

## **CHAPTER 4: METHODOLOGY**

As discussed in the introduction, the existence of traditional Thai shopping environments is being threatened by modern shopping environments, a result of a globalizing economy. If modern shopping environments replace traditional shopping environments, the sense of place in traditional markets, and the relationships between people and their places, will disappear. Thailand, especially Bangkok, will face the problem of placelessness and the loss of cultural identity embedded in vernacular environments. This dissertation responds to this problem by attempting to identify important aspects of traditional shopping environments by using a preference study approach. The previous literature review provides implications for the approach and methodology for this dissertation.

The following methods are derived from the literatures:

- From the exploratory model, Category Identifying Methodology; the analysis of the most and least preferred scenes, preference rating, and dimensional analysis are used to identify characteristics that influence preference.
- From the predictive model, canonical correlation is used to identify relationships among preference dimensions and other shopping attribute variables.
- From the experimental model, ANOVA and MANOVA are used to identify consensus and difference in preferences for different environments and of different subgroups of shoppers.
- Theoretical explanations and cumulative results provide the use of variables such as content and spatial categories, purposes, behaviors, and socio-economic backgrounds.
- Finally, previous literature provides an understanding of how these methods can be used together to deal with problems and to fulfill the objectives in this research.

This chapter discusses methodological issues related to this research. The discussion includes specific research methods applied in this dissertation. The chapter is organized into four sections. Section one describes the objectives of this research. Section two discusses specific research questions posed to fulfill the objectives. Section three describes research design and rationale, and procedures used in this dissertation. The design of this dissertation is comprised of two major parts: a preference survey of shoppers and interviews of developers, designers, and managers of shopping environments. The design of preference survey includes data collection

procedures, survey respondents, and data analysis methods. The design of the interview procedure includes interviewees, interview procedure, and interview analysis method.

## **I. Objectives**

A globalizing economy and culture is influencing the way that Thai people view their traditional environments. Being an ordinary vernacular environment, traditional Thai markets are not easily protected by historic preservation tools; thus, they are vulnerable to the change brought about by a globalizing economy. Since traditional shopping environments are dynamic, they cannot be preserved as they are. What can be preserved are the important aspects of these environments, such as what people think and what they perceive as important. To preserve this type of cultural environments, it is necessary to learn about people's attitudes toward the current conditions of shopping environments by identifying their preferences regarding the physical characteristics of shopping environments. Addressing people's preferences can help traditional environments meet today's needs for shopping environments. In responding to the problem, specific objectives are established as:

- 1. To identify important factors that influence preferences of Thai shoppers for shopping environments.*
- 2. To provide implications for future developments and improvements of existing traditional shopping.*

When accomplished, these objectives can help provide logical strategies for developers, designers, and managers of shopping environments to help preserve and enhance traditional shopping environments, enabling them to flourish in the new global economy. To fulfill the objectives, related information is required. Specific research questions are posed to gather the required information.

## **II. Research Questions**

The following paragraphs describe research questions. To fulfill the objectives, related information is required. Research questions are posed to obtain the relevant information required to fulfill the objectives. According to the above stated objectives, the following six research questions are posed.

- 1. How do people perceive traditional and modern shopping environments?*

To understand how people perceive shopping environments is to reveal the prototype or schema of the environments in people's minds. This question focuses on whether people recognize these environments as traditional and modern types, and whether they recognize the differences among subtypes. If they do, what physical characteristics constitute types and subtypes? This dissertation answers this question using preference rating and scene description surveys. Information is gained in the form of shared characteristics of the scenes in the groups, representing patterns of preference that emerge from the analysis of preference dimension. The interpretation of these shared characteristics is enhanced by the use of shoppers' verbal comments, to ensure that the information reflects what is on people's minds.

## ***2. What are the environmental factors that influence preferences for different shopping environments?***

To understand preferences for shopping environments, this question focuses on environmental factors or physical characteristics. Environmental factors such as spatial quality and specific content appearing in the place can influence shoppers' preferences for shopping environments. This dissertation answers this question using preference rating and scene description surveys. Information such as comparisons between common characteristics of the most and least preferred scenes of each environmental type and of the preference dimensions is used to identify environmental factors that influence preference. Similar to the previous question, the interpretation is triangulated by the use of shoppers, verbal comments on representative scenes.

## ***3. What are the relationships between the perceived importance of shopping attributes and preferences for shopping environments?***

Another factor that can influence preference is perceived importance of shopping attributes, which in this question refer to how much importance shoppers attach to different shopping attributes. Shoppers may prefer certain shopping places because of the shopping attributes that the places offer or seem to provide. Different shopping environments provide different shopping attributes such as products, services, decorations, convenience, facilities, and amenities. This question focuses on the relationship between the perceived importance of shopping attributes and preferences for environmental characteristics of shopping environments. This dissertation answers this question using the preference patterns from the previous question and the perceived importance survey. The relationship emerges as a correlation between a set of preference dimensions and another set of perceived importance shopping attribute dimensions and the strength of contribution of each dimension to the set.

