THE LOGIC OF MULTI-USE OF PUBLIC OPEN SPACES IN CHIANG MAI CITY

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ABSTRACT

This study aims to define the logic of the multi-use of public open spaces in Chiang Mai City by taking into account people, time and activity diversity. The study hypothesizes that the multi-use of public open spaces is influenced by three significant factors, namely specific characteristics of space, urban morphological structure, and users.

The research methodology consists of surveying forty-two public open spaces in Chiang Mai City. The resulting data are then used to conduct matrix analyses and the analysis of urban morphological structure using overlay mapping and figure-ground techniques. The study areas are grouped according to district, function, setting, and management. Subsequently three public open spaces, namely Ratchadamnoen Walking Street, Warorot Market Street, and the footpath behind Chiang Mai University are chosen for detailed study of users through questionnaire. The result of the study supports the hypothesis. It reveals that the three factors –specific characteristics of space, urban morphological structure and users– accounted for the multi-use of public open spaces at three different levels. The first level concerns basic factors, the second level concerns supporting factors and the third level concerns attraction factors. It also reveals that the effective multi-use of public open spaces depends on the appropriate combination of these factors.

Keywords : *logic / Multi-use / Public open space / Urban Morphology / Chiang Mai City*

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1. BACKGROUND AND SIGNIFICANCE

The public open space is essential to urban planning and design as its success can contribute significantly to the area at large (Whyte,1980, Gehl, 1996, Lennard, and Lennard, 1995, Khaisri Paksukcharern, 2003). In terms of physical significance, the public open space can accelerate the tendency for a change in land use. In terms of social significance, it is considered a cultural space that reflects as well as sustains the community identities and lifestyle. In terms of economic significance, it can enhance the small informal local economy outside the mainstream. This subsequently stimulates the growth of the formal economy. Therefore, it allows for an efficient use of the leftover space. However, the current problems concerning public open space are that most of the urban planners tend to focus on making the public open space into an idealistic public park or square while lacking the understanding about the nature of the area and overlooking the role of the public open space needed by the people for daily living. This results in some deserted public open spaces, which no one has made use of, which leads to several unpleasant situations and problems, namely high maintenance cost, security, health problems and environmental deterioration as well. Thus, if the planners and designers learn about the logic of public open space use, they will be able to create a public open space for multiple use or a variety of purposes.

Chiang Mai is the largest city in the North and is second only to Bangkok. The city is the center of trade, tourism, education and finance as well as art and culture. Its economy is rather dynamic with tourism as a major source of income. In terms of art and culture, Chiang Mai is also outstanding, especially for its approximately 700-year-old history. It is, therefore, diversified in terms of people as well as culture. Each year, there are several festivals and celebration events, particularly in the Heritage District where the public open space use is very lively and colorful, such as around Ratchadamnoen Walking Street. Moreover, there are several Economic Districts such as the Central Business District like Warorot Market Street, Chang Moi, Witchayanon and Chang Khlan Streets, where public open space use varies to some extent from one to another. These refer to some commercial hubs of the city such as the areas along Warorot Pedestrian Street, the free space in front of Nawarat Market and some tourist hubs such as the areas around the Night Bazaar, Anusan Market and Loy Khro Street. Whereas the parks in this area have not been used, the Central District has expanded around the Historical District and the Central Business District. The area within the first ring-road of the Super Highway has become a public open space for people's daily life as evident by food stalls and street vending. The New Development District or the University District is the area that has been expanded thanks to the establishment of Chiang Mai University. This area serves the users (students) from the University and Nimmanhemin Road, who go about daily activities such as strolling around or doing some shopping. These areas are especially crowded in the evening and they stretch all the way to Srinakharin Public Park, which is used by the university staff and students. The Suburban Area and the Government District at the farther end of the city have only a few public open spaces left unused by local people who prefer to go to the shopping centers or large department store complexes. Even such a large public park as the Rama IX Lanna Park sees only a small number of users.

The overall view of the urban economic activities of the city are loosely confined to hotels, restaurants, entertainment venues and coffee shops, which specifically cluster around the three main areas of the Heritage District, the Central Business District and the University District. Different districts of the city of Chiang Mai have different types of functions for the open spaces and urban morphological structures, namely the community and road structure of the old city, the Central Business District, the Central District and the Suburban District. The

characteristics of the users also vary from district to district: residents, students and tourists, for example.

Public open spaces found in Chiang Mai City consist of the town square, urban elements, plazas, leftover spaces, pedestrian streets, walking streets, the waterfront, public parks and a sports complex. Most of the public open spaces in the city are of the multi-purpose type. They are used by many groups of people at different times and for different activities whereas some public open spaces, public parks for example, are rarely used. This research aims to define how the public open spaces are of multi-use and the relevant logic supporting or related to their use is in order to find the reasons at the spatial, urban and user levels in combination with the physical, social and economic aspects.

The research objectives involve the study in the following areas:

1. the characteristics of the multi-use of public open spaces in Chiang Mai City;
2. the logic and specific characteristics of space in the physical, social and economic sub-factors exerting influences on the multi-use of public open spaces in Chiang Mai City;
3. the logic of urban morphological structure related to and affecting the multi use of public open spaces in Chiang Mai City;
4. the logic of users that affects their behavior and pattern of the multi-use of the public open spaces in Chiang Mai City.

The hypothesis of this research is that there are three factors relevant to the multi-use of the public open spaces, namely the specific characteristics of the space, the urban morphological structure and the users together with physical, social and economic sub-factors. These factors and sub-factors have influences on the use of the public open spaces at different levels.

The areas studied comprise those in the Chiang Mai Municipality and some areas of Chang Phueak Sub-district or 42 public open spaces, all of which are outdoors. Neither the public open spaces in temples nor their size were included in this study as they have totally different functions.

2. REVIEW OF THE LITERATURE

The study concept about public open spaces in the past focused on the spatial level, mainly visual and physical accessibility, form and size and enclosure as seen in Sitte (1889) and Zucker (1959: 75-111). The latter conducted a study on the city and squares with an emphasis on aesthetic aspects, open space proportion of the squares and the enclosure buildings. The study also concentrated on the aesthetic properties of the architecture surrounding the public open space creating perfection and elegance, the unity of the overall picture of the architecture and the public open spaces and the aim of the constructions as an “institute” of the city as those of the Greeks and Romans. And in the Modern Era, the public open spaces were created as a tool to improve the quality of life in the urban areas. However, the development of some modern cities has diminished the use of the public open spaces. Some buildings are constructed distinctively separately from the environment or surroundings are of large construction projects. The growth of the suburbs has made it necessary to depend more and more on motor vehicles, which reduces the chance for people interacting on public open spaces. At present, the concept of public open spaces gives significance to their importance more as a

place as Lynch (1960) discussed on the uniqueness of a city derived from mental picture and a social concept. In 1961, Jacob presented an book on "The Death and Life of Great American Cities" which was a study on public open spaces from a different point of view from those in the past. It was based on a social approach on the use of public open space in the daily life of a community, placing importance on interaction of the people on the footpath, streets and shops and ensuring liveliness, dynamism and safety to the community. Another prominent city planner, Whyte (1980), conducted a study on the public open spaces of the plazas in New York City in relation to the behavior and functions that made people use the spaces. An academic from Denmark, Gehl (1996), conducted a study on the pedestrians, explaining the ideas of "Life between Buildings". He stated that a good design of the environment can create opportunities for connection. To create functions for the public open spaces, it is necessary to create a variety of activities. In the economic aspect, the Heritage District plays a great role in the public open space nowadays. Ashworth and Tunbridge (1990) points out that tourism activities create an Economic District in a city as tourists tend to spend time on public life around the streets and footpaths causing the areas to gain a significant role. Crawford (1999, 2005) offers a contemporary concept of making the street areas a place for street vendors, creating liveliness in the city and drawing a good economy into the area. Therefore, it can be seen that there is a paradigm shift from the past to focus more on the physical study as well as the social and economic aspects.

The public open spaces in this study were divided according to their function: higher spaces consisting of squares, plazas; leftover spaces consisting of streets, walking streets paths and parks consisting of waterfronts and public parks.

Multi-use public open spaces mean public open spaces that involve diversities of people, time and activities as Whyte (1980:24-36) discussed concerning public open spaces such as people watching and Lennard and Lennard (1995: 25-28) referred to meeting in public. A prominent initiator on activities in public open spaces, Gehl (1996:17-31) proposes different levels of human activities outside a building, namely necessary activities, optional activities and social activities. He also states that a good public open space should have the highest level of social activities.

The spatial level and urban level factors that create the multi-use of public open spaces are of three kinds: physical, economic and social factors. Significant physical factors at the urban level according to Jacob (1961:406), involve intensive use of land and buildings by a mix use of building functions including a moderate block or plot which creates interaction and connection with the public open spaces. Therefore, Jacob's analysis deals with the urban level.

