Design of the landscape diversity of commercial streets in the old downtown of Ho Chi Minh City

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Abstract. Ho Chi Minh City is a city with many cultures, architectural styles, and different lifestyles. This makes Ho Chi Minh City characterized as a diverse city satisfying the different elements: spatial diversity, cultural diversity. According to the Saigon master plan of Coffyn designed in the early 20th century, together with public spaces, the commercial areas of Ho Chi Minh City were also identified as the main points for the city development. Therefore, the commercial streets in its old downtown also showed very obvious diversity. Vietnamese people have adjusted the urban spaces planned by French people in order to match with their lifestyle for more than 100 years. Besides, many old commercial buildings have been demolished and replaced with new buildings, causing the disturbance of life and cultural values of the city, leaving many streets losing their original landscapes and getting the same style. Their uncontrolled diverse development causes the clutter, loss of order, and insecurity. From this above situation, the author has chosen the subject “Design of the landscape diversity of commercial streets in the old downtown of Ho Chi Minh City” in order to find the oriented development for those streets on the basis of maintaining and developing their inherent diverse characteristics.

1 Introduction

In some Asian cities, the landscape diversity has been formed naturally and maintained effectively [6]. In European and US cities, there was a reconsideration on the theory of modern urban architecture and encouraging the trend to shift from planning method "template" to planning model "diversity, adaptation" [7]. The theoretical and practical lessons learned from the success of landscape diversity design in developed cities such as Tokyo, Hong Kong have created the platform for the comprehensive development solution for the urban landscape design in Asia, including Ho Chi Minh city. The methods measure diversity indices have led to the expectations on establishing a scientific design method for the development of landscape diversity on commercial streets of Ho Chi Minh city.

From the late 20th century, there was the movement to support the idea of diversity, from residential component diversity, living space diversity to diversity of social institutions. One of the pioneers of this idea is Jane Jacobs (1916-2006), the famous American researcher [8]. Following Jane Jacob, there have been plenty of research and designing about the ideal of

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diversity, forming a strong trend across the world with the famous authors such as Emily Talen (USA) [9], Ian Bentley (England) [10]. In the East, the sociocultural characteristics of some countries like Japan or Hong Kong have been more favorable to this idea, so they could help to blend the diversity in life naturally and inevitably as it seems. There were some well-known researchers in this field such as Yoshinobu Ashihara (Japan), William SW Lim (Singapore) [11].

3 Materials and methods

This study is designed to conduct in seven steps.
4 Results

4.1 Step-1: The concept of diversity and the concept of “Designs for landscape diversity of commercial streets”

4.1.1 The Concept of Diversity

a. Definition.

A diverse area is a place where gathers of many people with different of economic conditions, culture, race, gender, age, lifestyles [14]. The formation of many kinds of buildings and many different compositions of populations is an essential feature in the diversity area [9].

b. The meaning of diversity.

- The Vitality of Diverse areas: The Diversity brings economic development and ecological balance to the areas (creating sustainable development basis) [15].
- Social justice: The diversity ensures the better access to resources for all social groups [15].

c. The factors that form the diversity.

4.1.2 The concept of “Design for landscape diversity of commercial streets”

"Design for Diversity" is a design used for the buildings or spaces that have the physical diversity elements. Physical factor is one of three key elements of a diverse area (Physical factors, Historical/economic/social factors and Policy factors). These factors have discernment and linked by a chain of interactions.

“Design for landscape diversity of commercial streets”: the activities aimed at maintaining and developing the diversity of the physical elements which constitute the landscape diversity.
4.2 Step-2: The landscape characteristics of commercial streets in the old downtown of Ho Chi Minh City

Experiencing the development periods: the period before 1858; 1859 -1955; 1956 – 1975; 1975 to the present.

In the old center of District 3 (including Districts 1,3,5) have the typical streets with the characteristics represented for each district, and the most common ones in urban areas of Vietnam [16].