***4. How do preferences differ by people's shopping behaviors and socio-economic backgrounds?***

This question focuses on shoppers' characteristic factors influencing preferences for shopping environments. Shoppers differ by their personal behaviors and backgrounds. Marketers always target customers by identifying the shopping behaviors and socio-economic backgrounds of their prospective customers. Shopping behaviors refer to how people go shopping, while socio-economic backgrounds reflect shoppers' personal information such as age, education, income, and family status. This dissertation answers this question using the averaged preference means of different environmental dimensions and shopper's background survey. The preferences for different environmental dimensions of different groups of shoppers with different shopping behaviors and socio-economic backgrounds are compared to find out which shopper's characteristics influence preference for certain shopping environments.

***5. What are the factors that developers and designers perceive as important in building and designing shopping environments?***

Design professionals and the public have been found to have different attitudes toward the environment (Groat, 1995; Kaplan & Kaplan, 1995; Miller, 1984). To determine why existing environments were designed and built in a certain way, one must know what developers, designers, and managers perceived as important. It is also necessary to compare whether the factors they perceived as important are compatible with the perceptions of the public or their clients. This dissertation answers this question by using data derived from interviews with developers, designers, and managers in comparison with shoppers' information provided by the previous questions. Data derived from developers, designers, and managers about how the environments were developed, and important factors in shopping environments compared with the information from shoppers, help identify the misconceptions of developers and designers about shoppers' preferences and perceptions of shopping environments.

***6. Based on the above findings, what are logical strategies for designing and renovating shopping environments that will be more preferred by people?***

This question focuses on the implications for future developments and improvement of existing environments. This dissertation answers this question using the information gained from all of the above questions. What people perceive and prefer are used to establish logical strategy for future developments and improvements of existing shopping environments. In addition, what shoppers prefer and what developers and designers have been trying to provide are compared, in

order to inform developers and designers how to better approach future developments and improve existing environments.

### **III. Research Design**

To answer all of the above questions, research was conducted in Bangkok, Thailand. This research consists of two major parts 1) preference survey of shoppers and 2) interviews with developers, designers, and managers of shopping environments. The materials used in the survey and interview procedures were in Thai, the native language of the respondents and interviewees. The collected qualitative data such as verbal description and interview transcripts were analyzed, and then translated into English for interpretation. The English versions of all the materials are included in Appendix A—Instruments.

#### **Measuring Preference**

Preference was selected as an appropriate concept for measurement of people's attitudes toward shopping environments. Preferences are the results of both a cognitive process and direct response to physical surroundings (Kaplan & Kaplan, 1983). People can perceive almost subconsciously and react automatically to stimuli. Preference is a product of perception (Kaplan & Kaplan, 1983). Therefore, overall judgment such as preference can solicit the subconscious response to certain factors, causing people to react in a certain way to particular environments.

Stephen Kaplan (Kaplan, 1979) suggests using preference as a simple concept for measuring attitudes toward the environment rather than an abstract concept such as aesthetic, on which general respondents may have difficulty making judgments. Preference judgments are easy for people to make, just like one of the hundred simple judgments they make daily. Moreover, preference includes innate and learned knowledge that people use without difficulty (Kaplan & Kaplan, 1983). Preference is also appropriate for assessing shopping environments because people can react to shopping environments with regard to many different aspects including appearance and provided products, services, and facilities. They prefer a shopping place for many more reasons than the aesthetic quality of the place. Preferences reflect the cumulative knowledge, innate reactions, and cognitive processes taking place in the human mind. Therefore, studying patterns of preference can shed light on underlying perceptions. This approach to understanding human-environment relationships has been developed by environmental

psychologists Stephen and Rachel Kaplan, and is called Category [Content] Identifying Methodology (CIM).

## **1. Preference Survey**

This section describes the preference survey procedures. Preference survey is a major component of research design of this dissertation. Preference survey procedures include data collection process, survey respondents, survey procedure, and data analysis methods. Each of these aspects is described in detail below.

This section describes the process of data collection used in this dissertation. The data collected will be used to answer the posed research questions. Data collection procedures include:

- 1) Preference rating survey. This survey was used to obtain preference scores of all scenes from all the respondents.
- 2) Scene description survey. This survey was used to obtain verbal descriptions of the provided scenes from the respondents.
- 3) Important shopping attribute survey. This survey is used to obtain importance rating of several shopping attributes from the respondents.
- 4) Shopping behavior and socio-economic background survey. This survey is used to obtain the respondents' information about their shopping habits, and their personal information such as household status, age, gender, income, education, and marital status.