Physical factors at the spatial level involve accessibility and location including facilities, lighting, landscape and recreational space, as well as safety. Whyte (1980) conducted a behavioral study on users of public open spaces at some plazas in New York City by overlapping films of the place at different times. He pointed out several major factors causing the use of the area at various times. It was found that facilities such as accessibility, seats, activities, vending, food and beverages as well as amenities (were positive factors). The negative factors tend to be climate and undesirability.

Social factors concern people who like to make social contact at various levels ranging from people watching to chatting. Thus, this study divided social activities on the space and those surrounding the space. Whyte (1980: 94-101) argues that organizing festivals and parades, creating programs and identity of place in the neighborhood play a great role. Identity of place

usually embodied “sense of place”, “spirit of place”, “unique place” or “characteristics of place” themselves as Lennard and Lennard (1995:1-4) argues about the spirit of the unique city and the relationship between lifestyles, activities and use of the public open space. Rapoport (1977) explains that creating an area, cultural background and other relevant cultural background and activities are relevant complex elements.

Economic factors are concerned with commercial activities in the public open space, which is also considered important. Lennard and Lennard (1995: 73, 132-138) discuss the significance of walking streets and farmers’ markets ranging from vending, farm produce and display of goods to low prices to attract customers. Crawford (1999, 2000) mentions using space around streets for such activities to bring life to the scene and to boost the economy of the respective cities. This informal economy should not be overlooked as it can be a powerful driving force for the formal economy. Thus, the economic factors could be classified at two levels: in the public open space itself and around that space since the area would tend to be packed with economic activities.

Jacobs (1961) mentions factors at the urban level in relation to public open spaces. However, no research has been conducted. This study therefore applied the technique of GIS Overlay Mapping using Arch View GIS Version 3.1 as a tool for the urban analysis. Two overlapping elements were analyzed: multi-use and urban morphological structure namely population density, land use, network, economic activities, cultural activities and density proportion of building mass to the open space. Tranciks (1986) used the figure-ground theory in his study of urban space in “Finding the Lost Space”. His study on density proportion of building mass and open space could very well explain urban structure. In his study, the urban morphological structure and the analysis covered a 500-meter radius of the area to find the influences of the location or community around the area on the public open space.

Research framework

The review of the literature showed that there were three major elements involved in bringing about the use of public open space: the public open space itself, the city and the users. Thus, at the spatial level, specific characteristics of space were used to show the differences of the areas in the physical, social and economic aspects. The physical study was mainly explained by Whyte (1989) and Gehl (1996), whereas the social factors could be based on Rapoport’s study (1977) and the economic factors corresponded with Crawford’s study (1999). At the urban level, it can be observed that urban morphological structure has an influence on the use of public open space. The factors used according to Jacobs (1961) are population density, building structure, mixed-land use, block pattern and network. It can be concluded that the location and the city create an impact on the level of use of the public open space or the users themselves. If the specific characteristics of the space and the urban morphological structure favor or support each other, users will be drawn to the respective public open spaces with diversity of people, time and activities. Figure 1 demonstrates the concept of the logic of multi-use of public space.

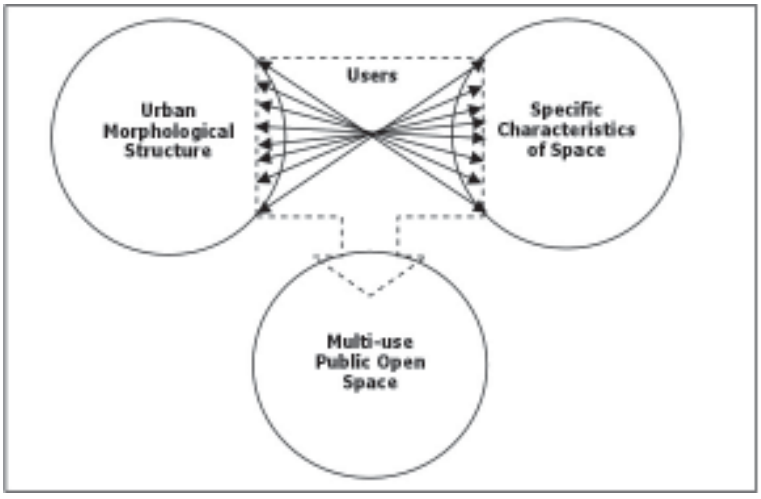


Figure 1 : The Concept of the Logic of multi-use of public open space (POS)

3. METHODOLOGY

Base on the three main elements: public open space, urban and users, this study will try to link them together as shown in Figure 2. The method comprised three major stages as follows

Stage 1: The study of logic at the spatial level is conducted by surveying two aspects, multi-use of public open space and specific characteristics of the space in order to find out the factors creating the use of the public open space. The survey examined the multi-use of 42 public open spaces in Chiang Mai City and divided the spaces into 6 groups according to the levels of the multi-use ranging from highest, high, medium, low to lowest and non-multi-use, respectively. The survey of specific characteristics of space was based on physical factors such accessibility, facilities; social factors such as cultural activities, events and identity; and economic factors such as goods, display of goods and other economic factors around the space. The survey data was analyzed by using a matrix table.

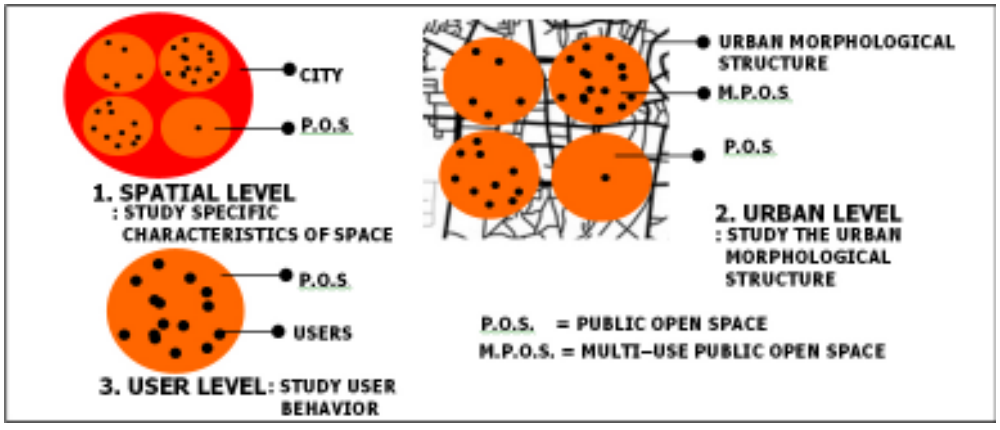


Figure 2 : Method and research process: All levels

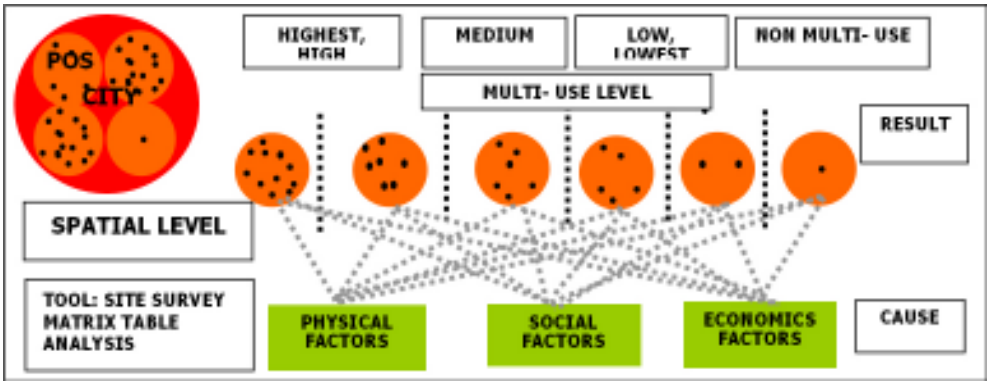


Figure 3 : Method and research process 1: Spatial level ,
Logic of multi-use public open space (POS) by specific characteristics of space

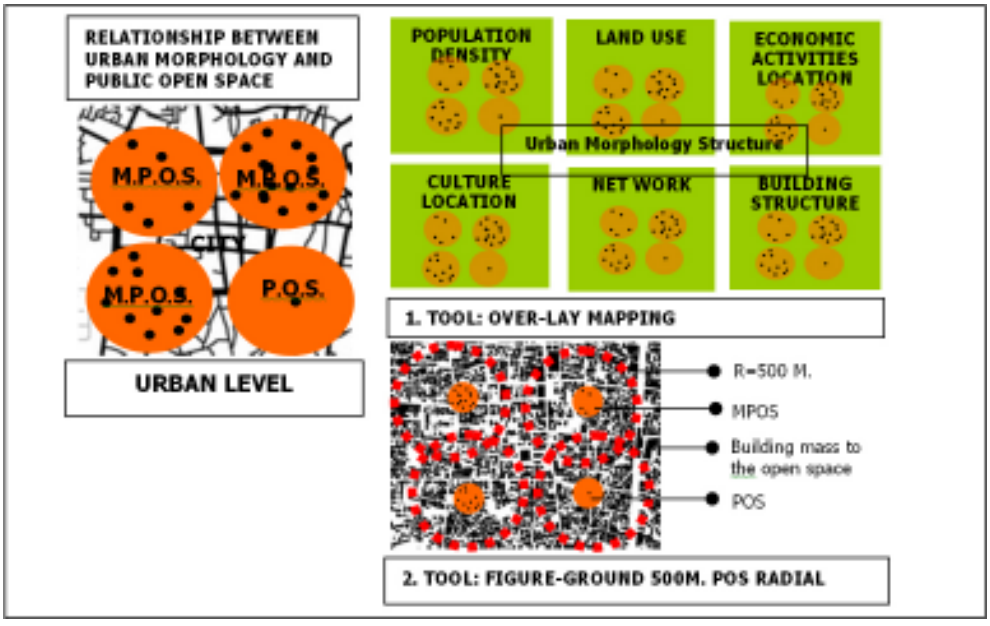


Figure 4 : Method and research process 2: Urban Level,
Logic of multi-use public open space (POS) by the urban morphological structure

