# Seminar on
# Theory and Application of
# Pedestrian Travel Culture

**Date: Tuesday, April 10th, 2012**

**Venue: Ministry of Public Works and Transport, Lao PDR**

**Organized by IRG-05-2005**

**Culturally sensitive pedestrian-centric philosophy to advancement of urban form in East Asia and Department of Transport/MPWT**

# Program

8:00 ~ 8:30
Registration

9:00 ~ 9:15
Opening address: Mr. Viengsavath Siphandone, the Director General, Department of Transport, Ministry of Public Works

8:45~12:00

## Part 1 Pedestrian Travel Culture

1. Purpose and Mission of the IRG and Past Activities
   -Upali Vandebona, University of New South Wales, Australia
2. Greeting from oversea visitors
   -Prof. Pongrid Klungboonkrong, Khon Kaen University, Thailand

Group photo and Coffee break

3. Concept of Pedestrian Travel Culture and Methodology
   -Hiroshi Tsukaguchi, Ritsumeikan University, Japan
4. Overview of Comparison of Awareness and Attitude toward Walking
   -Yoshiyuki Tajima, Ritsumeikan University, Japan
5. Effect of the Stage of Life and Lifestyle on Pedestrian Awareness and Attitude toward Walking
   -Hiroshi Tsukaguchi
6. Road Safety Issues in Laos
   -Mr. Somnuk Mektakul, Department of Transport / Ministry of Public Works and Transport, Lao PDR

Lunch break (Lunch provided by organizer)

13:00~14:30 Continuation of Part 1 Pedestrian Travel Culture

7. Corresponding Characteristics of Pedestrian awareness and attitudes in Taiwan
   -Hao-Ching Hsia, National Cheng Kung University, Taiwan
8. Korean Experience
   -Hun-Young Jung, Pusan National University, South Korea
9. Future view of the International Research Group (IRG)
   -Upali Vandebona

Coffee break

14:50~15:50

# Part 2 Panel Discussion on Pedestrian Travel Culture

Moderator: Upali Vandebona
Panel: Dr. Bounleam Sisoulth (Board of Directors, EASTS)
Prof. Pongrid Klungboonkrong
Hiroshi Tsukaguchi
Hun-Young Jung
Hao-Ching Hsia
Mr. Somnuk Mektakul
Mr. Lamphoun Kounpakdy
Mr. Phoumy Thanthaboun

15:50 ~ 16:00
Seminar closing: Upali Vandebona, University of New South Wales, Australia
Mr. Viengsavath Siphandone, Department of Transport, Ministry of Public Works, Laos

# CONTENTS

# 1. INTRODUCTION

Walking as a means of mobility has been important since the beginning of the human evolution. Today, walking is an unavoidable element in most passenger transport systems. To cater for walking, planners have to provide safe and user oriented pedestrian facilities. Also, in the modern day, importance of walking has increased as we strive to establish low-carbon emission cities to reorient the society toward ecological sustainability.

Pedestrian traffic is a complex phenomenon that should be and could be approached from various fields of academic research. A useful contribution to the multidisciplinary nature of understanding the pedestrian activity was provided by Nagayama (1989) who investigated the difference of pedestrian attitudes and behavior in several Japanese cities from the psychological point of view. His work and other researchers who have looked at impacts of gender and ethnicity (for example, Seedat et al., 2006; Lawson and Edwards, 1991) have indicated the need to understand the cultural significance in the context of pedestrian safety. Similarly, a study by Hughes (1988) has documented the influence of regional culture in the context of aesthetics of pedestrian facilities.

Pedestrian travel behavior is a composite outcome of infrastructure, individual characteristics and societal attributes. For example, awareness and attitudes toward walking depends on the lifestyle and outlook of people in a given region. Conversely, this particular mind-set has an effect on pedestrian behavior. Thus, understanding of pedestrian behavior is incomplete without an appreciation of the societal perspective. It is the lifestyle outlook that is referred to as the 'pedestrian travel culture' in this study.

Pedestrian traffic behavior is a composite outcome of infrastructure, individual characteristics and societal attributes. For example, awareness and attitude toward walking affect the lifestyle and outlook of people in a given area. Conversely, this particular mind-set has an effect on pedestrian behavior. Thus, understanding of pedestrian behavior is incomplete without an appreciation of the societal perspective. The challenge in this work is to include lifestyle elements in pedestrian facility planning without probing into personal life. Groundwork for this approach was documented by Sugihara and Tsukaguchi (2005) as well as Hsia and Yeh (2006). Tsuakguchi et al. (2007), in follow up work, made initial observations about comparisons among selected Japanese and Taiwanese cities from the view point of pedestrian travel culture. The above study focused on development of a methodology to identify similarities and dissimilarities of attitudes and preferences of pedestrians, as a means of understanding the outlook toward walking in different localities.

There are two main benefits anticipated from the study of pedestrian travel culture. They are:
(1) A behaviorally meaningful manner of planning for pedestrian space and establishing suitable

planning standards become possible when specific regional characteristics based on historical, cultural and lifestyle characteristics can be taken into consideration. This would reduce the need for a community to bow to fit and live with standardized trite planning. In the long-term, the community can develop a greater appreciation of their urban space when the built environment fits natural character of inhabitants.

(2) Planners and decision makers can set targets and priorities that are a close fit to the community they serve. Although they can use concepts handed down from national and international planning agencies, it is necessary to fine tune to local needs. On the other hand, planning agencies at higher levels of the hierarchy should provide adequate means and freedom to allow community level fine-tuning. Research is required to uncover the degree of specificity of the pedestrian culture so that appropriate protocols can be introduced to planning and engineering disciplines.

The work covered in this study attempts a quantitative analysis of pedestrians over East Asia countries in an attempt to better understand characteristics of citizens when they are engaged in walking. This study to understand pedestrian travel behavior is based on a framework that accounts for the outlook of residents toward walking in their communities and their particular sociological background. In particular, this paper explores the relevance of certain issues related to lifestyle and stage of life of citizens in different 21 cities in Japan, 4 cities in Taiwan, 2 cities in South Korea and one city in Australia.

## 2. CONCEPT OF PEDESTRIAN TRAVEL CULTURE

The aim of this research team is to provide evidence of the existence of the concept of pedestrian travel culture and to propose the appropriate direction applicable to pedestrian planning. In order to achieve this goal, it is necessary to explain important elements of the concept of pedestrian travel culture. The conceptual framework of pedestrian travel culture in this study is shown in Figure 2.1. This figure is a simplified illustration of the connectivity among elements that contribute to the pedestrian travel culture as proposed in Tsukaguchi et al. (2007). Briefly, the pedestrian behavior is influenced by system characteristics referred to here as regional characteristics. There are three main elements considered as regional characteristics. They are (A) level of service of the urban infrastructure (B) regional environment and (C) citizen attributes. It is the inclusion of citizen attributes under regional characteristics that allows us to consider pedestrian behavior in a cultural framework. There are interrelationships between elements of regional characteristics shown at the upper part of Figure 2-1 and pedestrian characteristics shown in the lower part of the diagram. Pedestrian characteristics include range of attributes such as pedestrian travel properties, awareness and general attitude toward walking, and awareness of pedestrian facilities and the surrounding.

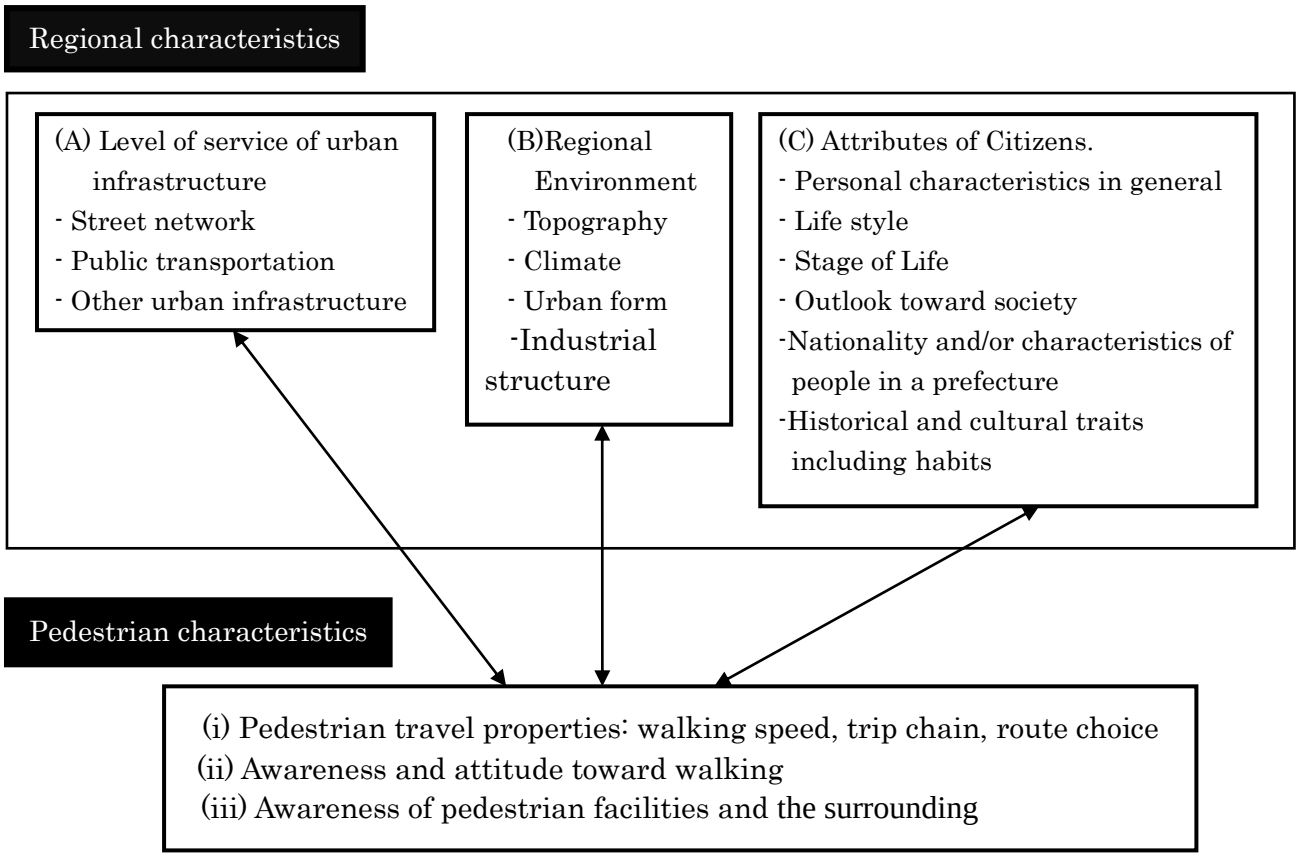



Figure 2-1 Topics of relevance for current study from the overall framework of pedestrian travel culture

As level of service of urban infrastructure and regional environment have strong contribution to pedestrian travel behavior, the types of (A) and (B) pedestrian characteristics are expected to be a significant proportion. For example, the influence of level of service of transportation facilities on pedestrian characteristics has been the subject many conventional research projects. Such works have made useful scientific contribution to the field of pedestrian planning. Anyhow, the analysis related to type (C) pedestrian characteristics may uncover more interesting issues because there is a wide range of unknown factors and possible quantification difficulties. This study wants to pay particular attention to the relationships centered around historical and cultural traits. This is anticipated to require an investigation of the role of habits, life style, way of thinking, and outlook toward society. Conventional studies on pedestrian travel do not deal with such seemingly 'soft' relationships, but this viewpoint is important to create 'pedestrian centric' environment in downtown areas and residential neighborhoods.

We have defined the pedestrian travel culture as a composite of all of regional and pedestrian characteristics. The pedestrian travel culture is a result of relationships among these features. Impacts from regional characteristics to pedestrian characteristics, and also from pedestrian characteristics to regional characteristics (two-way relationships) form the core of the pedestrian

travel culture.

There are several important relationships in Figure 2-1 including;

**(1)** Between (B) regional environment (Urban form: characteristics of cities including the location and population), and (ii) awareness and attitude toward walking,

**(2)** Among (C) attributes of citizens and (ii) awareness and attitude toward walking,

**(3)** Among (B) regional environment, (C) attributes of citizens, and (i) pedestrian travel properties,

**(4)** Between (A) level of service of urban infrastructure (public transportation) and, (iii) awareness of pedestrian facilities and environment,

Table 2-1 Relationships documented in this study

| | Relationship | Database | Publication |
|---|---|---|---|
| **(1)** | Between (B) regional environment (Urban form: characteristics of cities including the location and population), and (ii) awareness and attitude toward walking | 10 Japanese cities | Tsuakguchi, et al. (2007) |
| **(2)** | Among (C) attributes of citizens and (ii) awareness and attitude toward walking | 10 Japanese cities | Tsuakguchi, et al. (2009) |
| | | 4 Taiwanese cities | Hsia, et al. (2009) |
| | | 15 Japanese cities and 4 Taiwanese cities and two Korean cities | Tsuakguchi, et al. (2011-a) |
| | | 4 Taiwanese cities | Hsia, et al. (2011) |
| **(3)** | Among (B) regional environment, (C) attributes of citizens and, (i) pedestrian travel properties, | 5 Japanese cities | Tsuakguchi, et al. (2009) |
| **(4)** | Between (A) level of service of urban infrastructure (public transportation) and, (iii) awareness of pedestrian facilities and environment | 15 Japanese cities | Tanaka et al. (2009) |
| | | 15 Japanese cities and 4 Taiwanese cities and two Korean cities | Tsuakguchi, et al. (2011-b) |

The project group has studied above-mentioned relationships. Relationships previously analyzed following this framework are summarized in Table 2-1 which were published in EAST journal and proceedings. Firstly those studies were limited to comparison of regions within a single country but allowed the research team to develop and refine the conceptual framework and analysis methodology. At the second stage, the study fields are expanded to 22 urban areas located in three East Asia countries including Japan, Taiwan, South Korea, and Australia. The analysis based on the data of Sydney will be added from now on.

The project team would like to focus on the relationship of (1) and (2) in the Vientiane seminar.

# 3. METHODOLOGY FOR STUDIES ON PEDESTRIAN TRAVEL CULTURE

The fundamental methodology in this research is to investigate the relationships between the regional characteristics and pedestrian characteristics indicated in Figure 2-1. As the individual analytical method for each relationship is different, the methodology from analytical point of view is mentioned in each following chapter. Therefore in this chapter, two surveys are explained, including questionnaire surveys and observation surveys, in order to investigate the above-mentioned relationships.

## 3.1 Methodology for data collection

Two different data collection techniques were applied during this project. A questionnaire survey was conducted to explore attitudes and pedestrian space preferences. An observational survey was conducted to obtain supplementary data to quantify pedestrian behavior.

### 3.1.1 Questionnaire on awareness and attitudes toward walking

The following is the outline of the basic questionnaire form which is common to all countries. This form was utilized in surveys in Japan, and in Taiwanese and Korean surveys additional questions were added considering their own characteristics. The questionnaire forms were written in the three native languages Japanese, Chinese and Korean for the respective countries.

