they do on "values", present and past orientation: oriented toward present and past outcomes, rather than the future ones (Dunn, 1995).

One of the government's efforts to promote a more balanced high school quality is the issuance of new rules regarding the zoning system for New Student Admissions, through the Regulation of the Minister of Education and Culture (Number 14 of 2018) concerning the Admission of New Students, known as Penerimaan Peserta Didik Baru (PPDB). Based on this regulation, high schools under the authority of local government are required to admit prospective students who are domiciled in the radius of the closest zone from the school with a percentage of at least 90% of the total number of students admitted. This regulation directs the upcoming high school students to register at the school closest to their home address as printed on their family cards (Kartu Keluarga, KK).

The PPDB zoning system is a regional new student selection mechanism for junior and senior high schools. Students who have graduated from elementary school and live within a specific radius can enroll in the nearest junior high school. The same rule also applies to junior high school graduates who would enroll in senior high school. The implementation of the zoning system is part of the government's effort to promote a more balanced quality of education (Raharjo, 2018). According to the Office of Education, the positive impact of this zoning system is a more equal distribution of education, saving time because schools are closer to student's homes, saving transportation costs, improving student health, reducing congestion, and diverse environments can stimulate students and teachers to remain competent in teaching (Riyanti. et.al. 2019). From a transportation particular perspective, the zoning system policy can be seen as a strategy to achieve a better transportation level of service which would promote economic development while simultaneously enhancing social welfare and well-being (Docherty and Mackie, 2010). The land-use pattern and associated activity system can be the fundamental factors of travel demand generation in the context of urban transportation planning (Cervero dan Duncan, 2003, Rybarczyk dan Wu, 2014; Wang et al., 2016; Wu.et.al,2019).

It is known that the UK has also implemented a school zoning system. When viewed from the provision of school transportation services, the British

Government issued a policy regarding Home to School Travel and Transport Guidance in July 2014 for Local Governments (Department for Education Gov't of the United Kingdom, 2014) replacing the previous regulation, namely the Home to School Travel and Transport Guidance Guideline Number 00373-2007BKT-EN. The guidelines emphasize sustainable transportation and provide proper transportation for school children. Local governments are required to provide transportation needs for children in their area, supervise sustainable transportation infrastructure, have a strategy for developing sustainable transportation infrastructure, especially for school children, promote sustainable transportation programs for school trips, and publish travel strategies using sustainable modes. Apart from the UK, Australia has also implemented this policy. Based on information obtained from the website www.schoolcatchment.com.au which was accessed on 21 September 2020, Australia implemented a zoning system simultaneously in the cities of Brisbane, Victoria, Sydney, and Melbourne. The zoning or catchment system (local neighborhood zone) in Australia is based on the distance between the house and the nearest school. The calculation of the shortest distance is influenced by several factors, such as geographical conditions, main highways, rivers, and parks. These factors are taken into consideration so that children do not spend a lot of time on trips. As for the division of school zones in Australia, a Voronoi diagram is used, which is a way to map a nearby service point (which in this case is a school location) from another point (a student's residence) by making an imaginary line that forms a cell area or zone. If viewed from the transportation side, based on information obtained from the official Public Transport Victoria website (ptv.vic.gov.au/) which was accessed on 21 September 2020, to show student movement, the government has provided a school bus program to make it easier for students to travel to school. The policy for implementing school buses in Victoria is in collaboration with the Victorian Public Transport Agency. It was found that the two countries that have implemented the zoning system for a long time have also been supported by supporting facilities that can facilitate the movement of students to school, namely school buses.

In Bandung City, New Student Admissions (PPDB) always change every year in line with the government's refinement of regulations. Acceptance of New Students (PPDB) with the zoning system which came into effect in Bandung City in 2018 refers to Permendikbud Number 51 of 2018 while continuing to use an enhanced zoning system. It is different from the PPDB TK, SD, SMP which was handled by the Bandung City Government until the issuance of the Bandung Mayor Regulation (Perwal) Number 13 of 2019 concerning Procedures for Accepting New Students in TK, SD, and SMP, for PPDB SMA is fully under the authority of the Government West Java province. The policies that have been made by the Provincial Government of West Java as a reference in the implementation of PPDB, especially for the high school level, are as follows: 1. Technical Instructions for Admission of New Students (PPDB) in Senior High Schools (SMA), Vocational High Schools (SMK), and Special Schools (SLB) in 2018 in West Java Province 2. Technical Instructions for Admission of New Students (PPDB) in Senior High Schools (SMA), Vocational High Schools (SMK), and Special Schools (SLB) in 2019

in West Java Province 3. Technical Instructions for Acceptance of New Students (PPDB) in Senior High Schools (SMA), Vocational High Schools (SMK), and Special Schools (SLB) in 2020 in West Java Province.