*PB: building with low-rise, row houses, local architecture
*IA: buildings with mixed height, row houses, Western architecture
*IB: buildings with mixed height, Western architecture
*IIB: buildings with low-rise, local architecture
*IIB: buildings with mixed height, local architecture
*VA: buildings with low-rise, row houses, Chinese architecture
*VB: buildings with mixed height, row houses, Chinese architecture

4.3 Step-3: The scientific basis of design for landscape diversity

4.3.1 The rationale applied in diverse landscape design

a. The theory basis to classify, evaluate the characteristics of landscape diversity

- Classifying the landscape characteristics according to the block spatial elements

There are five factors that shape the landscape space, including Terrain, Trees, Water Surface, Available Space, Architecture. The thesis uses five factors as the basis for determining the block spatial elements of the commercial streets. Besides, the streets represent the difference through other elements: Function; Structure; Architecture; Feature.

- To assess landscape diversity

  - The frame of diverse elements

  The frames of diverse elements including the physical elements constituting the landscape: Block spatial elements; Activity spatial elements.
Fig. 2. The concept of "Design for landscape diversity of commercial streets".

4.2 Step 2: The landscape characteristics of commercial streets in the old downtown of Ho Chi Minh City

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4.3 Step 3: The scientific basis of design for landscape diversity

4.3.1 The ratio applied in diverse landscape design

a. The theory basis to classify, evaluate the characteristics of landscape diversity

- The diversity index of the landscape

The thesis uses Simpson’s diversity index to measure the diversity index of the landscape. According to this method, the higher diversity index, the more diversity landscape exists in that area and its elements are almost of the same quantity [17].

Fig. 3. The frame of diverse elements.

- The diversity index of the landscape

  The thesis uses Simpson’s diversity index to measure the diversity index of the landscape. According to this method, the higher diversity index, the more diversity landscape exists in that area and its elements are almost of the same quantity [17].

Fig. 4. The Simpson's diversity index. Indicate high diversity: high scores (close to 1), low scores (close to 0) indicate low diversity.

  * The rubrick to emotionally evaluate landscape

  The perception of the street landscape includes beauty - ugly, light - dark, traditional - modern ... (visual), hot - cool (touching), noisy - quiet (hearing) ... This research applies common assessment Japanese methodology and is based on the five-leveled scale (Godankai Hyōka) [18].

  b. The theory basis to create criteria, method for designing the landscape diversity

  * The theory basis to create design criteria

  From the theoretical basis: The conditions of landscape diversity of Jane Jacobs; Criteria for adaptive landscape diversity of Ian Bentley; The design criteria diversity landscape of Emily Talen; the thesis proposed four criteria for designing landscape diversity: Combination criteria; Connection criteria; Adaptation criteria; Safety Criteria.

  * The theory basis to create design method

  Because of the physical elements constituting the street landscape includes two main factors: the block spatial element and the operation spatial element, therefore the design method for each group is followed these two factors.

  * The theory basis to create design steps

  - Based on the criteria and methods for diversity landscape design.
- Simulation on the characteristics of the streets having highest diversity landscape in the old downtown of Ho Chi Minh City.
- Consistent with the characteristics of all street groups.
- Based on some design methods supporting the diversity urban.
- Based on the design experience for urban in the world.
- The theory basis of design solutions for diverse streets in old downtown of Ho Chi Minh City.

First of all, the diverse area needs to have a specific code to identify the diversity landscape characteristic and clarify into groups.

After that, each group is matched with the diversity criteria and design methods in order to test the suitability and adaptation to the diversity of each group.

Finally, proposing the appropriate methods for landscape diversity design to make the compliments of criteria, methods to enhance diversity landscape design.

4.3.2. The practical basis applied in landscape diversity design

a. Landscape diversity design in Chicago.
   Including Awareness of the value of diversity in the community, to reduce the pressure to develop new projects, social connection, the role of the social unions.

b. Landscape diversity design in Tokyo.
   Including Street landscape continuously changes over time; the street landscape has formed different areas with different characters, coexistence rather than elimination.

c. Landscape diversity design in Hong Kong.
   Including Flexible and opened plan for landscape diversity with friendly design, high building, and the surprising design.

