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Provision of Facilities for Street Vendors and Public Transport Stopping Near New Development Locate in Artery Road to Minimize the Traffic Impact

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Abstract: Street vendors and public transport have the same rights in the use of public facilities but this time the trimmings less serious attention consequently its existence often lead to traffic congestion, especially on the construction of new activity centres. This study explores the relationship between the development and the presence of street vendors and public transport stops on the way and then proposes the provision of amenities in order to avoid barriers to access in and out of the building and minimize traffic impact.

Key words: Street vendors, public transport facilities, traffic impact, new development, minimize, especially

INTRODUCTION

Relationship problems of land use and transportation is not only a concern of academics but also the government and the public when he felt a lot of transportation problems such as traffic jams, delays and air pollution caused by the construction of new developmpment (ITE, 2004, 2012; SDAG, 2010). One attempt to balance demand side and the supply is to do traffic impact analysis, clearly stated that the role of the traffic impact analysis is protecting's rights in the transport system for both the public and minimize degradation of land use and transportation. The aim of implementing the traffic impact analysis as a bridge to connect the two so that the efforts to reduce the level of traffic congestion and improve the quality of life can still be carried (NCHRP, 2011; FDOT, 2014).

Traffic impact analysis of new development had a great progress since it is discovered by Curtin. Therea are various methods for estimating the trip generation this calculation of trip generation is the first step to four stages transportation planning (four stage model) and to traffic impact analyzes of a new development plan, hence the calculation of the analysis of trip generation is becoming the most important thing in transport planning and land use as well as being the right size or less precisely a plan (Chang *et al*., 2014). The accuracy of calculation of this trip is also very important for planning traffic impact mitigation that will be proposed in anticipation of changes in land use, development and anticipation of travel thereof (ITE, 2012). Analytical methods of travel distribution, modal choice until the assignment on the road network also continues to grow until now. Trip generation estimation and traffic impact continues to be developed with the basic ideas of experts (Shoup, 2003) stating that the trip generation will be strongly influenced by spacious floor plans of the building. But this thinking then was much criticized for the estimation of trip generation by a factor of spatial alone (e.g., floor area) can be very misleading if used by investors because investors could think that the investment will be more profitable when it has a great building because it is affecting the arrival of customers this will also be very detrimental to businesses and governments.

Criticism for all methods have been proposed by Barnard and Brindle (1987) that the theory is not only based on space travel, submitted that the man making the trip according to their needs not because the relationship area development (diversity and design of the building). (Flyvbjerg *et al*., 2005) said that planners sometimes part of the problem not part of the solution to the problem, especially in the prediction of trip as it is only based on the calculation of traffic and geographical factors. The prediction error could be due to latent factors that have not been considered in the planning. And that needs serious attention is among the many that have not been many studies that observe and discuss the impact of the presence of street vendors and public transport stopping while both of these are latent variables that can not be ignored. Implementation of traffic impact analysis on plant activity and mitigation efforts will not be effective if it is not expensive either case, the real proof of this neglect is that many centers are still causing traffic jams even after the implementation of the traffic impact analysis.

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Literature review

Street vendors: The concept of the sector 'formal' and 'informal' was first introduced by Hart JK through writings, entitled in 1971. This concept was developed and implemented by the International Labour Office (ILO) in research in seven cities of the third world that is free town (Sierra Leone), Lagos and Kana (Nigeria), Kumasi (Ghana), Colombo, Jakarta, Manila, Kardoba and Campina (Brazil) (Hart, 1973). Rachbini and Hamid, quoted by Korompis (2005) says, the informal sector serves as a provider of goods and services especially for the lower middle class who live in cities. As according to McGee were also cited by Korompis (2005) defines vendors is "the people who offer goods or services for sale from public places, primarily streetes and pavement". "Street Vendors who are traders peddling reviews their merchandise using a cart on the edge of the public streets, sidewalks and in front of the store". While Manning and Effendi (1985) mentions that the hawkers is one of the jobs of the most obvious and important in most cities in Africa asia, the Middle East and Latin America.

