The effect of sidewalk pavement design to a cultural image of city –The case study in Taichung city

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This study focuses on the convergence of city image in different countries. And according to the concept of local identification, each city should have their unique cultural images as the city identity which can be the base of designing public spaces.

Since people recognize the city through movements and actions in the pedestrian space, the design of sidewalk pavement deeply influences people to identify a city's cultural image. In order to clarify the effect on cultural images through sidewalk pavement design, we investigate the sidewalk pavement in Taichung city by taking photos through the observation method at first, make analysis of concrete and abstract feelings by carrying out surveys with Likert scale questionnaires, then utilize the statistical software SPSS for analysis of the feasibility of building up the cultural image of city by virtue of the design elements of style, color and material etc. of the sidewalk pavement, and finally summarize the direction for future design.

Keywords: sidewalk pavement, city image, cultural images, Public environment

1. Introduction

City culture derives from the behaviors and characters of dwellers as an embodiment of inheritance and continuity of life. It is gradually evolving with the changes in environment, time and space. By exploring the relationship of "culture", "environment" and "user's behaviors", with the cultural creative thinking of industrial design, the study presents the technique of expressing the "city image" via "facilities" in the environment.

This study discusses the cultural image of city through users' impression of the environment, examines the question as to the convergence of city images of modern big cities and centered on the issue of city image, proposes that different cities should have totally dissimilar cultural relations and their distinctiveness. After literature review and questionnaire, this study aims at how to use the public environment, facilities and designs of a city to provide a feel for characteristics and recognition of local culture by locals and non-locals, and enhance the otherness and cultural traits between cities.

2. Literature

Currently related works reported on the issue of image and culture of Taiwan cities mostly confine their attention to creative studies on product design or commodity marketing and view cultural creations as a means of

developing economy and marketing local culture. There are few researches on the environmental design of city and exploring traces of design in the cultural image of city. This study mainly discusses the interrelations of "city impression", "cultural image", "pedestrian space" and "user" (Figure 1). Therefore, a literature review is conducted from the perspectives of "impacts of city space on people and city impression", "pedestrian space design and its user", "city space and environmental facilities", "people's affection for and impacts on culture" and "case study of cultural images of modern city spaces", so as to establish the basis for the present study.

2.1 Impacts of City Space on People and City Impression (Environment and People):

Lynch (1981) proposed the five types of elements constituting the city image: paths, edges, districts, nodes and landmarks. These five spatial patterns shape the basic structure of a city and are in the most direct contact with people living in the city, so their impacts are the most apparent. Walker who live in a city will have their own image to a city, but there are something similar basically so city planer don't care too much of those individual difference. Just care about the most common image of people to find the way to show all kinds of materials, to recognize a mark of an area intuitively, and what it's short of. When walker enter a strange area. They will draw a map in mind intuitively. This map can help them make sure the direction, conclude key-points, and exclude unnecessary information. "Urban Code 100 Lessons for Understanding the City" proposed people live in SoHo, Manhattan, New York can build clear environment images quickly is because of the straight streets make people move in one direction, which can easily build the image in one's mind. In Lynch's research, most respondents answered that Manhattan, New York is the city have obvious directionality. Because there are several area have obvious features, located by river and street, organize frame orderly.

Chou (2001) in "a social survey concerning the aesthetics of urban space", interviewed city dwellers of different professions for their impression of the city and extracted those elements of city impression, including: (1) function and pragmatic beauty; (2) development and sustainable development; (3) relations of individuality, locality, generality and globalization; (4) contemporariness and historical inheritance. The researchers were of the opinion that the four points indicated that the cultural image of a city represented a culture of continuity, transmission of regional characteristics and urban aesthetics of sustainable development.