**Q1** Do you use public transportation more than once a month when you make a trip for commuting or shopping?

1.Yes 2 No

→ Go to Q4

**Q 2** Answer the following questions on access to the nearest bus stop.

**Q2-1:** How far is it from your home to the nearest bus stop?
1) less than 2 min, 2) 2~5 min, 3) 5~10 min, 4) 10~15 min, 5) 15~20 min, 6) more than 20 min

**Q2-2:** What do you think about the nearest bus stop?
1) very far, 2) a bit far, 3) moderate, 4) not so far, 5) close

**Q2-3:** How do you think about environment of the route to the nearest bus stop?
1) very easy to walk, 2) easy to walk, 3) moderate, 4) difficult to walk, 5) very difficult to walk

**Q2-4:** Can you walk safely the route to the nearest bus stop?
1) very safe, 2) safe, 3) moderate, 4) dangerous, 5) very dangerous

**Q2-5:** What time is acceptable to the nearest bus stop in the current condition?
1) Less than 2 min, 2) 2~5 min, 3) 5~10 min, 4) 10~15 min, 5) 15~20 min, 6) More than 20 min

**Q2-6:** What time is acceptable to the nearest bus stop, the walking environment is modified?
1) less than 2 min, 2) 2~5 min, 3) 5~10 min, 4) 10~15 min, 5) 15~20 min, 6) more than 20 min

**Q3** Answer the following questions on access to the nearest railway station.

**Q3-1:** What transport mode do you use to the nearest railway station?
1) walk, 2) cycle, 3) motor cycle, 4) car, 5) bus

**Q3-2:** How long do you need to go from your home to the nearest railway station on food?
1) less than 2 min, 2) 2~5 min, 3) 5~10 min, 4) 10~15 min, 5) 15~20 min, 6) more than 20 min

**Q3-3:** What do you think about the nearest bus stop?
1) very far, 2) a bit far, 3) moderate, 4) not so far, 5) close

**Q3-4:** How do you think about environment of the route to the nearest railway station?
1) easy to walk, 2) easy to walk, 3) moderate, 4) difficult to walk, 5) very difficult to walk

**Q3-5:** Can you walk safely the route to the nearest railway station?
1)very safe, 2) safe, 3) moderate, 4) dangerous, 5) very dangerous

**Q3-6:** What time is acceptable to the nearest railway station on food in the current condition?
1) less than 2 min, 2) 2~5 min, 3) 5~10 min, 4) 10~15 min, 5) 15~20 min, 6) more than 20 min

**Q3-7:** What time is acceptable to the nearest railway station on, if the walking environment is modified?
1) less than 2 min, 2) 2~5 min, 3) 5~10 min, 4) 10~15 min, 5) 15~20 min, 6) more than 20 min

**Q4** Select the most suitable category consistent with your thinking.

| | | very | fairly | moderate | fairly | very | |
|---|---|---|---|---|---|---|---|
| **Example**<br>(a) I like walking(a) I like walking | I think so | | ○ | | | | I don't think so |
| (a) I like walking(a) I like walking | | | | | | | |
| (b) Walking is smart (clever). | | | | | | | |
| (c) I am willing to walk for a short distance in daily life. | | | | | | | |
| (c) I like to walk and stroll. | | | | | | | |
| (e) I prefer a street with good scenery for walking. | | | | | | | |
| (f) I prefer a street with good surroundings (neighborhood), even if a little detour is necessary. | | | | | | | |
| (g) I prefer a street with some people, even if a little detour is necessary. | | | | | | | |
| (h) I prefer the shortest route when the surroundings (neighborhood) are not pleasant. | | | | | | | |
| (i) I walk faster than others. | | | | | | | |
| (j) I usually cross a road during a red signal if there is no traffic. | | | | | | | |
| (k) When I visit unfamiliar area, I usually obtain enough information before start of walking. | | | | | | | |

**Q5** What is your gender? 1) male, 2) female

**Q6** How old are you? 1) less than 20, 2) 20~29, 3) 30~39, 4) 40~ 49,
5) 50~ 59, 6) 60~69, 7) 70~79, 8) 80~

**Q7** What is your occupation? 1) company staff, 2) official, 3) independent,
4) part-time job, 5) student, 6) housewife, 7) others

**Q8** Do you have your own car? 1) yes, 2) no

**Q9** How long do you live in this city? 1) less than 1year, 2) 1~5 years, 3) 5~10 years
4) 10~20 years, 5) more than 20 years

**Q10** What city do you live in the longest period so far? ( )

**Q11** Do you have an experience to meet with any traffic accident? 1) yes, 2) no

### 3.1.2 Observation survey on walking behavior

The survey addressed two aspects: (a) walking speeds during different times of the day and (b) compliance of pedestrian traffic signals. The walking speed was classified according to gender of pedestrian as well as whether the pedestrian is walking alone or in a group. The observers recorded travel time taken between predetermined marker points from video recordings of the pedestrian activity.

Walking speed for pedestrians were obtained from observation surveys as well. The observers selected pedestrians randomly and recorded the walking speed according to a time of day classification and pedestrian type classification. Data were collected for four time of day periods, namely, morning (8:00 am to 10:00am), lunch time (12:00 am to 14:00 pm), afternoon (14:00 am to 16:00 pm) and evening (17:00 pm to 19:00 pm, typically when people return home). Observers categorized pedestrians to three types, namely “walking alone, male” “walking alone, female” and “walking in group”.

Pedestrian traffic signal compliance survey was carried out for 50 signal cycles (see Table 8-2) at a selected signalized intersection. The locations selected had clearly marked zebra crossings for pedestrian use. Cycle length of signals at these sites ranged from 110 to 180 seconds. The pedestrian signal has three phases, Green, Flashing Green and Red. For the purpose of this survey any pedestrian who commenced the crossing activity during a Pedestrian Red signal was considered non-compliant and all others were considered compliant.

## 3. 2 Selection of cities surveyed

### 3.2.1 Classification of cities surveyed

In this section, we explain the selection method for cities surveyed. Japanese cities having populations of more than one hundred thousand in 2005 were chosen, which included 227 cities. The characteristics of the cities used in this section are shown in Table 3-1.

Table 3-1 City characteristics used in classification

| | Characteristics |
|---|---|
| Population | Population, population density, percentage of people older than 65 years, inflow population, outflow population, daytime population, number in household |
| Land area | Total land area, inhabitable land area |
| Economic activity | Number of enterprises in secondary industries, number of enterprises in tertiary industries, products of agriculture, amount of industrial shipments, number of newly constructed houses, number of commercial enterprises |
| Labor | Employment in (1) primary industries (2) secondary industries (3) in tertiary industries; unemployment rate, citizens older than 15 years working or studying within their home city |
| Living standards | Number of retail stores, number of restaurants, total road length, total length of major roads, total length of minor roads, total length of paved roads, number of retained motor vehicles, number of retained passenger cars per household, number of post offices, number of urban parks |

These cities were classified by applying principal component analysis and successive cluster analysis; the Tokyo metropolis was excluded in the present study because Tokyo is too large and complex to obtain a reasonable classification for this analysis. The principal component analysis identified the following three factors.

Table 3-2 Major factors

| Factor | Nature of the factor |
|---|---|
| First factor | Intensity of urban activity |
| Second factor | Urban and rural features |
| Third factor | Age distribution |

Using the scores obtained by principal component analysis, cluster analysis was done allowing the identification of seven types of cities. These types are listed approximately in the order of increasing size of population.

Table 3-3 Classification of cities

| City type | | Cities classified into type |
|---|---|---|
| Type1 | Local cities | Cities located in rural areas excluding large cities, or satellite cities in metropolitan areas (86 cities) |
| Type 2 | Major cities | Fukui, Akita, Kanazawa, Yamaguchi, Takamatsu, Tokushima, Kumagaya, Ogaki and others (84 cities) |
| Type 3 | | Fukushima, Nagano, Niigata, Nara, Matsuyama, Kumamoto, Fukushima and others (43 cities) |
| Type4 | Ordinance-designated cities | Kyoto, Nagoya |
| Type 5 | | Sendai, Hiroshima, Fukuoka, Kitakyushu, Kobe, Sapporo, Saitama, Chiba, Kawasaki |
| Type 6 | | Yokohama |
| Type 7 | | Osaka |

### 3.2.2 Cities selected for surveys

In principle, we followed the classification scheme shown in Table 3-3 that sorts cities into seven types. The nine underlined cities were selected to ensure a representative geographical distribution across Hokkaido, Honshu, Shikoku, and Kyushu provinces. Type 1 was excluded from this survey because none of the cities could be classified as significant regional centers, whereas the present study intended to focus on principal cities in the above-mentioned regions. Recall that Tokyo was not subject to the classification. However, the importance of this centre to Japan and economy is indisputable, so Tokyo was added to the sample. Therefore, the survey covered 10 cities spread across Japan.

Questionnaire surveys were conducted in the respective official languages in 10 Japanese cities, 4 Taiwanese cities, and 2 South Korean cities listed in Table 3-4. Selection of the target cities in Japan focused on selecting urban centers with greater than 100,000 of population. There were 227 such cities. These cities were sorted into seven types of cities using a principal component analysis and successive cluster analysis as shown in the directly before this section. Target urban centers were selected to be distributed approximately evenly in this list of cities. In Taiwan and South Korea, the target cities were selected for opportunistic reasons, based on proximity to the university where the collaborating research team members are located. An attempt is made to select cities that fit into the range of population size encountered in the Japanese surveys while selecting cities near the host universities in Taiwan and South Korea to minimize the survey administration cost.


Figure 3-1 Location map of cities covered in data collection

Table 3-4 Number of respondents in different East Asian cities

| Country | City | Population | Year Surveyed | Response Sample Size |
|---|---|---|---|---|
| Japan | Sapporo | 1,906,129 | 2004 | 237 |
| | Sendai | 1,037,093 | | 241 |
| | Tokyo | 8,502,527 | | 240 |
| | Nagano | 387,815 | | 259 |
| | Kanazawa | 458,833 | | 194 |
| | Kyoto | 1,464,137 | | 243 |
| | Osaka | 2,667,817 | | 222 |
| | Hiroshima | 1,174,103 | | 216 |
| | Matsuyama | 515,857 | | 242 |
| | Fukuoka | 1,461,631 | | 275 |
| | Fukushima | 293,465 | 2008 | 216 |
| | Kumagaya | 102,612 | | 256 |
| | Ogaki | 164,618 | | 306 |
| | Tokushima | 263,806 | | 246 |
| | Urazue | 111,595 | | 167 |
| | Osaka | | 2011 | 205 |
| | Matsuyama | | | 249 |
| | Sapporo | | | 239 |
| | Urazoe | | | 208 |
| | Tokyo | | | 210 |
| Taiwan | Kaoshiung | 1,525,999 | 2006 | 296 |
| | Tainan | 772,279 | | 318 |
| | Taichung | 1,078,348 | 2008 | 300 |
| | Chiayi | 274,657 | | 329 |
| Korea | Pusan | 3,523,582 | 2008 | 511 |
| | Daegu | 2,464,547 | | 401 |
| Total | | | | 5778 |

Note: (1) Population values in Japanese cities are estimates available for 2010. Population values in Taiwan and Korea were as reported for 2007 and 2009 respectively.
(2) Osaka, Matsuyama, Sapporo, Urazoe and Tokyo were surveyed again in 2011, focusing on stage of life and lifestyle.

The locations of all cities surveyed are illustrated in Figure 3-1, excluding Sydney, Australia.

# 4. OVERVIEW OF COMPARISON OF AWARENESS AND ATTITUDES TOWARD WALKING

This study has already shown the structure of pedestrian travel culture in Figure 2-1. In this chapter, we discuss the relationship (1), that is, the relationship between (B) "Urban form" and (ii) Awareness and attitude toward walking".

## 4.1 Comparison of citizen' image of walking among Japanese cities

To determine the impression of walking in the mind of the respondent, the following eight statements

were used:

(a) I like walking.

(b) Walking is smart.

(c) I am willing to walk for short distances in daily life.

(d) I like to walk and stroll.

(e) I prefer a street with good scenery for walking.

(f) I prefer a street with good surroundings (neighborhood), even if a little detour is necessary.

(g) I prefer a busy street, even if a little detour is necessary.

(h) I prefer the shortest route when the surroundings (neighborhood) are not pleasant.

Statements (a) through (d) indicate a general attitude toward walking, while statements (e) through (h) indicate preferred routes for walking.

The first four statements were applied to measure the attitude toward walking. The remaining four statements were applied to measure the preferred. The subjects were asked to rate the statements using five levels (0 to 4). Complete agreement with the statement was indicated by a value of 4.0, while strong disagreement with the statement was indicated by a value of 0.0. Statements that received a response greater than 2.0 were considered to be positive.

The overall results for Japanese cities surveyed are presented in Figure 4-2. In general, citizens perceived 'walking' as a positive action, with a preference for routes with good scenery and surroundings.

Comparison of results from ten cities does not show a clear difference among the evaluations of walking as shown in Figure 4-3. All diagrams have remarkably similar pattern. To investigate the results more closely, analysis of variance was performed. Although the data obtained from the questionnaires are rank order statistics, this study initially regarded their average as an ordinary variable to be able to estimate the tendency. But a detailed analysis required nonparametric statistics.

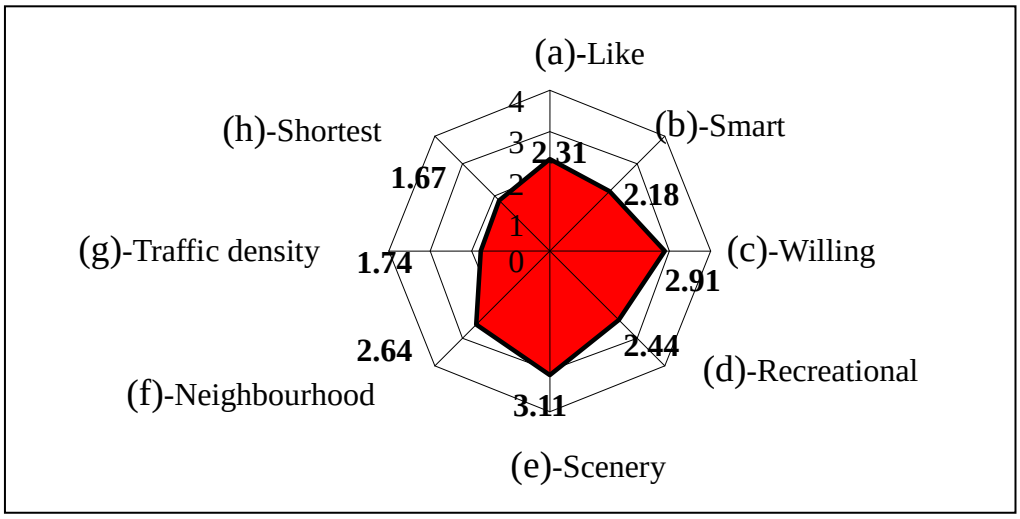
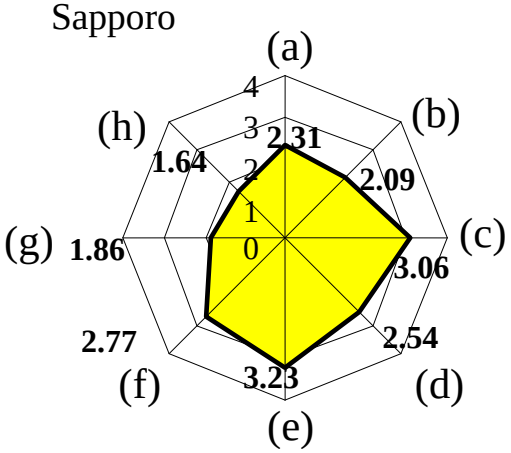
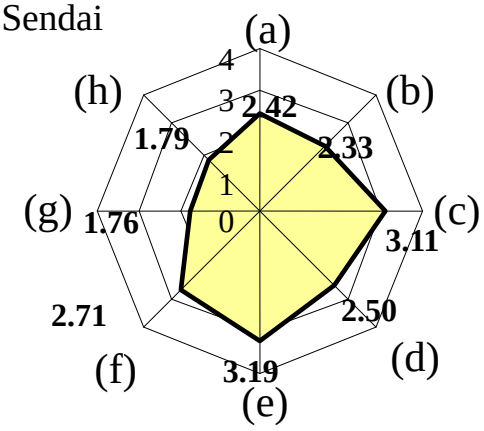



