

Finding Out the Root of Congestion Problems in Malang City and the Best Solution with Public Policy Analysis

Alfareza Firdaus^{1,2*}, Dzakiyah Adalatul Hikmah¹, Edmund Patrisius Purna²

¹Master of Public Policy and Management, Gadjah Mada University

²Think Policy Hub Malang City

Email: alfarezafirdaus20@gmail.com

ABSTRACT

Traffic congestion has a significant negative impact on regional economic activities and decreases community productivity. The purpose of this study is to analyze the sources of congestion problems in Malang City and the best way to solve them with a high level of effectiveness. The method used is qualitative with secondary data study. The researcher used a classification-based analysis approach to address the congestion problem with a multidisciplinary approach and explore the root of the congestion problem in Malang City. The first step involves logical division to classify the problem situation into several components. Second, logical classification refers to the act of combining different circumstances, things, or individuals into larger groups or classes. The results showed that the source of the problem was found in the high volume of vehicles and disorderly parking due to the growing accumulative population mobility. As a result, the capacity of Malang City is not able to accommodate this. Recommendations from alternative options resulting from the satisficing method analysis were carried out. In the end, the option to reorganize the road space is the option that is considered to meet all the criteria.

Keywords: *Congestion; Public Policy Analysis; Malang City*

INTRODUCTION

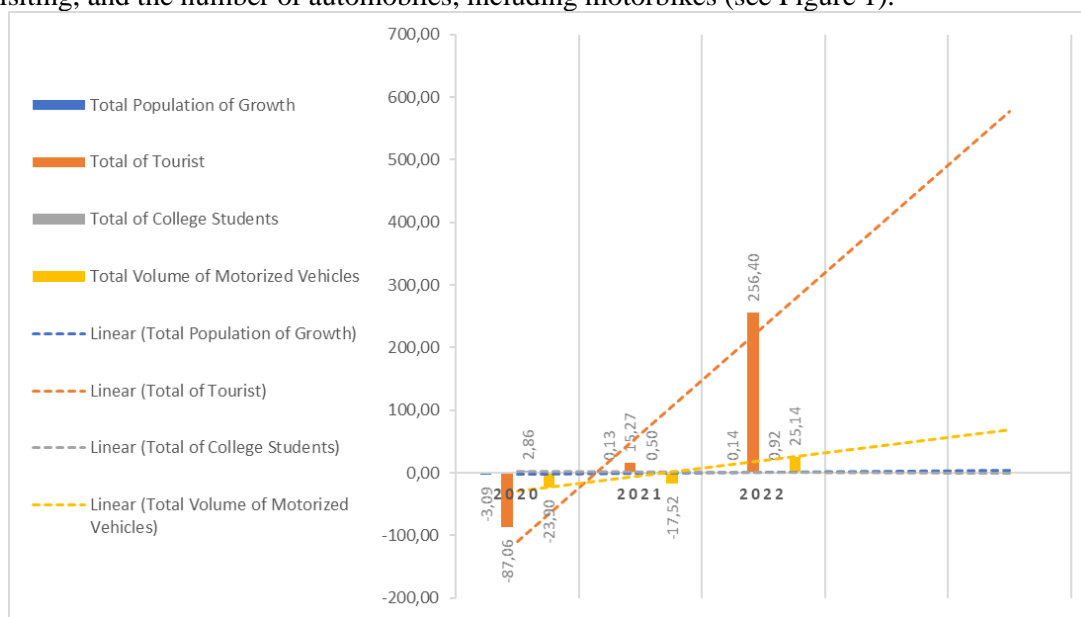
Population expansion, economic development, the dynamics of urban transportation networks, and the massive spread of informal settlements all contribute to urban growth. On the other hand, it creates social issues in urban areas. Malang City is one of the cities that has benefited considerably from these circumstances. The population grew by an average of 0.135 percent between 2020 and 2022 (BPS Kota Malang, 2023). Inrix.com ranked Malang as Indonesia's fourth-most-crowded city in 2022 (INRIX, 2023).