2.2 Pedestrian Space Design and Its User (Object and People):

Before the 19th century when the cars hadn't be developed. The most common way to move is walking on feet. Though there was no sidewalk pavement, street space for walker was taken seriously. The differences between sidewalk pavement and lane appeared because of compressing the walk space on street by the cars were widespread. The features of slow walking are getting information by contacting people, participating activities on street, and searching basic needs of human(Cheng C.W., 2003). From the development of sidewalk pavement, we can see the influences of city economic, social, and culture. The sidewalk pavement is not only ensure the safety and convenient of walker but make business thriving and neighborhood agglomerated (Huang Y.H., 2005). Sidewalk pavement effects the comforts and safeties of people which including the emotion and cognition psychologically. They are all influence the identity of one place to walker.

2.3 City Space and Environmental Facilities (Environment and Object):

As pointed out by Lin (2005), the street furniture was of the utmost importance for the city impression in the mind of people, and presentation of street furniture looked like a local dialect or distinctive culture. From the

composition of urban space, the pedestrian path (sidewalk), like street furniture, can be viewed as an embodiment of local culture. Paths are the most basic constitutive elements among the five types of elements proposed by Lynch (1981) in that the "paths" are the important channels linking "nodes" and "landmarks" in a city. Users on the pedestrian paths often move slowly (e.g. walking, jogging). As compared with the street space for vehicles, the environmental elements of the pedestrian path are more apt to attract passers-by's attention and build up the spatial image. Therefore, the design rules of pedestrian paths have considerable importance and influence on the image buildup of city space. Marks on floor can be easily seen by far, or be seen in long time can make people impressive, and be effective if the direction can be confirm. One mark can be a stable indicator in a complicated city if it can be recognized no matter the distance, slow walking or speedy driving, and day or night.

2.4 People's Affection for and Impacts on Culture (People and Culture):

Chou (2001) presented that the characteristic and charming urban space was built from three elements, i.e. "natural environment", "cultural conditions" and "artificial landscapes", especially talked on the relation of tradition and modernity in terms of cultural conditions and emphasized that the historical and cultural heritages in the city was not only the mark of continuity of culture, but also the soul of the environmental characteristics of a city, and once a city couldn't embody its cultural image, it lost the soul and characteristics. Yang (2005) further explained the "image of city" of Lynch (1981) and thought that the environmental image could be analyzed into the three components as "self-evidence", "structure" and "meaning", which enables the user to distinguish the difference in environment. Here "meaning", in other words, is the spiritual memory and emotional affection of the user, and this study discusses what the cultural image and city space mean to the pedestrians. Also, he mentioned that a city without individuality could neither offer a public image shared by citizens, nor give a sense of belonging and ownership. This reveals what the city dwellers in the 21st century are lack of and one of the reasons why city dwellers appear more aloof than residents of rural areas and small towns.
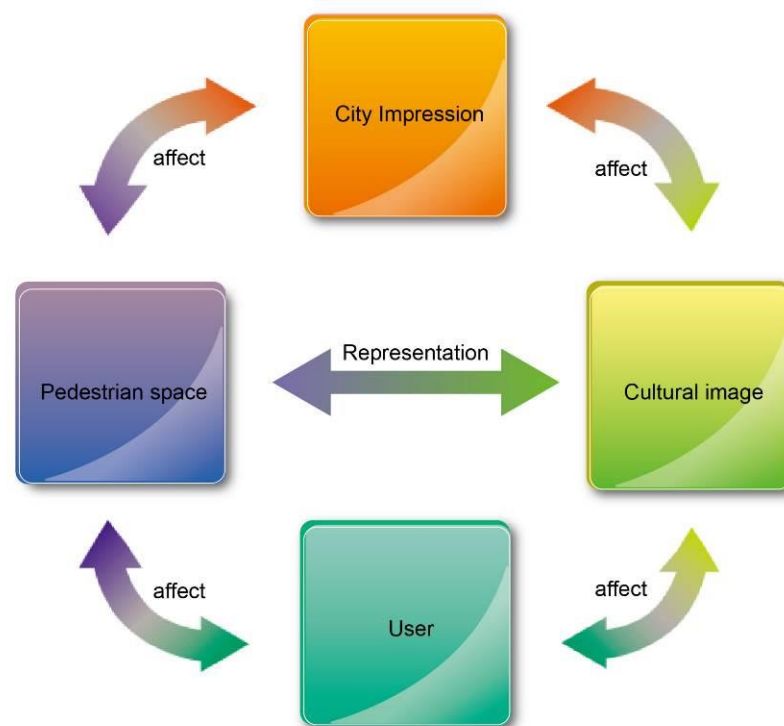
Figure 1 Relations of "pedestrian space — cultural image — city impression — user"