Each of these procedures is discussed in detailed below.

### **Preference Rating Survey**

As previously discussed in research design, the first part of the preference survey used Category Identifying Methodology (CIM) to reveal patterns of preferences and to identify factors important to people's preferences for different environments. This method uses photographic media such as color photographs or slides as surrogates for the actual environments. CIM involves measuring preference on a Likert-type rating scale and uses factor analysis to extract underlying dimensions or factors. These dimensions are groups of scenes that contain particular stimuli to which people reacted in a similar pattern, thus revealing information about people's underlying perceptions.

Preference ratings using the Likert scale have widely been used in environmental assessment surveys, especially in the landscape perception field, to assess people's overall judgment of environments or scenes (Kaplan & Kaplan, 1995). In this research, preference for shopping environments was measured using a preference rating on 1 to 5 scale, indicating how much the respondents preferred each scene. The scale was: 1 = not preferred, 2 = preferred a little, 3 = preferred somewhat, 4 = preferred, and 5 = very much preferred. This 1 to 5 scale has been shown to be a valid measurement tool providing reliable results for this purpose (Kaplan & Kaplan, 1995).

### **Scene Preparation Procedure**

To prepare a sample of scenes to be used in the survey, scene preparation procedure includes scene collection, scene selection, and scene presentation processes. Scene collection process is applied in taking photographs of a variety of shopping environments. Scene selection process is used in selecting scenes from the collected photographs to be used in the final set. Scene presentation process is used to systematically assign the scenes into order for presentation to the respondents. The following paragraphs describe the scene collection, scene selection, and scene presentation processes in detail.

### **Scene Collection Process**

The focus of this research is on those shopping environments that are multi-tenant developments. The places included shopping environments that are centrally developed and controlled, and which rent spaces to multiple tenants. Therefore, single-owned retail outlets such as supermarkets, stand-alone department stores, or discount stores were not included. The difference they make is that the centrally developed environments typically provide common or public spaces.

Over 400 photographs were taken of various shopping environments that represent current typical shopping environments in Bangkok, Thailand. These current shopping environments range from small traditional markets to large enclosed modern malls. The shopping environments that were photographed were selected to include a wide variety of retail styles, scales, locations, and conditions. The scenes taken were comprised of the interior and exterior spaces of different types of shopping environments. The scenes were photographed with a 35-mm camera using a 50 mm lens and color slide film. The collected scenes were expected to represent typical views that shoppers see from walkways and common areas. The viewpoints for photographing scenes were selected because they were viewpoints that are commonly seen by general shoppers. Viewpoints

were located along walkways and central areas at a variety of viewing distances and angles. This was done so that the effects of viewing distance and angle would be equally distributed and averaged out.

### **Scene Selection Process**

According to Rapoport (1990), physical environments communicate meaning through fixed features (spatial enclosure), semi-fixed features (vegetation and furniture), and non-fixed features (products, people and activities). The sample of the environments was intended to include the full range of environmental conditions found in traditional and modern shopping environments. This was done by categorizing all scenes photographed by: environmental type (traditional and modern), subtypes (sizes and forms), conditions, spatial configurations, and retail styles. Within each category, the scenes were arranged to include views from a variety of areas such as walkway and common space, and physical contents, such as products, vegetation, and furniture. The scenes that possessed features or elements that could induce bias were excluded. Exclusion criteria were applied to the scenes that possess:

- Low photographic quality such as under or over exposure, blur, and poor focus.
- Close-ups of people in the focal point.
- Negative elements or activities.

Finally, 51 scenes were selected by a stratification procedure to be certain that the selection included adequate amounts of variety and repetition of different categories. At least 3 scenes were randomly selected from the same subcategories. This was done to ensure that the survey include all categories—types and subtypes of environments, different contents, variety of spatial configurations, and a range of conditions. It is also important that people and activities be included because people and activities are non-fixed features that are common in shopping environments. However, range of conditions—lighting, number of people, and activities—were intended to be equally distributed so that their effect could be detected.

### **Scene Presentation**

The selected slides were randomly arranged into three sets with different orders to cancel out the order effect. A random number table was used to assign the scenes to each order of presentation. Each presentation order was compiled using the following criteria:

- No more than two consecutive scenes from the same subcategories were assigned next to each other.

- Sequential scenes from the original order were not placed together.
- Number of scenes from traditional and modern environments had to be proportionally distributed into each of the one-third of the total set. This means that each one-third of the total set of 51 includes seven traditional scenes and four modern scenes.

If the scene that did not meet the above, it was replaced and a new scene was drawn until the scene that met the criteria was drawn. The process was repeated until three presentation orders were derived. After the three sets were obtained, three extra scenes were added at the beginning of each presentation order to familiarize the respondents before getting to the first scene. Six extra scenes were added at the end of each presentation order to prevent the effect of respondents anticipating the end.