Congestion has severe effects on the urban development cycle. It inhibits economic development and reduces productivity (Sweet, 2011). Several studies on the effect of traffic congestion in Malang City have shown that it may impede urban expansion. Economic losses due to fuel waste caused by congestion; each motorist in Malang City loses Rp 2,000 per kilometre due to gasoline squandered at the congestion site (Aminudin, 2023). Assuming that the typical driver in Malang City drives 10 kilometres per day and is held in traffic for 200 days (assuming aggregated working days) per year, the annual loss per motorist is IDR 4,000,000. If Malang City has 438,519 motorized vehicles in 2022 (BPS Kota Malang, 2023), the total annual loss from wasted fuel is IDR 1.7 trillion.

Furthermore, Inrix (2023), estimates that the typical Malang City driver loses 18 hours yearly due to traffic congestion. If we estimate the average hourly pay in Malang City in 2022 is IDR 17,302, the annual loss per motorist is IDR 311,436. If the number of motorized vehicles in Malang City in 2022 is 438,519 (BPS Kota Malang, 2023), the annual cost due to wasted time is IDR 136 billion.

Only some studies on congestion in Malang City still investigate the root of the issue and the best way to cope with it. Much research has been done on how road users in Malang city feel about traffic congestion (Ratriadi et al., 2023), how people use online transportation (Dalimunthe & Nofryanti, 2020; Hardaningtyas, 2018), how to improve the public transportation system (Yunas & Huda, 2017), to classify traffic congestion in Malang city based on sentiment analysis and data mining (Widyaswari et al., 2019), and how well traffic engineering policies are at easing congestion (Damayanti et al., 2023). In general, there are few articles on public policy. As a result, it is critical to address the issue of congestion from the standpoint of public policy analysis to acquire a better knowledge of the root of the problem and develop solutions to it.

To deepen the problematization, researchers performed a forecasting study using a time series technique for 2019–2022 to predict the impacts and solutions to minimize pollution before it worsens (Dunn, 2018). The statistics indicate a promising trend in potential congestion in Malang City. The study covers the dimensions of population growth, the number of visitors visiting, and the number of automobiles, including motorbikes (see Figure 1).



Source: Data Processed by Researchers (2023)

Figure 1. 2020-2022 Forecasting Analysis

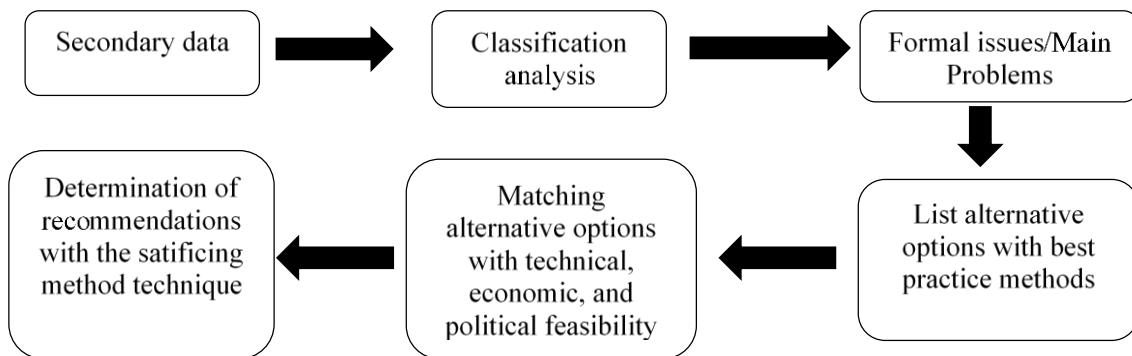
The study topic is, "How do you analyze the sources of congestion problems in Malang City and the best way to solve them effectively?" This study attempts to identify the cause of the issue based on the researcher's findings and present the best alternative solutions while maintaining high effectiveness and efficiency. The breakthrough is accomplished by using public

policy analysis methodologies (Dunn, 2018), to see a more thorough and broad cause-and-effect link between the phenomena occurring and the choices deemed the best to pursue. The results of this study are likely to be utilized as suggestions for regional policymakers as a practical data-driven approach for overcoming the multi-perspective congestion issue in Malang City.