4.4 Step-4 To classify and evaluate the groups of commercial street landscape in the old downtown of Ho Chi Minh City

4.4.1. Classification results according to physical factors constituting landscape

Classification into 7 street groups:
- PB (Popular): Streets having buildings with low-rise, row houses, local architecture
- IA: Streets having buildings with mixed height, row houses, Western architecture
- IB: Streets having buildings with mixed height, Western architecture
- IIIA: Streets having buildings with low-rise, Western architecture
- IIIB: Streets having buildings with low-rise, local architecture
- VA: Streets having buildings with low-rise, row houses, Chinese architecture
- VB: Streets having buildings with mixed height, row houses, Chinese architecture.

4.4.2. Evaluation results about the characteristic of landscape diversity

Reviewed characteristic landscape diversity through two surveys results, including the diversity of the physical elements constituting the landscape, the diverse index calculation results of typical commercial streets in the old downtown of Ho Chi Minh City.

4.4.3. Evaluation results about the landscape emotion

a. The main factors affecting the assessment of landscape emotion:
- Likes: Depending on factors: Beautiful, Bright, Open, Modern.
- Attractive: Depending on factors: Beautiful, Open, Bright, Comfortable, Luxury, Ancient, Modern.

- Wish to come: Depending factors: Beautiful, Open, Bright.

Thus, the key influence elements are as follows (from highest to lowest level):
Beautiful > Openness > Bright, Comfortable > Luxury, Traditional, Young > Modern.

There is a large difference in assessment of landscape emotion about the landscape of 30 streets. The streets having high landscape diversity are more attractive than others. The favorite extent is less change with age (young - old) or trendy (modern-traditional), but more depending on the elements of open, bright, comfortable.

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**Fig. 5.** Classify and evaluate the groups of commercial street landscape.

**4.5 Step-5: To establish the criteria for landscape diversity of commercial streets in the old downtown of Ho Chi Minh City**

- **Combination criteria**
- **Connection criteria**
- **Material space factors**
  - Methods: Combination of material space factors which have different styles
  - Methods: Integration of buildings
- **Activities space factors**
  - Methods: Suitability for small commercial company
  - Methods: Manual supervision and technical monitor
- **Adaptation criteria**
- **Safety criteria**

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**Fig. 6.** Classify and evaluate the groups of commercial street landscape.
4.6 Step-6: To propose the design solutions for landscape diversity of commercial streets in the old downtown of Ho Chi Minh City

4.6.1. Setting specific identification codes of the typical street landscape groups

Specific identification codes of the typical street landscape groups are not only helping to maintain the characteristics of inherent landscape diversity but also help to improve the diversity of street landscape. So we need to select the characteristic landscape on the two requirements as below.

As the results of classification, evaluation characteristic landscape diversity, the features of the street groups show a lot of diverse variables which are measured by various indicators such as: trees, building functions, building age, building architecture, building height; building width, front yard, fence, parking area, building front facade (closed-opened), color, commercial type, traffic type, culture type, social type... Therefore, the street groups have the above-mentioned characteristics which get high diversity values need to use them in setting specific Code of standard landscape features.

Other features such as the water surface, opened- spaces, squares, the form of the combined building, subsidiary building, pavement width, alley, intersection...can not be measured diversity level, but these properties are also supportive landscape diversity [19, 20]. Therefore, it is possible to use them in setting specific Code of standard landscape features.

According to my finding, there is no clear relationship between the width of the road, building density, the coefficient of land usage and landscape diversity in the commercial streets. Therefore, these features are not used in setting specific Code of standard landscape features [21].

![Fig. 8. Code of standard landscape features.](image)
4.6.2. Checking the level of response to the criteria of landscape diversity design in each commercial street group of Ho Chi Minh old downtown

Based on the framework of criteria and methods of landscape diversity design, checking the table for each commercial street group was established.

4.6.3. Selection of landscape diversity design way for each type of commercial and service streets in HCM old downtown


b. Typical street group IA: Streets having buildings with mixed height, row houses, Western architecture.
c. Typical street group IB: Streets having buildings with mixed height, Western architecture.