The survey utilized color photographs. The validity of the use of color photographs in the survey was discussed in the previous literature chapter. The scenes were digitized from color slides to digital format and assigned to the three presentation orders. Each presentation order was color printed on landscape-oriented sheets. Each page contained six 2.5-by-4-inches color pictures with corresponding numbers and spaces on the answer forms. The formatted pages were finally printed on letter-size papers and bound into three sets of booklets.

### **Scene Description Survey**

This section describes the second part of the preference survey procedures—the scene description survey. This scene description survey was used to obtain brief verbal description of the respondents for each scene that represent subcategory of the environments. Verbal description was used in previous research to obtain objective interpretation of common characteristics of the scenes representing the subcategories (Miller, 1984; Woods, 1995). The following paragraphs describe the scene description procedures in detail. The procedures include scene preparation and presentation and survey format.

The verbal descriptions also help identify the underlying reasons of the preference patterns while guarding against researcher's bias in interpreting the contents of the dimensions. 12 of the 51 scenes used in the scene rating survey were selected as representatives of the scenes from different subcategories containing different type and subtypes of environments. These 12 scenes were randomly arranged into three different random orders using the same process as described in the scene presentation process of the scene rating survey. The scenes were arranged and printed in the same format as the preference rating survey, and bound at the end of each booklet. The

respondents were asked to provide a few words that best described each scene in the provided space on the form (See Appendix A—Instruments). The results of this scene description survey were used to help clarify the analysis of common characteristics within the derived dimensions.

### **Shopping Behavior and Socio-Economic Survey**

The fourth part of the preference survey used questionnaire surveys to obtain respondents' shopping behaviors and socio-economic backgrounds. The results from this part were used to identify agreement or differences of preferences among the respondent groups with different shopping behaviors and socio-economic backgrounds. The respondents were asked to complete a survey consisting of 49 questions regarding their shopping behaviors and their socio-economic backgrounds. Shopping behaviors included perceived importance of shopping attributes, shopping frequency, and recreational shopping tendencies. Socio-economic variables included household community, household size, household status, age, gender, marital status, education, working status, and income. Responses to questions about perceived importance of shopping attributes, shopping behaviors, and recreational shopping were based on a 1-5 Likert scale, while questions about socio-economic variables were measured using nominal data based on categorical choices.

### **Perceived Importance of Shopping Attribute Variables**

The first set of questions (1-27) included were based on previous research about shopping environments (Gerhard, 1998; Woods, 1995). Other variables were included because they were marketing related and were expected to possibly affect shoppers' preferences for different shopping environments. Marketing-related variables were based on "the 4Ps"—products, price, place, and promotion. They are basic marketing strategies used to reach a target market (Berkowitz, Kerin, Hartley, & Rudelius, 1997). These variables relate directly to shoppers' decisions about where to shop. The variables were measured by their perceived importance on a 1-5 scale from 1 = not important to 5 = very important.

Product-related variables included product brand, variety, and quality, as well as service. Price-related variables included low price and negotiable price. Place-related variables included: types of environments, type of stores for different products, cleanliness, safety, air conditioning, crowded condition, anchor department stores, movie theaters, entertainment center, interesting things to see or do, provided furniture and sitting areas, available restaurants and cafés, visually pleasing environment, provided landscape, and accessibility. Promotion-related variables included advertising, discount, and sales activities.

### **Shopping Behaviors**

People's shopping behavior is an important factor in preference for shopping place (Gerhard, 1998). Shoppers tend to prefer to shop at a place that best suits their behaviors. Shoppers who have different shopping behaviors may prefer different shopping environments and react differently to the characteristics of shopping environments. The included shopping behavior variables were used in previous research and found to be important variables in preference for shopping places (Gerhard, 1998; Woods, 1995). Shopping time and day, average length of stay for each trip, average money spent per trip, and responsibility for household shopping were measured by categorical choices.

### **Social Aspects**

Gerhard (1998) found that people go out to shopping environments for social reasons, such as to meet friends, to spend time with their companions, and even to make new friends. These variables were included because they are related to social aspects of shopping and can influence preference of shoppers for different shopping environments. The variables related to social aspect of shopping included number of companions in regular shopping trip, relationship to the companions, and meeting arrangement. These variables were measured by categorical choices.

### **Socio-Economic Backgrounds**

A shopper's background may affect their behavior and preferences for shopping environments. Socio-economic variables are commonly used in survey research. Economic status and education have been found to influence taste and preference (Nasar, 1997). Age has been shown to influence preference for physical environments (Kaplan & Kaplan, 1995; Miller, 1984). The socio-economic variables used in this dissertation were measured by category. The included variables were household community, household size, household status, level of educational, employment status, age, gender, marital status, number of children, and monthly income.