Figure 4-2 Evaluation of an image of walking in ten cities in Japan

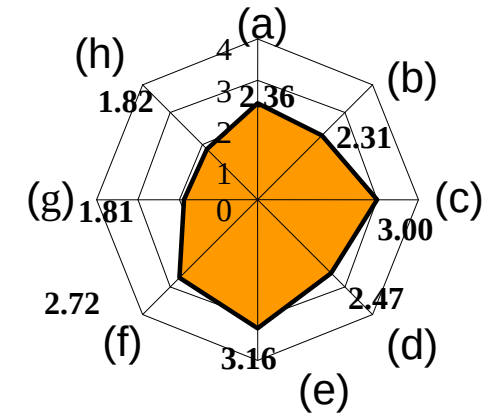
Sapporo



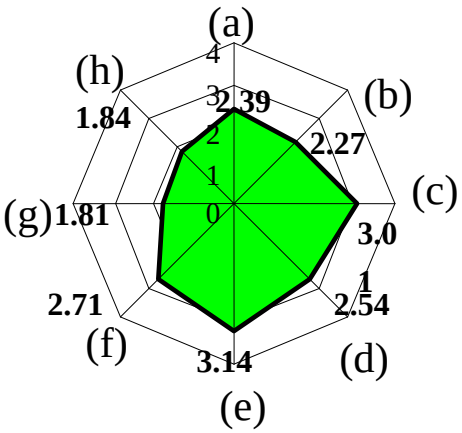

Sendai



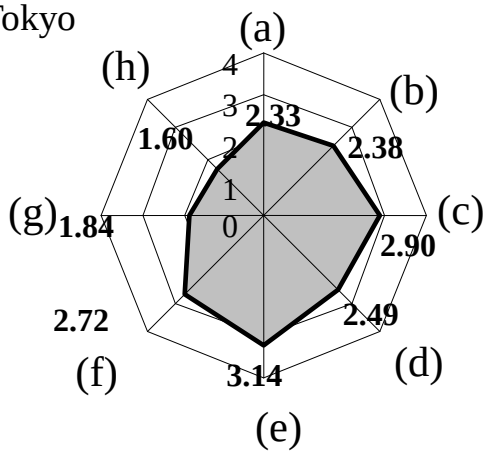

Nagano



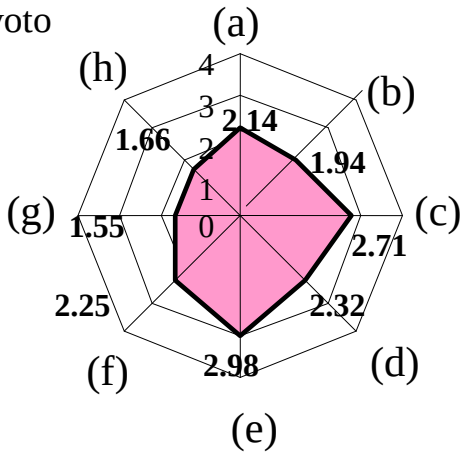

Kanazawa




Tokyo




Kyoto



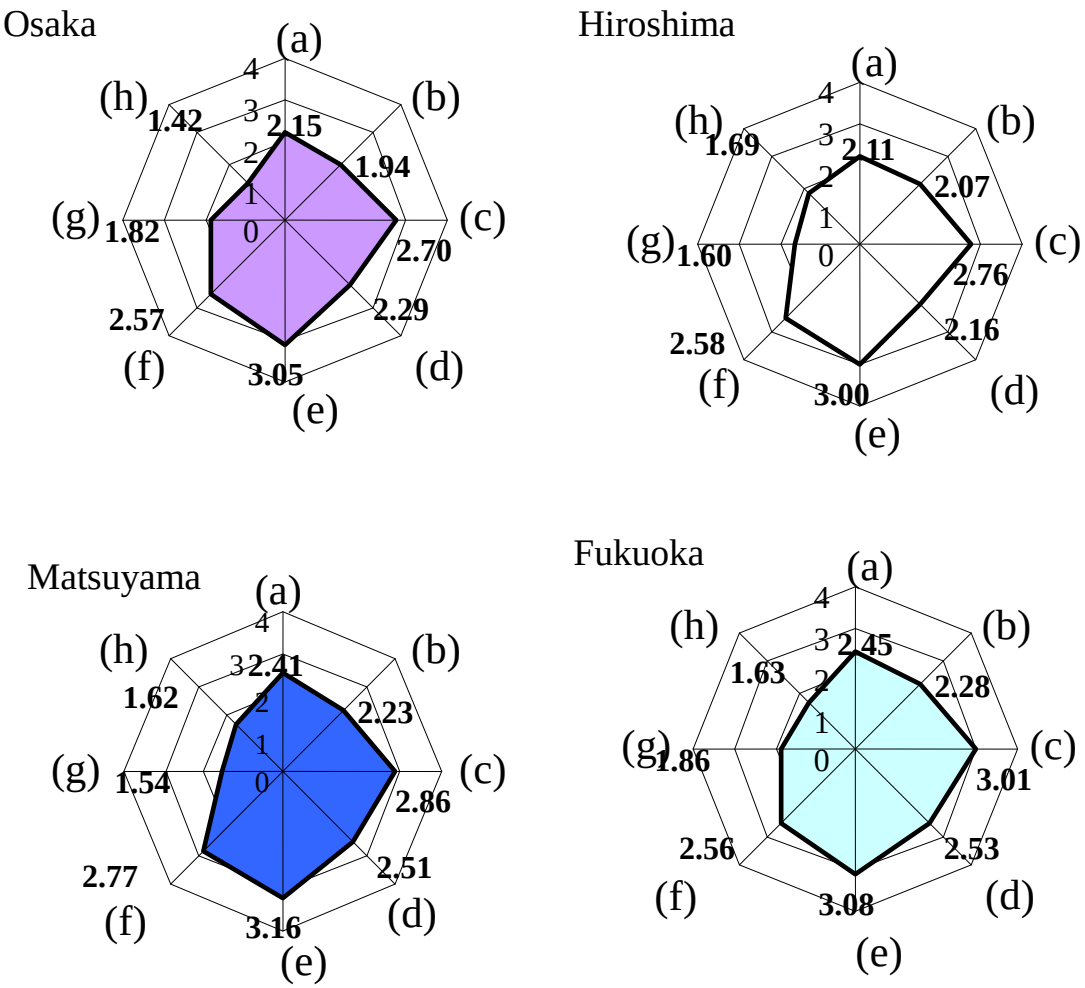



Figure 4-3 Evaluation of walking image in every city

The nonparametric variance analysis used here is the Kruskal-Wallis test. If equation (1) holds, a significant difference exists between the values. The results shown in Table 4-1 indicate that a regional difference exists in five factors out of eight. Results shown in Table 4-1 suggest that a significant difference exists in statements (e) through (h), which relate to preferred routes for walking than in statements (a) through (d), which represent a general attitude toward walking.

$$H(\chi^2) = \frac{h}{1 - \sum_{j=1}^{m} \frac{Tj}{(N^3 - N)}} \geq \chi^2_{a-1}(\alpha) \qquad (1)$$

where

$$h = \frac{12}{N(N+1)} \sum_{i=1}^{k} \frac{R_i^2}{n_i} - 3(N+1) \quad ,$$

$T_j = t_j^3 - t_j,$

$n_i$ : sample size of cities classified to group i,

N : total number of samples,

$R_i$ : sum of the ordered data in each city,

$t_j$ : number of samples in the same rank order,

$\alpha$ : level of significance.

Table 4-1 Results of Kruskal-Wallis test

| Factors | $H(\chi^2)$ | Degrees of freedom | $\chi^2_9(0.05)$ | $\chi^2_9(0.01)$ | Significance |
|---|---|---|---|---|---|
| b) Walking being smart | 26.8 | 9 | 16.9 | 21.7 | 1% |
| e) Preference of a street with good scenery | 17.5 | | | | 5% |
| f) Preference for street with good surroundings | 17.0 | | | | 5% |
| g) Preference of a busy street | 28.2 | | | | 1% |
| h) Preference of the shortest route | 20.8 | | | | 5% |

For the five factors for which a difference was identified, the pairs of cities with significant differences were identified. Table 4-2 shows values resulting from using Bonferroni's method, and indicates that a significant difference exists between Tokyo and Osaka, and other cities.

Table 4-2 Pairs of cities with a significant difference

| Factor | Pair of cities with significant difference |
|---|---|
| b) Walking being smart | Tokyo - Matsuyama |
| | Tokyo - Sapporo |
| | Tokyo - Osaka |
| e) Preference of a street with good scenery | ---------- |
| f) Preference of a street with good surroundings | Tokyo - Kyoto |
| g) Preference of a busy street | Tokyo - Matsuyama |
| | Osaka - Matsuyama |
| | Fukuoka - Matsuyama |
| h) Preference of the shortest route | Osaka - Kyoto |

### 4.3 Follow-up comparison among Japanese, Taiwanese, and Korean cities

#### 4.3.1 Comparison between Japanese and Taiwanese cities

A follow up study has been conducted in Taiwan although the main purpose of this study was to investigate the characteristics of the awareness and attitude toward walking in Japanese cities. Here, the data of Tainan and Kaoshiung surveyed in 2006 were used. The comparison between Japanese cities and other Asian cities is an interesting extension to this research work. Because the composition of subjects' ages in the Japanese and Taiwanese surveys was different, information from the subjects younger than 30 years in the Japanese survey were chosen and used for the comparison in Figure 4-4.

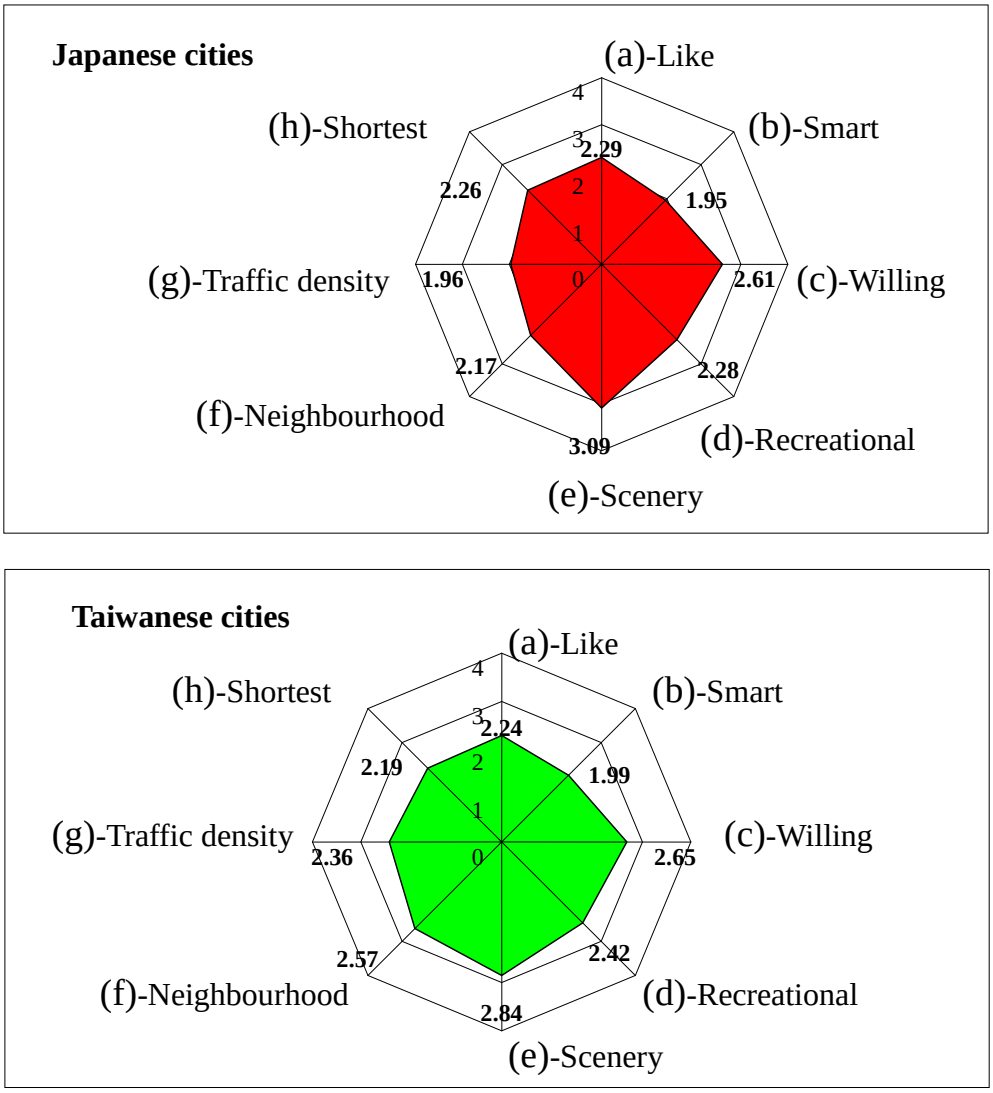



Figure 4-4 Comparison between Japanese and Taiwanese cities on awareness and attitude to walking.

The data in Figure 4-4 show little difference between the Japanese and Taiwanese for statements (a) through (d), which are related to general attitude toward walking. In contrast, a clear difference exists between the two for statements (e) through (h), which relate to preferable routes for walking. The statements, 'I prefer a street with good surroundings even if a little detour is necessary' (f), and 'I prefer a busy street even if a little detour is necessary' (g), are highly associated with Taiwanese cities.

### 4.3.2 Comparison among three countries

At the next step of comparison of general attitudes, preferences and stated behavior of pedestrians among the 3 countries, average values were computed from the corresponding cities for responses to the 10 statements, in which two statements (i) and (j) are added to the earlier mentioned 8 statements. These average values are presented in Figure 4-5. Here, data obtained in the four Taiwanese cities were used for analysis.

Recall that attitudes toward walking were interpreted from statements (a) to (d) and all cities in Japan and Taiwan show an average value of greater than 2.0 in the agreement scale. This shows positive attitudes toward walking in general in these two countries. In comparison, South Korean results show that the average values are below 2.0 for statements (a) to (d) indicating a negative attitude regarding walking.

Statements (e) to (h) related to preferred characteristics of pedestrian paths and the results shown in Figure 4-5 indicate a much larger spread. The statements (e), "I prefer a street with good scenery for walking", and (f) "I prefer a street with good surroundings (neighborhood), even if a little detour is necessary" have similar level of high agreement from pedestrians in cities in Japan and Taiwan. Strangely, the average score obtained from Korean respondents were less than 2.0 and means a disagreement with the need for a pleasant environment for walking. On the other hand, for the statements (g) "I prefer a street with some people, even if a little detour is necessary" and (j) I usually cross a road during a red signal if there is no traffic, the Korean respondents have provided a relatively positive response.

The spider-web representation adopted here is able to display these observations in an effective manner. Figure 4-5 suggests that there is a clear difference among views from pedestrians of the three countries. However, difference between results from Japan and Taiwan are relatively small in comparison to the differences with South Korea.

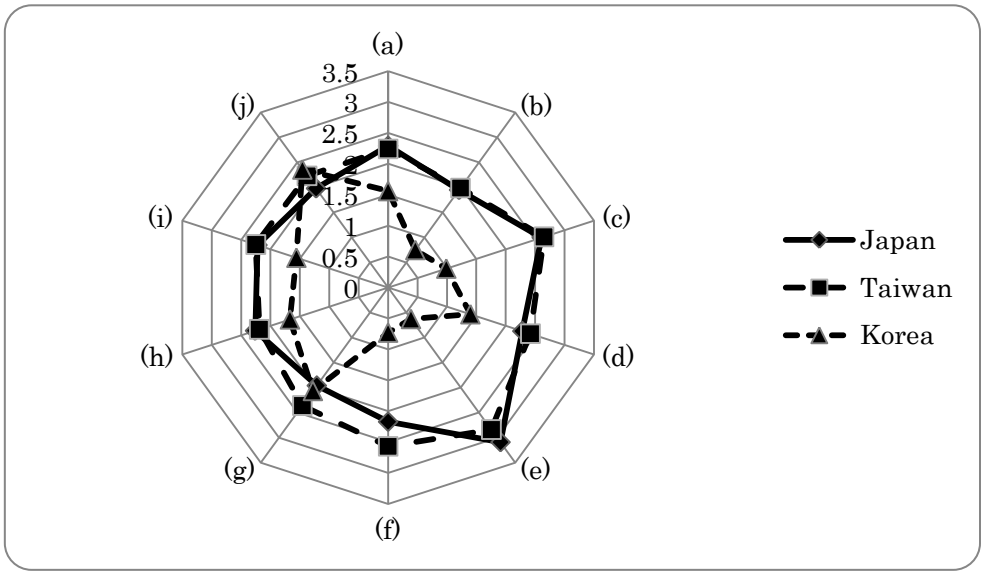



Figure 4-5 Comparison of characteristics of awareness toward walking in the three countries

### 4.4 Conclusions

This was an exploratory study to investigate 'pedestrian travel culture,' which is an important concept for successful development of pedestrian facilities and transport planning. The concept of 'pedestrian travel culture' is new to transport researchers; no previous studies on this subject were available to assist in formulating the concept. The results of this study led to the proposal of a tentative definition for the concept, allowing further investigations to proceed.

The awareness and attitude toward walking have been analyzed using a questionnaire with a target sample size of 10,000 subjects in more than 10 cities in Japan. The survey showed that a considerable difference exists in factors related to preferred routes for walking and factors related to general attitudes toward walking. Mathematical and graphical methods useful for such comparisons have been explained earlier in the paper. Statistical analysis has allowed the research team to identify city pairs with significant differences in attitudes and preferences related to walking.

In addition, a supplementary survey was conducted in two cities in Taiwan to provide further comparisons. Comparing pedestrian travel culture exists between Japanese cities and Taiwanese cities, we can find that a difference in pedestrian travel culture exists between them. However, when we compare three countries, the difference between results from Japan and Taiwan are relatively small in comparison to the differences with South Korea.

These findings suggest that it is meaningful for urban planners to perform a comprehensive study of 'pedestrian travel culture' in different Asian cities.

# 5. EFFECT OF STAGE OF LIFE AND LIFESTYLE ON PEDESTRIAN AWARENESS AND ATTITUDE TOWARD WALKING

In the previous chapter, this study has already shown the structure of pedestrian travel culture in Figure 2-1. In this chapter, the relationship (2) is discussed, that is, the relationship between (C) "Lifestyle and stage of life" and (ii) Awareness and attitude toward walking".

