Response to changes of public transport fares on travel mode and parking area choices in Cimahi commercial area

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Abstract. Parking is an absolute part of a journey, especially if one uses a private vehicle. Studies on parking have been conducted since the 1970s as part of the literature on individual travel, which is developing quite rapidly and is becoming increasingly important in urban planning; it is directly related to the availability of land used for parking. Public parking lots are found in the downtown area (CBD) and the commercial area. One example of cities that experience lack of available off-street parking lots in the city center is the Cimahi. Consequently, it gives rise to congestion and increased use of private vehicles that are increasingly high; with the number of vehicles being 312,033 units, around 80% were motorcycles. Based on the results of the calculation of several models, the response chosen was the response of switching to public transportation, having a Nagelkerke R Square value of 41.1%, with seven variables having a significant partial effect. Furthermore, after calculating using a probability analysis of public transport users with tariff options on stated preference responses with the lowest tariff of Rp2,000 will result in 55.65% of the opportunity to switch modes from private vehicles to public transportation.

1. Introduction

1.1. Background of the study
Parking is an absolute part of a journey, especially if one uses a private vehicle. Studies on parking have been conducted since the 1970s as part of the literature on individual travel that developed quite rapidly at that time [1]. Moreover, in the last two decades parking studies have increasingly become important in urban planning, mainly because of the ownership and use of private vehicles which continues to increase while the availability of land for parking is increasingly limited [2]. The lack of available parking lots pushes the increase of private vehicles usage and decreases the use of public transportation. In general, the availability of parking is often found in the downtown area (CBD) or even the commercial areas, because parking locations tend to be available on the final destination of activities, with secure parking, and the availability of parking permitted for a long time [3].

Cimahi experiences the lack of off-street parking; as a result, many owners of private vehicles choose on-street parking, becoming obstacles in commercial areas, e.g. on Gandawijaya Street, Amir Machmud Street, Gatot Subroto Street, and Baros Street. In addition to the number of vehicles in Cimahi City as many as 312,033 units, around 80% were motorcycles [4]. Public transport is available with relatively low rates, although only three existing public transport routes currently operating, namely AKDP route, border routes and local routes. Almost all of the routes in the route pass through the commercial area, but this fact does not affect the consumers’ choice in selecting vehicles. The number of people using private vehicles is large
enough and is a problem for Cimahi. Based on the results of research conducted by Cahyani [5], it is known that the chance of choosing public transportation among all samples of travelers is only about 35%.

This paper aims to examine the response in changes in public transport fares: whether this change may affect the choice of modes by private vehicle users and users of parking areas in Cimahi commercial area or not. Further, this paper is organized into several parts; the first part is an introduction to explain the background of the study, and a brief discussion of the literature review; the second part explains the methodology used; the third and fourth parts provide the general picture and analysis; and the last part is the conclusion and suggestions of further studies.

1.2. Literature Review
Mode choice is part of several common components (i.e. conventional four-step models, combinations, or activities) to represent the cost of travel for the modes available between the origin-destination pairs [6]. Mode choice is usually treated as an application of consumer choice theory based on the belief that people make rational choices between the alternative competition to maximize personal utility or existing benefits [7, 8]. In general, the analysis conducted in modal selection considers two classes of variables: (1) modal attributes such as travel time, cost, convenience, reliability, and comfort; and (2) traveler’s socioeconomic characteristics [9]. Wang and Hofe [10] explain that some variables influence mode choice, which can be organized into three categories: people who travel, travel, and the transportation system. Besides, in the selection of modes, several factors influence decisions in driving, one of which is the time in the parking search and parking rates and related to the provision of parking [11]. Furthermore, in recent years an official paper on parking has been published regarding the overall theory of parking policy that is relatively lacking [12]. In parking policies that are often compiled, the factor of parking availability is also a problem with other problems such as limited availability of land, cost factors, or the existence of efforts to control vehicle movement [13].

A solution to these problems related to mode choice is to use public transportation. In Urban Transit Systems and Technology, Vuchic [14] explains that urban transportation modes and operational concepts can be classified into some different bases. Where there is public transportation, mass transit or transit is a type of public transportation from urban passenger transportation that has an urban mode operational concept. Quality in public transport services depends on several factors (attributes) of service; some are quantitative (e.g. average travel time and reliability, transit wait time, monetary costs) while others are qualitative; the effects on user behavior are more difficult to assess (e.g. driving comfort, information, personal safety) [15]. Public transportation also provides to people who cannot access private vehicles. Therefore, public transport must continue to meet supply-side requirements for higher capacities and increasingly respond to demand-side needs for modes that are easily accessible, affordable, fast, and reliable [16].