<table>
<thead>
<tr>
<th>SOLUTI0N OF LANDSCAPE DIVERSITY DESIGN</th>
<th>TYPICAL STREET GROUP IB Streets having buildings with mixed height, Western architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific identification codes of landscape diversity</td>
<td>Code of standard landscape feature Code of landscape diversity index</td>
</tr>
<tr>
<td>![ typical street group IB ]</td>
<td>![ typical street group IB code ]</td>
</tr>
<tr>
<td>Diverse tree; Having water surface; Having open space; Having Square; Design type: diverse building function, diverse building age, the form of row houses combination, diverse building type, mixed height, different building width, diverse front yard, diverse fence, diverse parking lot, diverse building facade, diverse colour; Various commercial business types; Various traffic types; Pavement width: 3.5-5m; A lot of alleys and intersections.</td>
<td>![ typical street group IB code ]</td>
</tr>
<tr>
<td>- Commercial type (4.97)</td>
<td>- Colour (5.38)</td>
</tr>
<tr>
<td>- Width (4.33)</td>
<td>- Height (4.33)</td>
</tr>
<tr>
<td>- Traffic type (2.76)</td>
<td>- Activation “dead” areas</td>
</tr>
<tr>
<td>- Manual supervision and technical monitor</td>
<td></td>
</tr>
<tr>
<td>Methods and design ways for diverse landscape design</td>
<td>Combination criteria Connection criteria Adaption criteria Safety criteria</td>
</tr>
<tr>
<td>![ typical street group IB design ]</td>
<td>- Combine big and small commercial company</td>
</tr>
<tr>
<td>![ typical street group IB design ]</td>
<td>- Manual supervision and technical monitor</td>
</tr>
</tbody>
</table>

**Fig. 11.** Typical street group IB.

d. Typical street group IIIA: Streets having buildings with low-rise, Western architecture.

<table>
<thead>
<tr>
<th>SOLUTI0N OF LANDSCAPE DIVERSITY DESIGN</th>
<th>TYPICAL STREET GROUP IIIA Streets having buildings with low-rise, Western architecture</th>
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</thead>
<tbody>
<tr>
<td>Specific identification codes of landscape diversity</td>
<td>Code of standard landscape feature Code of landscape diversity index</td>
</tr>
<tr>
<td>![ typical street group IIIA ]</td>
<td>![ typical street group IIIA code ]</td>
</tr>
<tr>
<td>Diverse tree; Having water surface; Having open space; Having Square; Design type: diverse building function, diverse building age, diverse the form of building type combination, diverse building type, mixed height, different building width, having subsidiary buildings in front of main building, diverse front yard, diverse fence, diverse parking lot, diverse building facade, diverse colour; Various commercial business types; Various traffic types; Pavement width: 4.6m; A lot of alleys and intersections.</td>
<td>![ typical street group IIIA code ]</td>
</tr>
<tr>
<td>- Commercial type (4.45)</td>
<td>- Colour (4.94)</td>
</tr>
<tr>
<td>- Width (4.35)</td>
<td>- Backwards space (3.37)</td>
</tr>
<tr>
<td>- Traffic type (3.35)</td>
<td>- Activation “dead” areas</td>
</tr>
<tr>
<td>- Manual supervision and technical monitor</td>
<td></td>
</tr>
<tr>
<td>Methods and design ways for diverse landscape design</td>
<td>Combination criteria Connection criteria Adaption criteria Safety criteria</td>
</tr>
<tr>
<td>![ typical street group IIIA design ]</td>
<td>- Maintenance existing status</td>
</tr>
<tr>
<td>![ typical street group IIIA design ]</td>
<td>- Manual supervision and technical monitor</td>
</tr>
</tbody>
</table>

**Fig. 11.** Typical street group IIIA.

e. Typical street group IIIB: Streets having buildings with low-rise, local architecture.
### TYPICAL STREET GROUP IIIIB

**Streets having buildings with low-rise, local architecture**

<table>
<thead>
<tr>
<th>Specific identification codes of landscape diversity</th>
<th>Code of standard landscape feature</th>
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</thead>
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<tr>
<td><img src="image1" alt="Street group IIIIB" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
</tr>
</tbody>
</table>

**Design type:** diverse building function, diverse building age, different building width, diverse front yard, diverse parking lot, diverse building facade, diverse colour; Various commercial business types; Various traffic types; A lot of alleys and intersections.