## 5.1 Data collection methodology

Questionnaire surveys were conducted in the respective official languages in 10 Japanese cities, 4 Taiwanese cities, and 2 South Korean cities listed in Table 5-1. Selection of the target cities in Japan focused on selecting urban centers with greater than 100,000 of population. There were 227 such cities. These cities were sorted into seven types of cities using a principal component analysis and successive cluster analysis as shown in the directly before this section. Target urban centers were selected to be distributed approximately evenly in this list of cities. In Taiwan and South Korea, the target cities were selected for opportunistic reasons, based on proximity to the university where the collaborating research team members are located. An attempt is made to select cities that fit into the range of population size encountered in the Japanese surveys while selecting cities near the host universities in Taiwan and South Korea to minimize the survey administration cost.

There were some notable differences in survey administration method among countries. In Japan, questionnaires were mailed to 1000 randomly selected citizens in each city. Response rate achieved was approximately 24%. Interview survey technique was applied for data collection in Taiwan using trained university students. In South Korea the questionnaire forms were distributed and collected during classes held for renewal of driver license. It is acknowledged that these differences in the survey administration cause different biases to the survey sample selection. Respondent sample sizes are shown in the last column of Table 2-1. Here, the data observed in 2004 were utilized in Japan.

The questionnaire forms were written in the three native languages Japanese, Chinese and Korean for the respective countries. Much effort had been devoted to select the equivalent wording and terminology as well as the structure of the questionnaire. In this research project, the awareness and attitudes toward walking is measured by asking members of the community about their agreement or disagreement to a series of questions in a scale of 0 to 4 as explained later. The subjects were asked to respond to following 10 statements. The first four statements were related to the general attitude toward walking. The next four statements were related to characteristics of preferred routes for walking, and the last two statements were related to personal reflections of the individual's walking behavior. The 10 statements were:

(a) I like walking.
(b) Walking is smart (clever).
(c) I am willing to walk for a short distance in daily life.
(d) I like to walk and stroll.
(e) I prefer a street with good scenery for walking.
(f) I prefer a street with good surroundings (neighborhood), even if a little detour is necessary.
(g) I prefer a street with some people, even if a little detour is necessary.
(h) I prefer the shortest route when the surroundings (neighborhood) are not pleasant.
(i) I walk faster than others.
(j) I usually cross a road during a red signal if there is no traffic.

Complete agreement with a statement was indicated by a value of 4.0, while strong disagreement with the statement was indicated by a value of 0.0. In this scheme, statements that receive responses greater than 2.0 were considered positive responses and those with a response less than 2.0 were considered negative responses.

The aim here is to analyze the relationship between these pedestrian characteristics and demographic attributes of citizens. Therefore, citizen's attributes and accessibility properties were also recorded, including gender, age, car ownership, public transport usage, distance to the nearest bus stop and railway station, and perceived walking time to the nearest bus stop.

Recall that this study intends to analyze the relationship between pedestrian characteristics in terms of awareness and attitudes toward walking, and attributes of citizens in terms of lifestyle and life stage as shown in Figure 2-1. Pedestrian behavior characteristics relevant here are measured using responses for the statements (a) to (j) given in the questionnaire. For the purpose of stage of life and life style one relevant variable is the 'age' of respondents. The age was recorded at intervals of 20 years, in other words, respondents were grouped into age groups designated as 'below 20 years', "20 – 40 years", 40 – 60 years" and "above 60 years" old. This classification is sufficient to reflect the stage of life. It is acknowledged that the stage of life implies attributes such as marital status, number and age of children and employment or retirement stages which were not covered in the surveys performed. Such attributes can be expected to have a co-relationship with the biological age. On the other hand, age may represent life style as well, but to a limited extent.
The other variable of interest for the purpose of the current analysis is the 'public transport usage'. Indeed, the term lifestyle has a broad meaning, and "public transport usage" covers one aspect of lifestyle. This variable has been recorded as a frequency of usage where the respondent stated how often per week he or she has used public transport during a week. For the purpose of this study, a respondent who claims to use public transport more than once a month is considered a public transport user. A person who claims public transport usage is less than 1 per month is termed

'non-user' in the analysis presented later.

Preliminary investigation has shown that there are differences in the age profile of respondent properties in the samples from the three countries. This is an outcome of the differences of the sampling techniques mentioned earlier, in the three countries. Age distribution of respondents from Japan has almost half the sample in age group of above 60 years (See Figure 5-1). The below 20 years group was consistently very low in the survey samples from Japan. These observations could be considered consistent with the mail back survey technique that relied on the time availability and the goodwill of respondents. Samples from Taiwan and South Korea have a large proportion of respondents in the age band from 20 to 60 years old, as shown in Figure 5-1. The statistical analysis method followed during the comparison study is able to account for these variations of age distribution.

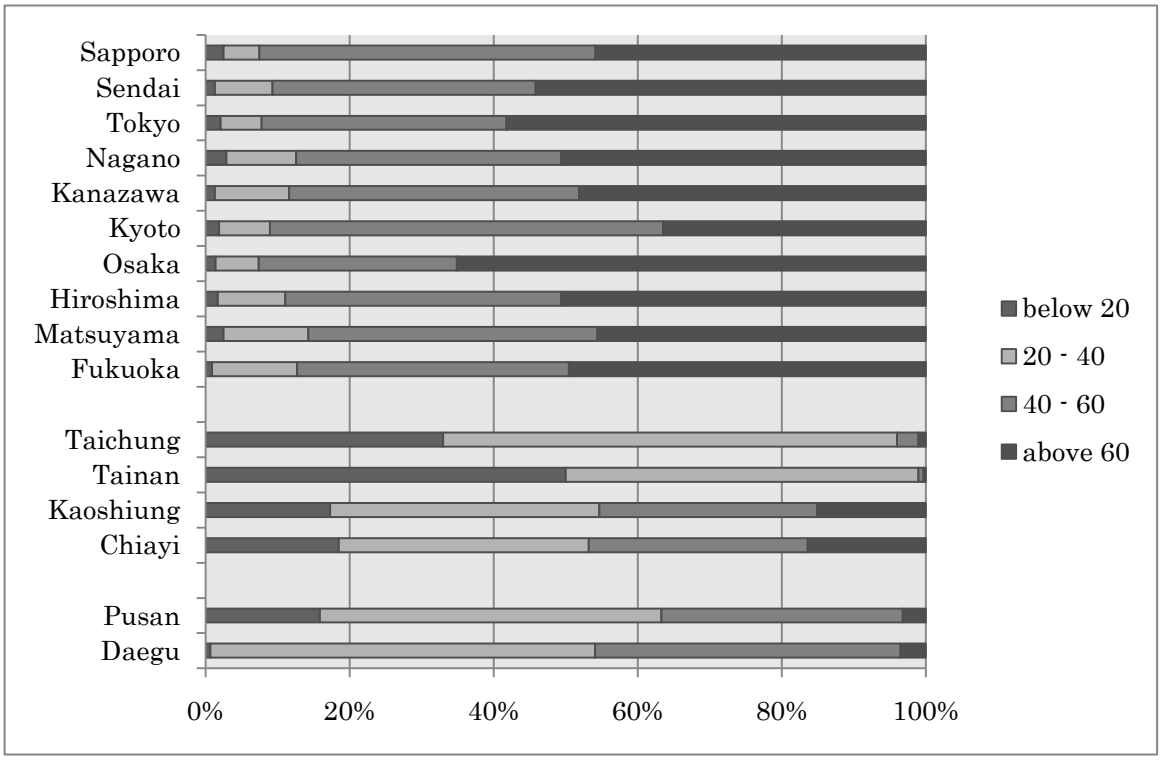



Figure 5-1 Age distribution of respondents in each city

As mentioned earlier, the other variable considered here to reflect the stage of life and lifestyle is the public transport usage. The public transport usage values of respondent samples are shown in Figure 5-2. In one city (from South Korea) the public transport usage group has exceeded 90%. Cities in Japan have provided the largest spread of the usage counts and values vary from approximately 33% to 90%. Public transport usage counts in Taiwanese cities remain in low levels.

### 5.2 Statistical method

This study has applied the nonparametric variance analysis using Kruskal-Wallis test to inspect the statistical significance of differences between attributes of citizens and cities from the view point of the above statements. This method is the same as one used in chapter 4 and 5, and is suitable to perform statistical comparisons where multiple significance tests are necessary to account for different sizes of groupings within the overall sample. If equation (1) given below holds, a significant difference exists between the responses (Siegel and Castellan, 1988).

$$H(\chi^2) = \frac{h}{1 - \sum_{j=1}^{m} \frac{Tj}{\left(N^3 - N\right)}} \geq \chi^2_{a-1}(\alpha) \qquad (1)$$

where

$$h = \frac{12}{N(N+1)} \sum_{i=1}^{k} \frac{R_i^2}{n_i} - 3(N+1)$$

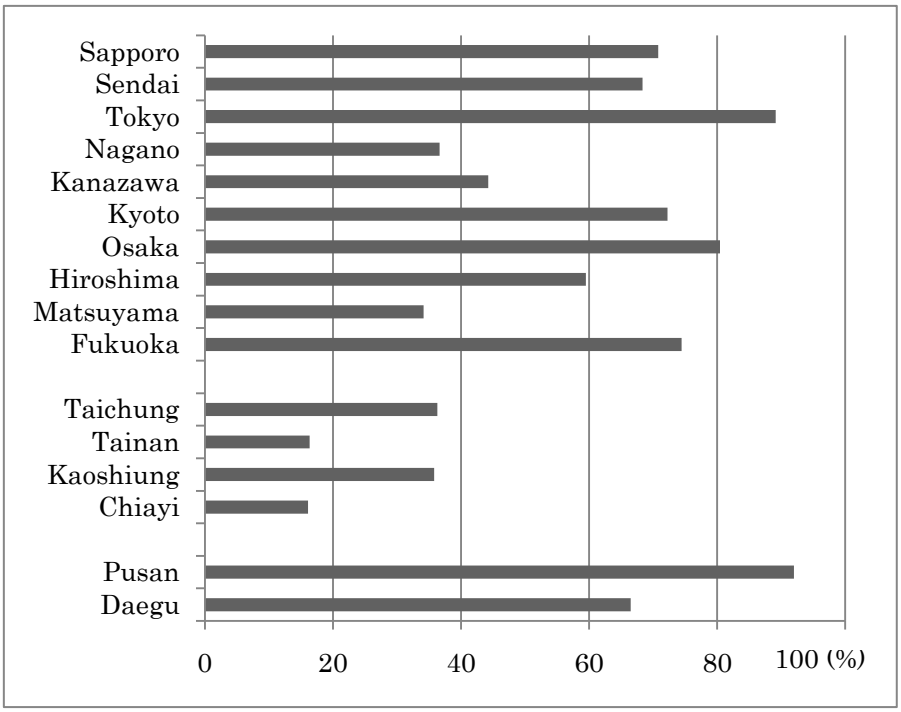



Figure 5-2 Public transport usage pattern of respondents in each city

$T_j = t_j^3 - t_j$,

$n_i$ : number of respondents with a particular attribute i ,

m : number of attributes in the analysis,

N : total number of respondents,

$R_i$ : sum of the ordered data for each attribute i,

$t_j$ : number of samples in the same rank order j, and

$\alpha$ : level of significance.

When a difference is identified, the following estimator in the Bonferroni method (Siegel and Castellan, 1988) leads to the level of significance for the particular pair of citizen attributes or the pair of cities.

$$Z = \frac{\left( U - \frac{n_1 n_2}{2} \right)}{\sqrt{\frac{n_1 n_2}{N(N-1)} \left( \frac{N^3 - N}{12} - \sum_i T_i \right)}} \qquad (2)$$

where

$$T_i = \frac{t^3 - t}{12}$$

U: Mann-Whitney's U parameter,

$n_1$, $n_2$: sample size of the pair of groups

### 5.3 Differences of awareness and attitude toward walking

#### 5.3.1 General attitudes toward walking

General attitudes toward walking observed through statements (a) through (d), are examined using the above method to find out whether there are differences that can be associated with citizen attributes or attributes of city or type of city where the respondents live. Table 5-1 shows results of the non-parametric variance analysis for statements (a) to (d). When there is a statistical difference between scores, the higher score sample group is reported first and the lower score sample is stated second (with a greater than sign separating them) in this tabulation. For example, for statement (a), only the last attribute (public transport usage) showed a statistically significant difference. The last row states 'User > non-user' indicating that those who use public transport (at least once a month) reported a statistically significant higher score than others.

Results presented in Table 5-1 indicate that there is no impact from gender on the scores given by the respondents. On the other hand, the age group the respondent belongs to makes a significant difference in attitudes toward walking according to three of the statements evaluated. The older age groups express relatively more positive attitude toward walking. Also, variables reflecting transport usage show some interesting results. For example, car ownership has no effect on attitude toward walking. But the public transport usage has an impact. Respondents who use public transport at least once a month have a positive attitude toward walking compared to others.

Table 5-1 General attitude toward walking

| | (a) I like walking | (b) Walking is smart | (c) Willing to walk a short distance daily | (d) I like a leisurely walk |
|---|---|---|---|---|
| Between cities | None | Tokyo > Matsuyama<br>Tokyo > Sapporo<br>Tokyo > Osaka | None | None |
| Between city size | None | None | Pop 1-1.5 mil<br>> pop below 1 mil | None |
| Sex | None | None | None | None |
| Age | None | 20~40 > below 20<br>40~60 > below 20<br>Above 60 > below 20* | 40~60 > below 20<br>Above 60 > below 20<br>Above 60 > 20~40 | Above 60 > 20~40* |
| Car ownership | None | None | None | None |
| Public transport usage | User > non user | None | User – non user | User – non user |

Note * = difference significant at 5%. All others 1% significance.

The results are unclear about whether the size of the metropolitan region affects the attitude about walking, but responses to one statement shows there seems be a tendency that citizens in larger cities have a higher degree of positive thinking about walking.

A two dimensional variance analysis was done to verify interactions between citizen attributes and cities. There is no interaction, statistically meaningful, between them other than one exception. Regarding the statement (d), there is a significant interaction between cities and usage of public transport. Citizens in larger cities who use public transport more than once a month prefer a more leisurely type of walk.

### 5.3.2 Preferred character of routes for walking

Statements (e) through (h) mentioned in section 5.1 represent preferences taken into account in route choice. The size of the metropolitan area has more occurrences of significant differences (see Table 5-2) with these preference statements than with the attitude statements discussed in the previous section. Relative ranking of the three groups of cities shows more positive responses for this statement from citizens in larger metropolitan areas. Similarly, gender plays a more prominent role with preference statements than with the attitude statements discussed in the previous section. For example, more males prefer the shortest route than females. On the other hand, females find good scenery and good surroundings important for their walking routes, even when some detour may be necessary.

Table 5-2 Preferences related to route choice

| | (e) Prefer good scenery en-route | (f) Prefer good neighborhood en-route | (g)Prefer busy routes | (h) Prefer shortest route |
|---|---|---|---|---|
| Between cities | Osaka > Matsuyama | Tokyo > Kyoto | Tokyo > Matsuyama<br>Osaka > Matsuyama<br>Fukuoka> Matsuyama | Kyoto > Osaka |
| Between city size | Pop above 1.5 mil > pop 1-1.5 mil<br>Pop 1-1.5 mil > pop below 1 mil | None | Pop above 1 mil > pop below 1 mil | None |
| Sex | None | Female>male | Female>male | Male>female |
| Age | None | Above 60 > below 20<br>Above 60 > 20-40<br>Above 60 > 40-60<br>40~60 > 20-40<br>40~60 > below 20* | None | Below 20 > above 60<br>20-40 > above 60<br>Below 20 > 40~60<br>20-40 > 40-60<br>Below 20 > 20~40* |
| Car ownership | None | None | Non owner > owner | None |
| Public transport usage | User > non user | User > non user | User > non user | None |

Note * = difference significant at 5%. All others 1% significance.

Age group has an impact according to certain statements considered in this survey. For example, elder age groups have a stronger preference for streets with good surroundings, even when that route is not the shortest. The statement concerning the route distance shows younger groups have a stronger preference for the shortest route than other age groups. In some sense this finding is not intuitive when one considers younger age groups are physically strong in general and able to better cope with distance than older groups. However, the potential larger time budget available to older groups may explain the observed preference.

Even once a month usage of public transport affects preferences taken into account in route choice, whereas this attribute did not play a major role earlier with attitudes toward walking. Car ownership provided significantly different results with only one preference statement, car owners showing a greater dislike to walk on crowded pedestrian facilities.