### **Pretest of Survey Instrument**

The survey instrument was tested in three steps before the survey was conducted in Bangkok, Thailand to ensure the validity of the instrument. First, the English version of the survey material was tested with 5 graduate students currently enrolled in the Environmental Design and Planning Program at Virginia Tech. After the revision, the instrument was translated into Thai. Second, the Thai version was tested with 8 Thai graduate students currently enrolled at Virginia Tech.

The instrument was then revised according to comments from the second pretest. Third, before the actual survey, the instrument was also shown to three experienced Thai researchers for comments. The instrument, finally was revised according to the comments, and was used in the survey conducted in Bangkok, Thailand.

## **Survey Respondents**

This dissertation attempts to understand preference for different shopping environments of shoppers in Bangkok, Thailand. To fulfill the requirement, a sample of Bangkok residents is selected. True random sampling was not possible due to practical reasons. On the other hand, specialized sample groups such as students are not adequately represent general shoppers. Therefore a sample of survey respondents in this dissertation included a broad range of Bangkok residents with proportionally-distributed gender, age, and income. Sample size and sampling procedure are described in detail in the following paragraphs.

## **Sample Size**

A sample size of 356 was used in the survey procedure of this dissertation. To obtain high statistical power, a large sample size would be required; however, the obtained size of 356 respondents was only possible given limited resources. This sample size was selected because it exceeds the minimum requirements for statistical analysis methods used in this dissertation. Statistical analysis methods, especially multivariate methods, require a large sample size. The minimum requirement of each statistical method suggested by Hair, Anderson, Tatham, and Black (1998) is described below.

- A minimum requirement of 5 respondents per variable for factor analysis. The total number of variables entered in factor analysis was 51; therefore, at least 255 respondents were required.
- A minimum cell size of 20 respondents for MANOVA. For example, a comparison of 6 groups needed at least 120 respondents.
- A minimum of 10 cases per variables in Canonical Correlation Analysis. In this research, 5 dependent variables and 8 independent variables were analyzed; therefore, at least 130 cases were required.

## **Sampling Procedure**

The sample size was equally distributed by gender, age group, and income to ensure inclusion of a variety of respondents in relation to the Bangkok population. Half of the respondents were male and the other half were female. Within each gender, the sample size was distributed by quota according to the percentage of each category to the overall population in the city. The categories included 3 levels of household monthly income: under 20000 Baht, 20001-40000 Baht, and 40001 Baht or higher) and 5 age groups, 15-19 years-old, 20-29 years-old, 30-39 years-old, 40-49 years-old, and 50 years-old and over. Three different orders of the picture booklets were equally assigned to each subgroup of the respondents. The table of Bangkok population characteristics and sample distribution are provided in Appendix B—Bangkok Population Characteristics and Sampling Quota Table.

## **Survey Procedures**

The survey was conducted at 12 locations in Bangkok Metro area, administered by a group of 14 students who have had training and experience in survey work. The locations included residences, educational institutions, small businesses, and public places. The respondents were selected by a partial self-selection process. First, area locations were selected to cover a variety of regions of Bangkok. Second, at each location, the survey administrator approached each residence or small business and contacted the possible respondent. Third, the survey administrator addressed the respondent individually and asked for permission to be included in the survey. If they agreed, the respondent was told the purpose for the survey, which is educational, and that this study has been approved by the academic institution to use humans as research subjects. The respondents were informed that their personal information would be handled confidentially and reported anonymously and collectively. This research has been approved for research involving human subjects by the Institutional Review Board (IRB) Office of Research Compliance of Virginia Tech. The approval document is provided in Appendix C—Approval Document by Institutional Review Board.

Before the survey started, each respondent was informed of the general procedure of the survey. For the preference rating survey, respondents were asked to view the scene and circle the number corresponding to the scene according to how much they liked the environment represented by the scene. For the scene description survey, respondents were asked to provide a few words that best described each scene. The description does not have to be in a sentence. The survey administrators wrote down the descriptions in the form for the respondents. For the shopping

behavior survey, which required a rating scale, respondents were asked to circle the number corresponding to how important each shopping attribute was in their choice of a place to shop. Finally, for the socio-economic background survey, the questions and the possible response categories were read to the respondents. After the respondents indicated the response categories, the survey administrators wrote down or circled the categories on the form for the respondents.

After each respondent finished the survey, the survey administrator thanked the respondent for his or her contribution to the study. The survey administrator also asked if the respondent had further questions or comments. If there were any, the question or comment was written down in the form to be reviewed by the researcher.

## **Data Analysis**

This section describes the rationale and procedures used to analyze the data collected during the preference survey. A statistical program, SPSS version 10, was used for all statistical procedures. The analytical methods used included analysis of most and least preferred scene, analysis of preference dimension, content analysis of respondents' comments, analysis of relationship between preference and shopping attribute dimensions, Analysis of Variance (ANOVA), and Multivariate Analysis of Variance (MANOVA). Each of these analyses is described in more detail below.