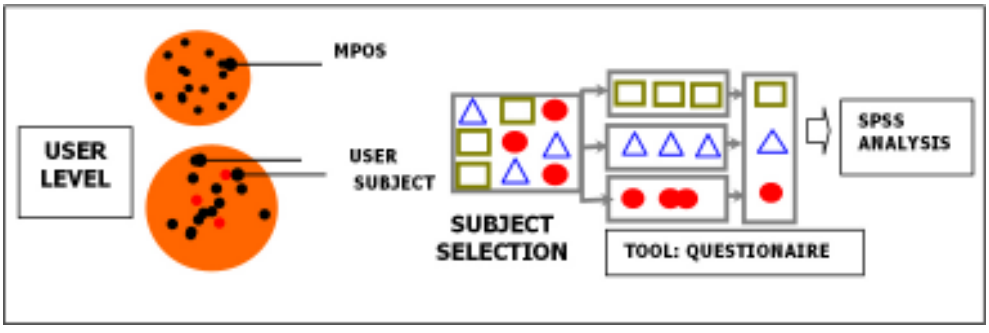


Figure 5 : Method and research process 3: User Level,
Logic of multi-use public open space (POS) by users

Stage 2: The study of the logic at the urban level in terms of urban morphological structure using GIS Overlay Mapping of multi-use of public open space and urban morphological structures together with the Figure-ground Analysis Technique to analyze the density of buildings and the space within a 500-meter radius in order to find out what type of urban morphological factors could create the multi-use of the space at both the urban and the community levels.

Stage 3: The study of the logic of the users. This dealt with the spatial and the urban areas, what were the factors that affected the users' decision at various levels. The study was concerned with the background of the use of public open space, social interaction in the people's life, characteristics of the use, reasons and objectives, activities as well as behavior related to the use. The tools used were a questionnaire and the SPSS Statistical Analysis program.

4. PUBLIC OPEN SPACES IN CHIANG MAI CITY

In the past, the public open spaces in Chiang Mai City were traditional public open spaces, namely Kuang Luang (royal town square), Kuang Wang (palace open space or palace square), Kuang Wat (temple square), Kuang Ruen (open space of the cluster house), Kuang Baan (residence open space). At present there are some historic public open spaces left such as squares: at the Three Kings Monument, Thapae Gate and those of urban elements, namely the City Gates referred to as Chang Phueak, Chiang Mai, Suan Prung and Suan Dok. There are also some Lanna Thai Community public open spaces in which the open spaces inside and outside the houses are used for household agricultural activities. Such spaces, however, are very few nowadays and they exist mostly in the rural communities. Modern public open spaces in Chiang Mai City consist of public parks and waterfront used mainly for relaxation and recreation by a rather small number of people. These are areas on both sides of the Ping River, the city moats, along the sides of Mae Khla Canal and Buak Haad Park. The present public open spaces are of many types, plazas and inner block void which are mainly for commercial purposes and some are parts of big buildings of some larger private projects such as those of Anusan Market, the all-night Food Market at Chang Phueak, Chiang Mai Pavillion Plaza, Kad Suan Kaew Plaza and the lanes between buildings opposite Chiang Mai University. The leftover spaces are the areas where people like to come for bargaining prices. They are such areas as the open ground in front of Nawarat Market and Ban Chang Khian. A walking street was first inaugurated at Rachadamnoen Street in 2001. It is the most successful one and draws the largest number of users (70,000-100,000 persons: every Sunday evening). Later, this walking street was followed by the ones at Wualai (20,000 persons: every Saturday evening) and Bamrungrat Walking Street, which are mostly crowded on week-ends. Finally, there are also paths, which are the public open spaces that people use most in everyday life. Among them are the ones at the Night Bazaar, Warorot Market, Suthep Road around the back of Chiang Mai University. The 42 public open spaces used in this research were grouped according to their functions as in Table 1.

Table 1 : Public open spaces in Chiang Mai City

Square, plaza and leftover space	Walking street and path	Park and waterfront
Square and urban element 1. Three Kings Monument Square 2. Thapae Gate Square 3. Chiang Mai Gate Square 4. Suan Dok Gate 5. Chang Phueak Gate 6. Suan Prung Gate Plaza and inner block void 7. Anusan Night Market 8. Chang Phueak Night Food Market 9. Suriwong Book Center Plaza 10. Chiang Mai Pavillion Plaza 11. Kad Suan Kaew Plaza 12. Shopping lane opposite Chiang Mai University Free space, leftover space 13. Nawarat Market Open Space 14. Ban Chang Khian Open Space 15. Wat Natharama Open Space 16. Santitham Crematorium 17. Huay Kaew Plaza Night Market 18. Wat Chet Yod Night Food Market	Walking street 19. Rachadamnoen Walking Street 20. Wualai Walking Street 21. Bamrungrat Walking Street Path 22. Night Bazaar Path 23. Warorot Path and Night Street 24. Loy Khro Path 25. Suthep Path –Back of Chiang Mai University 26. Nimmanhemin Path 27. Front of Chiang Mai University Path 28. Chang Khian Lane Path	Linear waterfront 29. Mae Ping River Waterfront 30. Inner Wall Waterfront 31. Mae Khla Canal Waterfront 32. Suan Loung Lanna Rama 9 Park Park 33. Buak Haad Park 34. Kanchanapisek Park 35. Sri Nakarintara Health Park 36. Huay Kaew Health Park Pocket park 37. Lumyai Market Pocket Park 38. East Nawarat Park 39. Governor's House Pocket Park 40. King Kavila Monument Park 41. Hayya Pocket Park Sport Complex 42. Municipal Sport Complex

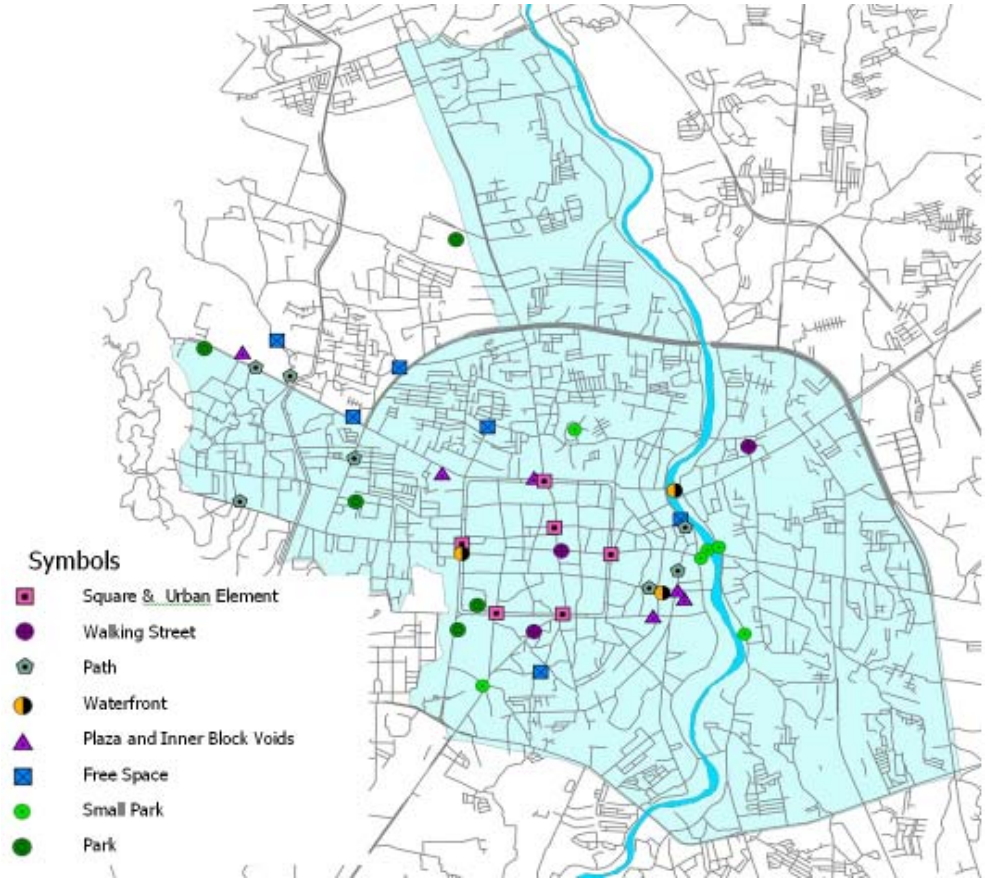


Figure 6 : Map showing 42 public opens spaces in Chiang Mai City

5. RESEARCH RESULTS

5.1 Multi-use of public open spaces

The matrix analysis shown in Table 2 revealed that the relationship of the public open spaces and the multiple use consists of human diversity, time diversity and activity diversity. A total of 37 elements were set up with one point assigned to each element and the multiple use was divided into 6 levels as discussed below.