### 5.3.3 Personal reflections about walking behavior

The walking behavior attributes considered in the survey are walking speed and pedestrian signal compliance. Table 5-3 shows comparison of results obtained from analysis of personal reflections of walking behavior of respondents. Analysis of the statement (i) related to walking speed shows there is significant difference with gender and age. However, there is no significant difference observed between city pairs. Males and younger age groups have evaluated them as faster walkers more often than females and older persons. All six attributes considered in this analysis showed differences of statistical significance for the statement that related to signal observance.

Respondents in larger cities such as Osaka and Tokyo have stated their tendency to cross a road during a red signal for pedestrians when there is no traffic.

Table 5-3 Personal reflections on walking behavior

| | (i) Fast walker | (j) Regular signal violator |
|---|---|---|
| Between cities | None | Osaka > Kanazawa, Osaka > Matsuyama<br>Osaka > Nagano, Osaka > Sendai<br>Osaka > Fukuoka, Osaka > Hiroshima<br>Osaka > Sapporo, Tokyo > Matsuyama<br>Tokyo > Sendai, Tokyo > Nagano<br>Kyoto > Matsuyama, Kyoto > Sendai |
| Between city size | None | Pop above 1.5 mil > pop 1-1.5 mil<br>Pop above 1.5 mil > pop below 1 mil |
| Sex | Male > female | Male > female |
| Age | 20-40 > above 60<br>40~60 > above 60 | 20~40 > below 20<br>40~60 > below 20<br>Above 60 > below 20* |
| Car ownership | Owner > non owner | Owner > non owner |
| Public transport usage | None | User > non user |

## 5.4 Impact of the stage of life on general attitudes toward walking

Table 5-4 shows the pattern of the relationship of awareness and attitude toward walking, and age group. Here, age is adopted as the proxy variable for the stage of life as mentioned in Section 5.2. The statistical method used here is the non-parametric variance analysis mentioned in the previous section. When there is a difference, we indicate the age group that provided the more positive score using the mathematical symbol for larger than sign. For example, 'Below 20 > 20-40' means that the age group less than 20 years old provided a higher score than group 20-40 years old. When the difference of the average scores between the age groups were not statistically significant, the tabulation has a blank cell using the - symbol.

When there is a statistical difference between scores in which younger group's score is lower than that of elder group, bold letters are used in the tabulation in addition to the use of the appropriate mathematical symbol. This is done to assist the visual inspection of the table. On the other hand, when there is a statistical difference between scores in which younger group's score is higher than that of an elder group, regular fonts are used.

Results presented in Table 5-4 indicate that the age group the respondents belong to makes a difference in the level of awareness and attitudes toward walking. As for the statements (a) through (d) that indicate general attitudes toward walking, the younger generation's scores are lower than the scores of older generation in Japan and Taiwan. This means younger groups are less positive in attitudes toward walking than elder generations in these countries. Results for Korea show the

opposite trend. There, general attitudes toward walking appear to deteriorate as one advances through different stages of life.

Table 5-4 General attitude toward walking by age group

| | Japan | Taiwan | Korea |
|---|---|---|---|
| (a) I like walking | - | **Below 20 < 20~40**<br>**Below 20 < 40~60**<br>**Below 20 < above 60**<br>**20~40 < 40~60**<br>**20~40 < above 60** | - |
| (b) Walking is smart | **Below 20 < 20~40**<br>**Below 20 < 40~60**<br>**Below 20 < above 60*** | **Below 20 < 20~40**<br>**Below 20 < 40~60**<br>**Below 20 < above 60**<br>**20~40 < 40~60**<br>**20~40 < above 60** | 20~40 > 40~60 |
| (c) Willing to walk a short distance daily | **Below 20 < 40~60**<br>**Below 20 < above 60**<br>**20~40 < above 60** | **Below 20 < 20~40**<br>**Below 20 < above 60** | - |
| (d) I like a leisurely walk | **20~40 < above 60*** | - | Below 20 > above 60*<br>20~40 > above 60* |
| (e) Prefer good scenery en-route | - | **Below 20 < 20~40**<br>20~40 > above 60 | - |
| (f) Prefer good neighborhood en-route | **Below 20 < above 60**<br>**20~40 < above 60**<br>**40~60 < above 60**<br>**20~40 < 40~60**<br>**Below 20 < 40~60*** | **Below 20 < 20~40**<br>**Below 20 < 40~60**<br>**20~40 < 40~60**<br>40~60 > above 60* | - |
| (g)Prefer busy routes | - | - | **Below 20 < 40-60**<br>**Below 20 < above 60**<br>**20~40 < 40~60***<br>**20~40 < above 60** |
| (h) Prefer shortest route | Below 20 > above 60<br>20-40 > above 60<br>Below 20 > 40~60<br>20-40 > 40-60<br>Below 20 > 20~40* | **Below 20 < 20~40*** | **20~40 < 40~60** |
| (i) Fast walker | 20-40 > above 60<br>40~60 > above 60 | **Below 20 < 40~60**<br>**20~40 < 40~60**<br>40~60 > above 60 | - |
| (j) Regular signal violator | **Below 20 < 20~40**<br>**Below 20 < 40~60**<br>**Below 20 < above 60*** | Below 20 > 20~40<br>Below 20 > 40~60 | **Below 20 < 40~60**<br>**Below 20 < above 60**<br>**20~40 < 40~60**<br>**20~40 < above 60**<br>**40~60 < above 60*** |

Note - indicates failed to show a statistically significant difference. * indicates difference is significant at 5%. All others have a difference significant at 1%.

Statements (e) through (j) represent characteristics of preferred routes for walking and personal reflections of walking behavior. Table 5-4 shows that the stage of life as indicated by the age of respondent, makes a difference in the three countries to preferences and the stated behavior of

respondents, according to majority of statements put forward to them.

However, the distribution pattern of results for individual statements is different among the three countries. For example, in relation to the statement (f), younger group's score is lower than that of relatively older groups in Japan, younger group's score is higher than that of an older group in Korea, and mix of the pattern is observed n Taiwan. Anyhow, an interesting pattern is present in Table 5-4 when we ignore the numbers and focus on the direction of the comparison signs (also highlighted by the use of bold and regular symbols). Recall that the lower age group is always stated first in the comparison. In majority of situation in the tabulation, the comparisons move in one direction of the chronological age. For example, in the row (a), for Taiwan results, the response scores become more positive as respondents grow older. In contrast, in row (d), for results from Korea, the scores become less positive as respondents move through different stages of life. Although there are some exceptions, the response scores generally display a unidirectional movement with age.

Further research is required to find specific reasons for the movement of attitudes in different directions in different countries at different stages of life. However, the difference observed in Table 5-5 has provided statistical evidence for the presence of the concept of 'pedestrian travel culture' specific to different societies, and the need to treat pedestrian behavior studies within that framework.

### 5.5 Impact of lifestyle on general attitudes toward walking

As mentioned in section 5.2, the proxy variable to denote the lifestyle in this research work is the level of usage of public transport. Table 5-5 shows results from the comparison study performed for each of the statements presented to the respondents to measure the awareness and general attitudes toward walking. To reduce complexity, the comparison is made here between those who were classified as users and those considered non-users of public transport. The statistical method described earlier in section 5.2 is applied again for this comparison.

Table 5-5 has 'User' as the lead label in all comparisons. When this group's score is lower than the non-user group, the bold font is selected to highlight the change in direction of the inequality symbol. In Japan, public transport users have generally more positive attitudes (as indicated by (a) through (d) in the statement list) toward walking compared to those who do not use regular public transport services such as trains and buses. Implication of this observation is different for different cities as some cities have a high percentage of public transport users (example – Tokyo in Figure 5-2) and others may have a large proportion of non-users (examples: Nagano and Matsuyama).

Comparison of data from Taiwan for the attitude indicators shows a reversal of the direction of the

inequality symbol, indicating that non-users have provided a relatively higher score than users for two of the indicators (see rows (a) and (b) in Table 5-6). Results for South Korea also has two indicators where non-users of public transport have scored the larger magnitude (see rows (a) and (c) in Table 5-3). Although it is not possible to provide a definitive reason for these changes of behavior from different countries according to the lifestyle variable, these results indicate the importance of considering pedestrian system development in the context of the local pedestrian travel culture.

Table 5-5 Comparison of attitude toward walking according to usage of public transport

| | Japan | Taiwan | South Korea |
|---|---|---|---|
| (a) I like walking | User > non user | **User < non user** | **User < None user*** |
| (b) Walking is smart | - | **User < non user** | User > non user* |
| (c) Willing to walk a short distance daily | User > non user | - | **User < None user** |
| (d) I like a leisurely walk | User > non user | User > none user* | - |
| (e) Prefer good scenery en-route | User > non user | - | - |
| (f) Prefer good neighborhood en-route | User > non user | - | - |
| (g)Prefer busy routes | User > non user | - | **User < None user*** |
| (h) Prefer shortest route | - | - | - |
| (i) Fast walker | - | - | - |
| (j) Regular signal violator | User > non user | User > none user* | - |

Note - indicates failed to show a statistically significant difference. * indicates difference is significant at 5%. All others have a difference significant at 1%.

Pedestrian preferences and stated behavior (see (e) through (j) in the statement list) are also relatively more intense for public transport users according majority of indicators considered in Table 5-5 for respondents from Japanese cities. Taiwan samples have shown a significant difference for only one indicator in this comparison. That is for agreement with propensity to violate pedestrian traffic signals when crossing a street (row (j) of Table 5-5). Similarly, only one indicator in this group provided a significant difference in the South Korean study. It is interesting to note that the South Korean study showed the public transport non-users providing a relatively higher score, which is different from what was observed in Japan and Taiwan.

Anyhow, as public transport users in Japan prefer improved amenities for walking, it can be argued that efforts to establish quality public transport systems with integrated pedestrian facilities are logical planning directions that would receive public support. However, dealing with the opposite direction of the preference comparison of South Korean results is more challenging. There, improved pedestrian facilities may not be a priority for public transport users. It is also important to review the survey methodology followed in providing an explanation for the results. The Korean survey was administered during classes held for driving license renewal and therefore the survey

respondents could have a history of above average motor car dependence. This may have introduced a sample bias in representation of views toward public transport and walking. On the other hand, the low level of pedestrian network connectivity observed by some commentators in South Korea may be a reflection of the lack of public support indicated in results shown in Table 5-5.

### 5.6 Conclusions

This research work has studied the awareness and attitudes toward walking of three different countries in East Asia. The study is based on the concept of pedestrian travel culture that ties in level of service of urban infrastructure, regional environmental factors and attributes of citizens to explain the pedestrian travel behavior.

There are two attributes of survey respondents used as causal variables termed as stage of life and lifestyle considered in the work presented in this chapter. The stage of life was measured through the proxy variable of age of respondents. For the purpose of this study, the age is classified into four groups. The variable adopted to measure the lifestyle is the public transport usage. Here, this is a binary variable, and classifies respondents to users and non-users of public transport. The methodology followed is based on searching for situations where there is a significant difference of average scores provided by respondents about their general attitudes toward walking. A computational method has been applied to conduct this search in a statistically meaningful manner.

The body of data collected for this research work has been growing since 2004 when data were first collected for 10 cities in Japan. Later a corresponding survey was conducted in Taiwan in the local language. Four cities in Taiwan were surveyed, in two installments, the first two cities in 2006 and the other two in 2008. Also in 2008, two South Korean cities completed the field survey that contributed to the database. The paper has documented the relevant differences among the survey administration process. Relevance of background studies previously conducted to investigate differences among cities within a particular country has been mentioned in chapter 4.

The statistical analysis has shown that significant relationships exist for different indices in the urban communities studied, although the pattern of relationships is different among the three countries. Nevertheless, there is a regularity observed for relationships within each individual country, strengthening the argument for treating the pedestrian behavior analysis with a cultural perspective as adopted in Figure 2-1. It could be concluded that each country has an own identity in terms of pedestrian culture.

Although this project has identified where relationships exist and the direction of relationship patterns, it is acknowledged that reasons for such observations are somewhat hypothetical at this

stage. There are further variables covered in the study framework that could now be explored to assist further. For example, analysis from the view point of nationality, historical and cultural traits mentioned in the conceptual framework, may provide more appropriate and quantifiable explanation to observations made during the current analysis.

# 6. CORRESPONDENCE ANALYSIS CHARACTERISTICS OF PEDESTRIAN AWARENESS AND ATTITUDES IN TAIWAN

## 6.1 Introduction

The sustainable development has been a well-known concept in urban planning and transportation planning since last decade. Most of urban planners and transportation planners devoted to make a plan which can drive the urban development toward sustainable (Calthorpe, 1993). In recent years, "low carbon emission" and "green sustainable development" have also become a new trend in urban planning and transportation planning. Planners and researchers focus on how to provide useful strategies to restrain people from using private motorized vehicles and encourage people to use the public transport more in daily life. In transportation planning field, the measure of transportation (or travel, traffic) demand management, such as road pricing and car pooling, have a significant role in decreasing the use of private motorized vehicles. However, it is not enough to "encourage" people to use public transport since the public transport is not so convenient for people to conduct their activities. Therefore, the measures of TDM should coordinate with the ways of spatial planning, such as transit malls and pedestrian facilities, transit oriented development and so on, to increase the level of convenience of public transport. That is a better way to push people to use public transport and sustainability may be realized in real world.

Under this circumstance, planners have gradually paid more attention to the pedestrian facility planning. A comprehensive understanding of pedestrian preferences and behavior is thus necessary when planners make a pedestrian plan. The work covered in this chapter attempts an exploratory statistical analysis of pedestrians over four Taiwanese cities in order to have a better understanding of the corresponding characteristics of pedestrian image. This study is based on the framework that proposed by Tsukaguchi *et al.* (2007). This study attempts to use a simplified but statistical way to visualize and explore the relevance of personal characteristics and walking image of citizens in different 4 cities in Taiwan.

Pedestrian travel behavior is a composite and complex outcome of individual characteristics, interpersonal characteristics and physical environmental characteristics (Krizek *et al.*, 2009). However, the past research also demonstrated that the effect of physical environment improvement is relatively small (Krizek *et al.*, 2009). It is necessary to examine what influence pedestrian travel behavior based on different perspectives and approaches. In recent year, one new approach considering the effect of the societal perspective toward walking behavior has emerged. Not only the effect of investment of infrastructure, but the effects of natural environmental conditions and attributes of citizens are taken into consideration when analyzing pedestrian behavior. Tsukaguchi *et al.* (2007) named this new approach "pedestrian travel culture" and drew a conceptual outline as shown in figure 1. Follow-up publications have attempted to investigate relationships within the pedestrian travel culture framework. Tsukaguchi *et al.* (2009) have reported the relationship between awareness toward walking and attributes of citizens. Tanaka *et al.* (2009) have investigated the relationship between level of service of public transport and pedestrian attitudes. Hsia *et al.* (2009) have examined the difference of walking image among life stages. This paper incorporates past research experiences with new thoughts available from the members of international research team in attempt to investigate pedestrian attitudes. The purpose of this study is to investigate the relationships among pedestrian attitude and the multiple attributes of citizens in the same time by using correspondence analysis.

### 6.2 Study Framework of this chapter

The conceptual framework of pedestrian travel culture in this study is proposed by Tsukaguchi *et al.* (2007). In this framework, authors have assumed that the pedestrian behavior is influenced by system characteristics referred to here as regional characteristics. Three main elements were considered as regional characteristics. They are (A) level of service of the urban infrastructure (B) regional environment and (C) citizen attributes. Past related studies showed that there are interrelationships between elements of the regional characteristics and pedestrian characteristics. Those interrelationships have been proved by Tsukaguchi *et al.* (2007) and Tanaka *et al.* (2009) as well as Hsia *et al.* (2009). However, those studies mentioned above only focused on the relationship between pedestrian attitudes and another single factor, such as age of the level of service of public transport. There is no study to discuss the relationship between pedestrian attitudes and several pedestrian attributes simultaneously. Thus, the purpose of this chapter is to investigate the corresponding characteristics of pedestrian awareness and attitudes toward walking. The relationship (2) is discussed, that is, the relationship among (C) "Personal characteristics in general" and "Lifestyle and stage of life", and (ii) Awareness and attitude toward walking" (see Figure 2-1).

### 6.3 Data Collection and Methodology

The correspondence analysis is famous in France and Japan. Clausen (1988) has described the brief history of the development of correspondence analysis in his book. This method does not assume any

underlying theoretical distribution. That means it is likely to be a kind of model-free method. The method has been used as a technique for exploratory data analysis because of its features.

Kim and Yamashita (2008) have indicated that multiple correspondence analysis has two main features. The first one is the multivariate treatment of the data through simultaneous consideration of multiple categorical variables. That means it can display the relationships among multiple variables simultaneously. The second feature is the graphic presentation of the multivariate data in a map. It is helpful to discover the structure inherent in the data.