From a transportation perspective, this zoning system would potentially affect the trip patterns of high school students on a city-wide scale. The implementation of the zoning policy in PPDB is expected to reduce the total trip length since the policy would lead to a more matching home-school location. Furthermore, the schooling trip length reduction and more balanced distribution are expected to improve the transportation performance of Bandung City. Travel time or distance is usually a critical component in accessibility calculation that reflects the spatial/temporal easiness of getting to the destinations. Many studies use gravity-based accessibility indicators to evaluate the attraction of sites (La Rosa, Takatori, Shimizu, & Privitera, 2018; Liu et al., 2017). A gravity model has the advantage of describing both "accessible regions" and "magnitude of activities" in urban transformation simulations (Cong.et.al,2022). To evaluate the transportation impact resulting from the implementation of the PPDB zoning system policy, this study performs an analysis of comparison of the trip distribution and duration before and after the implementation of the policy. For workability reasons, the evaluation will focus on the senior high school trip segment.

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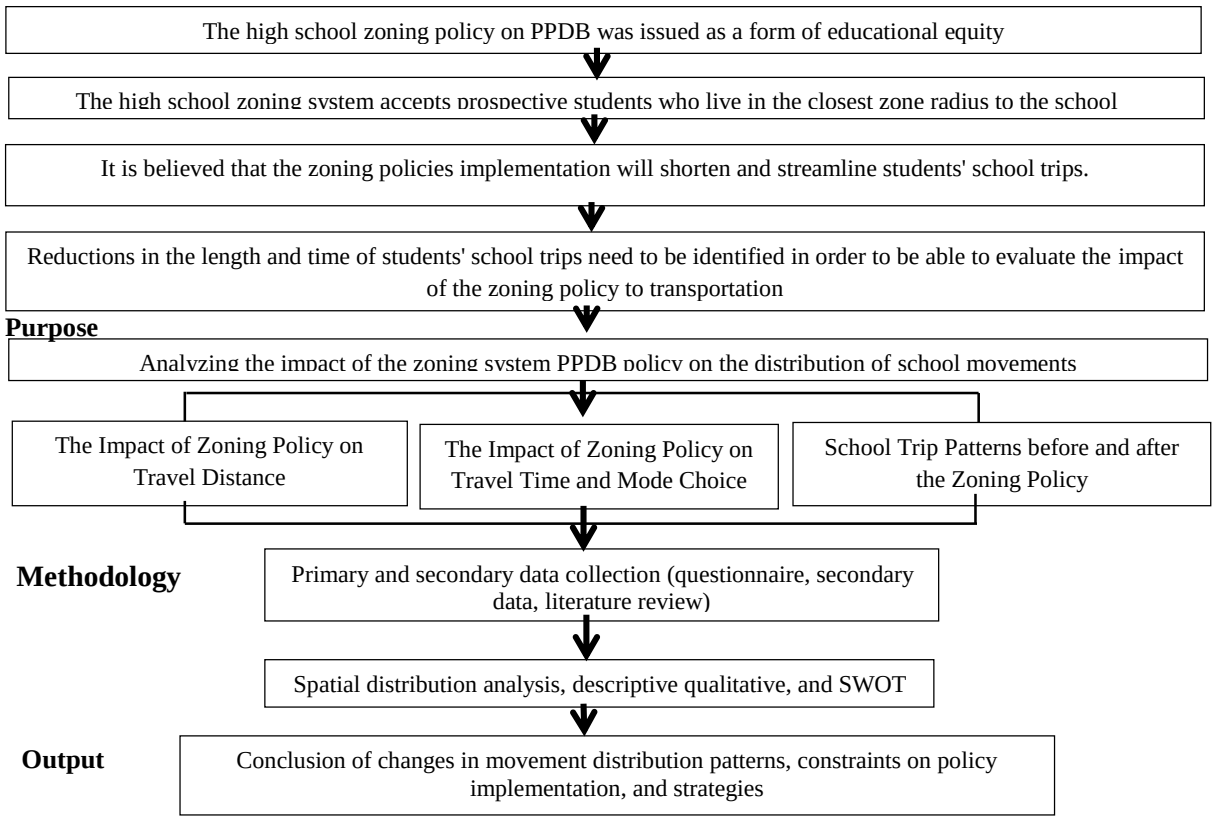
METHODOLOGICAL FRAMEWORK



