

# Visual Thinking as a Strategy for City Sustainability

Hsiu-hui Lin, and Weii Lee

**Abstract**—Historically, the developments of the traditional Chinese settlement always include the attempt not only to respect the important ideas in the form of the landscape, but also to state the critical values in the function of the city. Both components link to the rhetoric of ‘visual thinking’ which is important for city sustainability. The transformation of cultural ideas into instructive principles of sustainable design relating to visual thinking for a traditional Chinese settlement, Zuoying, located in southern Taiwan is the focus of this paper. The process of analyzing the city landscape, the temple monument, and the housing layout can be recognized as a critical dialogue of learning the values and the ideas of sustainable design. Moreover, the concept of visual thinking enables us to translate various visual clues of a historical settlement into the design guidelines. Such an operational procedure should be process-oriented in order to play a critical role in carrying out the logic of designing a sustainable city and in unifying the meaning of the ecological city forms into a traditional Chinese settlement.

**Keywords**—Artifacts, natural landscape, sustainable development, visual thinking, visual clue.

## I. INTRODUCTION

THE ideal of improving the quality of a city has consistently occupied a privileged place in the dream of city dwellers. It implies not only the valuing of history, but also the specific changes to fit the current time, and perhaps the expectation to the future. In the context of the struggle between environmental globalization and ecological localization, the reconstruction of the physical environment to improve the quality of life and to honor the living place is a critical issue of sustainability for all city dwellers. In particular for the Eastern cities of traditional Chinese settlements, the strategy of designing a sustainable city is not only a vision of progress, but also a practice of unfolding various cultural ideas embodied in the history, the memory and the tradition.

With respect to history, there are two essential components for designing a traditional Chinese city. The first is to have the ideas of improving the city for everyday life in order to state the critical values in the function of the city. The second is to refer to cultural ideas that are important to respect the important ideas in the form of the landscape. Both components link to the

rhetoric of ‘visual thinking’ which, as pointed out by McKim (1970:8), “pervades all human activity from the abstract and theoretical to the down-to-earth and everyday”. This view recently also emphasizes by Moore (2003) who defined ‘visual thinking’ as ‘a natural part of our lives’. Especially, for a settlement, visual thinking contains not only the formal aesthetics, such as the image of harmony and order in ideal city plans, but also the symbolic significance which gives cultural meaning.

The meaningful concept of visual thinking is recognized as a critical dialogue between the natural landscape and the existing artifacts. The problem of how to encourage visual thinking that brings historic references with the ideals of sustainable reconstruction is the main theme of this paper. To read an evolving settlement is to learn the values of the historical city and to translate the cultural ideas of the city into an operational interface for sustainable design. The study employs a detailed examination on Zuoying, a traditional Chinese settlement located in Kaohsiung, Taiwan. All the environmental features considered here are of order and complexity. By analyzing the natural landscape of the city context, the historical layout of the city and the settlement, the spatial texture of the housing layouts and the development axis of the temple monuments, this paper will present ideas about how the settlement has been developed with the peculiar aspects of visual thinking.

Based on these data the ideas of visual thinking in the historical settlement of Zuoying can serve as an operational interface, which contain three parts. The first part is the hierarchy of spatial organization reflecting the settings of natural landscape; the second is the legibility of artifacts translating the natural context of the city; and the last is the characters of the court-yard houses representing a response of the ecological environment. These ideas of visual thinking are similar to the traditional principles of feng-shui that enable the residents to understand the diversified values in the relationship between the landscape and the artifacts, as well as the culture of the city. In addition, these ideas of visual thinking enable the city designers to translate the results of the investigation into practical guidelines for designing a sustainable city -- e.g., form, material, function, spatial structure and spatial character -- to fit in the transition in the nature of a city. This, in turn, provides a strategy for designing the sustainable city which reminding us not only of the memory of city history, but also of the understanding of the logic and the meaning of the city forms.