Golob and Hensher (2007) employed multiple correspondence analysis to examine the corresponding characteristics of the trip chaining activity of Sydney residents. In their paper, the advantage of multiple correspondence analysis that can deal with the causality of nonlinear and non-monotonic relationship between social economic descriptors and measures of travel behavior was emphasized. In addition, this method can be used for forecasting future demand based on different scenarios.

The goal of this study is to discover the relationship among pedestrian attitude toward walking and other variables which are personal characteristics, life style and stage of life by using multiple correspondence analysis. Therefore, the method of multiple correspondence analysis is adopted to discover the inherent structure of data. Data from a questionnaire survey of pedestrian awareness and attitudes in four cities in Taiwan was used and the distribution of questionnaire counts can be found in table 6-1.

Table 6-1 Distribution of questionnaire counts from four Taiwanese cities

| City | Frequency | Relative frequency |
|---|---|---|
| Taichung city | 300 | 0.24 |
| Kaoshiung city | 296 | 0.24 |
| Tainan city | 318 | 0.26 |
| Chiayi city | 329 | 0.26 |
| Total | 1243 | 1 |

The pedestrian attitude includes the following statements.

(a) I like walking.

(b) Walking is smart (clever).

(c) I am willing to walk for a short distance in daily life.

(d) I like to walk and stroll.

(e) I prefer a street with good scenery for walking.

(f) I prefer a street with good surroundings (neighborhood), even if a little detour is necessary.

(g) I prefer a street with some people, even if a little detour is necessary.

(h) I prefer the shortest route when the surroundings (neighborhood) are not pleasant.

(i) I walk faster than others.

(j) I usually cross a road during a red signal if there is no traffic.

The Likert scale (Meyer and Miller, 2001; Dawes, 2008) was used in evaluating the level of agreement. Complete agreement with a statement was indicated by a value of 5, while strong disagreement with the statement was indicated by a value of 1. The particular value of this format is the unambiguous ordinality of response categories (Babbie, 2000).

For the purpose of stage of life one relevant variable is the 'age' of respondents. The respondents have been grouped into age groups designated as 'below 20 years (younger)', "20 – 40 years (young adult)", 40 – 60 years (adult)" and "above 60 years (elder)" old. This classification is sufficient to reflect the stage of life. The basic composition of data is listed in table 2. Note that the sample distributions based on different grouping variables do not be agree fully with the distributions of population because of the sampling error. A correction could be applied by using a weighting technique to bring the distribution in line with real population breakdowns. As we do not intend to compute indices such as overall averages from the sample, such corrections are not required in the current analysis

Another variables used for the purpose of the current analysis is the 'public transport usage' and 'car ownership'. Indeed, the term lifestyle has a broad meaning and "public transport usage" as well as 'car ownership' covers one aspect of lifestyle. The variable shown by public transport usage has been recorded as a frequency of usage where the respondent stated how often per month he or she has used public transport. For the purpose of this study, a respondent who claims to use public transport more than once a month is considered as a public transport user (henceforth PT user). A person who claims public transport usage is equal to one time or less than one time per month is termed 'PT non-user' in the analysis presented later. The variable shown by car ownership has been recorded as an index that indicates whether respondents have a car or not. A person who has at least one car is termed 'car owner'. On the other hand, a person who does not own a car is considered as 'no car'.

Table 6-2 Composition of the data

| Variable | category | Frequency | Relative frequency |
|---|---|---|---|
| Age | Below 20 (younger) | 363 | 0.29 |
| | 20-40 (young adult) | 567 | 0.46 |
| | 40-60 (adult) | 207 | 0.17 |
| | Above 60 (elder) | 106 | 0.09 |
| | Total | 1243 | 1 |
| Public transport usage | PT user | 320 | 0.26 |
| | PT non-user | 923 | 0.74 |
| | Total | 1243 | 1 |
| Car ownership | Car owner | 901 | 0.72 |
| | No car | 342 | 0.28 |
| | Total | 1243 | 1 |

### 6.4 Results and Findings

The process of analysis includes two steps. The Kruskall-Wallis test (KW test) is used to find whether the difference exists between different groups in the first step. The comparison of pedestrian attitudes among different groups was conducted in this step. The grouping variables include age, public transport usage and car ownership. The variable of age represents the stage of life. Both public transport usage and car ownership are used to represent life style. To conduct KW test is a preceding step toward the multiple correspondence analysis because it can reduce the unnecessary information caused by the unrelated variables.

By using KW test, we can find where the difference of pedestrian attitudes significantly exists among groups under different grouping variables (please see Table 6-3). For example, pedestrian attitude shown by the statement 'I like walking' has significant difference among different age groups, public transport usage groups and car ownership groups respectively. Therefore, the multiple correspondence analysis method is used to illustrate the relationship among pedestrian attitude toward statement 'I like walking', age, public transport usage and car ownership in the same time. The result is shown in Figure 6-1.

Table 6-3 Result of Kruskal-Wallis test

| Statement | Age | Public Transport Usage | Car Ownership |
|---|---|---|---|
| (a) I like walking | Yes | Yes | Yes |
| (b) Walking is smart | Yes | Yes | Yes |
| (c) Willing to walk a short distance daily | Yes* | No | No |
| (d) I like a leisurely walk | No | Yes* | No |
| (e) Prefer good scenery en-route | Yes | No | No |
| (f) Prefer good neighborhood en-route | Yes | No | Yes |
| (g)Prefer busy routes | No | No | No |
| (h) Prefer shortest route | No | No | No |
| (i) Fast walker | Yes* | No | Yes |
| (j) Regular signal violator | Yes* | Yes* | Yes |

Note : "No" indicates failed to show a statistically significant difference. * indicates difference is significant at 5%. All others have a difference significant at 1%.

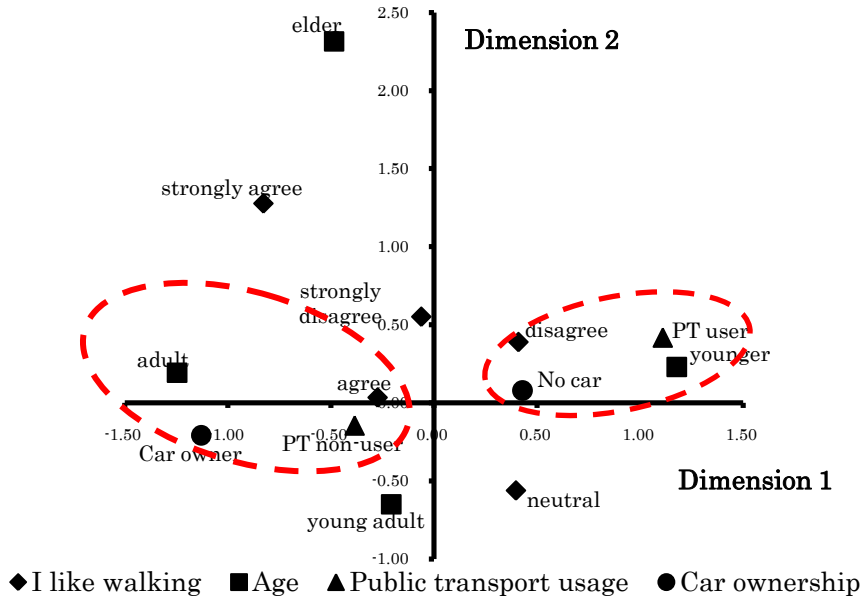



Figure 6-1 Multiple correspondence analysis of age, car ownership, public transport usage and pedestrian attitude shown by the statement 'I like walking'

In order to display relationships among pedestrian attitude toward walking and other variables simultaneously, statements with only one significant influential variable will not be analyzed in the following work.

The corresponding characteristics of the statement 'I like walking' are drawn in Figure 6-1. The figure shows that pedestrians who disagree with the statement 'I like walking' are in young generation, using public transport frequently and do not have a car. Pedestrians who agree with statement 'I like walking' are older than 20, not using public transport frequently and own a car. It is obvious that the stage of life plays an important role in pedestrian attitude toward walking. A similar situation can be found again in Figure 6-2. When people are old enough, they will regard walking as a smart thing in their daily life. However, young generations find it difficult to agree that walking is smart.

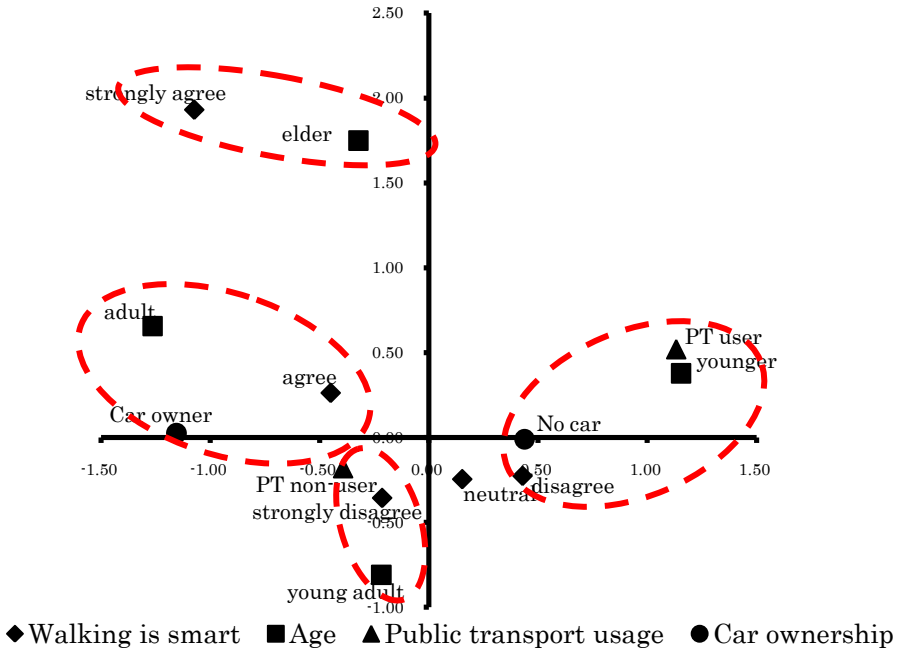



Figure 6-2 Multiple correspondence analysis of age, car ownership, public transport usage and pedestrian attitude shown by the statement 'walking is smart'

Respondents who own a car are likely to have a positive attitude toward walking, also shown in Figure 6-2. In contrast, respondents who do not have a car are less likely to have a positive attitude toward walking. Respondents who have a car are likely to drive a long way to the city center and only walk a short distance to his destination in his journey in their daily life. However, respondents who do not have a car tend to regard walking as the necessary mode. More precisely, walking is an indispensable mode for them. They may need to walk a long distance to find a public transport or arrive to their destination by feet. Walking becomes a reluctant activity for them and walking always makes them tired. Thus, it is not amazing that respondents who do not own a car have negative attitudes toward walking.

The age and car ownership are considered as corresponding characteristics of the statement shown by 'prefer good neighborhood en-route'. The result of multiple correspondence analysis is as Figure 6-3. The Figure 6-3 shows that the elders whose age is above 60 years old are less likely to take a little detour even the street is with good surrounding. The younger population whose age is below 20 years old is also likely to have a negative attitude toward statement 'prefer good neighborhood en-route'. The result implies that detour is less likely to be accepted by respondents who often go to their destinations by their feet. Figure 6-3 also shows that the young adult and adult who own a car are grouped in the agree side.


Figure 6-3 Multiple correspondence analysis of age, car ownership and pedestrian attitude shown by the statement 'prefer good neighborhood en-route'

The Figure 6-4 shows that elders disagree with that they walk faster than others. The stage of life somewhat represents the vigor of respondents in this study. The result indicates when the vigor of respondents is low, they have negative attitudes toward walking.

The Figure 6-5 shows the corresponding characteristics of the regular signal violator. The result indicates that the elder and younger age groups are likely to cross the road during a red signal if there is no traffic. Adults who own a car and do not use public transport frequently are less likely to violate the signal.

There are two dimensions in each figure presented above. The name of each dimension can be given by the consideration of data distribution on each figure. In some research the names of dimensions are important element. However, the names of dimensions are not so important in this paper since the focus is on the result of appearance of data clustering. Briefly speaking, the dimension 1 represents stage of life and life style in each figure. On contrast, the dimension 2 represents respondents' attitudes toward specific statements.

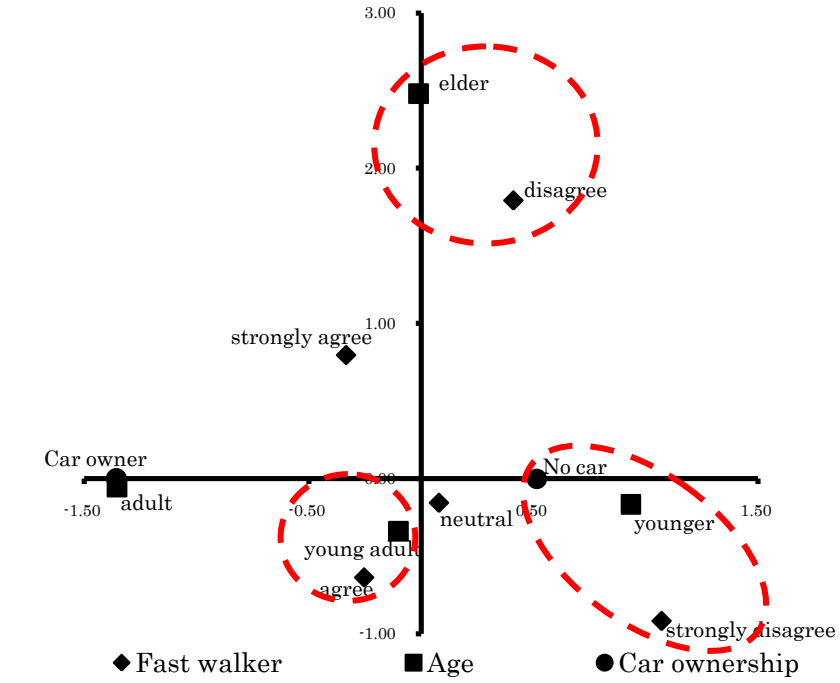



Figure 6-4 Multiple correspondence analysis of age, car ownership, and pedestrian attitude shown by the statement 'faster walker'

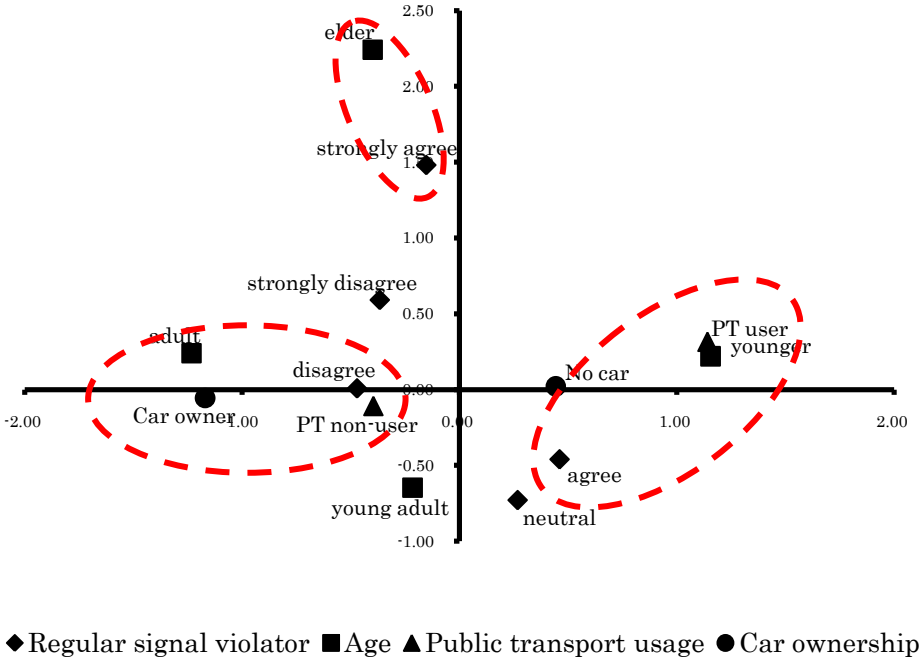



Figure 6-5 Multiple correspondence analysis of age, car ownership, public transport usage and pedestrian attitude shown by the statement 'regular signal violator'

## 6.6 Conclusions

This study is based on the concept of pedestrian travel culture and uses the multiple correspondence analysis in attempts to visualize the relationship among pedestrian attitudes and other variables including personal characteristic, life style and stages of life. Although it is only an exploratory study, it still provides an easy way for people to understand the relationship among pedestrian attitudes and personal characteristics, life style and stage of life.