Business street is part of the small business group which is engaged in the informal sector known as the "street vendors" (Korompis, 2005) basically an informal sector activity must have a precise location in order to make a profit (profit) which is more than anywhere else and to achieve maximum benefit, an activity must be as efficient as possible (Donovan, 2008). Conception of the informal sector got a very broad internationally from experts economic development, thus encouraging research in several developing countries including Indonesia by various research institutions of government, private sector, NGOs and universities. This happens due to the shift in the direction of economic development that is not only focusing on macro-economic growth but more towards equitable distribution of income Swasono by Fransiska. Korompis said that the informal sector is not just because of lack of jobs but the informal sector is a pillar of the formal sector to the overall economy that proved inefficient this may indicate that the informal sector has been subsidizing.

Arterial Road: Primary Arterial Road designed with a design speed of at least 60 km/h, the driveway is limited can not be <500 m has road equipment sufficient, special lanes should be provided that can be provided for bicycles and vehicles slow the other, should not be disturbed by the shuttle traffic and local traffic as well as local activities. For secondary arterial roads: designed with a design speed of at least 30 km/h, the driveway is limited can not be <250 m has road equipment sufficient, special lanes should be provided for bicycles and vehicles slow other traffic disruption shuttle and then local traffic and local activities are minimized.

Traffic impact analysis: "Traffic impact analysis is a tool or a method to measure the traffic generated by the development plan with the construction of new access roads or access existing ones. Generally, traffic impact analysis includes the size and intensity of development plans, estimates of traffic impacts and mitigation measures that should be taken to ensure that the safe development plan to be implemented" (FDT, 2014).

ITE Methods (ITE, 2012) for the analysis of trip generation in traffic impact analysis has the advantage that an objective, logical plasticity, fast. Weakness is because the data used did not represent the general conditions (Ewing *et al*., 2010) and have not been able to accommodate the development of land use umum (Ewing and Cervero 2010). ITE cautions that their trip-generation rates are not appropriate or accurate for assessing land use projects located in downtowns, places served by public transit or with Transportation Demand Management (TDM) programs. That is because the ITE data is collected primarily at single-use suburban land use developments with plentiful parking and little transit service. In fact, traffic counts data that ITE receives that do not fit these criteria are not accepted for inclusion in ITE's trip-generation. Unfortunately, there is no source of trip-generation data for such projects currently available in the US (Parker, 2012) three current methods for the analysis of traffic impact the EPA MXD, NCHRP, MXD+developed by oleh (FDT, 2014) for the construction of a standalone (single bulding), building mixed (mixed building) until the Transit Oriented Development (TOD) no one has consider the impact of existence, street vendors and public transport as part of a trip generation, therefore all of these methods have problems if applied in a location that has peculiarities such as Indonesia. Comparison of current methods for estimation of trip and variables to be considered can be seen in Table 1.

As can be seen in Table 1 there has been no attention to the existence of street vendors and the public transport stops on the road in traffic impact analysis. This study is expected to improve the accuracy of prediction of trip so that the impact of such traffic congestion, chaos and pollution can be minimized as well as to propose a typical facility for that purpose.

Table 1: Comparison of three methods generation journey estimation based on characteristics considered

	Estimation method		
Variables	EPA MXD	NCHRP 684	MXD+
Characteristics considered			
Building density	V		V
Diversity usage: work/home	V	V	V
Diversity usage: home/shopping		V	V
The diversity of use: office/service		V	V
Diversity usage: entertainment, hotel		V	V
Design: connectedness, ease of walking	V	V	V
Design: separation between the use of		V	V
Objective: accessibility with public transportation	V		V
Objective: accessibility by foot	V		V
Distance from public transport stops	V		V
Size/scale building	V		V
Profll demographics	V		V
Data needed (for analysis)			
The average member of the family	V		V
Average per household vehicle ownership	V		V
Availability terminals and stations (within 1/4 mile)	V		V
Availability of workplace within 1 mile	V		V
Availability of workplace within a 30 min drive	V		V
Provision of employment regional	V		V
Located in the CBD or TOD?	V		V
Classification development plan		V	V
Estimated occupancy public transport		V	
Estimated usage mode		V	