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## II. VISUAL THINKING AND SUSTAINABLE DESIGN

Visual thinking contributed to the physical environment from the ancient times to these days must show the attitudes towards the presentation of its subject matter for the ideas of god, man, nature or earth. It always relates to the physical context where people collects experiences and comes out of the ideas for constructing a better place to dwell. During the process of physical construction, the idea of visual thinking needs to be carried out by artifacts which are comprised by juxtaposing the natural landscape, buildings, monuments and architectural elements. As Nathan B. Winters (1937: 72) described, people can find the “specific visual clues to identifying style, themes, periods, and movements in architecture”.

Since 1960, different urban theorists have been exploring the visual clues which are related to the ‘visual perception’ and are linked to the city image (e.g., Cullen, 1959, 1971; Lynch, 1960; Colquhoun, 1991; Bacon, 1969). Similar to the idea of approaching this topic by Rapoport (1977, 2005), the visual perception comes out of the experience of human inhabitants to having the ideas for reading the existing physical context and considering the physical characteristics of the city. Among them, some are concerned with the city’s physical elements as the types of artifacts in its historical contexts and in the environmental formation of the city (e.g. Rossi, 1966; Vidler, 1996; Rowe & Koetter, 1975; Colquhoun, 1991, 2002).

Facing the challenge of global environment problem, people tends to view the physical elements of a city not only as a base of the city’s redevelopment with respect to its physical settings (Kallus, 2001; Levi, 2005), but also as a generator of sustainable development in the ecological dimension (Moughtin, 1996; Benson and Roe eds., 2000; Thomas ed., 2003 ; Barton et al., 2003 ; Riddel, 2004). These approaches focus on the city’s settings and its physical functions, both of which find expressions in terms of the city’s shape, material, function, spatial structure and spatial character. Emphasizing on the natural environment and its inhabitants, they are thus concerned with the visual experience and the formal settings in order to referring to the meaning of the physical built environment, as well as to enhancing the quality of life.

From these perspectives, the sustainable development of the historical settlement of Zuoying can be viewed as a dialogue between the Western modernization and the Chinese tradition through the transformation of the spatial organization of a city and the evolution of architectural development. Just as Peter Eisenman (1989:7) states “History comes to be known through the relationship between a collective memory of events, the singularity of place, and the sign of the place as expressed in form”, Zuoying’s physical redevelopment must present ideas of improving the quality of city life. The historical settlement of Zuoying takes the privileged place in architectural aspirations that comes from physical traditions and shared memories. The shared memories that offer a connection between the historical Zuoying and its residents originate in the experience of the city. Meanwhile, applying the characters of landscape can be

interpreted as a method of improving the modern developments in the historical city. Consequently, the notion of artifacts that relates to the physical tradition, which is regarded as an essence of sustainable development, can provide a framework for designing the sustainable city in the traditional Chinese settlement of Zuoying.

## III. EMERGENCE AND DEVELOPMENT OF THE HISTORICAL ZUOYING

Located in Kaohsiung, the biggest city in south Taiwan, the traditional Chinese settlement of Zuoying (also known as ‘the historical Zuoying’) situates one-block away form the station of Taiwan high speed rail and the entrance of Freeway No. 10, within Zuoying District (Fig. 1). The historical Zuoying is surrounded by the natural barriers of Chou-Tsi wet-land to the east, the Turtle Mountain to the south, Mt. Panping to the north, and the Taiwan Strait to the west. The famous Lotus Pond is laid on the center of the site. There are Chun and Ciou Pavilions, Wuli Pavilion, and Dragon and Tiger Pagodas in the Lotus Pond. There are two highly visible and vibrant communities which lay on both sides of the pond, where the architecture modeling is grand and solemn. Today, Lotus Pond has become a famous scenic spot in south Taiwan.

