COEXISTENCE OF PEDESTRIAN, VENDOR AND VEHICLE IN
YOGYAKARTA MALIOBORO, INDONESIA

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1. INTRODUCTION

For certain reasons, transportation engineers or city planners who involve in infrastructure works such as road, sidewalks, parking area, etc. sometimes have satisfied with their planning without taking into consideration other external factors such as local culture, social life and economic background of the people. Unfortunately, in practice, such kind of planning would be less useful for the society in the area concern as they can not get much benefit from the implementation of the planning. Therefore, understanding of the people's interests become important in transportation planning.

This view can also be applied for the case of Malioboro street of Yogyakarta where pedestrians, vendors, and vehicles altogether exist. It is interesting to note since there seems to be conflicting interests among those three different groups. By using field data and questionnaires, the purpose of this paper is to find the proper way to minimize the conflict for which Analytic Hierarchy Process (AHP) approach is used as a model in the study.

2. CASE STUDY IN YOGYAKARTA

In the 1970s Yogyakarta was well-known as a "bicycle city" as bicycle became a major transportation mode of the people. Following with the improvement of the economy and the advancement of technology in the region, however, since 1980s the major transportation mode has changed to motorcycle. The problems appear as parking facilities in Yogyakarta city still heavily depend on on-road-parking instead of off-road parking, particularly in the down town of Malioboro where it becomes one of tourist destinations in the region. Since walking activity is a basic movement for everybody who wants to make a journey in the CBD of Yogyakarta, then pedestrian facilities become a particular concern. The problem is that decision maker sometimes pay less attention to the pedestrian and their walking facilities compared to that of for motorway.

In case of Malioboro, the street has been completed with pedestrian facilities (sidewalks). However, motorcycle parking is also located on the same place with walking facilities which is often considered a "conflict in use", let alone a lot of sellers /vendors sell their goods along the sidewalks of Malioboro street. So, on the one side of the sidewalks, problem of "conflict in use" often arises between vendors and pedestrians but at the same time the existence of vendors create the uniqueness and trait of Malioboro. On the other side of the sidewalks, the "conflict in use" becomes more severe since the sidewalk is also used for parking of motorcycles, but this parking facilities creates another convenience for the shoppers.

3. ANALYTIC HIERARCHY PROCESS MODEL

The Analytic Hierarchy Process Model (AHP Model) is a more or less faithful model for unstructured problems such as economic, social, and management sciences. This model was developed by Thomas L. Saaty to solve various problems by using systems approach, and the necessary judgment to evaluate the impact of various elements of a system on the whole system and determine their priorities. Saaty said that a central point in AHP Model approach is that people are often inconsistent, but priorities must be assigned and things done despite inconsistency.

The method of AHP Model can be described as follows:
1) The complex problems decompose into simple structure by using hierarchical form with the top level is a single purpose or a general aim, influenced by others factors or next lower level. These factors are also influenced by another group of factors which are located at the level below. The factors in each group or level of the hierarchy,

are assumed to be independent, and the elements of the lowest level are the alternatives which will be determined their priorities.

2) Matrices are constructed in such a way that each element of them reflects a comparison, and find the eigenvector with the largest eigenvalue. The eigenvector provides the priority ordering and the eigenvalue is a measure of the consistency of judgment.

3) From the questionnaires used in the study, we can get the pairwise judgment matrices as shown in table1 and 2. Three alternatives from people's point of view to their wistfully were analyzed. Those alternatives are: A (walkway just for pedestrian), B (walkway share for pedestrian and seller) and C (walkway share for pedestrian, seller and parking place). Five independent characteristics were selected for the comparison : attractiveness, comfort, convenience, safety and security.

The priority vector of the first matrix is given by
$$W^T = (0.352, 0.162, 0.186, 0.186, 0.113)$$
The selection for overall priority of alternative :
$$Y = [W_1, W_2, ..., W_5]W$$
So that the multiplication of the matrix is as follow:

$$Y = \begin{matrix} A \\ B \\ C \end{matrix} \begin{bmatrix} 0.078 & 0.500 & 0.249 & 0.634 & 0.200 \\ 0.487 & 0.250 & 0.157 & 0.192 & 0.400 \\ 0.435 & 0.250 & 0.594 & 0.174 & 0.400 \end{bmatrix} \begin{bmatrix} 0.352 \\ 0.162 \\ 0.186 \\ 0.186 \\ 0.113 \end{bmatrix} \rightarrow Y = \begin{matrix} A \\ B \\ C \end{matrix} \begin{bmatrix} 0.295 \\ 0.322 \\ 0.382 \end{bmatrix}$$

(Attractiveness Comfort Convenience Safety Security)

The final overall priority of alternative C is 0.382, B is 0.322 and A is 0.295 according to their overall impact.

This means that walkway share for pedestrian, seller and parking area (C) get the highest value than that of walkway share only for pedestrian and seller (B) and walkway just only for pedestrian (A).

4. CONCLUSIONS

From all of comparisons and computations above, by using AHP model, the coexistence of pedestrian, vendor and vehicle in the down town of Malioboro can be accepted. Furthermore, the arrangement of parking place, well organized of the vendor and provident pedestrian facilities are the important factors for further improvement.

5. REFERENCES

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Table 1.

	attractiveness	comfort	convenience	safety	security
attractiveness	1.00	2.00	2.00	2.00	3.00
comfort	0.50	1.00	1.00	1.00	1.00
convenience	0.50	1.00	1.00	1.00	2.00
safety	0.50	1.00	1.00	1.00	2.00
security	0.33	1.00	0.50	0.50	1.00

λ_{max}=5.052 CI=0.0131
CR=0.012 <0.1 ok!
λ_{max}= maximum eigenvalue
CI = Consistency Index
CR = Consistency Ratio

Table 2.

Attractiveness	A	B	C
A	1.00	0.14	0.20
B	7.00	1.00	1.00
C	5.00	1.00	1.00
λ_{max}= 3.01 CI=0.0065			
CR= 0.011 < 0.1 OK!			

Comfort	A	B	C
A	1.00	2.00	2.00
B	0.50	1.00	1.00
C	0.50	1.00	1.00
λ_{max}= 3.00 CI=0.00			
CR= 0.00 < 0.1 OK!			

Convenience	A	B	C
A	1.00	2.00	0.33
B	0.50	1.00	0.33
C	3.00	3.00	1.00
λ_{max}= 3.05 CI=0.027			
CR= 0.046< 0.1 OK!			

Safety	A	B	C
A	1.00	3.00	4.00
B	0.33	1.00	1.00
C	0.25	1.00	1.00
λ_{max}= 3.01 CI=0.0045			
CR= 0.007< 0.1 OK!			

Security	A	B	C
A	1.00	0.50	0.50
B	2.00	1.00	1.00
C	2.00	1.00	1.00
λ_{max}= 3.00 CI=0.00			
CR= 0.00< 0.1 OK!			

Attractiveness	W_1^T= (0.078, 0.487, 0.435)
Comfort	W_2^T= (0.500, 0.250, 0.250)
Convenience	W_3^T= (0.249, 0.157, 0.594)
Safety	W_4^T= (0.634, 0.192, 0.174)
Security	W_5^T= (0.200, 0.400, 0.400)