METHOD

This research utilized a qualitative methodology, specifically using desk research and observation techniques (Johnston & Johnston, 2017). The researcher gathered and evaluated papers such as the Inrix 2022 Release Report, Malang City Regional Statistics 2023, Malang City based on Data 2023–2019, and internet media sources focused on Malang City traffic congestion. Observations were made by observing public transportation support facilities such as bus stops and pedestrians.

In addition, researchers used a classification-based analytic strategy. Classification analysis is used to handle congestion concerns in a multidisciplinary manner. This analysis takes two forms. The first step is to divide the issue scenario into various components logically. Second, logical categorization refers to grouping distinct instances into more significant categories. The causative factors determine categorization, which considers multiple secondary data sources. The next step is to identify policy choices (Dunn, 2018). Adjustments are made according to technical feasibility criteria such as efficacy, efficiency, and acceptability (Patton et al., 2013). After getting many solutions that fit these criteria, researchers use the satisfying technique approach (Subarsono, 2012) untuk memastikan rekomendasi yang paling layak. to ensure the most viable suggestions. According to this method, the chosen policy choice may be the most successful if it meets all the defined criteria (Dunn, 2018; Subarsono, 2012).



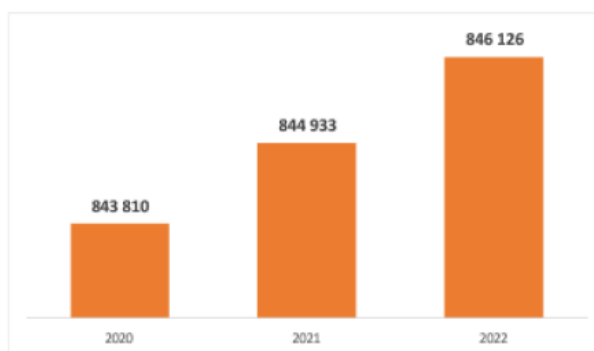
Source: data processed by researchers

Figure 2. Stages of analysis flow

RESULT AND DISSCUSION

Improving the Demographic Aspects of Malang City

Based on data from BPS Malang City, the population of Malang City increased over time, with an average of 0.135% from 2020 to 2022 (see Figure 3). This results from population migration from other areas to Malang City, significantly contributing to population growth (Abidin, 2017). Data from BPS Malang City, which showed that 22,353 people moved to Malang City in 2022, supports this. This number increased compared to 2021, which amounted to 22,790 people.



Source: BPS Malang City (2023)

Figure 3. Population of Malang City (2020-2022)

In addition, the high natality rate in Malang City is also a factor that drives population growth (Sampurno, 2022). According to data from the Central Bureau of Statistics (BPS), Malang City's natality rate in 2022 was 12.22. This number decreased compared to 2021, which amounted to 12.42. However, Malang City's natality rate is still higher than the national natality rate of 10.9 in 2022 (BPS Kota Malang, 2023). In addition, the number of students in Malang City is the second highest in East Java for three years (2019–2022) (BPS Provinsi Jawa Timur, 2023). In particular, Lowokwaru, Klojen, and Blimbing sub-districts (BPS Kota Malang, 2023). Due to these factors, Malang City's population growth—primarily driven by migration, births, and population movements from outside the city—can also impact congestion.

Strong Tourism Potential

The increase in the number of tourists, both foreign and domestic, indicates that the tourism sector in Malang City is getting stronger. Based on data from BPS Malang City (2023) the increase in tourists has decreased due to the impact of the COVID-19 pandemic in 2020 and 2021. However, in 2022, it rose again with a significant percentage of 256.4% (see Figure 4). This made tourism in Malang City, and its supporting facilities show good performance again.