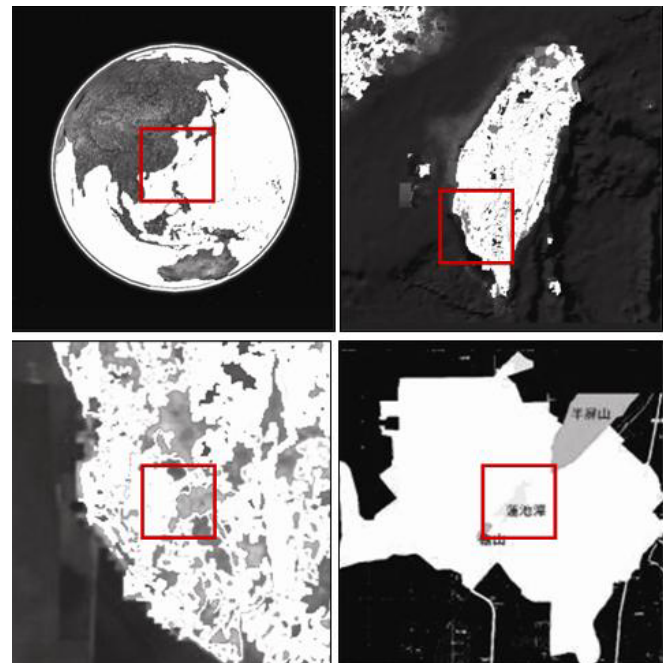


Fig. 1 Location of the historical Zuoying in Kaohsiung, south of Taiwan

The traditional Chinese settlement of Zuoying is outside the old Feng-Shan walled-city which used to be a critical wall-city in Taiwan since late Ming Dynasty (1662-1683). The historical Zuoying was not only a critical node in the water network of Kaohsiung, but also a major juncture on the way from the city of Tainan to the southern area of Taiwan. The city landscape with castles and streets in the historical Zuoying was first

developed by the Chin Dynasty from the eighteenth century to the nineteenth century (Fig. 2). Since then, most artifacts of the historical Zuoying were constructed outside the city wall of Feng-Shan old town. With the sovereignty changes of the Japanese occupied period (1895-1945), the area inside the city wall has been developed as a naval base. Since World War II, the city has been left out from the process of modernization during the last six decades. Till now, the physical evolution of the historical Zuoying contains the crucial characters related to the framework of natural landscape and the pattern of Chinese organic evolution. Today, Zuoying District is recognized not only as the most important historical settlement, but also an important base of navy in Taiwan. In the trade of economic integration and transpiration development, the landscape of the historical Zuoying has not been invigorated by the rapid modernization.

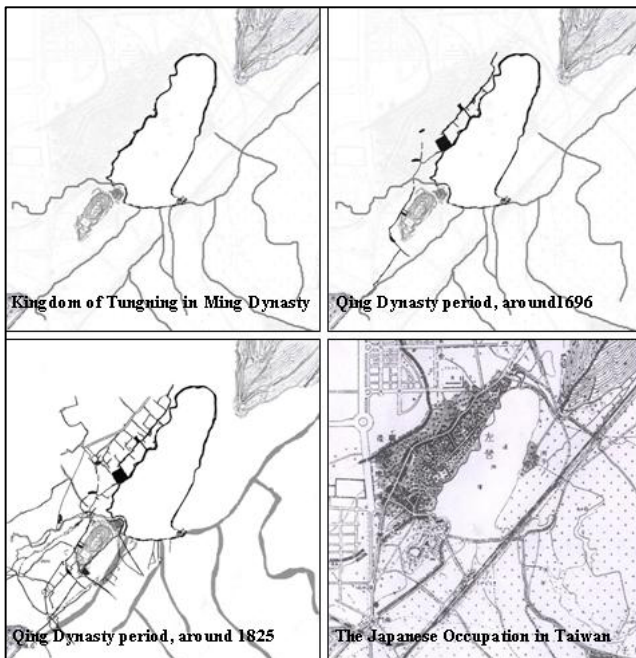


Fig. 2 The map of the transition of the historical Zuoying

Through the twentieth century from the emergence of urban planning, the restriction of building construction has caused not only the housing to have fallen into a serious state of decay, and also the spatial form to have become irrelevant to the settlement's context. Meanwhile, it also gives rise to the danger of public safety and the loss of identity of the place. At the turn of the 21st century, the historical Zuoying has faced various problems of sustainable development, such as the demolition of the historical buildings, the water pollution, and the declination of the population. Motivated by the sustainable perspective and the ecological movement, the redevelopment of the wetlands around the historical Zuoying has become the major element for reconstructing the city since 2000. This specific ingredient of the overall reconstruction, which roots in the idea of observing the nature as the basis of a progressive life, has played the guiding role for redesigning the city.