The results show that the stage of life does play a significant role in forming pedestrian attitudes toward walking. From the viewpoint of physiology, the vigor of pedestrian is different in their stage of life. Therefore, they are likely to hold different attitudes toward walking in different stage of life. In general, the generations of young adults and adults are likely to give high evaluations to walking. In contrast, those in younger and older age groups are less likely to have good evaluation to walking.

Does life style affect the pedestrian attitudes toward walking directly? In this study, the life style was measured through the proxy variables of car ownership and public transport usage of respondents. The result shows respondents who own a car and do not use bus frequently are likely to have positive attitudes toward walking because walking is an ancillary activity for their daily trip. However, those who do not have a car and use bus frequently are likely to have negative attitudes toward walking because their capability of moving is limited. It implies that life style may affect individual's attitude toward walking.

This study uses multiple correspondence analysis in attempts to discover the structural relationship among life style, stage of life and pedestrian attitudes toward walking. The graphical presentation provides an easy way for people to read and understand the data structure. Although all associations discovered in this study need to be validated using other statistical methods, the methodology has provided a viable direction for future research work on pedestrian travel culture.

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# APPENDICES

## 1. Purpose and Mission of the IRG

Walking is a vital transport mode and plays an indispensable role in a sustainable society. Development of attractive and functional public space consistent with natural tendencies of the community requires an understanding of relevant attributes of the local culture and the range of applicable planning concepts. This IRG is ambitious in its aim to attempt to supplement the research and planning community with guidelines specific to different East Asian cities to improve socio-cultural acceptance of urban change.

The IRG is formed to collaborate and provide leadership where necessary with researchers in this field in member countries to analyze and disseminate the cultural significance of natural pedestrian behavior with the view of developing meaningful planning guidelines. The inclusion of unique features of the heritage is important to ensure the long term sustainability and efficiency of urban developments. Specific outcomes of the IRG would be (a) the development of the research personal network, (b) holding a dedicated session in EASTS conferences, and (c) development of a planning philosophy that is sympathetic to inclusion of cultural attributes.

## 2. Overview of the Past Activities

**(1)Papers**

(a)***Effect of the Stage of Life and Lifestyle on Pedestrian Behavior in East Asian Countries***
by Hiroshi TSUKAGUCHI, Upali VANDEBONA, Kuang-Yih YEH, Hao-Ching HSIA, Hun-Young JUNG, and Yoshiyuki Tajima, Journal of the Eastern Asia Society for Transport Studies, Vol.9(2011), pp943-955.

(b)***Corresponding Characteristics of Pedestrian awareness and attitudes in Taiwan***
by Hao-Ching HSIA , Kuang-Yih YEH, Upali VANDEBONA and Hiroshi TSUKAGUCHI, Proceedings of the Eastern Asia Society for Transport Studies,Vol.2011(2011) pp.214-

(c) ***Impact of Ease of Access to Public Transport on User Expectations***
by Hiroshi TSUKAGUCHI, Upali VANDEBONA, Kuang-Yih YEH, Hun-Young JUNG, Hao-Ching HSIA, and Yuya Tanaka, Proceedings of the Eastern Asia Society for Transport Studies,Vol.2011(2011) pp.237-

(d)***Study on characteristics of space formed by promenade behaviors***
by Tomonori YOSHIMURA, and Akihito WADA, Proceedings of the Eastern Asia Society for Transport Studies,Vol.2011(2011) pp.232-

(e)***Research Framework of Pedestrian Travel Culture and its Perspective***
by Hiroshi TSUKAGUCHI, Upali VANDEBONA, Kuang-Yih YEH, Hun-Young JUNG, and Hao-Ching HSIA, Proceedings of the Infrastructure planning and management, JSCE, 2010 (in Japanese).

(f)***Comparative Study of Pedestrian Travel Culture in Different Cities in Japan***

by Hiroshi TSUKAGUCHI, Upali VANDEBONA, Kuang-Yih YEH, Hao-Ching HSIA and Hun-Young JUNG, Journal of the Eastern Asia Society for Transportation Studies, Vol.8(2010), pp.1164-1178

(g)***Comparison of Walking Image among Different Age Groups in Taiwanese Cities***
Hao-Ching HSIA, Kuang-Yih YEH, Upali VANDEBONA and Hiroshi TSUKAGUCHI, Journal of the Eastern Asia Society for Transportation Studies, Vol. 8(2010), pp. 1245-1260.

(h)***Relationship between Level of Service of Mass Transit and Pedestrian Attitudes***
by Yuya TANAKA, Hiroki SHIBATA ,Hiroshi TSUKAGUCHI and Upali VANDEBONA, Proceedings of the Eastern Asia Society for Transport Studies,Vol.2009(2009) pp.259-

(i)***Comparison of Attitudes toward Walking in Japanese Cities,***
by Hiroshi TSUKAGUCHI, Upali VANDEBONA, Shinji SUGIHARA, and Kuang-Yih YEH, Journal of the Eastern Asia Society for Transportation Studies, Vol.7(2007), pp.1794-1805.

(j)***Comparative study on awareness of walking behaviour in Taiwanese cities***
By Hao-Ching HSIA, Kuang-Yih YEH (2006), International conference organized by Ritsumeikan University and National Cheng Kung University (in Chinese).

(k)***Comparative study on awareness of walking behaviour in major Japanese cities***
by Shinji SUGIHARA and Hiroshi TSUKAGUCHI (2005), Paper presented at the annual conference of JSCE (in Japanese).

**(2)Seminar**

**Seminar 1**

Title: Culturally sensitive pedestrian-centric philosophy to advancement of urban form in East Asia
Date: 3 December 2008
Venue: Auditorium 50102, Department of Urban planning, National Cheng-Kung University, Tainan, Taiwan
Seminar schedule:

| Time | Presenters and topics |
|---|---|
| 13:30～14:00 | Opening comments<br>Prof. Kuang-Yih Yeh<br>Prof. Hiroshi Tsukaguchi<br>Dr. Upali Vandebona |
| 14:00～14:40 | Technical Presentations<br>1. *Upali Vandebona*-IRG Objectives and Work Plan<br>2. *Kan-Chung Huang*-Pedestrian Route Choice Behavior (Taiwan Experience) |
| 14:40～14:50 | Tea Break |
| 14:50～15:30 | Technical Presentations<br>1. *Hiroshi Tsukaguchi*-Framework for study of culturally sensitive pedestrian-centric philosophy<br>2. *Hao-Ching Hsia*-Survey and Comparison of Pedestrian Needs in 4 Taiwan Cities |
| 15:30~15:50 | Closing session |

**Seminar 2**

Title: Theory and Application of Pedestrian Travel Culture
Date : Friday, December 4th, 2010
Venue :Busan National University, South Korea
Seminar schedule:

| Time | Presenters and topics |
|---|---|
| 10:00~10:05 | Opening address<br>Hun-Young Jung |
| 10:05～12:00 | Purpose and Mission<br>Upali Vandebona<br>Overview of the Past Activities<br>Upali Vandebona and Hiroshi Tsukaguchi<br>Japanese Experience<br>Hiroshi Tsukaguchi<br>Taiwanese Experience<br>Kuang-Yih Yeh and Hao-Ching Hsia |
| 13:00～14:30 | Korean Experience<br>Hiroshi Tsukaguchi and Hun-Young Jung<br>Future view of the IRG<br>Upali Vandebona and Hiroshi Tsukaguchi |
| 14:30～15:00 | Tea Break |
| 15:00～16:55 | Selected Topics of on Pedestrian and Cyclists<br>(1)An Analysis of Traffic Conflict Phenomenon of Bicycles Using Space Occupancy Index<br>Keiichi Ogawa<br>(2)Safety of Pedestrians Using Mobile Devices at Road Crossings<br>Upali Vandebona<br>(3)A study on the effect analysis and activation of Traffic System Advanced Plan influencing the Walking Rights strengthening<br>Seok-Yong Jang, Hun- young Jung, Sang-sun Ko, and Sung-in Lee<br>(4)Non- motorized/ Non-carbon transport mode master plan of Korea<br>Won-Suck Choi and Young- In Kwon |
| 16:55~17:00 | Closing session |

**(3) Special Session**

Special Technical Sessions were held three times in EASTS Conference, including Dalian in 2007, Surabaya in 2009, and Jeju in 2011.

## 3. List of the IRG Members

Upali Vandebona (Representative), Senior Lecturer, School of Civil and Environmental Engineering, University of New South Wales, Sydney, Australia,

Hiroshi Tsukaguchi, Professor, Department of Civil Engineering, Ritsumeikan University, Japan,

Hun-Young Jung, Professor, Department of Urban Engineering, Pusan National University, Korea,

Kuang-Yih Yeh, Professor, National Cheng Kung University, Taiwan,

Keiichi Ogawa, Associate Professor, Ritsumeikan University, Japan,

Hao-Ching Hsia, National Cheng Kung University, Taiwan,

Shinji Sugihara, Chuo Consultants Co. Ltd., Japan,

Yuya Tanaka, Kyoto City Office, Japan,

Yuki Shibata, Ministry of Land, Infrastructure, Transport and Tourism, Japan,

Kardi Teknomo, Associate Professor, Ateneo de Manila University,

Derlie Mateo-Babiano, Lecturer in Planning, The University of Queensland, Australia,

Choi Chi Gook, Senior researcher, Busan Development Institute, Korea,

Lee Sang Yong, Busan Metropolitan City Office, Korea,

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Choi jai Sung, Professor, Seoul City University, Korea

Chun-Fu Shao, Professor, Beijing Jiaotong University, China

Khounpakdy Lamphoun, Public works and Transport Institute, Lao PDR (currently Graduate Student, Ritsumeikan University)

Yoshiyuki Tajima, Graduate School of Ritsumeikan University, Japan

Ida Ayu Wardiani, Transportation Department of Tabanan Regency, Bali Province, Indonesia

Akihito Wada, Professor, Fukui Institute of Technology, Japan,

Tomonori Yoshimura, Graduate School of Fukui Institute of Technology, Japan

Taufiq Hidayat Putra, Indonesia

Thanthaboun Phoumy, Ministry of Public works and Transport, Lao Transport Engineering Consult

## 4. Future view of the IRG

This IRG has an ambitious aim to supplement the research and planning community with guidelines specific to different East Asian cities to incorporate socio-cultural acceptance of urban change.

In order to achieve outcomes mentioned at the early part of the report, including (i) the development of the research personal network, (ii) holding a dedicated session in EASTS conferences, and (iii) development of a planning philosophy that is sympathetic to inclusion of cultural attributes, the IRG has been formed to collaborate and provide leadership where necessary with researchers in this field in member countries.

The documents indicated in this report are a portion of the present outcomes of the IRG, analyzing and disseminating the cultural significance of natural pedestrian behavior with the view of developing meaningful planning guidelines. Considering these outcomes, it can be said that the concept of pedestrian travel culture shared by the project group has an important role in planning processes in different cities and countries.

Based on our professional experience so far, the IRG has to consider number of important paths in its plan for future research.

(a) Dissemination of the research established research framework in the other countries in the East Asian region. It will be useful to see results from countries other than Japan, Taiwan, Korea, and Australia. Researchers based on other countries in our personal network would be approached for such collaborations.

(b) Further analysis of already collected data from the past surveys could be worthwhile in order to ensure the concept of pedestrian travel culture, especially from view points of lifestyle, stage of life, custom, and nationality.

(c) Investigate the modifications required to the traditional transport planning and management methods to incorporate the proposed concept of pedestrian travel culture.

(d) Development of a practical planning method that specifically accounts for differences of the pedestrian travel culture during infrastructure development that can be presented to planning professionals in the East Asian region.

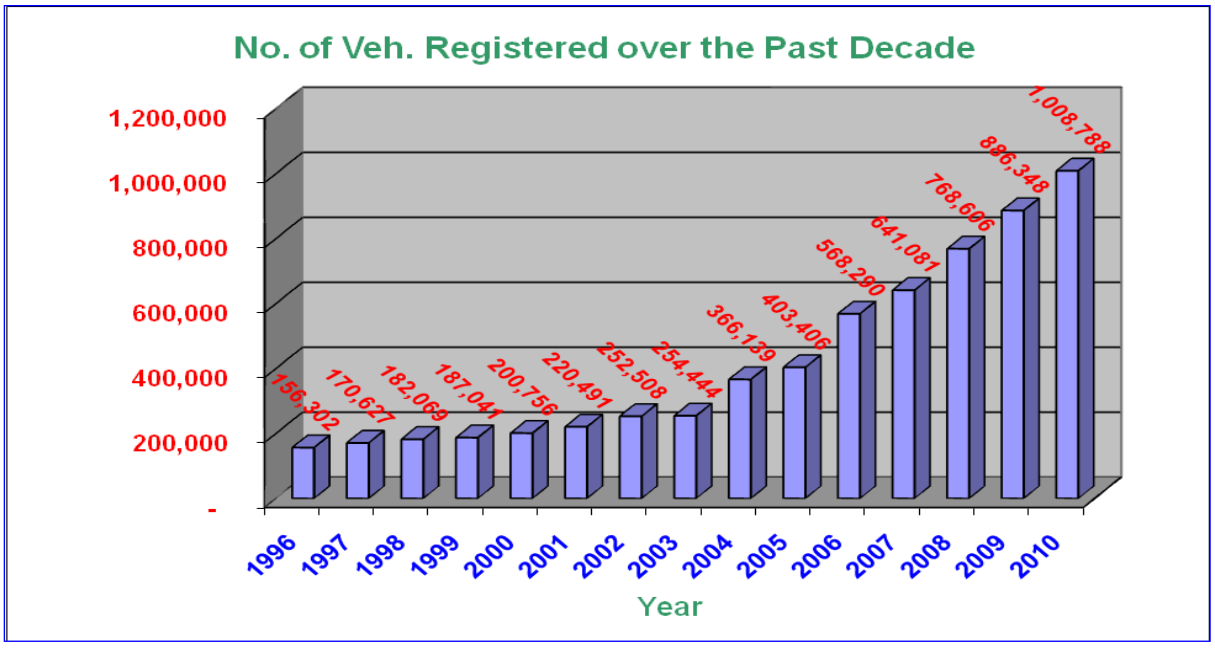
(e) Consider an effective and practical method to retain the body of research produced by this collaborative team.

## THE ROAD SAFETY ISSUE IN LAOS

**GENERAL**: The Traffic Safety situation in Lao PDR could be similar to the traffic Safety conditions in neighbouring countries by one way or another. Road crashes and casualties continue to increase and the severity of injuries has an increased tendency. The Governments of each country have tried hard to minimise serious injury, lost of life and property damage but had little success as yet.

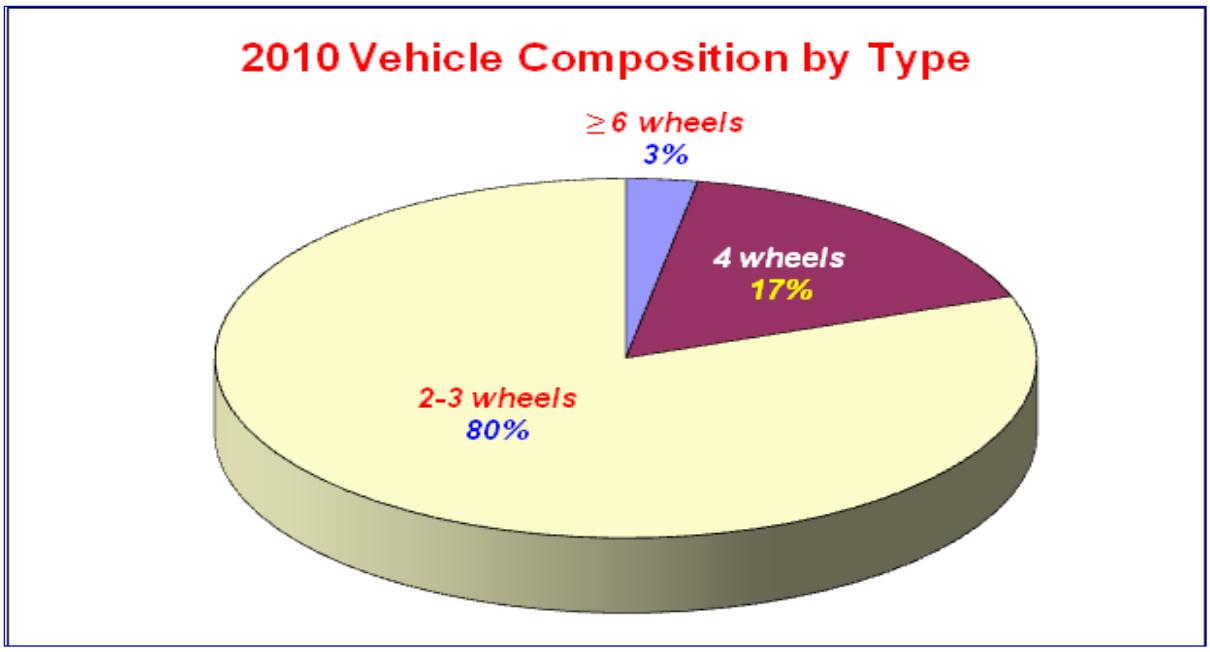
**STATISTICS**: The 2010 record shows that the total number of vehicles registered is 1,008,788 unit, of which 80.6% is motorcycle, 16.6% is car, 2.8% truck, bus and others. Over the past decade, the number of vehicle has an average increase of 15% per annum (figure: 1.1-1.2).