MATERIALS AND METHODS

This research was conducted in two steps, the first step to prove that there is a relationship between plant trips to the presence of street vendors and public transport stops on the way. The second step is to provide examples of the provision of facilities to accommodate the first step for the first step, taken case study of several plant trips in Bandung considering that Bandung is a complete city with an icon of services, tourism, education, trade once the capital of West Java Province that relates directly to the nation's capital and already facilitated various accessibility such cipularang toll road, railway lines coupled with the flow of Foreign tourists coming from Husein Sastranegara Airport. Data taken with random sampling at some locations shopping centers, offices, banks, hospitals, restaurants and schools in Bandung. The existence of street vendors and the public transport stops on the way visits correlation and regression with a building area and the number of employees/students refer to the statement of professor shoup in "the truth in transportation planning" that "many factors variable for determining the trip generation of a development are: floor area, the number of workers, the density of buildings and others but among these factors, only the floor area to be the only affecting trip generation for a building and that too should not be expected that the floor area be the right size to predict the trip generation" (Shoup, 2003) analysis using regression analysis and correlation with the consideration that this is a statistical tool that is most commonly used in the prediction of trip (Shoup, 2003, 1997; Ewing *et al*., 2010; Chang *et al*., 2014).

RESULTS AND DISCUSSION

The floor area of the building and the number of employees see a correlation and regression with the presence of street vendors and public transport stopping for some central activities is summarized as Table 2.

Table 2 shows that the hawkers and public transport ngetem always found in plants, so that this trip is a thing that must be considered in the analysis of the impact of traffic in general, the most powerful relationship between the generating activities with street traders found in the allotment of shopping centers, hospitals and schools and less common in offices and banks. Stopping for public transport are found in shopping malls, restaurants and schools, little is found in hospitals because most patients use private vehicles either cars or motorcycles.

Provision of facilities for street vendors and public transport case city link: Land area of festival city link is 30.173^2 m, building area of 139.463 m^2 (all included hotels, theaters) total tenant that is open 282 tenant number of employees: 600 spacious parking: Harris

Table 2: Comprehensive relationship between the building and the number of employees with vendors and public transport stops on the way

Correlation and regression of each land use	Building area	Number of employees	Information
Shopping center			
Street vendors	$y = 6E-05x+5.308$, $R^2 = 0.24255$	$y = 0.0216x+3.8811$, $R^2 = 0.56955$	The number of employees more strongly affect the existence of street vendors and public transport instead of building area
Public transport stops on the way	$y = 3E-05x+4.4492$, $R^2 = 0.11468$	$y = 0.0165x+2.9034$, $R^2 = 0.62341$	
Office			
Street vendors	$y = -4E-06x+4.0007$, $R^2 = 0.00039$	$y = 0.0002x+3.8293$, $R^2 = 0.00763$	For the office but the relationship is not very strong presence, street vendors and public transport stopping remains indicate that this is a latent variable that must be considered
Public transport stops on the way	$y = -3E-05x+2.5621$, $R^2 = 0.04659$	$y = -0.0002x+2.3992$, $R^2 = 0.03259$	
Bank			
Street vendors	$y = 0.0001x+2.5312$, $R^2 = 0.05782$	$y = 0.0545x+1.1133$, $R^2 = 0.10451$	For banks, the relationship is not very very strong but remains indicate that this is a latent variable that must be considered stops on the way
Public transport stops on the way	$y = 2E-05x+2.8078$, $R^2 = 0.00402$	$y = 0.0136x+2.4212$, $R^2 = 0.01987$	
Hospital			
Street vendors	$y = 6E-05x+4.9542$, $R^2 = 0.75387$	$y = 0.0588x+2.9682$, $R^2 = 0.61976$	Building area more strongly affect the existence of street vendors and public on transport stopping than the number of employees
Public transport stops the way	$y = 5E-06x+2.6318$, $R^2 = 0.1223$	$y = 0.0062x+2.3979$, $R^2 = 0.13595$	
Restaurant			
Street vendors	$y = 6E-05x+4.9542$, $R^2 = 0.75387$	$y = 0.0588x+2.9682$, $R^2 = 0.61976$	Building area more strongly affect the existence of street vendors and public stops transport stopping than the number of employees
Public transport on the way	$y = 5E-06x+2.6318$, $R^2 = 0.1223$	$y = 0.0062x+2.3979$, $R^2 = 0.13595$	
School			
Street vendors	$y = -0.0004x+7.5952$, $R^2 = 0.42481$	$y = 0.0161x -9.7423$, $R^2 = 0.69491$	For school, the relationship is not very strong but remains indicate that this is a latent variable that must be considered
Public transport stops on the way	$y = -0.0002x+8.6681$, $R^2 = 0.50935$	$y = 0.0045x+3.2443$, $R^2 = 0.23233$	