According to the 2007 city redevelopment plan of the Kaoshiung metropolitan, a lot of redevelopments around the historical Zuoying will be completed by the commencement of The World Games 2009 in Kaoshiung. Most of the redevelopments are related to the notion of ecological conservation, and to the local economic developments. In order to deal with the issue of sustainable development and to respond to the new constructions adjacent to the site, the study of visual thinking in the historical settlement is necessary and consequential.

#### IV. VISUAL CLUES IN THE HISTORICAL ZOUYING

With respect to the history of Chinese city developments, the traditional concepts of feng-shui are applied to the settings of all wall-in cities in Taiwan where the walls are integrated with the natural landscape. Within the walls, the arrangement of artifacts (e.g., temple, square, government offices and court-yard house) must comply with the harmony of the Universe. Based on this significant notion, the reading of the historical Zuoying which includes both the traditional settlement of Zuoying and the old city of Fengshan County can be analyzed by the natural landscape, the historical layout, the spatial texture and the development axis.

##### A. *The Natural Landscape of the City Context*

The site selection, which is necessarily compatible with the natural context, is the key point in the early developments of the settlement and immigration in Taiwan. Similar to the development of most settlement in other places, the conditions of the site must take into account the basic requirement for human survival and the foundation of political or economical development. Therefore, the geographical characters of a settlement, such as the landscape feature, the soil, the climate, the hydrology ...etc., intimately relate to its development (Fig. 3).

The city landscape with the pond and mountains in Zuoying was first developed by the soldiers in the era of Ming Zheng. After that, the natural features of Lotus pond, Mt. Panping, the Turtle mountain and the Snake mountain play important roles for the city development. Like most Chinese cities, the development of the old city of Fenshan County was concerned with the natural defense and the agricultural production. The city wall which is integrated with the Turtle mountain in the north and the Snake mountain in the south is an important reference for protecting the city. In addition, the Lotus pond has been acting as a critical water resource for the agricultural development in this area since Ming Zheng era. From the evolution of Zuoying, the mountains and the water not only render the growth of the settlement, but also represent an essential role for designing the sustainable Zuoying of tomorrow.