3. Research Methods

This study selects ten pedestrian spaces in Taichung city for filed observation, collects samples by taking photos, includes them into questionnaire, and uses the Likert scales for the survey and multiple-choice questions in the questionnaires. 100 questionnaires are distributed, and among 68 received, canceling out 4 invalid questionnaires, finally 64 valid questionnaires are gathered.

The questionnaire is designed to exhibit the photos of 10 pedestrian spaces. The respondents are required to choose the city impression after viewing the pictures. Multiple choices are utilized and the design elements are classified into four types for multiple choice: "style", "color", "material" and "plane pattern". Figure2 is the example of research survey, there are three major categories: "culture image", "the reason making culture image", and "impressive level". Researcher introduce the basic acknowledgements by oral and paper before execute survey which including: 1. Culture image: evaluate the degree of culture meaning of facilities in photo 2. What kind of factor effects generate culture image (form, color, material, pattern) 3. Impression degree: evaluate the impression degree of facilities in photo. Improve the validity of survey by introducing to respondents.

1. Cultural image degree
2. What kind of factor effects generate culture images?
   (form, color, material, pattern)
3. Impression degree

Figure.2

It is anticipated that the questionnaire may reveal the major influencing factors on the cultural image by the sidewalk pavements of Taichung city. In the questionnaire, the samples are measured by the cultural image and the city impression, and then the crossover comparison and the percentage calculation are conducted to obtain the relative relationship between cultural image and city impression of the samples. The photos of samples are presented as follows. (Table 1)
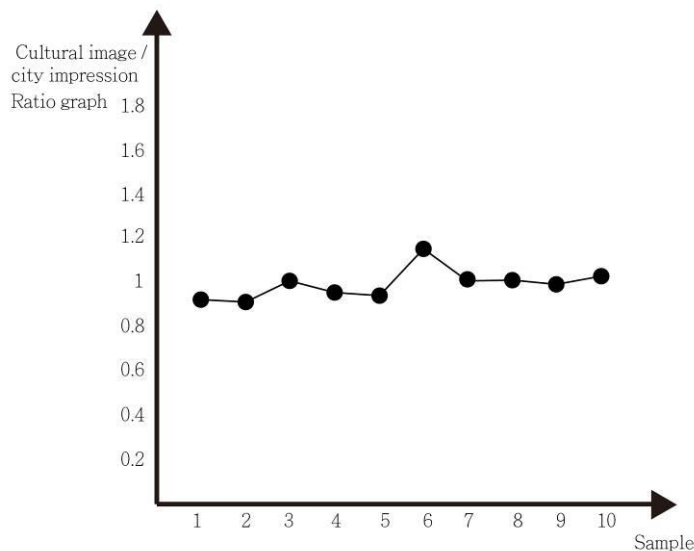
Sample 1.	Sample 6
Sample 2	Sample 7
Sample 3	Sample 8
Sample 4	Sample 9
Sample 5	Sample 10

(Table 1)

4. Statistical Analysis

Based on 64 valid questionnaires collected, the software SPSS is employed for the statistical analysis of number and percentages. The percentages are calculated by the statistics of degree of cultural image and city impression for ten samples and the two are cross compared, in order to judge the relative relationshipship between cultural image and city impression. As for the basic data of received questionnaires, gender: male 56.2% and female 43.8%; residents: locals 93.7% and non-locals 6.3%; 73.4% living in the city for over five years, 3.1% three to five years, 15.6% one to three years, and 7.8% less than one year. According to the statistical results of questionnaires, the figure below is the "line chart of percentages" of cultural image and city impression for each sample (Figure 2). In addition, the numerical values of the two are calculated and the "line chart of degree" is plotted and overlaps with another line chart (Figure 3) to analyze the situations of 10 samples.