Figure 1.1: Number of Registered Vehicles




Source: NRSC Secretariat.

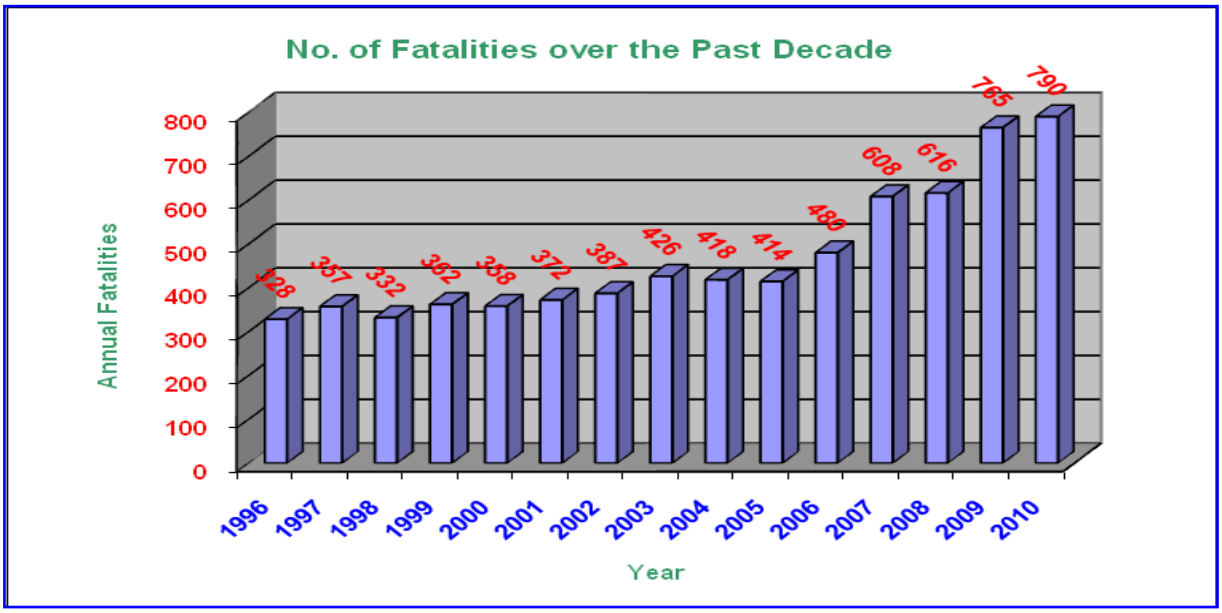
Figure 1.2: Vehicle Composition 2010




**Source: NRSC Secretariat.**

**RECORD ON ACCIDENT:** With and increased Vehicles, the number of accident was 4,500 cases per year and with the increased rate of 4.5% per annum. The number of fatality was 470 person per year and with the increased rate of 7% per annum, (figure. 1.3).

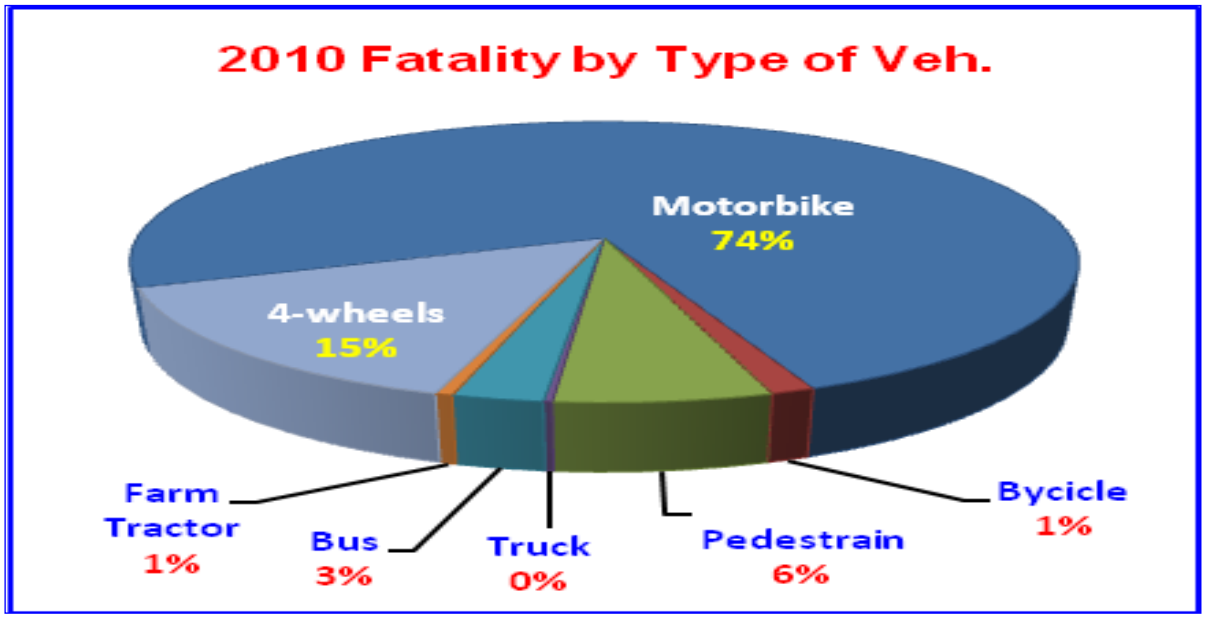
Figure 1.3: Number of Fatality




**Source: NRSC Secretariat.**

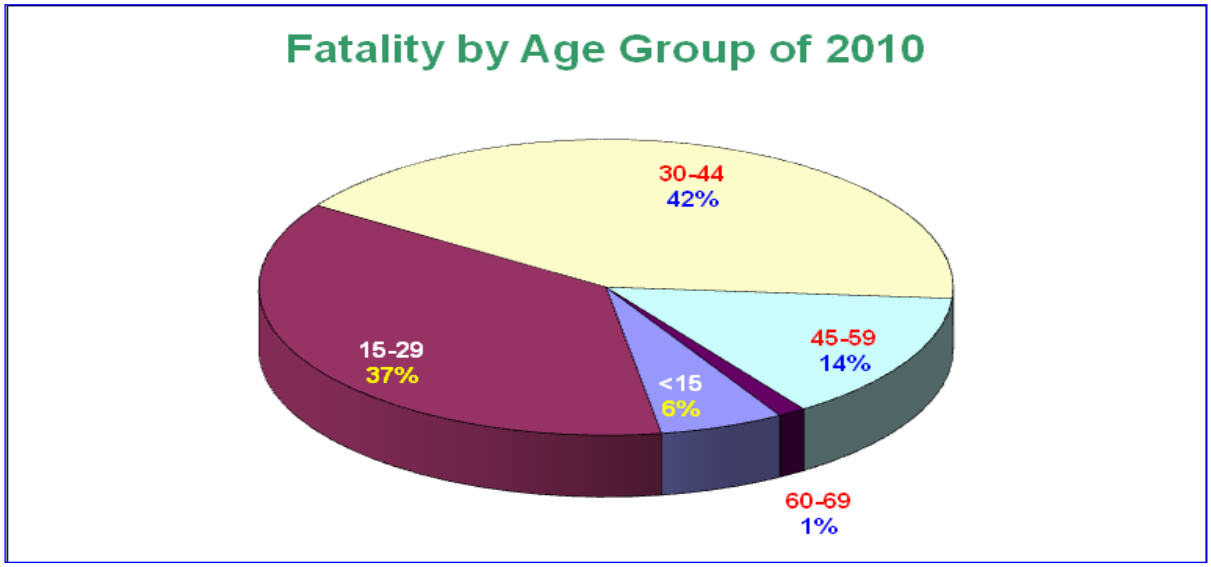
The total number of fatality over the past 15 years (1996-2010) was 7,013 persons, of which 75% related to motocycle and 80% aged 15-45 years old (figure.: 1.4-1.5). The number of injury was 105,537 person or 7,036 person per year on average. Some became hadicaped and became a burden to family and sociaty. The property lost was about 50 billion kip per annum excluding the treatment cost and others.

Figure 1.4: Fatality by Type of Vehicle




Source: NRSC Secretariat.

Figure 1.5: Fatality by Age

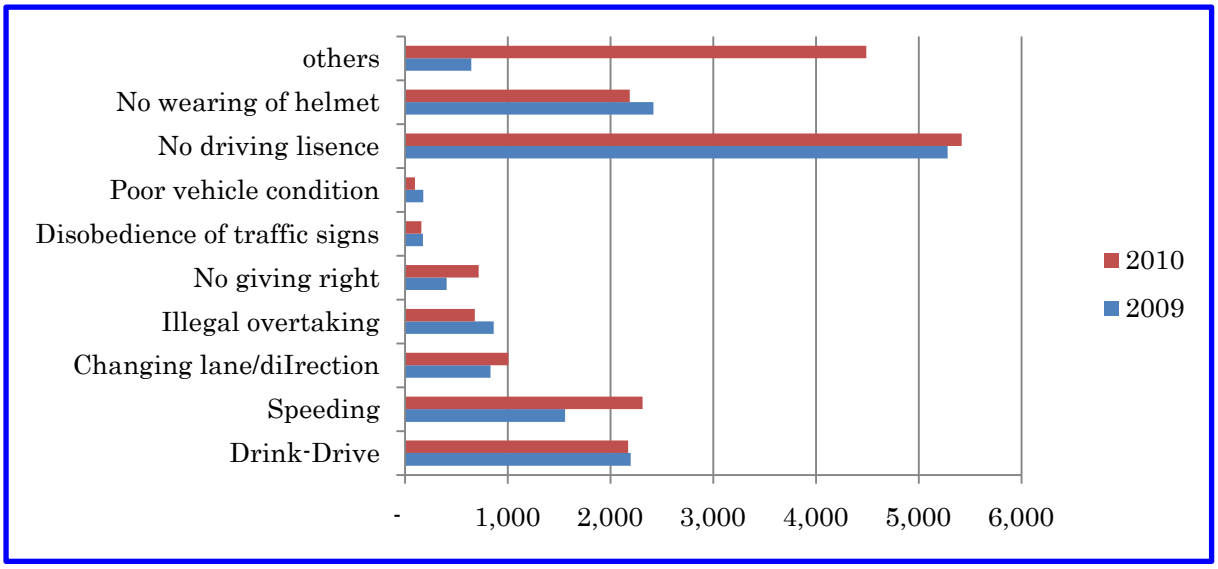



Source: NRSC Secretariat.

FACTORS OF ACCIDENTS: The main factor of accidents includes: careless driving, breaking of traffic rule, drink-drive, speeding, riding without helmet, poor condition of vehicle, poor road

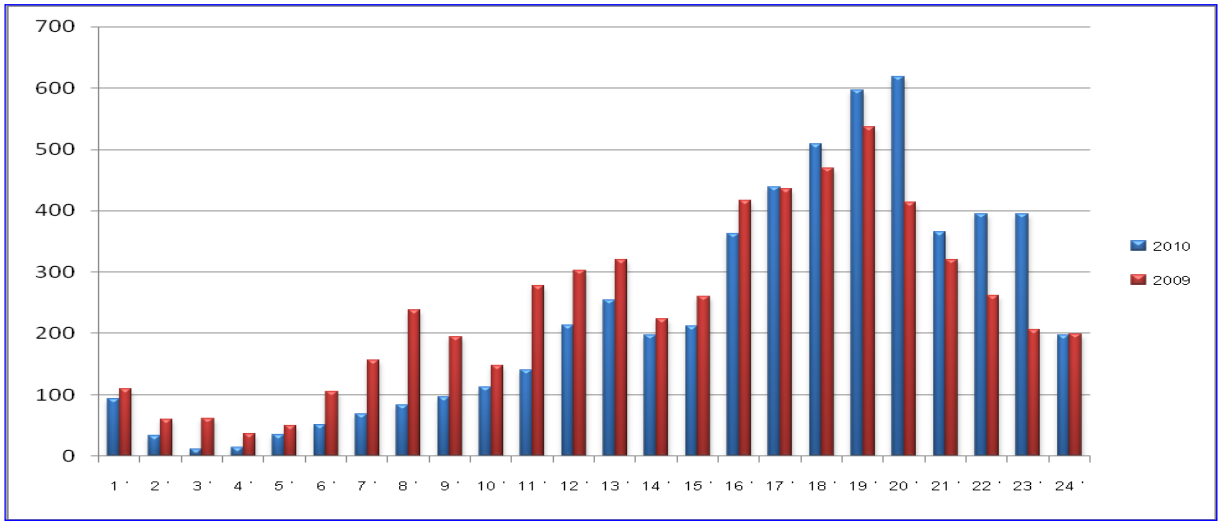
condition and traffic signal. In conclusion, accidents occur due to three factors namely: human, vehicle road environment. The accident tends to happen during 19:00-24:00 hrs (figure. 1.6.-1.7).

Figure 1.6: Main Causes of Accidents




Source: NRSC Secretariat.

Figure 1.7: Accident Period




Source: NRSC Secretariat.

THE WAY FORWARDS: To cope with the increased traffic accident, the Government of Lao had adopted/approved the five-year Road Safety Strategy and Action Plan 2005-2010 (RS S-AP) on 26 April 2005. The strategy had identified the goals and objectives, the structure of the Road Safety Institution and the formation of the Road Safety Fund (RSF). The RS S-AP was expired in Oct 2010.

WHO financially and technically supported the Secretariat to National Road Safety Committee (NRSC Sec.) to conduct two Workshops namely: the Stake Holders' Workshop on 1-2 Sept 2009 and the Finalization Workshop on 11 May 2011 to revise and update the RS S-AP to be the Lao Decade RS S-AP 2011-2020.

UNESCAP had financially and technically supported the NRSC Sec. to conduct the Refining Workshop on 1 Nov 2011. The main objective of the Workshop was to compare the Regional Road Safety Goals, Targets and Indicators to the Lao Decade RS S-AP 2011-2020.
The 3rd NRSC Conference had been conducted on 12 Aug 2011 under the Chairmanship of the Deputy Prime Minister, Chair to NRSC, during which the Decade RS S-AP 2011-2020 and the Rule and RSF Regulation had been presented.

The Lao Decade RS Strategy 2011-2020 includes the followings:

1. 50% Reduction of the Road Traffic Fatality by year 2020.
2. Changing of Indicator from the Fatality Rate per 10,000 veh. to become the Fatality Rate per 100,000 population.
3. Extend the Road Safety Committee Structure from two levels into three levels namely: (1) the National Road Safety Committee (NRSC), (2) the Provincial Road Safety Committee (PRSC) and (3) the District Road Safety Committee (DRSC). The National level plays the policy-maker role, while the Provincial level plays the planning role and the District level plays the implementing role.
4. Adaptation of five Pillars as per Moscow Declaration namely: (1) Road Safety Management, (2) Safer Roads and Mobility, (3) Safer Vehicle, (4) Safer Road Users and (5) Post-crash response (replaced: former version of 5 Es)
5. Primary Focuses on: (1) Helmet Wearing, (2) Drink-Drive, (3) Speed Management, (4) Seat-belt, (5) Driving License, (6) Night time Visibility and (7) Traffic Management and

The Lao Decade RS Action Plan 2011-2020 includes the followings:

1. coordination and management,
2. accident data system,
3. road safety fund,
4. safe road: planning, design and construction,
5. improvement of black spots,
6. safety education,
7. driver training and testing,
8. public awareness,
9. vehicle standard,
10. legislations,

11. enforcement,
12. emergency assistance,
13. road safety research and
14. accident costing and
15. collaboration

At the moment, the Lao Decade RS S-AP 2011-2020 and the RSF Decree have been submitted to the Ministry of Public Works and Transport (MPWT) whereby the MPWT and the Ministry of Justice will continue proposing the Government of Lao for adaptation of the Lao Decade RS S-AP 2011-2020 and the RSF Decree respectively.