For human diversity, there were 1) age diversity divided into small children 1-11 years old, teenagers 12-19, young adults 20-30, adults 31-60 and the elderly 60 years old and over, 2) gender diversity divided into male and female, 3) people diversity such as the passersby, buyers, sellers and service providers, strollers 4) status diversity such as local people, outsiders, workers, Thai and foreign tourists.

For time diversity, there were 1) time range diversity such as morning, noon, evening and night; 2) day diversity such as workday, weekend, annual holiday or festival; 3) duration diversity such as long period or short period.

For activity diversity, there were 1) everyday activities comprising overlapping activities in same areas or those in separate areas, and such activities as those causing the traffic transition or changing mode of transport, those aimed toward a destination and those leading to other locations; 2) optional activities such as street performance, shopping, eating or drinking, recreation or sports or entertainment pleasant, hobbies and reading; 3) social activities such as people watching, resting, chatting (sitting/standing), group conversation or crowding together to watch some kind of street performance.

The study revealed that of all the six groups (Table 3) of the multi-use of public open spaces, the group that received the highest scores was the walking street in the Heritage District. The groups that received high score were the leftover space and plazas, the path in the Central Business District and around Chiang Mai University. The groups that received medium scores were the public parks, the path and walking street in the Central District, the University District and the City District. The groups that received low scores located outside the city wall and in the suburbs. The group that received the lowest scores were the spaces near the Ping River, the Central District and those not tending themselves to the multi-use, mostly the river front and public parks.

Those districts that greatly affected the multi-use public open space were the Heritage District, the Central Business District and the University District followed by the public open spaces like the walking street, paths, plazas and the leftover space. These places tended to be of a highly multiple use. The non-multi-use areas were the areas around the parks, waterfront and some of the city gates. These city gates are not large enough to accommodate activities. Thus, they are just an urban element.

Figure 7 : Parks and waterfronts public opens spaces–Non-multi-use public opens spaces

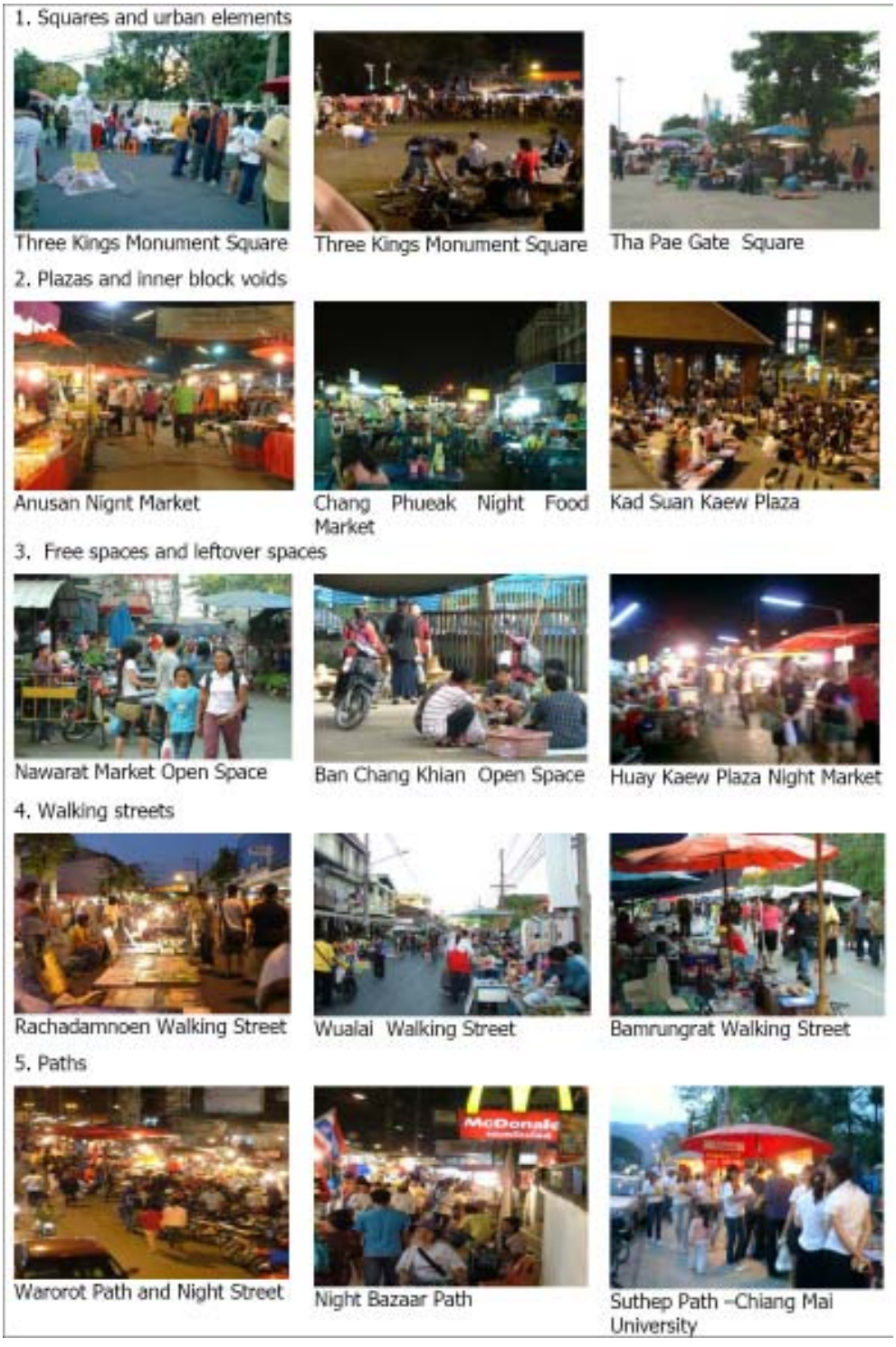


Figure 8 : Public open spaces in Chiang Mai City drawing large numbers of people with human, time and activity diversity –Multi-use public open spaces