Sample	Ratio of cultural image / city impression
Sample 1	0.91
Sample 2	0.90
Sample 3	1.01
Sample 4	1.00
Sample 5	0.94
Sample 6	1.15
Sample 7	1.01
Sample 8	1.00
Sample 9	0.99
Sample 10	1.03

(Figure 3)   (Table 2)

The graph analysis (Figure 3) (Table 2) is conducted by the ratios of cultural image and city impression. It is found that the two are mutually affected. When the ratio is closer to 1, the difference of them is lower, and to higher extent they affect each other. The ratio for Sample 6 is larger than other samples, and this means the difference in the assessment of cultural image and city impression is big for the sample. On the whole, the error

values of all samples are between ±0.15 and it indicates that the cultural image is closely linked to the city impression.

Furthermore, the line graphs of percentages of cultural image and city impression are plotted and contrasted (Figure 4). According to the features exhibited in the line graphs, the samples approximately fall into three categories: the first category contains those with high cultural image and city impression, the second category includes those having low cultural image but high city impression, and the third category comprising those with low cultural image and city impression. These three situations are interpreted as follows: the first category indicates that the sidewalk samples are superior to other samples in the representation of cultural image; the second category performs worse than the first category so that the city impression is higher than the cultural image, and this may be due to problems or mistakes in the way of representation; the last category has almost no sense of presence, so these samples are easily neglected or almost have characteristics in sidewalk pavements.
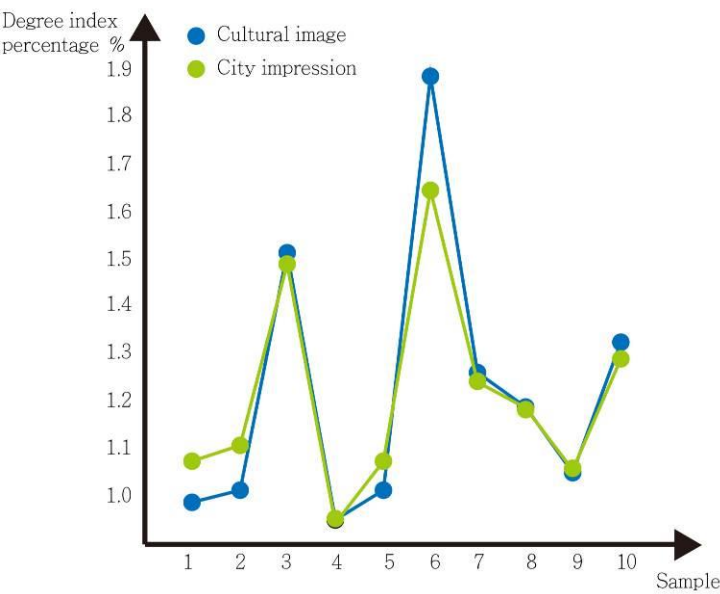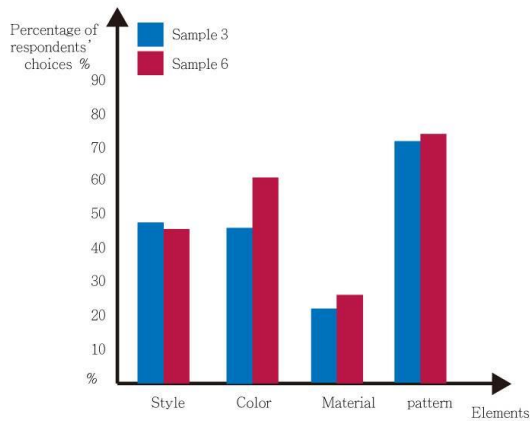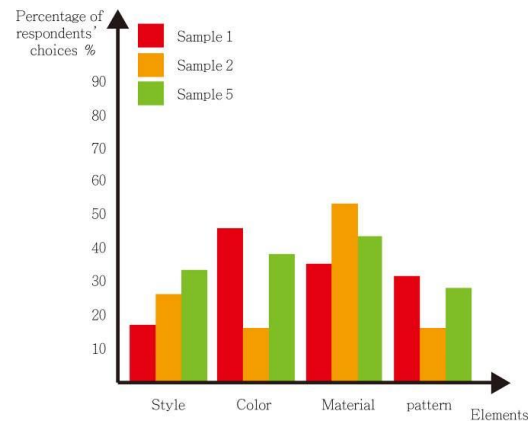