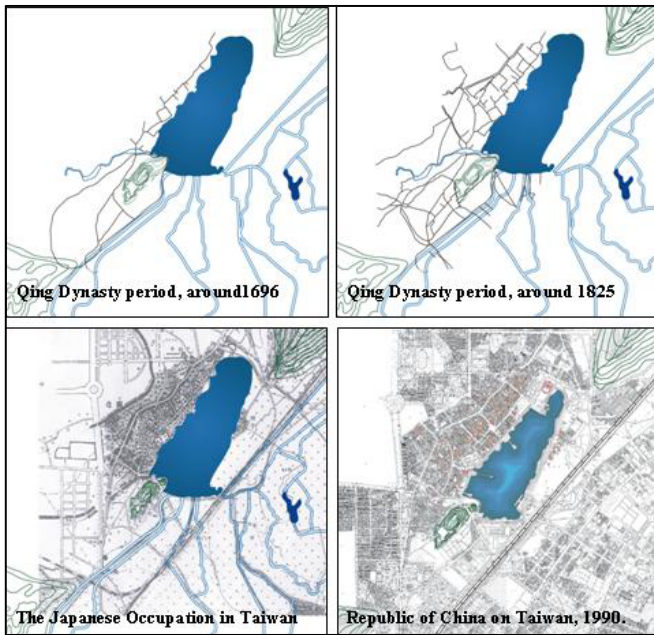


Fig. 3 The map of the natural landscape of the historical Zuoying

*B. The Historical Layout of the City*

The historical Zuoying is an important foothold in the history of Taiwan immigration. The site of the settlement used to be the battalion occupied by the soldiers in Ming Zheng era. In 1684, when Taiwan was formally incorporated into the territory of the Qing Dynasty, it became the capital of Fenshan County. Historically, the old city of Fenshan County and the traditional settlement of Zuoying have their own spatial pattern of development. Although the old city was developed as the strategy place of politic, outside the city the settlement was grown as a prototype of the traditional settlement. With the sovereignty changes and the demolition of the city wall, the area inside the city wall has become a central green park in Zuoying District (Fig. 4). Meanwhile, the traditional settlement outside the wall has gradually transformed into the place where the courtyard houses mixed with the road houses.

Not only the remained wall clearly outlines the edge of the old city, the north gate and the south gate also explicitly indicates the access of the old city. Today, outside the north gate the north extended space of the traditional settlement of Zuoying along the Lotus pond displaces the deep relationship between the historical Zouying and the natural landscape. In the span of 300 years, the historical layout of Zuoying actually creates not only a unique understanding of the city transition, but a fundamental pondering on the sustainable development of traditional spatial culture in Taiwan.

*C. The Spatial Texture of the Housing*

The old city of Fenshan County and the traditional settlement of Zuoying are characterized by two deferment spatial textures. Inside the old city, the spatial development was structured by the Xing-Long street which provides the functional service for daily life. Outside the north end of the old city, the settlement is

formed by two living quarters located on both banks of the Lotus pond. Those two living quarters are made up by traditional courtyard houses. The subsequent physical developments have provided two totally different structures to the historical settlement (Fig. 5).

In the east bank of the Lotus pond, the spatial texture of the living quarter was developed directly towards the north-south direction adjacent to the terrain along the water edge, and the courtyards of the vernacular housings are opened to face the south. In contrast to the east bank of the pond, the spatial texture of the west living quarter was developed directly towards the east-west direction adjacent to the terrain along the water edge, and the courtyards of the vernacular housings are opened to face the east. Both living quarters followed the traditional concepts of feng-shui are constructed by streets which are formed by the private domain of courtyard houses and are connected to the public domain of temples. In particular, the spatial textures in both living quarters take into account the effects of the wind, the sunlight and the relationship with the heights of the mountains.

Through the spatial textures, it is straightforward to read off both the development of the living quarters based upon the territory of public activities associating with temples and the edges of the quarters constituted by the natural landforms and the streets. The architectural developments among these two living quarters have provided abundant images embedded within various tectonic characters of the city landscape. The diversity of spatial textures in the historical Zuoying can be realized as a critical dialogue between the traditional Chinese culture and the natural context of Formosa.