Table 2 : Matrix analysis of the multi-use public open spaces in Chiang Mai City

Public Open Spaces in Chiang Mai City (1)		(2)	Multi-Use of Public Open Spaces (3)																																				
			Human Diversity (4)														Time Diversity (5)									Activity Diversity (6)													
			Age (7)					Gender (8)		Type of People (9)				Status (10)			Time Range (11)				Day (12)			Duration (13)		Everyday Activity (14)					Optional Activities (15)					Social Activities (16)			
	Column	Score of Multi-Use	Small Children 1-11 Years	Teenagers 12-19 Years	Young Adults 20-30 Years	Adults 31-60	Elderly 60 years	Male	Female	Pedestrian	Buyers	Sellers and Service Providers	Sleeper	Local People	Outsiders or Workers	Thai and Foreign Tourists	Morning	Noon	Evening	Night	Weekday	Weekend	Annual Holiday or Festival	Long Period	Short Period	Overlapping Activities in Areas	Separate Activities in Areas	The Traffic Transition or Changing Mode of	Destination	Linking to Other Landmarks	Street Performance	Shopping	Eating and Drinking	Recreation, Sports, Entertainment Resort	Hobbies and Reading	People Watching	Seating, Chatting (sitting/standing)	Group Conversation	Group Watching of Street Performance
1.Three King Monument Square	(1)	33	○	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●
15.Rachadamnoen Walking Street	(2)	33	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●
20.Wualai Walking Street	(3)	32	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	○	○	●	●	●	○	●	●	●	●	●
2.Thapae Gate Square	(4)	31	○	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	●	●	●	○	○	○	●	●	●	●	●	●	●	●	●
23.Warorot Path and Night Street	(5)	30	○	●	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	○	●	●	○	○	●	●	●	○
13.Nawarat Market Open Space	(6)	30	○	○	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	○	○	●	●	●	○
3.Chiang Mai Gate Square	(7)	30	○	○	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	○	○	●	●	●	○
11.Kad Suan Kaew Plaza	(8)	29	●	●	●	●	○	●	●	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●	○	●	○	●	●	●	●	○	●	●	○	○
22.Night Bazaar Path	(9)	29	○	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	○	●	○	○	●	●	○	○	●	●	●	○
26.Nimmanhaemin Path	(10)	29	○	●	●	●	○	●	●	●	●	○	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●	○	●	●	○	●	●	●	●	●	●	●	○
7.Anusarn Night Market	(11)	28	○	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○	○	●	●	○	○
10.Chiang Mai Pavilion Plaza	(12)	28	○	●	●	●	●	●	●	●	●	●	●	○	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○	○	●	●	●	○
27.Front of Chiang Mai University Path	(13)	27	○	○	●	●	○	●	●	●	●	●	●	●	●	○	○	○	●	●	●	●	○	●	●	●	●	●	●	●	○	●	●	●	○	●	●	●	○
14.Ban Chang Khian Open Space	(14)	26	●	●	●	●	●	●	●	○	●	●	●	●	○	○	●	○	●	○	●	●	○	●	●	●	●	○	○	●	○	●	●	●	○	●	●	●	○
28.Chang Khian Lane Path	(15)	26	●	●	●	●	●	●	●	○	○	●	●	●	○	○	●	●	●	●	●	●	○	●	●	●	●	○	○	●	○	●	●	○	○	●	●	●	○
9.Chang Phueak Night Food Market	(16)	26	●	●	●	●	●	●	●	●	●	●	○	●	●	●	●	○	●	●	●	●	○	●	●	●	●	●	○	○	○	●	●	○	○	○	●	○	○
21.Bannuagrat Walking Street	(17)	25	○	●	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●	○	○	●	○	●	●	●	○	●	○	○	○	●	●	○	●	●	●	●	○
25.Suthep Path –Back of Chiang Mai University	(18)	24	○	●	●	●	●	●	●	●	●	●	○	●	●	○	●	○	●	●	●	●	○	●	○	●	○	●	○	●	○	●	●	○	○	○	●	●	○
35.Sri Nakarintara Health Park	(19)	24	●	●	●	●	●	●	●	○	○	○	●	●	●	○	○	○	●	●	●	●	○	●	●	○	●	○	○	○	○	●	●	●	●	●	●	●	○
24.Loy Khor Path	(20)	24	○	●	●	●	○	●	●	●	●	●	●	○	●	●	○	○	●	●	●	●	○	●	●	●	○	●	○	○	○	●	●	●	○	○	●	●	○
12.Shopping lane opposite Chiang Mai University	(21)	22	○	●	●	●	○	●	●	●	●	●	○	●	●	○	○	○	●	●	●	●	○	●	○	●	○	●	○	○	○	●	●	○	○	●	●	●	○
33.Buak Haad Park	(22)	22	●	●	●	●	●	●	●	○	○	○	●	●	●	○	○	●	●	○	●	●	●	○	●	○	●	○	●	○	○	○	○	●	●	●	○	●	○
17.Huay Kaew Plaza Night Market	(24)	19	○	●	●	●	○	●	●	○	●	●	○	●	●	○	○	○	●	●	●	●	○	●	●	○	●	○	○	○	○	●	●	○	○	○	●	○	○
15.Wat Nathasiama Open Space	(23)	18	●	○	●	●	●	●	●	○	○	○	●	●	●	○	○	●	●	○	●	●	○	●	●	○	●	○	○	○	○	○	○	●	●	○	○	●	○
32.Suan Luang Lanna Rama 9 Park	(25)	18	●	●	●	●	○	●	●	○	○	○	●	○	●	○	○	●	●	○	○	●	○	●	●	○	●	○	○	○	○	○	○	●	●	●	○	●	○
18.Wat Chet Yod Night Food Market	(26)	17	○	●	●	●	○	●	●	●	●	●	○	●	●	○	○	○	○	●	●	●	○	●	○	○	●	○	○	○	○	○	●	○	○	○	●	○	○
8.Sanwong Book Center Plaza	(27)	16	●	●	○	●	○	●	●	●	●	○	○	○	●	○	○	○	●	○	●	●	○	●	○	○	●	○	○	○	○	○	●	○	●	○	●	○	○
16.Santitham Crematorium	(28)	15	●	●	○	○	○	●	●	●	○	●	○	●	○	○	○	○	●	●	●	●	○	●	○	○	●	○	○	○	○	○	●	●	○	○	○	○	○
42.Municipal Sport Complex	(29)	14	○	●	●	●	○	●	●	○	○	○	●	●	○	○	○	○	●	○	●	●	○	○	●	○	○	○	○	○	○	○	○	●	○	○	●	●	○
29.Mae Ping River Waterfront	(30)	11	○	●	●	○	○	●	●	○	○	○	○	●	○	●	○	○	○	○	○	○	●	●	●	○	●	○	○	○	○	○	○	●	○	○	○	○	○
30.Inner Wall Waterfront	(31)	9	○	●	●	○	○	●	●	○	○	○	○	●	○	●	○	○	●	○	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
41.Haiya Pocket Park	(32)	8	○	●	○	●	○	●	○	○	○	○	○	●	○	○	○	○	●	○	●	●	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○
4.Suan Dok Gate	(33)	5	○	○	○	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5.Chang Phueak Gate	(34)	5	○	○	○	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.Suan Prung Gate	(35)	5	○	○	○	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
37.Lumyai Market Pocket Park	(36)	3	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○
38.Bak Nawarat Park	(37)	2	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
39.Governor's House Pocket Park	(38)	2	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
40.King Kavila Monument Park	(39)	1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
31.Mae Kha Canal Waterfront	(40)	0	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
34.Kanchanapisek Park	(41)	0	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
36.Huay Kaew Health Park	(42)	0	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
			11	29	32	32	21	35	34	21	32	32	19	28	24	15	9	14	30	32	24	30	32	29	25	20	26	14	11	9	5	22	26	16	10	20	26	22	5

Table 3 : Scores from the survey of the multi-use of public open spaces in Chiang Mai City

Multi-use public open spaces	Name of public open spaces
1. Highest score 31-33	Three Kings Monument Square, Rachadamnoen Walking Street, Wualai Walking Street, Tha Pae Gate Square
2. High score 26-30	Warorot Path and Night Street , Nawarat Market Open Space, Chiang Mai Gate Square, Kad Suan Kaew Plaza, Night Bazaar Path, Nimmanhemin Path , Anusan Night Market, Chiang Mai Pavilion Plaza, Front of Chiang Mai University path, Ban Chang Khian Open Space, Chang Khian Lane Path, Chang Phueak Night Food Market
3. Medium score21-25	Bamrungrat Walking Street, Suthep Path –Back of Chiang Mai University, Sri Nakarintara Health Park, Loy Khor Path, Shopping lane opposite Chiang Mai University, Buak Haad Park
4. Low score 16-20	Huay Kaew Plaza Night Market, Wat Natharama Open Space, Suan Loung Lanna Rama 9 Park, Wat Chet Yod Night Food Market, Suriwong Book Center Plaza
5. Lowest score 11-15	Santitham Crematorium, Municipal Sport Complex, Mae Ping River Waterfront
6. Non-multi-use score 0-10	Inner Wall Waterfront, Hayya Pocket Park, Suan Dok Gate, Chang Phueak Gate, Suan Prung Gate, Lumyai Market Pocket Park, East Nawarat Park, Governor's House Pocket Park, King Kavila Monument Park, Mae Khla Canal Waterfront Park, Kanchanapisek Park, Huay Kaew Health Park Health Park

5.2 Logic of specific characteristics of spaces

The matrix analysis shown in Table 4 revealed the relationship between the multi-use of public open spaces involving physical, social and economic factors, a total of 47 factors. One point was assigned when there was a relationship between the public open spaces and the factors, and the total score was calculated for each space. The analysis aimed to find the causes accounting for specific characteristics of the public open spaces generate the high multi-use. The results were as follows:

1. Physical factors

Physical characteristics of the space influenced the use due to its location close to the residential areas or the center of the city. However, the study found that physical factors do not have much effect on multi-use of public open space because although they are easy to access, some public open spaces have not much used for multi-purpose. Other factors have to be considered as well, namely environment and facilities. Some public open spaces in Chiang Mai lack suitable facilities. Some do not even have basic necessary facilities. The study found that sometimes multi-use space and non- multi-use space can have the same characteristics. Therefore, there must be other factors for multi-use.

2. Social factors

The more social characteristics emerge, the more multi-function or use seems to occur and vice versa. Thus, the social factors tend to affect the use more than the physical factors. It was found that the socio-cultural characteristics of the public open space, namely cultural activities and programs highly influenced the users followed by the identity of the area or its cultural environment.

3. Economic factors

Economic factors could affect the use of public open space, for example sidewalk stalls, food vendors, which causes the trade conduct on public open spaces to become common and attractive. This could draw more people and make some space and paths become colorful while adding life and a vital economic climate to the city and its vicinity. Thus the characteristics of the goods and the display of goods could be important reasons for the multi-use of the public open spaces. Moreover, the surrounding area of some public open spaces near the market and banks together with the shops and services of the convenience stores, restaurants and entertainment places in the nearby areas could support the use of the space to a great extent.