The choice of model is strongly influenced by the purpose of the trip [17]. For each urban scenario, travel for work purposes is a major part of daily travel in an area, therefore such mandatory travel has received most of the attention in the context of transportation planning on mode choice behavior. However, with changes in socio-economic behavior and lifestyles, along with upcoming traffic-related problems, it is very important to focus attention on traveling to other destinations. Such socioeconomic activities have a direct effect on transportation demand because more and more trips are directed to shopping centers [18]. One early study of mode choice and trade was conducted by Marjanen [19], who analyzed the out-of-town shopping behavior of a consumer in Turku, Finland. Based on socio-economic characteristics, the study found that the use of private vehicles to travel shopping increases with income and the number of families. Furthermore, research conducted by Schneider [20] shows that mode choice in the commercial/shopping area is influenced by travel characteristics, socioeconomic, local environment, and attitude and perception variables.
2. Methodology
The overall structure for the research methodology adopted for the current research is shown in Figure 1. Furthermore, the sample calculation used purposive sampling, as the population of people using private vehicles in Cimahi commercial area is unknown in quantity, so to determine the number of samples using the Lemeshow equation with a confidence level of 95% [21], with population variations reaching 0.5 and the sampling error value of 7%. Then the number of samples or respondents is obtained 196; however, to avoid any questionnaire errors that are not valid then the sample is rounded to 200 samples.

![Figure 2. Study methodology flow chart](image-url)
A questionnaire was prepared for as many as 200 samples of users of private vehicles parked in the commercial area in accordance with the Spatial Plan of Cimahi, including Cibabat, Baros, Cimahi, Karangmekar, and Setiamanah. As mentioned earlier, mode choice depends on three main factors: characteristics of travel users, characteristics of travel, and characteristics of transportation facilities. The questionnaire would also obtain information on the age, gender, ownership of the driver's license, occupation, education, vehicle ownership, and income of the respondents as part of the characteristics of travel users. Information on the origin of the trip, the purpose of the trip, the type of model used, the purpose and time of the trip, the cost of the trip, the parking fee, and availability of parking are also included to record the characteristics of the trip. Furthermore, a method using stated preference is also used to conduct research on travel patterns and to identify responses/behaviors to a choice [3]. Stated preference is strongly influenced by the attitudes and behavior of respondents who represent the level of satisfaction and level of importance of an attribute against other attributes in a choice. In carrying out stated preferences, four response choices will be offered to all respondents, from which the 4 response choices will be chosen one with the right model using binary logit analysis and known models and related variables, then it can be done according to the identification of the modal shift probability of private vehicles to transport by considering the influential independent variables.

3. Descriptive Analysis
This section broadly highlights the quantitative analysis of samples collected in the mode choice modeling. The questionnaires were compiled and distributed around the commercial areas which are in the CBD, including Cibabat, Baros, Cimahi, Karangmekar, and Setiamanah. From 200 respondents in the commercial area based on the range of the amount of income, it is known that the amount of income is in the range of 3-6 million per month, namely 59 respondents or around 29.5%, followed by respondents earning <1 million namely as many as 46 respondents with a percentage around 23%, and respondents earning 1-2 million, as many as 42 respondents or around 21%. Meanwhile, the fewest respondents were those earning >10 million with 9 respondents or around 4.5%.
Figure 4. The number and the percentage of income range by survey location.

Based on the trips made from outside the Cimahi, there were 49 respondents with a percentage of around 24.5%, while those in Cimahi were respondents who came from Cibabat (36 respondents or around 18%). Also, the respondents that came from at least Pasirkaliki and Utama villages are 2 respondents respectively or only about 1%.

Figure 5. Number and percentage of trip origin by subdistrict.

It was found then that the majority of respondents headed to the commercial area for shopping were 93 respondents or around 46.5%. Next, 71 respondents or around 35.5% traveled to the commercial area to work as employees or even shop owners in the commercial area.