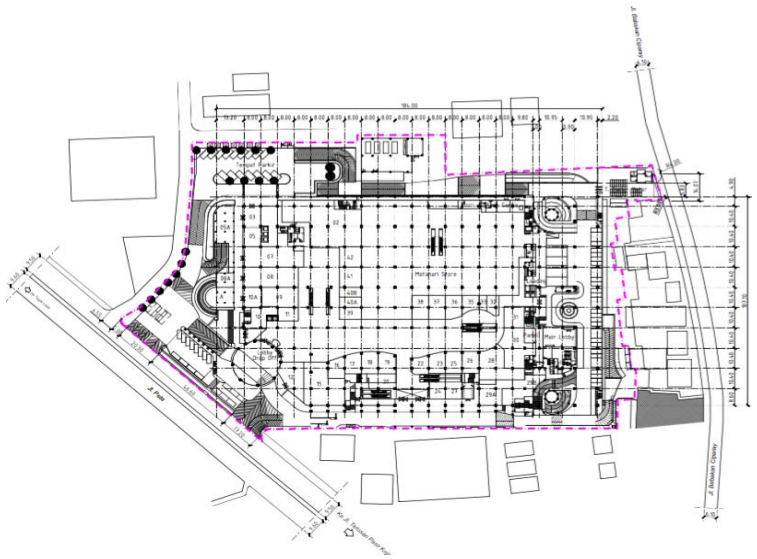

Fig. 1: Site plan of festival city link (mall)

Hotel 10.324 m^2 (70 lots) spacious parking: POP Hotel (Budget Hotel) 4,209 m^2 (35 lots). Spacious parking: Mall 50.162 m^2 (1250 cars, 1000 motorcycles).

According Dinas Perhubungan Kota Bandung annual average daily traffic of jalan peta (in front of festival city link) is 25.043 emp, maximal speed is 30 km/h and average speed is 24 km/h. According festival city link management, visitors in May, 825.386 person, number of cars in May = 99.631cars, number Motorcycle in May 101,636 motocycles. With the consideration that traders and public transport stops are latent variables that must be considered in the construction of new facilities provision, according to Table 2 existence of street vendors follows the equation $y = 0.0216x+3.8811$, so facility for street vendors 15 units for public transport the equation is $y = 0.0165x + 2.9034$, so the facility for public transport is 12 units. It can be recommended as Fig. 1 and 2.

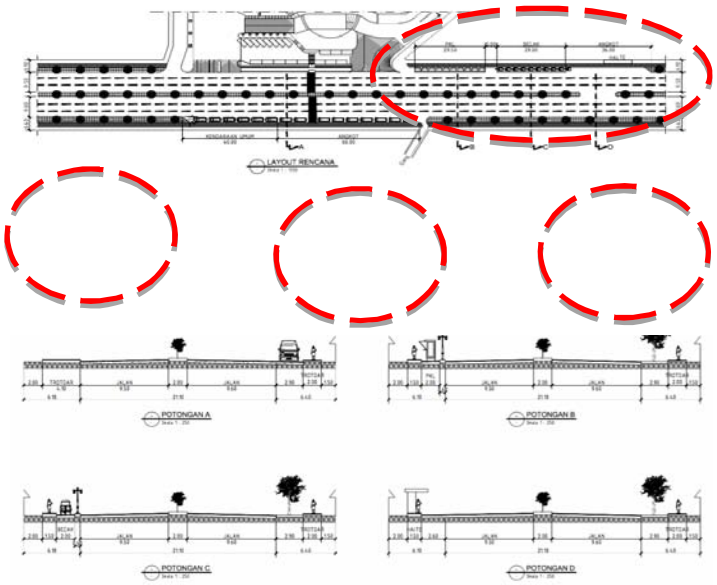

Fig. 2: Recommendation street vendors and public transport facilities

CONCLUSION

The results show the relationship between the area of the building or the number of employees with a presence of street vendors and public transport stopping may vary depending on the designation and the function of the building but consideration will be two of this (presence of street vendors and public transport stopping) is mandatory in the estimation of seizure travel for the purposes of traffic impact analysis for these two things are the latent variables are almost always found in every development center.

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