High School Zoning Policy Impact On Transportation In Bandung City West Jawa Province
(*Miming Miharja, Anindita Putri Dewanti, Renny Desiana*)

METHODS

To ensure successful implementation of regional restructuring and development, the capability of the government from lowest level to the highest level is important in the implementation of public services effectively and efficiently (Simangunsong and Imelda, 2018). Public sector sustainability is hypothesized as a univariate variable which measured with good governance, infrastructure development and community empowerment as a latent construct (Simangusong and Imelda, 2020). This approach is categorized as public policy research. In this research, the above regional restructuring and development principles are to be exercised in the case of Bandung City policy of high school zoning regulation in the context of this policy impact to the transportation performances.

To elaborate this, the research carries out both primary data and secondary data collection. Primary data collection was conducted by distributing questionnaires online in August 2020 to high school students in 2018, 2019, and 2020 as well as high school alumni in 2013, 2014, and 2015. The collection of two years data set with 5 years time lag (each consists of three sequential years) allows this research to analyze a comparison of the before and after zoning policy implementation. The selection of high schools was carried out by using the purposive sampling technique so that the samples were obtained, namely SMAN 2, SMAN 3, SMAN 5, SMAN 8, SMAN 11, SMAN 17, SMAN 18, SMAN 19, SMAN 26, and SMAN 27 Bandung City. The selection of schools was made with the following considerations:

1. 5 top schools based on the highest National Exam scores in Bandung City in the last 5 years (2015-2019)
2. 5 non-excellent schools based on the lowest National Exam scores in Bandung City in the last 5 years (2015-2019)
3. Number of students

The selection of respondents was carried out by random sampling using the Slovin formula to obtain a sample of 200 people for each active student and alumni respondent. Questionnaire questions related to the topic around the characteristics of the respondent include the identity of the respondent and the socio-economic conditions of the respondent as well as the characteristics of the respondent's schooling trip including high school origin, location of residence, travel time, time of departure to school, use of transportation modes to school, reasons for using the mode of transportation to school, estimated travel costs. In this study, the distribution of questionnaires was carried out online using the Google form media where respondents were given a link or links to fill in several questions that had been attached to the link. Secondary data collection is done by collecting data in the form of literature and regulations related to New Student Admissions (PPDB) with a zoning system.

The analysis method uses spatial distribution analysis to determine the amount of school trip flow from a zone of origin to a destination zone which is presented in the form of an Origin-Destination (MAT) matrix which is then visualized in the form of a desire line map so that the lines generated from the map is used to calculate the length of the trip before and after the implementation of the zoning policy. The analysis of comparison was then performed to understand the impact of

the zoning policy on the schooling trip travel distance, travel time, departure time, mode choice, Reasons for Choosing the Mode of Transportation, and trip pattern changes before and after the implementation of the policy.

RESULT AND DISCUSSION

Trip Characteristic is described in terms of travel distance, travel time, time of departure, choice of transportation mode, and reasons for choosing the mode of transportation. The number of respondents is as many as 206 people for each respondent group 1 and 2. The information given by respondent group 1 shows the characteristics before the implementation of the zoning policy, while the information given by respondent group 2 shows the characteristics after the implementation of the zoning policy.

1.1 The Impact of Zoning Policy on Travel Distance

The average trip length is the total length of the schooling trip from all origin zones to all destination zones. The trip frequency is the number of trips, which in this study is the number of trips from home to school in one day. While the average total trip length is the total number of each trip length multiplied by the trip frequency. By dividing the total average trip length by the trip frequency, we get the average length of each student's trip. Table 1 shows that the total average length of school trips for high school students in Bandung City before and after the implementation of the zoning policy has decreased by 35%. Before the policy, the total average trip length was 932,159 km with an average trip length of 4.53 km per student. After the policy, the trip length has reduced to 444.294 km, with an average trip of 2.16 km per student. This result shows that the zoning policy does have an impact in reducing the schooling trip distance as the policy allows the students to choose the school closest to their home location.