Therefore, the logic of the physical factors seems to be in line with that of Whyte (1980) and Gehl (2001). However, this study found that its influence on the location is rather small. The social factors according to Rapoport (1977) and the socio-cultural activities and the identity as well as programs for organizations, certain festivals based on Whyte (1980) had more influence on the public open space than the economic factors. Crawford (1999) emphasized the significance of conducting trade on the space. This study found some differences in that it is possible to separate the level of the influence of those factors and their elements that affect the multiple use as shown in Figure 9 In order to have a multi-use public open space, it is necessary that the logic must contain the elements shown in the diagram.

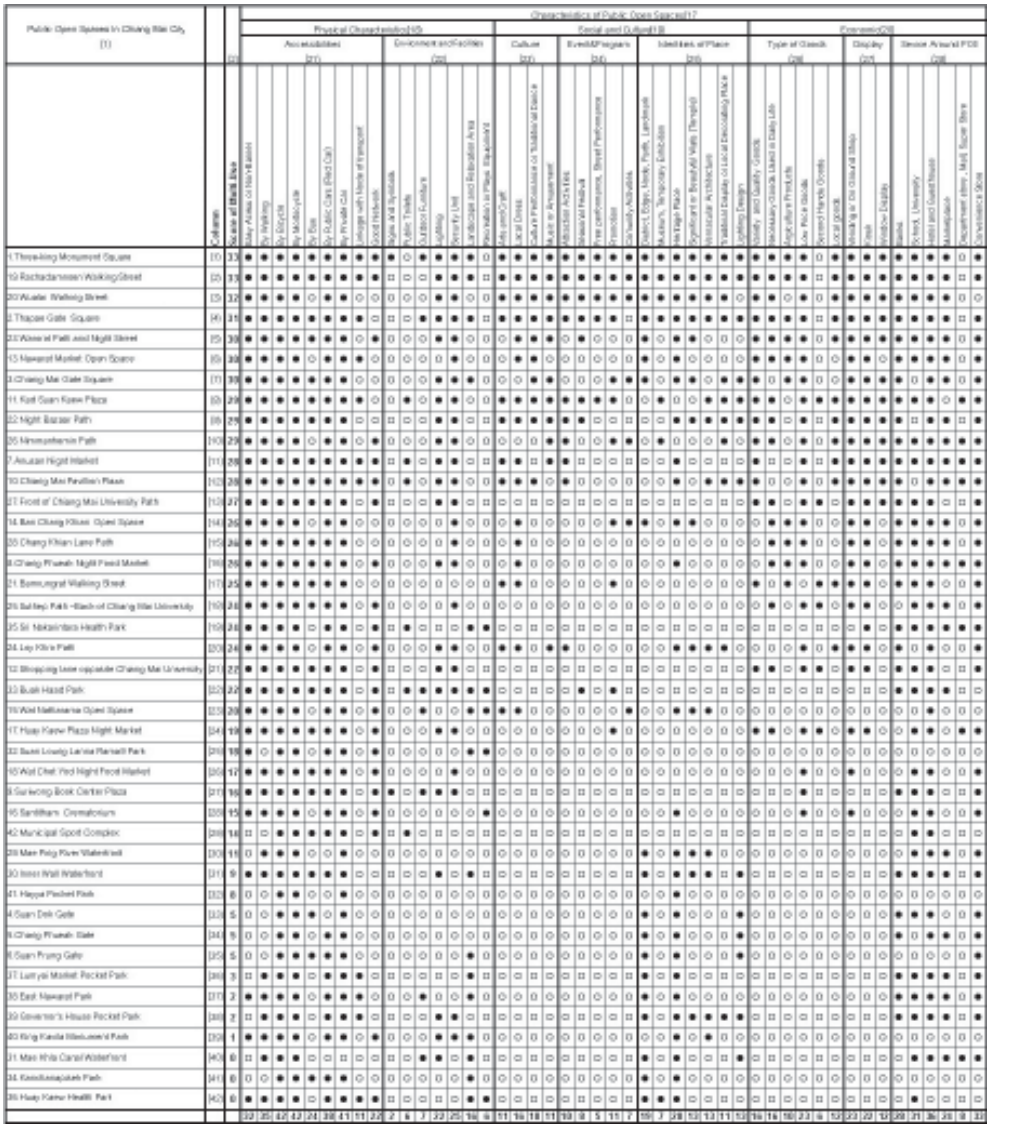
The specific characteristics of space that could support the multi-use of public open spaces should contain the following factors.

1. Basic factors such as physical factors related to accessibility and facilities, which are basic factors that all areas should have. Good basic factors give rise to opportunities for multi-use. It is noted that accessibility means ways to reach the surrounding area while facilities are physical property in the area. Both are only basic factors.

2. Support factors are second in importance. They are more important than basic factors. These are economic activities and services taking place around the area. These factors together with the socio-cultural factors of space identity provide better opportunities for multi-use of the public open space. However, such support factors could have only a moderate influence on the public open space multi-use and it could reflect the condition of the surrounding.

3. Attraction factors are the most important factors namely cultural and social activities, whereas economic factors, namely goods and produce display could attract people and influence the multi-use of the public open spaces. The higher the attraction factor, are the higher the degree of multi-use there will be. Thus, it is considered a powerful factor. It can be noted that the economic and social factors embedded in the attraction factors are the factors attached to the respective public open spaces, which are different from the support factors that exist around the area.

Table 4 : Matrix analysis of the characteristics of public open spaces in Chiang Mai City



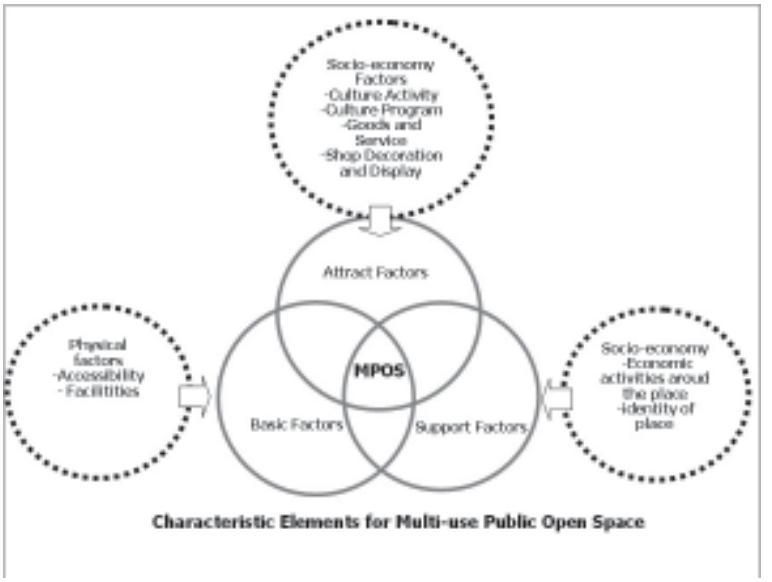


Figure 9 : Specific characteristics of multi-use public open space

5.3 Logic of the morphological structure of Chiang Mai City

The study of the relationship of the morphological structure of Chiang Mai City and the multi-use public open spaces by the overlay mapping technique in terms of population density, land use, location of economic activities and cultural activities shows that the urban morphological structure influences the multi-use of public open spaces and population density (Figure 10.1) affects the use of public open spaces. The higher the density is, the higher the opportunity. It allows for multi-use of public open space and vice versa. Land use (Figure 10.2) appears to be of mix use, between residential purposes and commercial purposes. The old commercial area in the Central Business District and the Heritage District influence the use of public open spaces. It allows for a higher opportunity for multi-use as in the area round Rachadamnoen Street and Warorot Market. The network and the use of public open space (Figure 10.3) are also related. For example, the area with a good network means a better access and a higher multi-use of public open spaces and vice versa. The areas with a high amount of traffic have more opportunities for multi-use public open space.