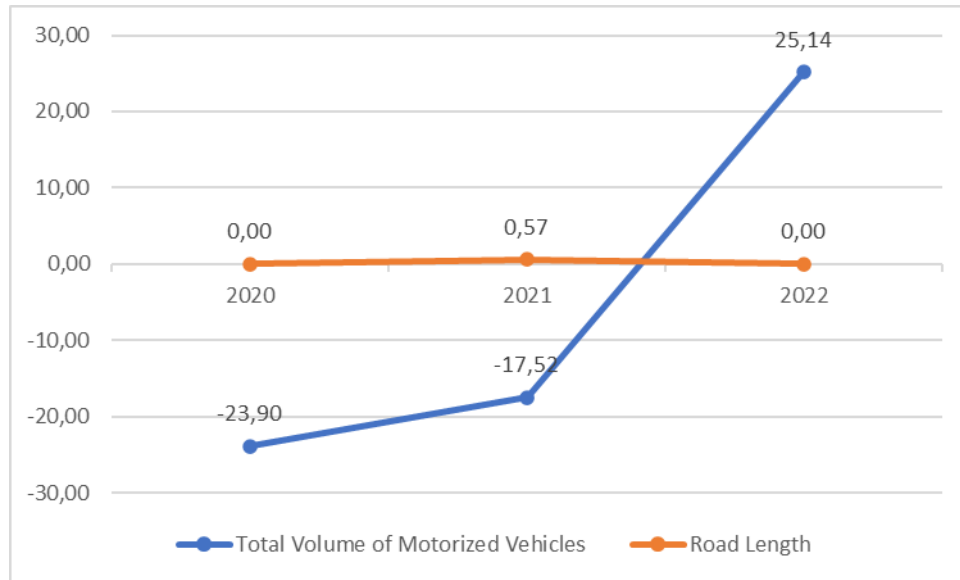
Source: BPS Malang City (2023)

Figure 4. Number of Tourists in Malang City (2019-2022)

In addition, the tourism characteristics of Malang City consist of three types of tourism, namely city park tourism, historical tourism, and creative economy tourism. One of the exciting tours in Malang City is Kayutan Heritage. Tourists from inside and outside Malang City always visit the tour. This causes traffic congestion, especially on the roadside (Wijaya, 2023a). Additionally, there is an increase in visitors to the tour every weekend (Indo, 2023a). Although the Malang City Government has made efforts by using two road points and stopping the park's renovation in the Kayutangan Heritage Corridor to stop congestion (Indo, 2023b) it has yet to reduce congestion. The surge of tourists coming to Malang City contributes to the congestion, especially during the holiday season or certain celebratory days.

Ineffective Urban Traffic Management

At the end of 2023, the Government of Malang City focused on reorganizing urban traffic, focusing on five sub-districts in Malang City, such as Klojen, Blimbing, Sukun, Lowokwaru and Kedungkandang sub-districts (Wijaya, 2023a). In addition, there is no additional road length for two years (2021-2022). There was only an increase in the road network from 2020 to 2021, with a difference of 6.37 km. This makes the growth imbalance between road length and vehicle volume inconsistent. Not to mention the increase in vehicle volume.