Table 1 Distance to School

	Average Trip Length (km)	Frequency	Total Average Trip Length (km)	Average Person Trips (km)
Before the Zoning Policy Implemented	594	206	932,159	4,53
After the Zoning Policy has been implemented	251	206	444,29	2,16

1.2 The Impact of Zoning Policy on Travel Time and Mode Choice

Travel time is the total time required to travel a certain trip length, including stop times and delays at intersections.

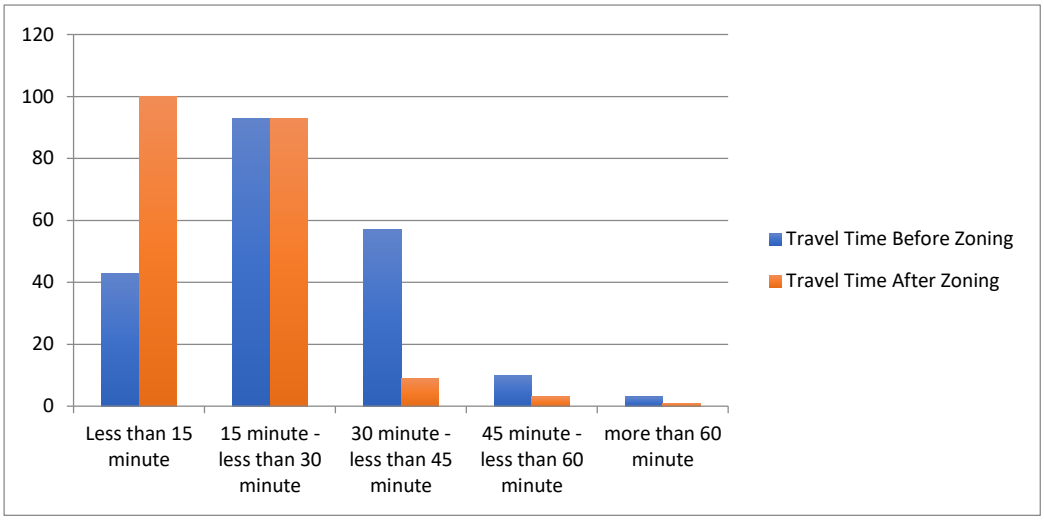


Figure 1. Travel Time to School
(Source: Analysis Results, 2020)

Figure 1 shows that, in line with changes in travel distance, travel time has also decreased. It can be seen that after the implementation of the zoning policy, trips to schools that take less than 15 minutes increased by 28%, followed by decreased proportion in the category of longer travel times. Trips to school that take 15 minutes to less than 30 minutes did not change, while trips that take 30 minutes to less than 45 minutes decreased by 24%. Student trips with a travel time of 45 minutes to 60 minutes experienced a change of 4%, and trips with travel times of more than 60 minutes experienced a change of 1%. These results show that the enactment of the zoning policy reduces the travel time for students to go to school. This is followed by many other positive impacts, such as increased schooling trips by walking, reduced number of motorized vehicles, reduced city air pollution, etc.

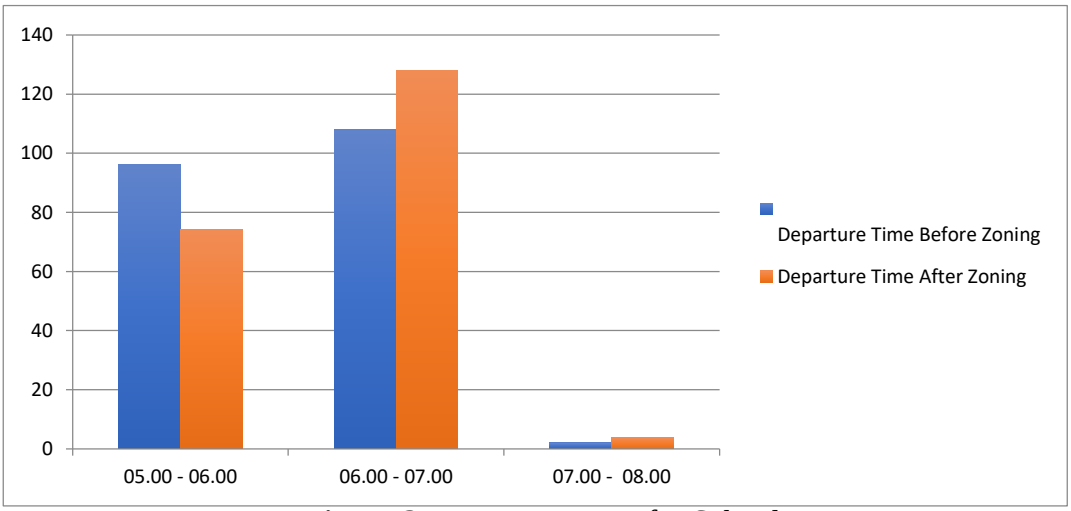


Figure 2. Departure Time for School
(Source: Analysis Results, 2020)

Figure 2 shows that there was an 11% decrease in student proportion with departure time from 05.00 to 06.00 and an increase in student proportion with departure time from 06.00 to 07.00 by 10%. This means that more students do not need to leave earlier because of the closer distance from their homes to the school.