The study of figure-ground shows that there is sufficient density to allow for multi-use (Figure 10.4 and Figure 11). An analysis of the plot within 500 meters of the community and the vicinity of the public open space indicates some characteristic elements for multi-use public open space. Figure 11 and Table 3 show the density proportion of building mass to the open space as follows: the Rachadamnoen Walking Street: 6.58:10 (building mass : the open space), The Three Kings Monument: 6:10 Wualai Walking Street: 5.9:10; the multi use has the highest scores: 31-33. Warorot Market street path has a density proportion of building mass to the open space: 5.63:10, so the multi-use has high scores: 26-30. Suthep Road around the back of Chiang Mai University has density proportion of building mass of the open space at 2:10, and the multi-use has medium scores of 21-25. The relationship the density proportion of building mass to the open space and the multi use scores are relative the same. Figures 11.1 and 11.3 show the moats cutting through the areas while Figure 11.4 shows the Ping River, the main waterway, going right through the middle of the space. The density of settlement around the riverside areas is rather obvious with the density proportion of building mass to the open space

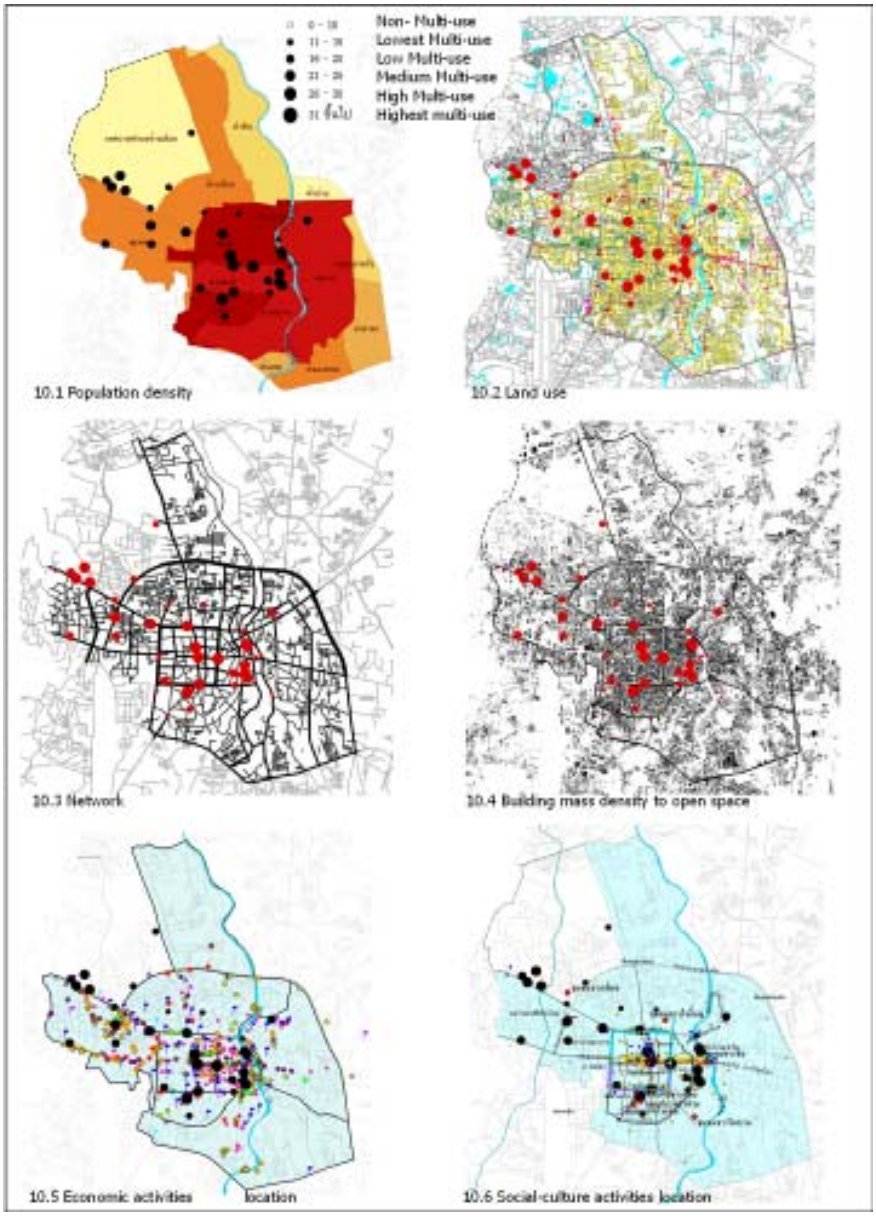


Figure 10 : Overlay mapping of multi-use and urban morphological structures (10.1-10.4) Economic and social-culture activities location (10.5-10.6) of Chiang Mai City

of 6.58, 5.9 and 5.63 respectively. This indicates a high level of use in the vicinity of the river due to the settlement density as the river is not used for transportation. Study results are in line with Jacobs (1961) with regard to the use of high density plots and multi-use where the land blocks are not too large and there are many road-crossing corners. However, this study found that the factors are not equally important and their influential supports are also different. Figure 11 shows the figure-ground of the districts within 500-meter radius of the multi-use public open spaces in the Heritage District and the Central Business District of the city where the density proportion of the buildings and the open space is quite high whereas the University District has less density.

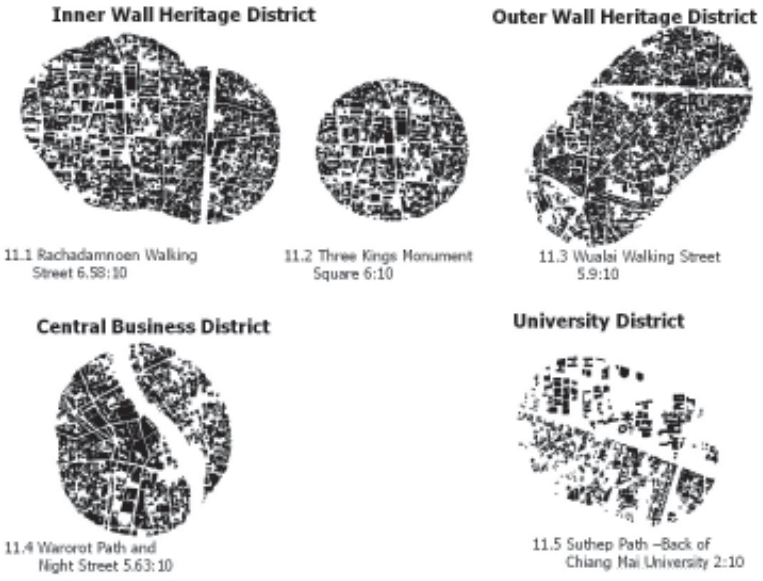


Figure 11 : The figure-ground of the districts within the 500-meters radius of the multi-use public open spaces in Chiang Mai City

Furthermore, the relationship between the economic activities and the use of public open spaces (Figure 10.5) is also higher. The results of the study on the urban areas where economic activities are intensified show that the opportunity for multi-use of public open space will increase accordingly. The influence of the economic activities varies in degree. For example, markets, hotels, guesthouses, restaurants, pubs and coffee shops have more influence on the multi-use than do schools, government offices or banks. The relationship between urban cultural activities and the use of public open space (Figure 10.6) are combined. The areas with urban cultural activities can serve the multi-use of public open space too.

5.4 Logic of the users

People variables concerning the use of the public open spaces in this study based on the questionnaire and analysis with the SPSS Program are age, sex, status, education, income and residence. The three areas of study are Rachadamnoen Walking Street, Warorot Market path and Suthep Road around the back of Chiang Mai University. The results are as follows:

1. Personal variable

In terms of gender, the average showed an equal value for both male and female. As for their age, young adults were among the highest number of users whereas those in the market area were users of various ages. As for career, most of the users were students followed by people engaged in commerce. Users of single status (unmarried) were higher in number and most of them had a Bachelor's Degree. However, their income varied; the higher income they had, the less they made use of the public open space. As for their residence, users of the public open space lived mostly in the municipal area with the exception of those who came to the walking street, who were mostly tourists and people from other provinces. On the other hand, users of the public open space around the path and the street at Warorot Market were mostly people who lived in the Chiang Mai Municipality.

2. Characteristics and behavior of users

2.1 Time

Most of public open space users in the evening and the nighttime as the climate of Chiang Mai is tropical. Those people went during their resting time for mostly 1-2 hours with the frequency of once a week, on the weekend or in the evening after work or school.

2.2 Participants

Participants in the public open space users in Chiang Mai City usually came with their friends as they were in their teens whose objectives were to stroll around and to relax, followed by those who intended to buy things and to eat out. The study found that recreation was not important for the lifestyle of the urban people in Chiang Mai. People here enjoyed looking at the goods and finding something to drink or eat more than going to a public park to enjoy nature.

2.3 Means of travel

Most of the users of the public open space traveled to the location by motorcycle and very few people went on foot since the weather was too hot and there were no paths for pedestrians available and the lack of public transportation to link with the public open space.

2.4 Characteristics of the location

The location of the public open space should be close to residential areas and the community. However, accessibility is a secondary reason. If the public open space is that of a pedestrian street, tourism activities and recreation, it should be located in the central and residential areas.

2.5 Characteristics of the district

A pedestrian street, which is a tourist attraction and where the largest number of users is made up of tourists, should emphasize aesthetic value and availability of the souvenirs. The market areas attract people because of cheap prices and the variety of goods and food. The University District is attractive due to the variety of food and the cheap prices of goods. Shopping and variety of goods are secondary reasons since students prefer to use the public open spaces for everyday life activities.

2.6 Characteristic of the local people

The reasons users go to the pedestrian streets are the diversity of people, races and local lifestyle. Similar reasons apply to the public open spaces in the Market District which additionally enjoys the age diversity whereas the public open space in the University District involves an additional reason namely fun and freedom.