### **Analysis of Most and Least Preferred Scenes**

Analysis of the most and least preferred scenes used descriptive analysis as a part of the process to identify characteristics that influence preferences for shopping environments. The scenes from each group of traditional and modern environments were ranked according to their means of preference scores. Eight most preferred scenes, those with the 8 highest means preference, were expected to reveal some common characteristics inducing high preference scores. On the contrary, 8 least preferred scenes, those with the 8 lowest means preference, were expected to reveal some common characteristics inducing low preference scores. The groups of scenes, most and least preferred, were then examined, listed, and compared, to find their common characteristics or contents. The comments from the scenes in these sets derived from the scene description survey were also used to help interpret the contents. This method was successfully used in research to identify the preferred characteristics of commercial landscapes and storefronts (Woods, 1995), and to identify preferred characteristics and elements of traditional Korean, Japanese, and western style landscapes (Yang & Brown, 1992).

## **Analysis of Preference Dimension**

Analysis of preference dimension used factor analysis to identify preference dimensions and preferred characteristics of shopping environments. Factor analysis is an appropriate tool for grouping the scenes with similar characteristics. Factor analysis can group rated items, in this case the 51 scenes, into meaningful groups based on their patterns of rating across all respondents (Hair et al., 1998). For the 51 scenes, factor analysis groups the scenes with similar stimuli together based on similar reactions from the respondents. The groups of scenes are called dimensions; they contain scenes with similar characteristics that shoppers similarly react to. Each dimension can be interpreted according to the common characteristics that they contain.

For this dissertation, maximum likelihood factor analysis\* is an appropriate technique to deal with the nature of this type of data. Maximum likelihood factor analysis was used with two sets of data: preference scores of the 51 scenes and importance rating of shopping attributes (questions 1-27 from the questionnaire). The analysis of preference dimension of the scenes used maximum likelihood factor analysis to group the scenes into dimensions that contain the scenes with similar physical characteristics. To achieve the best explainable dimensions, an oblique rotation method called promax was used to rotate the dimension axis to better fit the pattern of the data. The oblique rotation method such as promax provides more discrete dimensions with less overlapping members among factors (Hair et al., 1998).

Criteria suggested by Kaplan and Kaplan (1995) and Hair and others (1998) were used as guidelines. The criteria are described below.

- Eigenvalues of the factor had to be greater than 1.0 to be included for interpretation (Kaplan & Kaplan, 1995). This ensures that the solution accounts for an adequate portion of variances.
- In addition to eigenvalues greater than 1.0, a scree plot was examined to identify the number of factors to extract. A flattening slope suggests that little variances were gained for the next additional factor. This means that very little improvement was gained from extracting one more factor (Hair et al., 1998).

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\* Maximum Likelihood factor analysis was recommended as appropriate procedure for this set of data by statistical consultants in a statistics department.

- According to Hair and others (1998), loading of at least .30 or above was considered significant. This procedure increases the likelihood that the scenes that will be interpreted contain enough characteristics shared by the scenes in the same group.
- Scenes that did not load significantly on any factors would be deleted (Kaplan and Kaplan 1995). Excluding the non-related scene increases the common variances among the scenes.
- The factors or dimensions had to contain at least three scenes to be interpretable (Kaplan & Kaplan, 1995).

### **Interpreting the Dimensions**

In the interpretation process, the scenes that loaded significantly on each dimension were sorted and ranked according to their factor loading scores. Then the scenes from each dimension were examined to identify the common characteristics of the scenes within the dimension. The common characteristics of each dimension revealed the patterns of preference that people have for dimension. For the first set of data—the 51 scenes—the derived 5 dimensions or “preference dimensions” were labeled according to the contents of the scenes in the dimensions. Factor scores were calculated and saved for use as variables in further analysis. The second data set—27 shopping attributes—were analyzed with the same procedures and criteria, except that 8 factors were extracted. The derived 8 factors or “shopping attribute dimensions” were labeled according to their similar contents. Factor scores were also used as variables in further analysis.