According to Miro (2012: 32) modal comes from "modus" which is everything that can be seen physically. For transportation, the meaning is the same but more emphasis is on techniques or ways of moving a person or goods from the point of origin to the point of destination. The technique or method of moving is the mode or form of transportation media that serves it.

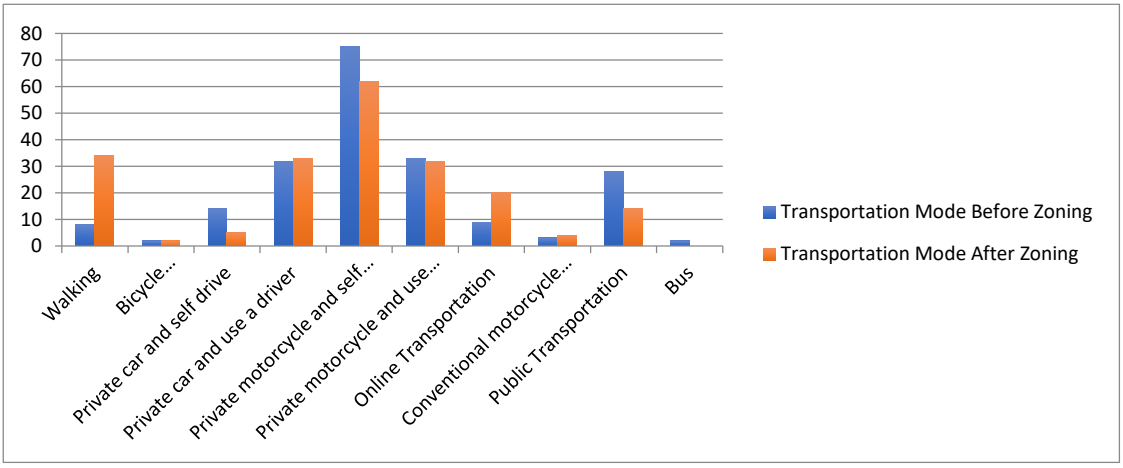


Figure 3. Selection of Mode of Transportation to Schools
(Source: Analysis Results, 2020)

Figure 3 shows that the use of transportation modes is dominated by motorbikes. Interestingly, there was an increase in the number of students walking to school by 14% after the implementation of the zoning policy. However, there was no change in private modes of transportation to public transportation. In addition, there was an increase in the use of two-wheeled online transportation by 6%, considering that the use of online transportation from 2017 to 2020 was recently more prevalent and more developed than from 2013 to 2016.

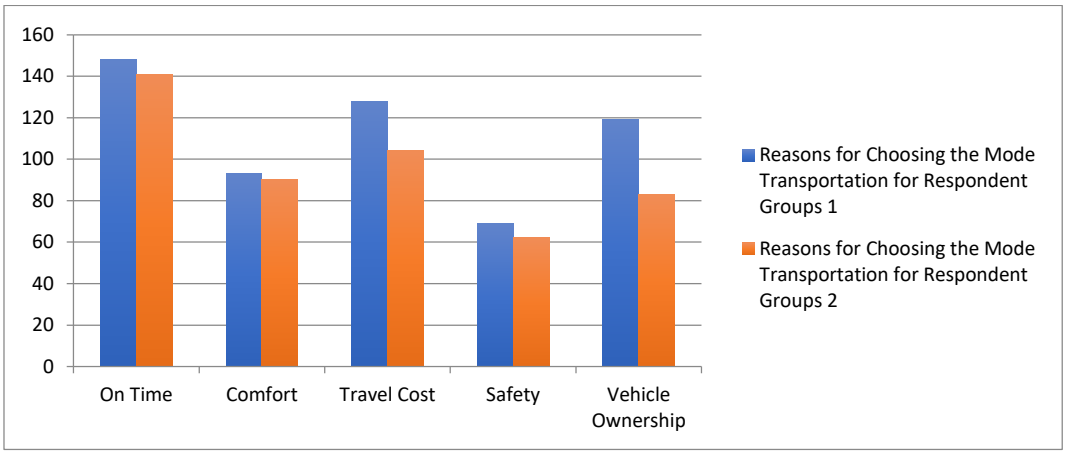


Figure 4. Reasons for Choosing the Mode of Transportation
(Source: Analysis Results, 2020)