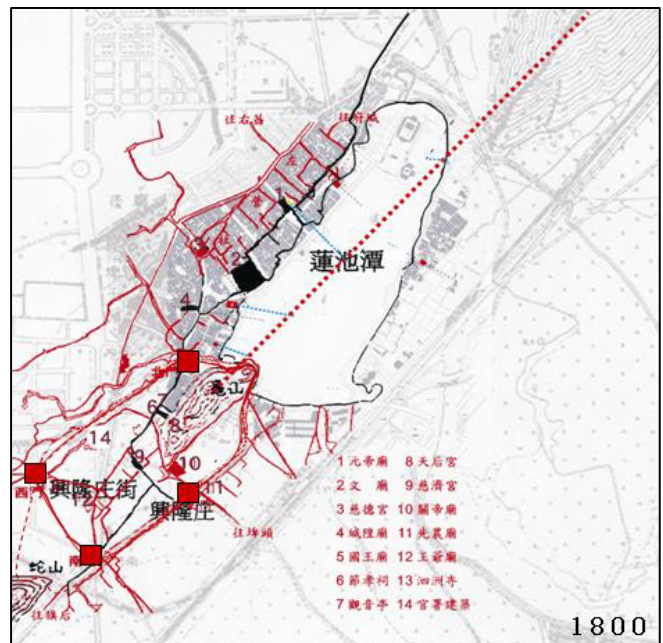


Fig. 4 The map of the historical layout of the historical Zuoying

#### D. The Development Axis of the Temples

Reading from the historical drawings and the recent maps, the physical development in the traditional settlement of Zuoying coincides with a visual axis which is formed by the linkage of Mt. Panping, the Turtle mountain and the Snake mountain. Moreover, the temples which reveal the collective attitude towards the nature also implement that particular axis as a basic coordinate of their redevelopment (Fig. 5). The outcome of the development by means of the geometry and the mathematics incorporating with the visual axis strongly reflects the cosmological beliefs on the existential meaning of the landscape.

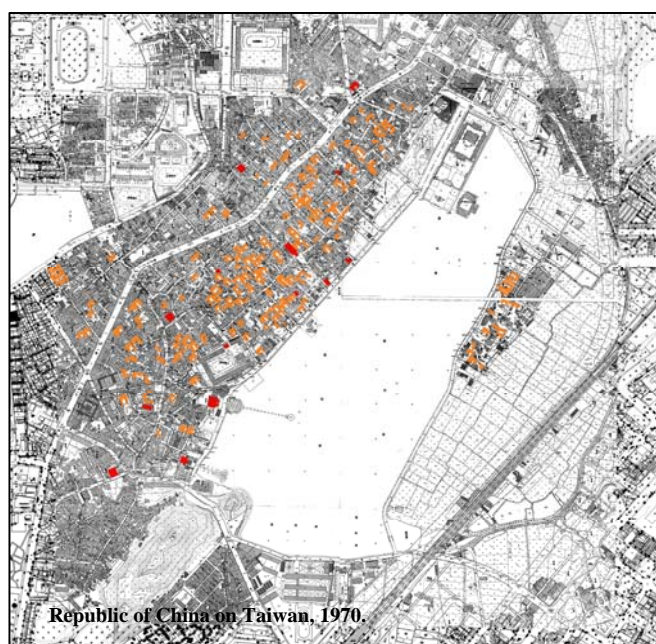


Fig. 5 The map of the spatial texture of the historical Zuoying

#### V. PRINCIPLE OF DESIGNING THE SUSTAINABLE CITY OF THE HISTORICAL ZOUYING

Through the analysis above, the visual clues in the traditional Chinese settlement of Zuoying can actually be recognized as a dialogue between the natural landscape and the manmade artifacts. It can be summarized in three critical characters for designing the sustainable city of Zuoying.



Fig. 6 The map of the development axis of the historical Zuoying

#### A. The Hierarchy of Spatial Organization Reflecting the Settings of Natural Landscape

The spatial organization of the historical Zuoying represents the visual framework of the natural landscape and the manmade constructions. In both living quarters of the settlement, it is easy to read the visually recognizable relationships between the water edges with the living quarter, the housing of the terrain, and the mountain axis with the temples. By virtue of the relationships, the historical Zuoying can actually demonstrate the traditional Chinese ideas about the nature symbolically. It provides several guiding principles for reconstructing a sustainable city through the facing and the features of buildings, the orientation and the settings of streets and squares, as well as the constitution of monuments.

As Adlo Rossi (1984:29) has pointed out, “we live it and experience it, and in turn it structures the city”. The physical context of the historical Zuoying could be read as a comprehensible structure that is related to the past, and articulated by the wall, the temples, and the living quarters of court-yard house. The hierarchy of the mountains, the temples and the streets in the city is a readily accessible part of a visual language which carries significant potential for meaning.

The spatial organizations of the historical Zuoying not only imply an attitude towards the place, but as Fish's idea (1989) of visual thinking -- ‘a habit of thought’, represent the way of life which incorporated with the natural landscape. By clarifying the hierarchy of spatial organization during the sustainable development, the city not only revitalizes the context but also provides guidance for new built forms.