Figure 4

Representative samples of each category are sorted out from 10 samples for in-depth discussions. Sample 6 and Sample 3 belong to the first category. The percentages of the cultural image elements for these two samples are respectively Sample 6: style 44.16%, color 60.9%, material 26.5%, and pattern 73.4%, Sample 3: style 48.4%, color 43.7%, material 21.8%, and pattern 71.8% (Figure 5). From the above percentage data, it is seen that the two samples have significant impact on the respondents in respect of pattern LOGO, followed by color or style. The second category consists of Sample 1, Sample 2 and Sample 5. The percentages of these three samples in terms of cultural image elements are respectively Sample 1: style 18.7%, color 40.6%, material 35.9%, and pattern 32.8%, Sample 2: style 28.1%, color 18.7%, material 54.6%, and pattern 18.7%, Sample 5: style 34.3%, color 39.0%, material 43.7%, and pattern 29.6%(Figure 6).

(Figure 5)

(Figure 6)

From the figures above we see, if the pattern LOGO is used as the principal design element of sidewalk pavement, it may ensure both cultural image and city impression. But the material can't effectively highlight the presence of cultural image, and the design of cultural image embodied by material use still needs further assessment. With regard to style and color, although the results do not demonstrate their effects on the cultural image of sidewalk pavement, they possibly have indirect influence. Also, from Figure 4 it is observed that the difference of Sample 3 and Sample 6 only lies in the different scores in Figure 2 (ratio of cultural image and city impression) resulted from the difference in color.

5. Conclusions

In a word, this study arrives at the three conclusions. 1) The sidewalk pavement of pedestrian spaces in Taichung city can't effectively present the traits of local culture the city dwellers are able to be sensible of, so they have a low opinion of cultural image and city impression. 2) As far as the sidewalk pavement concerned, the design element of pattern is easier to attract the user and leave a good impression; therefore, if the pavement is designed by different materials or special materials, the representation of visual image should be laid stress on to enhance the discernibility of cultural image expression. 3) In point of the pattern design, color-aided design may be applied to more effectively consolidate the link between cultural representation and visual image. 4) According to the calculated date, the culture image of sidewalk pavement will affect the impression degree, but the degree is not just affected by the culture image at all.

6. Further Studies and Improvements

The study focuses on the sidewalk pavement of the pedestrian space. Comprehensively In view of the cultural image, the sidewalk pavement should not be the only influencing factor. Accordingly future studies on the cultural image of streets in city may continue the statistical method of the present study and also investigate other influencing factors to ensure the integrality of study on cultural image.

1) The study reviews the selection of photos and the questionnaire. The photo screening is a little deficient in objectivity and shooting angle and has restrictions on form, leading to difficulty for respondents in discerning the questionnaire. Therefore, in future studies, screening and shooting conditions of photos of samples should be further modified to improve the accuracy of the questionnaire.

2) The number of respondents and samples are insufficient for a more accurate quantitative study. The inadequacy of samples is unfavorable for data analysis of the quantitative study and deviation easily occurs. This study will increase number of samples and questionnaires to make up the deficiencies in research data.

3) For SPSS analysis, other statistical methods should be added and the multivariate factors should be used for crossover analysis. By this means the accuracy of the statistics is validated, and a discussion may center on whether there are more methods of interpretation.

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