### **Content Analysis of Respondents’ Comments**

The brief comments of the respondents for each scene in the descriptive survey were gathered and analyzed using content analysis procedure. The descriptive words provided for each scene were categorized and counted, and were used to help interpret the content of the dimension that the scene was part of. The analytical procedure used is described as follows:

1. Gather together all of the comments for each scene.
2. Create tentative categories according to the comments across all scenes.
3. Place comments into created categories. Similar comments were grouped into the same categories. Positive and negative comments were separated, but included in the same categories.
4. Translate comments from Thai to English

5. Collapse related categories into the large category. The final categories included atmospheric character, organization and display, spatial configuration, environmental condition, physical content, convenience, and overall assessment.
6. The comments in each category were counted and tabulated by categories for each scene. The comments included must be mentioned at least 10 times
7. Comments for each scene were arranged together in the same table according to the grouping by the most and least preferred scenes and by dimensions to be used in the interpretation

The results were used to clarify the interpretation of common characteristics underlying each factor or dimension from factor analysis. The most frequent comments were determined to be used in interpretation. The most frequent comments had to have the frequency that exceeded the overall average frequency of all scenes. The overall average frequency was determined for each descriptive and dimensional analysis by the average frequency per comment per scene.

### **Analysis of Relationship between Preference and Shopping Attribute Dimensions**

Analysis of relationship between preference and shopping attribute dimensions used canonical correlation analysis procedure to identify relationships between 5 preference dimensions from 51 scenes and 8 shopping attribute dimensions from question 1-27. Canonical correlation analysis was used to identify the relationship between a set of dependent variables and another set of independent variables. Canonical correlation measures the strength of the overall relationships between the linear composites of both sets of variables. The nature of the relationship between independent variables and dependent variables was determined by the contributions of each variable to the canonical functions represented by canonical weight or loadings (Hair et al., 1998). The factor scores of 5 preference dimensions from factor analysis of 51 scenes were used as multiple dependent variables, and the factor scores from 8 shopping attribute dimensions were used as multiple independent variables. Hair and others (1998) provides criteria for interpretation as:

- Significant canonical correlation at .05 or lower is considered significant and will be interpreted.
- Canonical loadings were used for interpreting the canonical variates or the relationship. Loading above .30 or below -.30 are considered significant and will be interpreted.

## **Analysis of Variance (ANOVA) and Multivariate Analysis of Variance (MANOVA)**

ANOVA was used to identify whether there is a difference between preference means of different preference dimensions. For this purpose, ANOVA was used to compare the means of preference dimensions to identify significant differences in preferences for different environments. A one-way repeated measure procedure in SPSS package was used to compare means of averaged preference scores of 5 preference dimensions. A Post-hoc test was performed to determine which mean significantly differed from the others. Bonferroni method in post-hoc procedure was used because it can control for experiment-wide type I error.

MANOVA was used to identify the relationship between preference for different shopping environments and respondents' shopping behaviors and socio-economic backgrounds. For this purpose, MANOVA was used to compare means of the subgroups of the respondents for shopping behavior and socio-economic variables on all 5 preference dimensions or dependent variables. MANOVA is the appropriate method to use when there are relationships among dependent variables. MANOVA has the advantage of controlling experiment-wide type I error level from inflation when several tests are conducted according to the number of dependent variables (Hair et al., 1998). The MANOVA procedure from the general linear model menu in SPSS package was used. All categorical data from question 49-70 were analyzed by a one-way multivariate test. Data from some of the questions were collapsed into a smaller number of categories to obtain sufficient frequencies and more equal distribution between subgroups as required by MANOVA. The procedure used is described in more detail below.

First, the means preference of categorical subgroups were compared by one-way multivariate test to determine whether there was any significant difference on the combination of 5 dependent variables. For each categorical variable, means preference for the categories were compared to identify the significant differences among the means.

Second, if there was significant difference on the multivariate test, the means of subgroups of respondents who have different shopping behaviors or socio-economic backgrounds were further compared for each dependent variable by univariate test. The means preference of the subgroups were compared on each preference dimension.

Third, if there was significant difference between subgroups on each dependent variable, the means of each subgroup were then tested by comparing each mean to all other means in pair with a post-hoc procedure to identify which means differed significantly from another. All of the tests

were conducted at .05 significance level. Post-hoc test was conducted using Bonferroni method for multiple comparisons to control experiment-wide type I error rate.

## **2. Interview**

The second part of the research design of this dissertation involves interviews with developers, designers, and managers of shopping environments. Interview method is described by interview procedure, interviewee, and analysis of interview data. Each of these topics is described in more detailed below.

### **Interview Procedure**

The interview procedure involved interviews with people involved in the process of making decisions, designing and renovating shopping environments. These people (developers, managers and designers) were interviewed about their roles in developing, managing, or designing shopping environments, their opinions about shopping environments and their comments on issues related to shopping environments. The format for the interview was a structured interview with standard questions. The questions were the same for all interviewees; however, the probes might be different according to the roles and involvements with shopping environments of the interviewees. The interview was comprised of ten major questions with some following detail items or probes such as: reasons of the answer, clarification of the answers, and related attributes that the interviewee did not mention in the first answers. The interview questions are included in Appendix A—Instruments.

The following questions were asked in the interview sessions:

#### 1. Background question

- What is your current position?
- What is your role and involvement with shopping environments?