Figure 6. Number and percentage of trip origin by outer city.
The majority of respondents used motorcycle, namely 184 respondents or about 92%, whereas 16 respondents or only about 8% used cars.
It can be seen that almost all respondents who used cars went shopping during various times of the day, namely morning, afternoon, evening, and night. This was done by the respondents from four sub districts/kelurahans, with the exception of Baros. There were also few respondents who use motorbikes when shopping, seen in those from Cibabat (21 respondents or around 10.5%) on motorcycle mode to shop in the afternoon. From Karangmekar, 16 respondents or around 8% did shopping activities while traveling using motorbikes in the morning; and also from Setiamanah, 15 respondents or 7.5% did shopping too with motorbikes but in the afternoon. More details can be seen in the cross-linked table below of the Cross Tabulation between Mode Types, Traveling Time, and the Purpose of Respondents’ Travel by Survey Location.

![Figure 10. Cross tabulation between mode types, travelling time, and the purpose of respondent’s travel by survey location.](image)

Also, respondents were categorized based on age; the age range of 14-25 years was the largest age group with 87 respondents or with a percentage of 43.5%, and the smallest is the age range of 56-70 years with 8 respondents or only 4% of the total number of respondents.
Figure 11. Number and percentage of respondents’ age range.

If it is seen based on the availability of parking, it is known that the majority of respondents parked their vehicles both on-street and off-street (84 respondents or around 42%). It was followed by respondents who parked vehicles at off-street locations or available parking at the destination of the journey (71 respondents or around 35.5%), and the respondents who parked their vehicles on-street (20 respondents or around 10%). The least group was the respondents who did not park at the destination location (25 respondents or around 12.5%).

Figure 12. Number and percentage of parking availability.

4. Model Structure and Results

4.1. Model for Changing Public Transportation Rates
The analysis conducted is an analysis of the relationship between the response of changes in public transport fares and the probability of switching modes. Similar the previous analysis, this analysis also used 200 samples of respondents spread in 4 response choices and 9 answer choices, so that in 1 response produced 1800 observations of samples arranged in a stated preference to find the right model. The calculation of the model used binary logit regression analysis or what in SPSS is called binary logistic. It
consists of two variables used in this analysis, namely the dependent and independent variables. The dependent variable is mode selection, with several responses from travelers including:

- Permanent Response of Using Private Vehicles and Parking in the Commercial Area
- Permanent Response of Using Private Vehicles and Parking outside the Commercial Area
- Response of Switching Using Public Transport
- Switch Response of Using Online Transportation

**Table 1. Variable equations in binary logit regression.**

| No | Response | R2 | Hosmer and Lemeshow Test | Variables | Sig. | Description of Variables |
|----|----------|----|--------------------------|-----------|------|--------------------------|
| 1  | 1st Response | 0.366 | 0.098 | X1.4 | 0.000 | Cibabat |
|    |           |     |                 | X2      | 0.000 | Public Transport Fares |
|    |           |     |                 | X4      | 0.042 | Income |
|    |           |     |                 | X7      | 0.000 | Purpose of Trip |
|    |           |     |                 | X11     | 0.000 | Parking Availability |
|    |           |     |                 | X13     | 0.000 | Public Transport Security |
| 2  | 2nd Response | 0.384 | 1.000 | X2 | 0.004 | Public Transport Fares |
| 3  | 3rd Response | 0.411 | 0.950 | X2 | 0.000 | Public Transport Fares |
|    |           |     |                 | X4 | 0.001 | Income |
|    |           |     |                 | X5 | 0.029 | Origin of Trip |
|    |           |     |                 | X7 | 0.018 | Purpose of Trip |
|    |           |     |                 | X9 | 0.007 | Parking Duration |
|    |           |     |                 | X11 | 0.005 | Parking Availability |
|    |           |     |                 | X13 | 0.001 | Public Transport Security |
| 4  | 4th Response | 0.437 | 0.977 | X2 | 0.000 | Public Transport Fares |
|    |           |     |                 | X4 | 0.002 | Income |
|    |           |     |                 | X12 | 0.031 | Public Transport Comfort |