- Commercial type (5.13)
- Colour (6.32)
- Width (1.68)
- Backwards space (3.08)
- Traffic type (2.76)

<table>
<thead>
<tr>
<th>Combination criteria</th>
<th>Connection criteria</th>
<th>Adoption criteria</th>
<th>Safety criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Maintenance existing status</td>
<td>- Having space characteristic</td>
<td>- Adaptation to economic, culture, social activities</td>
<td>- Having a strong and clearly boundary</td>
</tr>
<tr>
<td></td>
<td>- Having public space</td>
<td></td>
<td>- Activation “dead” areas</td>
</tr>
<tr>
<td></td>
<td>- Suitability for social activity</td>
<td></td>
<td>- Manual supervision and technical monitor</td>
</tr>
</tbody>
</table>

**Methods and design ways for diverse landscape design**

- Combination of material space factors which have different style
- Combination of different building ownerships
- Combine big and small commercial company

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**Fig. 12.** Typical street group IIIIB.

f. Typical street group VA: Streets having buildings with low-rise, row houses, Chinese architecture.

### TYPICAL STREET GROUP VA

**Streets having buildings with low-rise, row houses, Chinese architecture**

<table>
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<tr>
<th>Specific identification codes of landscape diversity</th>
<th>Code of standard landscape feature</th>
<th>Code of landscape diversity index</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Street group VA" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
</tr>
</tbody>
</table>

**Design type:** the form of row houses combination, having subsidiary buildings in front of main building, diverse colour; Various commercial business types; A lot of alleys and intersections.

- Commercial type (4.21)
- Colour (6.02)

<table>
<thead>
<tr>
<th>Combination criteria</th>
<th>Connection criteria</th>
<th>Adoption criteria</th>
<th>Safety criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Having public space</td>
<td>- Adaptation to natural environment</td>
<td>- Having a strong and clearly boundary</td>
</tr>
<tr>
<td></td>
<td>- Suitability for social activity</td>
<td></td>
<td>- Having regulation of all activities for each area.</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Methods and design ways for diverse landscape design</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Combination of material space factors which have different style</td>
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<td>- Combine big and small commercial company</td>
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</tbody>
</table>

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**Fig. 13.** Typical street group VA.

g. Typical street group VB: Streets having buildings with mixed height, row houses, Chinese architecture.
5 Discussion

- Maintenance and development the landscape features should be considered as a key task in the development of street space in Ho Chi Minh City.
- There should be more researches to build a set of specific standards and regulations for the development of landscape architecture in Ho Chi Minh City
- Raising awareness and promote the role and responsibilities of the community in urban centers about development landscape diversity of Ho Chi Minh City old downtown.

6 Conclusions

a. Classification and evaluation of landscape diversity characteristics
   *PB: Streets having buildings with low-rise, row houses, local architecture
   *IA: Streets having buildings with mixed height, row houses, architecture
   *IB: Streets having buildings with mixed height, Western architecture
   *IIIA: Streets having buildings with low-rise, Western architecture
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   *VB: Streets having buildings with mixed height, row houses, Chinese architecture

b. Developing a system of criteria, methods, ways for landscape diversity design: combination criteria; connection criteria; adaptation criteria; safety criteria.

c. Developing design solutions for diverse landscape of seven street groups in old downtown of Ho Chi Minh City
   - Establishing specific identification codes of the typical street landscape groups.
   - Checking the level of response to the criteria of landscape diversity design.
   - Selection of landscape diversity design way for each type of commercial and service streets in Ho Chi Minh city old downtown.
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Conclusions

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b. Developing a system of criteria, methods, ways for landscape diversity design:
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   - connection criteria;
   - adaptation criteria;
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