Source: BPS Malang City, 2023-2022

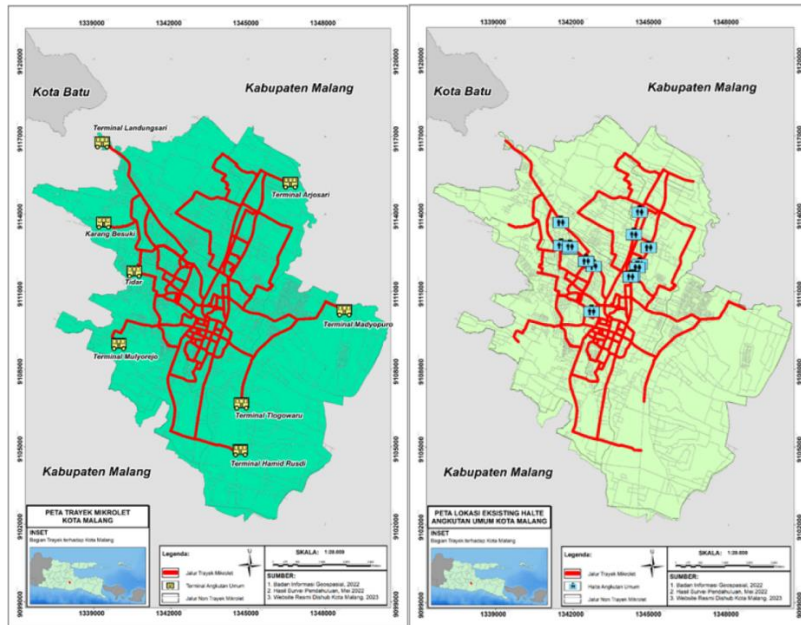
Figure 5. Comparison of Number of Vehicles and Road Length

Another critical problem in urban planning is parking. Malang City's extensive unlawful parking has caused traffic congestion (Wijaya, 2023b). Specifically in Dinoyo, Tlogomas, Merjosari, and Jatimulyo villages (Pratama, 2023). Furthermore, chaotic parking places provide chances for illegal parking attendants across Malang City (Winahyu, 2023). specially for tourist destinations, such as Kayuwangan Heritage, cannot handle the number of automobiles arriving (Wijaya, 2023b). As a result, urban planning is not prepared to handle the increase in car traffic.

Unoptimal Public Transportation

In addition, there is the issue of road-based public transit that links locations around the city. It needs to be more effective in both function and implementation. Over the last ten years, just 16 operating routes remain, down from 25 in 2013. Not to mention the falling load factor, which implies that service delivery could be better. For example, in 2016, the route AH (Terminal Arjosari-Gadang - Terminal Hamid Rusdi) had an average occupancy of 41% (Widyatami et al., 2017). The optimal minimum load factor is 70%.

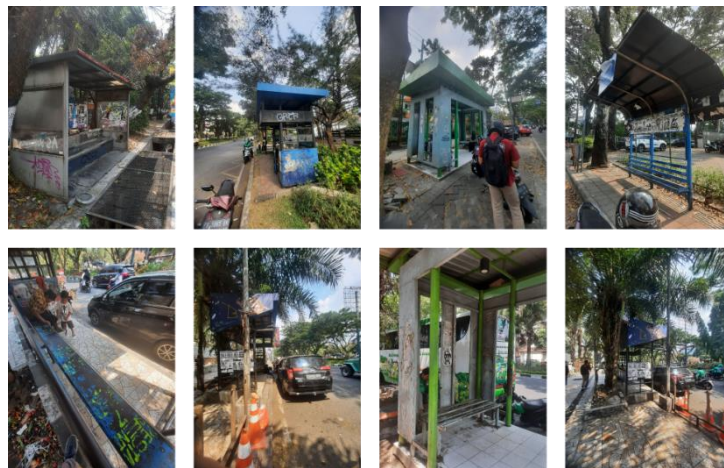
On the one hand, the route requires just 132 ships each day, yet the available fleets exceed 300 (Widyatami et al., 2017). This indicates that there is an imbalance between supply and demand. Figure 6, as shown on the official website of the Transportation Office of Malang City (Dinas Perhubungan Kota Malang, 2023), shows that not all Malang's city area is served by public transportation lines. A tiny portion of the northern and most eastern regions still need public transit.