On the other hand, the independent variable is a translation of some of the variables that exist in the characteristics of travelers, characteristics of travel, and characteristics of transportation facilities. The method is used in stated preference, when the survey looks for anyone parking using a private vehicle either motorbikes or cars; the respondent is then asked a number of questions previously compiled, and a choice simulation is carried out for the tariffs of public transport routes: if the public transport route is affordable, will people continue to park in the commercial area, park outside of it, or prefer the public transportation? Afterwards, all of the results are recapitulated, the analysis process will be carried out using binary logit. After calculating binary logit regression or binary logistic regression, in the four response models there is found one model that has a Nagelkerke R Square value of 41.1% among others, namely the third model of “Response Switches of Using Public Transportation”. This result can then be called appropriate as the purpose of this study is to improve the use of public transportation and develop several strategies together with parking management to reduce the number of vehicles parked in Cimahi commercial area. Meanwhile, compared with the other three response models, where the Nagelkerke R Square value for the first response is 36.6%, the second response is 38.4%, and the fourth or final response is 43.7%, even though the last response had the Nagelkerke R-value Square is bigger than the third response, influential variables cannot be calculated into a model. Therefore, it is one of strong reasons to choose the third response model as it has a greater Nagelkerke R Square value than other response models do, as well as the fact that influential variables can be calculated into a model.

Furthermore, the Hosmer and Lemeshow Test table is part of the Goodness of Fit test (GoF), which is a test to determine whether the formulated model follows the data or not. Based on the calculation results, it concludes a significant value of 0.950 where this value is greater than 0.05. Therefore, H0 is accepted by the hypothesis that the model follows the data, which indicates that with a 95% confidence level, there is evidence that the model used is quite capable of explaining the data.
From some of the calculated variables, 7 variables have a significant p-value test of <0.05 including X2 (Public Transportation Fares), X4 (Income), X5 (Origin of Trip), X7 (Purpose of Trip), X9 (Parking Duration), X11 (Parking Availability), and X13 (Security in Public Transportation), meaning that each of these variables has a significant partial effect on the mode selection response in the model. Furthermore, variable X2 (Public Transportation Fares) has a Sig value of 0.000, lower than 0.05, thus rejecting H0 and meaning that any change in public transport tariffs can have a significant partial effect on modal selection using public transport. Variable X4 (Income) has a Sig value of 0.001, lower than 0.05, which also rejects H0 and means that the amount of income affects the mode selection behavior. Variable X5 (Origin of Trip) has a Sig value of 0.029, lower than 0.05, which also rejects H0 so the origin of the trip also influences selection behavior mode. For more details about other influential variables can be seen in the table below.

Table 2. Binary Logit Regression Results (N=200).

| Step 1 | B   | S.E. | Wald | Df  | Sig. | Exp(B) | 95%C.I. for Exp(B) |
|--------|-----|------|------|-----|------|--------|-------------------|
|        |     |      |      |     |      |        | Lower           |
|        |     |      |      |     |      |        | Upper           |
| X1.1   | -.702 | .377 | 3.474 | 1 | .062 | .496 | .237 | 1.037 |
| X1.2   | .077 | .353 | .048 | 1 | .827 | 1.080 | .541 | 2.156 |
| X1.3   | -19.544 | 1677.093 | .000 | 1 | .991 | .000 | .000 | .000 |
| X1.4   | .297 | .354 | .702 | 1 | .402 | 1.346 | .672 | 2.696 |
| X2     | -.001 | .000 | 161.806 | 1 | .000 | .999 | .999 | 1.000 |
| X3     | -.339 | .613 | .306 | 1 | .580 | .713 | .214 | 2.368 |
| X4     | -.654 | .203 | 10.341 | 1 | .001 | .520 | .349 | .775 |
| X5     | -.518 | .237 | 4.789 | 1 | .029 | 1.056 | .375 | .947 |
| X6     | .787 | .430 | 3.346 | 1 | .067 | 2.196 | .945 | 5.103 |
| X7     | .705 | .297 | 5.635 | 1 | .018 | 2.024 | 1.131 | 3.623 |
| X8     | -.422 | .248 | 2.888 | 1 | .089 | .656 | .403 | 1.067 |
| X9     | .631 | .234 | 7.240 | 1 | .007 | 1.879 | 1.187 | 2.975 |
| X10    | -.832 | .465 | 3.197 | 1 | .074 | .435 | .175 | 1.083 |
| X11    | 1.161 | .418 | 7.721 | 1 | .005 | 3.192 | 1.408 | 7.237 |
| X12    | -.347 | .204 | 2.892 | 1 | .089 | .707 | .474 | 1.054 |
| X13    | .814 | .253 | 10.353 | 1 | .001 | 2.258 | 1.375 | 3.707 |
| Constant | .595 | .691 | .742 | 1 | .389 | 1.1812 | 1.037 | 1.037 |