#### 2. Development process question

- What is the process of development that you or your organization use?
- How are development and design programs and requirements generated and used?

- How do developers and designers work together?
3. Customers
- Who are the customers?
  - Where does the information about customers come from?
4. Prototype
- What is the inspiration in developing a shopping environment?
  - Is there any prototype? Where is the prototype from?
5. Important Factors
- What do you think are the most important factors and elements for the development and design of shopping environments?
6. Previous Trends
- What were the recent previous trends?
  - What do you think about the previous trends?
  - What do you think about the appearance of small retailers in common areas and exposed products?
  - Do you think that it has something to do with familiarity, tradition, or culture?
7. Future Trends
- What do you think about the future development or design of shopping environments?
  - What about the new type, superstore?
  - How about small developments or specialized centers?
8. Problems
- What are the problems of shopping environments?

- How can these problems be solved?

9. Ideal Place and successful criteria

- What is your ideal shopping environment?
- What are the successful criteria for a shopping environment?

10. Is there anything important you want to add?

11. Comments about research

- I am conducting a research about preferences for different shopping environments. Do you have any comment or suggestion?

For all questions, the interviewees were free to answer as long as they wanted to. The answers were recorded using a tape recording device with the interviewees' permissions. The results were used in making recommendations about logical strategies for future management, designs and renovations of shopping environments.

## **Interviewees**

A group of 10 interviewees, comprised of developers and designers, were included in the interview. The sample was selected to represent different roles and types of environments; however, the inclusion of interviewees depended on their consent. The selection process was:

- A set of shopping environments was selected and listed as representatives of different types.
- For each type of shopping environment, a few prominent companies were contacted and asked for permission to interview persons who were involved in the process of developing, designing, and managing shopping environments.
- If permission was granted, the interviewees were contacted and included in the interviews.
- If possible, the interviewer asked the interviewees to recommend another related colleague with related roles. For example, the developers recommended their designers.
- The interviews were conducted at the interviewees' business addresses for their convenience.

The final set of interviewees were composed of:

- 3 developers: One has been involved in development of a private traditional fresh market. One has been involved in the development of modern malls. Another has been involved in development of a modern outdoor shopping center.
- 4 designers: One was a planner of a traditional weekend market. Three architects were involved in designing modern malls.
- 3 managers: One is currently managing several public traditional weekend markets. Two are currently managing modern malls.

### **Analysis of Interview Data**

The recorded tapes from all 10 interviews were transcribed, coded, and categorized according to the roles of interviewees, type of environments, and topic of questions. Silverman (1993) suggests using tabulation format for analyzing data about facts and attitudes of interviewees from standard questions. The data were tabulated into questions by the interviewer. The tabulation format provided comparisons of data. The results were used to compare with other findings and to provide recommendations for future developments and improvement of existing environments. The analytical process is described below.

1. Each interview tape was transcribed into text.
2. Each transcript was coded.
3. The coded data interviewee were tabulated.
4. The tabulated data from all the interviewees were combined by their roles and type of environments.
5. The combined data were translated from Thai to English.

The information from interview analysis was used to compare with the findings from the preference survey of shoppers and used to identify strategies for future development and improvement of shopping environments.

## Summary

This methodology chapter has provided discussion of the methods and procedures applied in this dissertation. The chapter has discussed the objectives of this dissertation, research questions in order to fulfill the objectives, and methods used to collect and analyze the data required by the research questions. Two major parts of the methods—preference survey of the shoppers and interviews with developers, designers, and managers of shopping environments—were described.

The preference survey was discussed by data collection methods, survey respondents, and data analysis methods. Data collection methods included preference rating survey, scene description survey, shopping behavior survey, and survey of socio-economic backgrounds. Survey respondents were described by sampling process and sample size. To analyze the data collected by the above methods, a set of data analysis methods were used:

- 1) Analysis of most and least preferred scenes used descriptive analysis to identify the physical characteristics of most-and least-preferred scenes.
- 2) Analysis of preference dimension used factor analysis to group data from the preference rating survey to identify preference dimensions and to group data from the importance rating of shopping attributes.
- 3) Content analysis of respondents' comments was used to analyze respondents' comments from the scene description survey, which were used to help identify preferred characteristics of shopping environments.
- 4) ANOVA was used to compare means preference between preference dimensions to identify the differences.
- 5) Analysis of relationship between preference and shopping attribute dimensions used canonical correlation analysis to identify the relationship between preference for different shopping environments and the perceived importance of shopping attributes.
- 6) MANOVA was used to identify the significant differences in preferences for different shopping environments among different subgroups of respondents according to shopping behaviors and socio-economic backgrounds.

Interviews with developers, designers, and managers of shopping environments were described by interview procedure, interviewees, and analysis of interview data. The results from all of the analysis methods will be discussed in detail in the following result chapter.