Source: Transportation Office of Malang City (2023)

Figure 6. Map of Malang City Public Transportation Route (Left) and Distribution Points of Bus Stops in Malang City (Right)

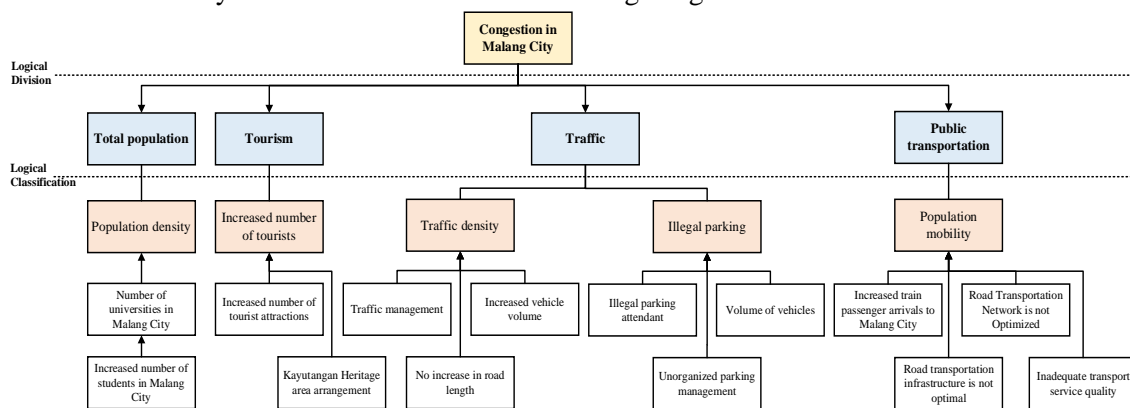
Furthermore, just 13 Bus Stops (see Figure 6) were found to be distributed across the city core. Furthermore, the circumstances are concerning, such as being unmaintained, less accessible to people with disabilities and the elderly, damaged pedestrian walkways, and inadequate station amenities (see Figure 7).



Source: Personal Document (2023)

Figure 7. Condition of Bus Stop and Pedestrian Facilities in Malang City

Malang City's public transportation services still need to be better and fulfil passenger expectations regarding punctuality and vehicle quality. Widyatami (2017) survey findings reveal that comfort is a poor point, as are the dimensions of transportation-related amenities such as pedestrians and bus stops. As a result, the effectiveness of public transportation in servicing users and the community serves as a baseline for alleviating congestion.



Source: Data Processed by Researchers, 2023

Figure 8. Classification analysis of Congestion Issues in Malang City

According to the findings of this research, when the region has a high cumulative population growth rate as a consequence of individuals arriving in Malang City. In addition, the city's public transit system could be more efficient. However, categorization analysis based on population (Falcocchio & Levinson, 2015) and the high number of motor vehicles (Sweet, 2011, 2014) still demonstrates that economic activities are the primary cause of congestion. Policy solutions are chosen based on the chosen phenomena and the issue description set by prior studies and research findings. The following alternatives are provided:

1. Conduct push and pull strategy of traffic control management

There is a shift in approach from adding new roads to the best solution of controlling and restricting motor vehicle use, called the Transportation Demand Management (TDM) approach. This approach focuses on reducing the use of private vehicles. Improvements follow this in public transportation (Arlington County Commuter Services (ACCS), 2023). This approach focuses on incentivizing the use of public transportation (pull strategy) and disincentivizing the use of private motor vehicles (push strategy).

2. Reorganize road space to improve road user safety and comfort.

Realigning road space by widening sidewalks, adding medians, and adjusting vehicle lanes can improve road user safety and comfort by reducing conflicts between different modes of transportation, providing sufficient space for pedestrians and cyclists, and improving traffic order and flow (Putra, 2023). In addition, providing integrated and electronic parking facilities can

improve the safety and convenience of road users by reducing the density of vehicles that park haphazardly on the roadside (ITDP Indonesia, 2017b). Reorganizing road space by building bicycle lanes and implementing bike share systems along roads (ITDP Indonesia, 2020).