From Figure 4, it can be seen that the reason for choosing the mode of transportation is dominated by the timeliness to get to the destination. These are followed, respectively, by travel costs/expenses, and vehicle availability or ownership. The factor of comfort, safety, and security does not influence the choice of mode, it can be seen from the number which is quite far compared to the other 3 highest factors. This is to Munawar's (2005) statement that the problem that often occurs in urban areas is the lack of functioning of public transportation optimally, which is in almost all major cities in Indonesia, public transportation does not function properly and tends to be the community's last resort as a means of transportation.

1.3 School Trip Patterns before and after the Zoning Policy

To determine the trip pattern that occurs is done by calculating the number of generated and drawn trips which are presented with the Origin-Destination (MAT) matrix. After the Origin-Destination (MAT) matrix is obtained, can be seen the magnitude of the inter-zone and intra-zone trip flows that occur, but the description or orientation of the trips is not known. Therefore, the deficiency of the Origin-Destination Matrix (MAT) can be overcome with the help of visualization in the form of the desired line map which can show a picture of the trips that occur. From the results of the line of desire, the length of the trip from one sub-district to another is obtained.

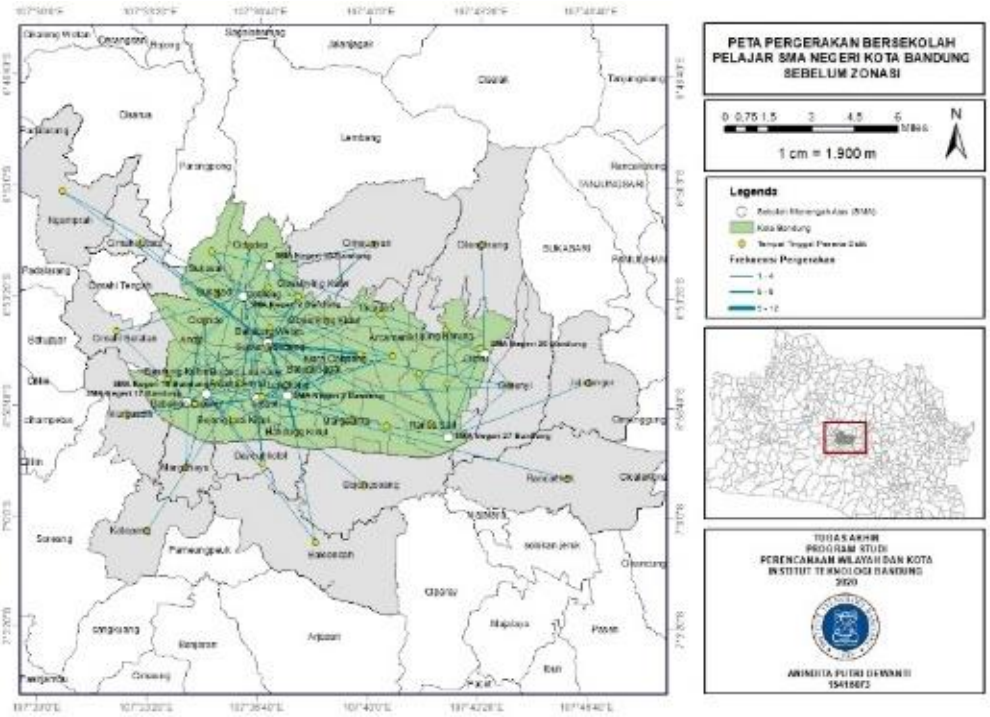


Figure 5. Trip Pattern Map before Zoning Policy
(Source: Analysis Results, 2020)

The internal trip is described as the trip between sub-districts within Bandung City so, in this figure, 30 districts are found in the internal zone. Meanwhile, external trips are trips that occur in sub-districts outside of Bandung City with a total of 14 sub-districts in Bandung Regency, West Bandung Regency, Sumedang Regency, and Cimahi City. Through this figure, it can be identified that the trip patterns formed before zoning are included in the external-internal travel pattern where the starting point node is outside the study area and the destination node is inside the study area, but the trip pattern of Bandung City Senior High School students before zoning is dominated by internal-internal travel patterns where the starting point nodes are in the study area and the destination points are in the study area.