2.7 Characteristic of place

The reasons for people's use of the public open spaces are related to economic vitality, identity and unique community lifestyle, the quality of goods and services as well as social variety. The walking street draws a lot of people thanks to the types of local products, food and beverages, art works and collectors' items such as handicrafts. The Market District offers food, useful items for everyday life, which are considered important. The University District has attractive low-cost products available at a bargaining price that users are looking for. Moreover, the public open space can bring life to the core central city, particularly the Central Business District of the city.

The markets are likely to be the most attractive spots followed by restaurants and convenience stores. Recreation, banks, department stores, schools and entertainment venues are not attractive enough to draw people to use the public open space.

3. Activities

Everyday activities that people can do at the public open spaces are eating/drinking, shopping, service seeking, selling goods and offering services whereas activities related to work, business, appointment to meet acquaintances or traveling on the local bus are of little importance, unlike the phenomena observed in the Western countries.

As for alternative activities, people go to the public open spaces for leisurely strolling, traveling and enjoying events related to local customs and culture.

As for social interaction, the reasons why people visited the walking streets were that they enjoy watching street performance, and that they go to the public open space as part of their everyday life mainly to meet and chat with their acquaintances and to get to know some strangers. According to the users' logic in physical, social and economic terms, all of these factors also had sub-factors of which the most influential are attraction factors and supporting factors exerting of a medium influence, and basic factors of less influence in drawing the users to the public open spaces.

The study results showed that the use of public open spaces must consist of the logic of the specific characteristics of space, of an urban morphological structure, and additionally of the users of public open spaces. Each of the factors had influences on the spaces at a different level where the influences of the attraction factor showed the highest level followed by the support factors and the basic factor which showed the least influence on the use of the space. These factors could be used to create a model for public open spaces as follows:

THE CAKE MODEL

The cake model as shown in Figure 12 is a model used to explain the relationship of various factors influencing the public open spaces, which consists of three aspects, namely the urban morphological structure, the specific characteristics of space structure and users with sub-factors in three areas: physical, social and economic. The hypothesis is that the influences of each element of the public open space vary, which results in causing the public open space to have different levels of function as explained below.

The circle areas of the cake model represent different levels of functions. Space 1: HMPOS with a darker shade at the center indicates a high level of multi-use public open space and diversity of human, time and activities. Space 2: MPOS with a gray shade shows some multi-use public open space and Space 3: NPOS with a white shade shows non-multi-use public open space. This happens due to various reasons related to the elements of the influential factors of different levels which create the multi-use for the public open space. Each cake has different layers, each of which represents physical, social and economic factors, and has different combination of factors representing the levels of influence on the public open space. The influence of AF (Attraction Factors), SF (Support Factors) and BF (Basic Factors) ranged from high to low level. Basic factors depend mainly on the public space and the users who are understandably considered the original users of the space. Therefore, if their specific

characteristics are good, it is likely that they will have a high influence on the area. These specific characteristics, therefore, become support and attraction factors whereas the urban morphological structures become sub-factors or merely support and attraction factors. A high influence creates a high multi-use of the public open space, medium influential factors and the basic influential factors reduce the multi-use of the space accordingly.

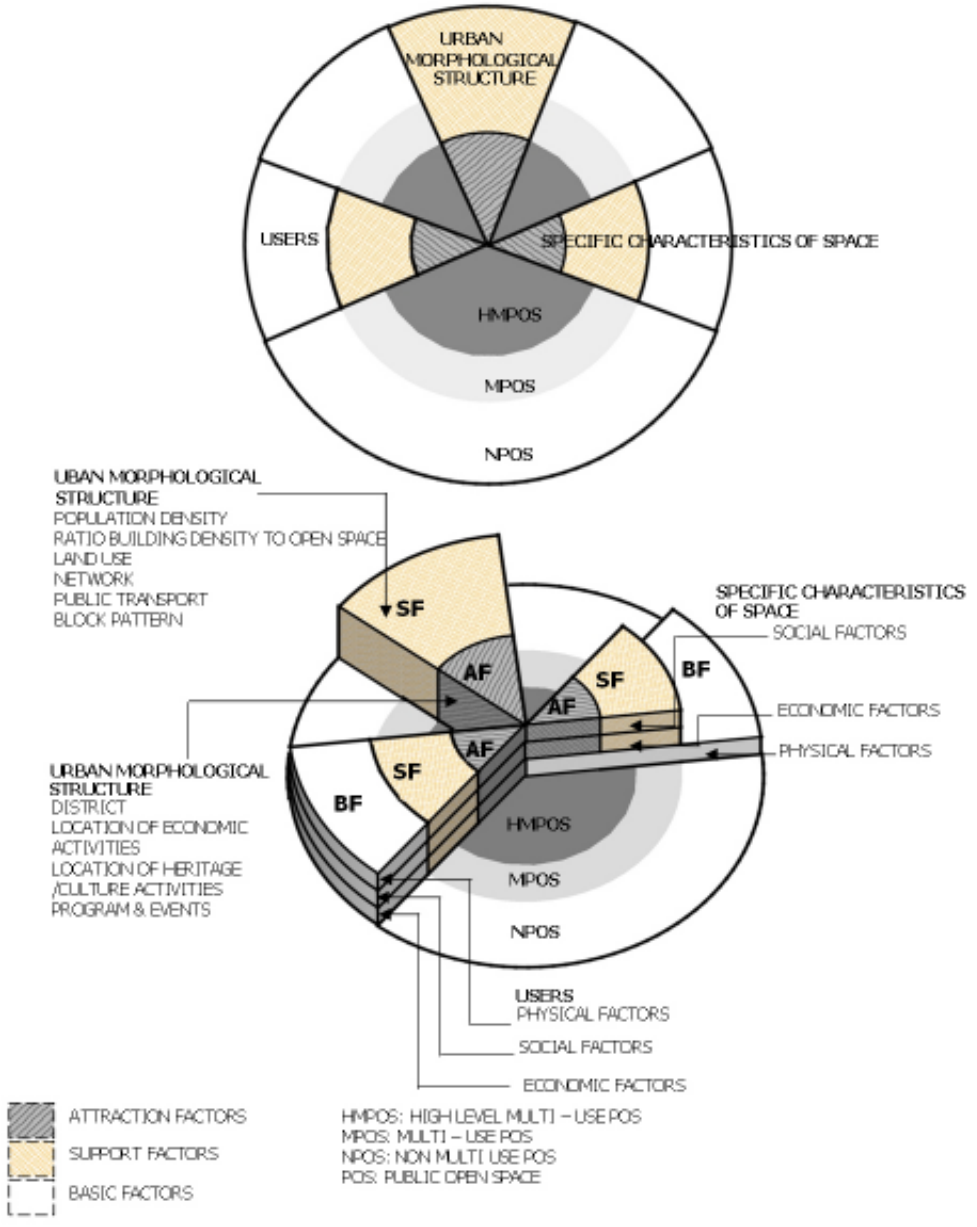


Figure 12 : The Cake model showing the relationship of influential factors on public open space with 3 elements, namely the urban morphological structure, the specific characteristics of space and users

6. CONCLUSION

The result of this study conforms with the hypothesis in terms of the specific characteristics of space, particularly the physical aspects related to accessibility and facilities concerned with the concepts expressed by Whyte (1980) and Gahl (1996), the social aspects of Rapoport (1997), the economic aspects of Lennard and Lennard (1995) and Crawford (1999, 2005) and urban morphological structure of Jacobs (1961). It was found that all the factors affected public open spaces. Nevertheless, finding differed somewhat from those scholars. On the study hypothesis that each factor bares different influences on the public open space, it was discovered that these factors shared different levels of influence on different types of public open spaces.

For specific characteristics of space, the influences are divided into three levels: attraction factors which are social and economic factors within the space; support factors which are social factors around the space and the physical factors which are the basic factors.

Concerning urban morphological structure, the influences were divided into two levels since it served more or less as support for the space. Attraction factors of urban morphological factors were economic activities, social activities with routes/location and cultural activities. Support factors were population density, building structure, land use, network, public transport and block pattern.

With regard to users, the factors lay in different levels owing to physical, economic and social influences which were basic factors, support factors and attraction factors depending on the users' logic. Individual variables were related to sex, age, income, education, status, career and habitation.

In light of the issues concerning the lack of use of some idealistic and empty public open space in contrast to the active multi-use public open space, this study found that it is possible to make efficient and optimum use of the space for the good of the city and to stimulate a lively socio-economic interaction. It can be concluded that reasons for multi-use of public open space resulted from three factors: specific characteristics of space, urban morphological structure and users. These three elements exerted three different levels of influence on the multi-use of public open space: high, medium and low, corresponding to attraction factors, support factors and basic factors. To create a successful multi-use public open space, it is necessary to have the basic factors. However, this type of factor by itself is not adequate for the space to achieve the goal of being multi-functional in terms of human diversity, time diversity and activity diversity. Thus, it is also necessary to include support factors and attraction factors. The more attraction factors it has, the more opportunities it affords for alternate multi-use.

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