Finally, the two options were combined with the criteria determined by the researcher: effectiveness, efficiency, and acceptability (Patton et al., 2013). Determining the criteria is practical because the congestion problem is related to achieving the desired goal: overcoming congestion problems by reducing the volume of vehicles, improving the quality of public transportation, and improving road infrastructure (Mu'allimah & Mashpufah, 2022). The efficient aspect means that policies can use available resources optimally by minimizing costs and maximizing benefits (Purwata, 2023). Considering the satisfaction, participation, involvement, and compliance level, the acceptability aspect denotes that the community and stakeholders can accept the policy (Mu'allimah & Mashpufah, 2022). The three criteria, chosen from the various alternative policy options, are then analyzed based on the criteria to determine the policy form to encourage the resolution of congestion in Malang City. The analysis is described in the following table.

Table 1. Analysis of Satisficing Methods Recommendations

Policy Alternative	Effectiveness	Efficiency	Acceptability
Conduct push and pull strategy of traffic control management	Push and pull strategies have proven to be more effective in diverting people to public transportation, walking, and cycling, as well as encouraging efficient land use by creating compact and dynamic urban layouts (Putra, 2023)	Push and pull strategies can provide more efficient alternatives through improved integrated public transport services (Hafifah, 2022) and traffic calming management tends to be low-cost but beneficial in reducing congestion.	Public acceptance of pull policies will be high because many people do not want to use transit because of low service quality; if the service is improved, people will switch to public transportation. The push strategy is likely to be less accepted by vehicle users because of the high costs that must be paid for the vehicles they use.
Reorganizing road space to improve road user safety and comfort	The arrangement of road space, especially controlling illegal parking, is very effective because it is	Developing disability- and elderly-inclusive streetscapes, plus providing complete supporting	This option is more acceptable to the general public without sacrificing motorists.

Policy Alternative	Effectiveness	Efficiency	Acceptability
	one of the main contributors to congestion in Malang City. Moreover, the parking system is developed through electronics to minimize illegal parking attendants (Pratama, 2023). Meanwhile, sidewalk improvements focus on road segments around the centre of community activities to make it easier for passengers to access public transport services and increase public interest in public transportation (ITDP Indonesia, 2017a).	facilities, is not cheap. However, it can be done with a public-private partnership scheme if there are budget constraints.	

Source: Data Processed by Researchers, 2023

From the above analysis, both alternative options have the potential to meet the established policy criteria of effectiveness, efficiency, and acceptability. However, option 2 (road space rearrangement) is superior in all aspects of the criteria set. In contrast, option 1 (push and pull strategy) needs to improve acceptability because it is considered only to benefit non-motorized users.

Therefore, road realignment by widening sidewalks, adding medians, adjusting vehicle lanes, providing integrated and electronic parking facilities, building bicycle lanes and implementing bike share systems along protocol roads and urban strategic areas are considered suitable to overcome congestion (ITDP Indonesia, 2017a). Shorter trips to public facilities might be more popular with people in reality than standard planning models predict (Ng, 2008). Studies show that greenhouse gas emissions are four times lower in a dense city like Madrid, where urban density is ten times higher than in Atlanta. This achievement can also be applied to address

congestion in Malang City by impacting a much higher volume of public transit use. With improvements to road space and public facilities, the potential for the public to switch to public transport is more dominant (Adriana et al., 2018).

CONCLUSION

In dealing with congestion in Malang City, various problems are interrelated, which requires a comprehensive analysis to explore the root of the problem. A classification analysis was conducted to identify the existing problems in depth. The problem's source was the high volume of vehicles and disorderly parking due to the growing accumulative population mobility. As a result, Malang City's capacity cannot accommodate this. Recommendations from alternative options resulting from the satisfying method analysis were carried out. Finally, the option to reorganize road space meets all criteria. However, this research's limitations on data acquisition are limited to secondary data sources. In the future, a conceptual model can be created to illustrate a solution system to overcome congestion that can cover all problem dimensions.

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