The internal-internal trip patterns that occur are as many as 160 trips or equal to 77.66% while the external-internal trip patterns that occur are as many as 46 trips or equal to 22.33%. Several lines pass from one sub-district to another that are far apart and are not concentrated or gathered based on a line drawing indicating school clusters or strata. This demonstrates that the city center high school, namely the favorite high school, has an attraction that attracts students from various sub-districts, it is affected because zoning policies have not yet been implemented, allowing students who live far away to attend school anywhere without regard to distance, so that many students who attend favorite schools in the city center come from regencies outside Bandung City. Whenever compared to non-favorite high schools on the outskirts of town, particularly east of Bandung City, school migration occurs exclusively in the sub-districts around the school. It is considered that non-favorite schools are unappealing to students, therefore few will join.

The sub-districts with the highest number of walking were the sub-districts where SMA was sampled so that the large number of trips originating from these sub-districts compared to other districts indicated that the zoning policy had an impact on changes in a trip, where more students came from the same sub-district as the location of the school district.

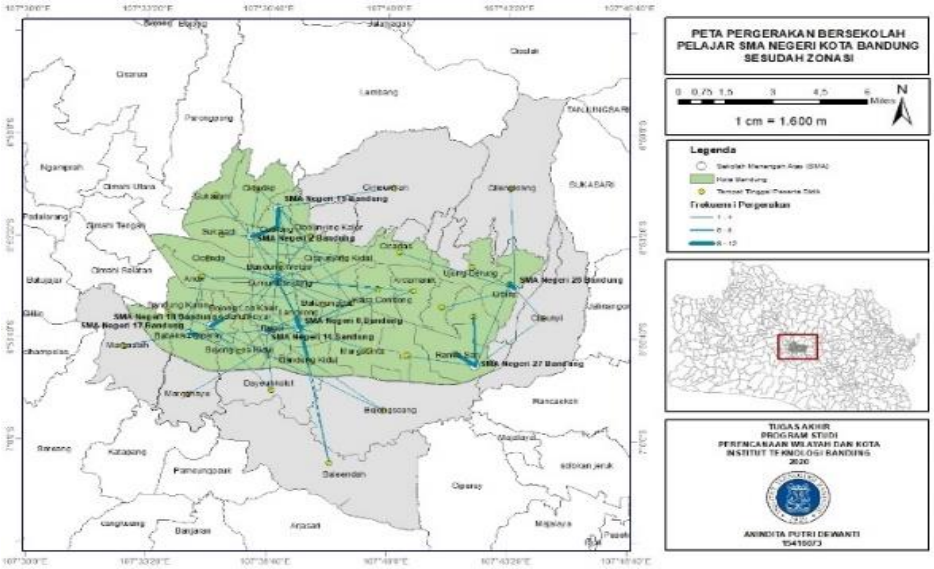


Figure 6. Trip Pattern Map after Zoning Policy
Source: Analysis Results, 2020

From Figure 6, it is obtained 30 points in the internal zone. Meanwhile, the external trip was 8 points. Through this picture, it can be identified that the trip pattern of Bandung City Senior High School students after the implementation of the zoning policy is included in the external-internal travel pattern but is dominated by internal-internal travel patterns. The internal-internal trip patterns that occurred were 185 trips or equal to 89.8%, while the internal-external trip patterns that occurred were as many as 21 trips or equal to 10.19%.

The trip patterns before zoning and after zoning were applied did not change, but in percentage terms, there was a reduction in the external-internal trip patterns. This is in line with the regulations in the zoning policy that now most students come from the same sub-district or not far from the location of the school district. The existence of an external-internal trip pattern cannot be avoided or eliminated because its policy teaches the term "intersection area" which allows students from outside Bandung to enrol in schools in Bandung City. However, of course, the number of trips with an external-internal pattern can be minimized because there is a zoning system that prioritizes distance will make students from outside Bandung City choose schools that are located around the outskirts of Bandung City, considering that before zoning was implemented, their favourite high school was in the city center mostly filled by students who come from outside Bandung City.