Furthermore, the magnitude of influence is shown by the value of Exp (B) or also called the Odds Ratio. It can be seen that there is an OR value above 1, including variable X7 (the purpose of the trip) with an OR value of 2.024, variable X9 (duration of parking) with an OR value of 1.8879, variable X11 (parking availability) with an OR value of 3.192, and finally variable X13 (security in public transportation) with an OR value of 2.258. At the same time, there is also an OR value of less than 1; variable X2 (public transport fares) has an OR value of 0.999, variable X4 (income) an OR value of 0.520, and variable X5 (origin of the trip) an OR value of 0.596. For an OR value of less than 1, to facilitate interpretation, the value is rounded into 1 / (odds ratio on the output). Resulting interpretations include:

- Variable X11 (parking availability), is interpreted that travelers traveling to the location of the commercial area are more likely to switch to using public transportation as much as 3.192 times compared to if there is no parking location in the commercial area.
- Variable X13 (public transport security), is interpreted that the interest in using public transportation to the location of the commercial area will be much more desirable as much as 2.258 times by travel agents if public transportation can ensure safety on the journey.
- Variable X7 (purpose of travel), is interpreted that travelers traveling to the commercial area demand as much as 2.024 times using public transportation to travel for work and shopping.
Variable X4 (income), is interpreted that travelers who have income of lower than 3 million will be more likely to switch to using public transportation as much as 1.923 times compared to travelers with income of higher than 3 million

Variable X9 (parking duration), is interpreted that with a limit on parking duration, travelers tend to choose to use public transportation 1.887 times as much as to choose private vehicles

Variable X5 (origin of the trip), is interpreted that travel agents from within the city are likely to use public transportation as much as 1.677 times to the location of the commercial area compared to those from outside of Cimahi.

Variable X2 (public transport fares), is interpreted that by setting affordable public transport fares, travelers will be more likely to switch to using public transportation as much as 1.001 times compared to using private vehicles.

Furthermore, based on the values of the variable equations generated in the table calculations above, the equation models can be formed as follows:

\[
\ln \left( \frac{\pi}{1 - \pi} \right) = 0.595 - 0.001 \times (X2) - 0.654 \times (X4) - 0.518 \times (X5) + 0.705 \times (X7) \\
+ 0.631 \times (X9) + 1.161 \times (X11) + 0.814 \times (X13)
\]  

(1)

Based on the above model equation, it is known that the parking availability variable has a greater value than other variables that influence the choice of modal change in Cimahi commercial area. Other variables that have the effect of changing modes are the public transport safety, the purpose of the trip, the amount of income, the duration of parking, the origin of the trip, and the fare of public transportation.

4.2. Public Transportation User Probability

From the model that has been formulated, the level of probability in the use of public transport can be seen; meanwhile, it is discussed earlier that parking availability has the greatest sensitivity among other indicators, (1.161 with a positive coefficient), and the safety indicator has the second-largest sensitivity (0.814 with a positive coefficient). Indicators of income, the origin of travel, and fares have a negative coefficient. This means that if the value of the three respective indicators increases, it will reduce the probability of shifting to public transport modes in the commercial area. On the other hand, security in public transportation, the purpose of travel, parking availability, and duration of parking have a positive coefficient; a greater value will increase the probability of using public transportation. The following is a table of the probability of modal transfer from private transport to public transportation using the results of the binary logit modeling that have been formulated and the magnitude of the variable values based on the scenario:

| No | X2  | X4  | X5  | X7  | X9  | X11 | X13 | Model | EXP  | 1 + EXP | Prob  |
|----|-----|-----|-----|-----|-----|-----|-----|-------|------|---------|-------|
| 1  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | 2.227 | 9.27201 | 10.2720 | 90.26% |
| 2  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | 1.727 | 5.62376 | 6.6238  | 84.90% |
| 3  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | 1.227 | 3.41098 | 4.4110  | 77.33% |
| 4  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | 0.727 | 2.06886 | 3.0689  | 67.41% |
| 5  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | 0.227 | 1.25483 | 2.2548  | 55.65% |
| 6  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -0.773 | 0.46163 | 1.4616  | 31.58% |
| 7  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -1.773 | 0.16982 | 1.1698  | 14.52% |
| 8  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -2.773 | 0.06247 | 1.0625  | 5.88%  |
| 9  | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -3.773 | 0.02298 | 1.0230  | 2.25%  |
| 10 | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -4.773 | 0.00845 | 1.0085  | 0.84%  |
| 11 | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -5.773 | 0.00311 | 1.0031  | 0.31%  |
| 12 | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -6.773 | 0.00114 | 1.0011  | 0.11%  |
| 13 | Rp  | 0   | 1   | 1   | 1   | 0   | 1   | -7.773 | 0.00042 | 1.0004  | 0.04%  |
Based on the table, it is known that the application of the current tariff of Rp3,000 only results in an opportunity to switch modes of 31.58%, whereas the application the lowest tariff according to the stated preference response of Rp2,000 changes the opportunity as much as 24.07 to 55.65% of the opportunity to switch modes using public transportation. Additionally, if a subsidized rate is applied resulting in free public transportation to the commercial area, there will be an opportunity to switch modes to 90.26%. This can certainly be supported if the availability of on-street parking is regulated and reduced, and off-street parking outside the commercial area is provided.