#### B. The Legibility of Artifacts Translating the Natural Context of the City

As Vidler notes “*The Third Typology*” (1976, 1996:260) ‘Type’ (ordering principles - structure) in the traditional city, should have the ability to survive through the change of function, aesthetics and technical developments. The artifacts, such as the wall, the temples, the streets and the living quarters of court-yard house in the historical Zuoying, as the visual types, are analogies to the architectural words of the city which have their own physical functions tied to their configurations. These artifacts in the city are clearly defined by given certain size, shape, orientation and physical properties to present its legibility incorporated with the mountains, the pond and the landform.

Such as the temples around the Lotus pond constituted the tall tower with special characters and located on the water are attributed to the meanings of respecting to the mountain axis. With the evolution of the historical Zuoying, these temples also have the ability to satisfy public needs, and represent the ideas of traditional Chinese culture that influence the social life in the city. As the monuments in the historical city, the wall, the temples, the streets and the living quarters of courtyard house in the historical Zuoying interpret themselves by physical juxtaposition offering different meanings.

The artifacts in the historical Zuoying provide the needs of everyday life, and support the public activities, as well as offer

the comprehensible understanding of city context. With legibility of artifacts, the historical Zuoying is possible for people to read the city giving a sense of identity within a place. Therefore, the legibility of artifacts translating the natural context of the city can be considered more than functional rejuvenation that are complex symbols having meaning for designing the sustainable city of tomorrow.

### C. The Characters of the Court-yard Houses Representing a Response of the Ecological Environment

Through the studies of historical precedents of the historical Zuoying, the ideas of sustainable development in the city are realized based on the natural ideas of ecological organization and visual concepts of environmental harmony. As a consequence, the critical characters of courtyard houses actually provide principles that can be used as guidelines for the housing redevelopment. The courtyard houses in the historical Zuoying incorporating with the natural landscape and the ecological environment resist the homogenizing effect, thus yield a different character to the city. By connecting the settlement's courtyard houses and the diversified activities, the ideas of sustainable development allow not only the artifacts to contribute to the city life, but new meanings to emerge from the interactions between the past and the future.

## VI. CONCLUSION

As Peter Newman and John Kenworthy (2003: 235) suggested: "sustainability goals and indicators are ways to incorporate the many overlapping areas of sustainability into a city's consciousness about what it values", the sustainable development of a historical city in the tread of globalization is rather complex. There are two essential components in designing a sustainable city of the twenty-first century. The first is the attempt to restructure the city's historical contexts in order to make a new image associating with the existing architectural features of the city. Another is the effort to deal with the impact of the global ecology and to represent the value of landscape. The former links up with the design process for a sustainable city, and the later with the evaluation for the existing context. Both components interrelate to the rhetoric of visual thinking constructed by characteristics of landscapes and artifacts, as shown in the case of the historical Zuoying.

By means of the studies on the visual clues in the historical Zuoying, the settings of the city actually demonstrate the visual clues of the natural landscape through the physical construction. These visual clues can serve as the guiding principles for sustainable development. There are (1) the hierarchy of spatial organization reflecting the settings of natural landscape; (2) the legibility of artifacts translating the natural context of the city; and (3) the characters of the courtyard houses representing a response of the ecological environment.

As Fisher-Gewirtzman, Burt and Tzimir (2003:576) mentioned about the physical environment that "spatial configuration has a great impact on perception, as it is more direct and more elementary than individual details", the ideas

of improving the ecologic quality of the traditional Chinese settlement of Zuoying fall in a visual reading of intentional ideas found in the juxtaposition of the natural settings and the manmade features. Such an ideal configuration of the historical Zuoying referring to the visual thinking is at the main idea of city existence in the 21st century. In recognizing the interaction between the natural landscape and the manmade feature, it is critical to have a strategy to carrying out a vision of making a sustainable city.

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