From a transportation perspective, the zoning policy should ideally result in a reduction of school travel length. In addition, the reduced length of trips should be able to make students switch modes of transportation to public transportation that is on an environmental scale such as city transportation (angkot), bicycles, or foot because zoning policies limit the movement caused by educational activities outside the zone of residence. According to the questionnaire data, the length of the trip has decreased by 35%, but when examined from the desire line, there has been no shift in the use of modes from private to public transportation, despite a 14 % increase in the number of pupils walking to school.

The existing angkot routes have passed through all residential areas so that students should be able to reach city transportation easily to go to school, but when compared to the existence of public high schools, out of the 10 public high schools sampled, there were only 5 schools that were directly passed by public transportation routes namely SMAN 2, SMAN 3, SMAN 5, SMAN 8, SMAN 27, where the majority of these schools are favourite schools which are mostly located in the city center, while other schools are not traversed directly by public transportation routes, moreover, they can be seen on the eastern part of Bandung City, there are not as many public transportation routes as there are in the city center, even SMA Negeri 26 is very far from the existing public transportation routes, this requires students to get to school on time by using private vehicles or larger businesses to use a bicycle or on foot.

In accommodating movements with educational purposes, Bandung City launched 4 school bus routes allocated for 3-time shifts, namely morning, afternoon, and evening. The existing routes available are the Antapani-Ledeng, Dago-Leuwipanjang, Cibiru-Asia Afrika, and Cibiru-Cibureum routes. Procurement of school buses aims to provide services to students to get transportation facilities that are comfortable, safe, fast, and inexpensive

(free). However, from the school bus routes and plans, there are still schools that are not served by this bus. In addition, the load factor of this school bus does not reach 100%, especially during the morning shift which only reaches 46.7% and reaches a maximum of 73.3% in the afternoon shift . The main reason for the reluctance of students to use the school bus was that the school bus did not go to where they lived.

The provided school bus service routes only serve the northern and eastern parts of Bandung City which tend to head to the city center so not all of the 10 public high schools used as samples are served by these school bus routes. The schools that are passed by this route are only SMA Negeri 2, while the route is adjacent to SMA Negeri 3 and SMA Negeri 5 but does not pass directly. Mangara's research (2018) states that the level of occupancy of the Bandung City school bus is considered low, and this low level of occupancy can affect the service of the school bus itself. Coupled with the fact that one of the reasons is the student's residence which is not served by school buses, which means that the school bus service area has not been able to reach student pickup points in Bandung City. The lack of available routes certainly explains why not many students use this transportation service to go to school, school children prefer to use transportation with a wider range of routes.

A zoning policy is expected to contribute positively to the transportation sector by reducing city traffic congestion. The zoning policy has had a good impact from a transportation perspective with a more even distribution of movements which has an impact on reducing the length of movements, but the resulting impact will be even more optimal if further development is carried out, both in terms of transportation and from the educational facilities themselves. The availability of suitable public transportation is a crucial factor that must be enhanced and developed to gain optimum positive impact from the zoning policy impact on the transportation sector. From a transportation perspective, public transportation reform is urgently needed by expanding routes and improving quality, as the complementary strategy to the high school zoning policy.

CONCLUSION

This paper concludes that there were significant changes in the high school total trip length and distribution pattern as the impact of the implementation of the high school zoning policy in Bandung City through the new student admission system.

1. The results of the analysis show that there has been a change in the distribution and length of the movement as a result of the implementation of the zoning policy which needs to be evaluated to improve the transportation performance of Bandung City.
2. The before-after analysis of comparison using three years data set with 5 years time lag (students register in years 2013, 2014, and 2015 compare to 218, 2019, 2020) reveals that schooling trip length has been reduced by 35% and the number of student trips to schools with travel times less than 15 minutes has increased by 28%. The positive changes are also shown by the departure time and the mode choices, which have shifted to “not necessary too early”. This zoning policy has also stimulated the 14% increasing student proportion that goes to school by walk.
3. The research also found that the trip-to-school distribution pattern has changed. Before the zoning policy was

implemented, the distribution of student trips in Bandung City was mostly centralized in some favorite schools. Meanwhile, after zoning policy implementation, the distribution of trips became more evenly distributed throughout the districts with a fairly trip generation distribution across the residential zones.

These results demonstrate that the high school zoning policy through the new student admission system has a potential positive impact to be implemented in other cities, particularly those with challenging "peak time" transportation problems.

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Peraturan Menteri Pendidikan dan Kebudayaan Nomor 14 Tahun 2018 tentang Penerimaan Peserta Didik Baru (PPDB)

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