5. Discussion and Conclusions
Based on the results of the conducted research, it is understood that at least some factors are affecting the minimal use of public transportation and that the use of private vehicles is more desirable and somehow becomes an absolute choice. Regulations by the government of Cimahi via the Department of Transportation can be considered good based on Cimahi RPJMD (a regional Medium-Term Development Program), as the transportation service has served almost the entire Cimahi area; the public transport routes have included the part of the commercial area in the center of Cimahi. Besides, the influence of the commercial area in Cimahi that attracts attention from both inside Cimahi and outside Cimahi requires the involvement of all parties to manage traffic jams and to reduce the use of private vehicles. This will also impact the decreasing availability of both on-street and off-street parking.

Various scientific approaches have been applied to identify travelers around the commercial area; to understand the characteristics and perceptions of travelers towards public transport and parking; to formulate a model of the changes in the relationship of public transport fares and some respondents’ choices, with a stated preference questionnaire design; to formulate effective strategies for parking management to influence people going to the commercial to use public transportation.

In formulating the model, it can be seen that the response from the public is a preference in choosing and using public transportation, with the potential of Cimahi as public transportation routes have reached the entire commercial area, especially around Kelurahan Cimahi. Unfortunately, the route is not sufficient if the tariff set towards the commercial area is still not low enough. Also, the condition of the existing public transportation and its facilities are also inadequate. In contrast to public transport tariffs that must be more affordable, parking rates should be increased, particularly those in Cimahi central commercial area. There should also be several measures and policies to implement to reduce the number of vehicles parked at the commercial area.

What’s to bear in mind is that 65% of respondents believe that the current tariff for on-street parking in the commercial area is affordable or relatively cheap. 59.5% of respondents think that they prefer safer parking even though they have to pay more. This means that increasing the security of on-street parking in the central commercial area with high tariffs does not guarantee that there will be a reduction in the number of vehicles in the central commercial area. However, from the other two statements, there is a significant negative response, namely paying additional parking rates/fines to the parking operators in the commercial area when the parking duration exceeds the set duration, receiving a disagreeing response from 44% of respondents. The statement that parking fees in the commercial area is higher compared to parking outside the commercial area gets a disagreeing response of 42.5% of respondents. This can be a stimulant for vehicle reduction policies in parking areas in the commercial area.

Some of the recommendations are produced, which are actually parts of the results of the analysis conducted as well as the efforts of preparing this better research, including:

- Cooperation between stakeholders is needed; it is not only from the Government of Cimahi via the Department of Transportation, but also the support and cooperation of the Cimahi City Police to reduce the number of users of private vehicles with no driving license, both during regular document checks (razia) or in the parking area of the commercial area.
- Additionally, cooperation is required between the Government of Cimahi via Department of Transportation or the Regional Revenue Service with private parking managers such as Center
Park, ISS Parking, and Secure Parking as part of knowledge sharing, to be able to implement
on-street parking systems like off-street parking systems.
• Re-regulating parking fees in Local Regulation of Cimahi (Perda Kota Cimahi) No. 2 of 2017
concerning Public Service Levies is required so that parking rates can be adjusted again and
hourly parking rates can be applied. Promotion of the new parking tariff would necessarily be
carried out.

The research prepared is expected to be the start of other researches with similar topics and methods,
and to reduce all the limitations in this research. Based on the weaknesses of the study that have been
submitted, there are some suggestions so that this study can be continued better, including:

• Further studies or researches on the response and adaptability of public transport fares to the
commercial area in Cimahi.
• Further studies or researches on the response of travelers of the commercial area to changes in
parking fees both inside and outside the commercial area.
• Further studies on the decision to select modes to conduct shopping activities around the
commercial area by using multinomial logit model analysis.

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