

TOWARD AN INCLUSIVE FUTURE

revise the public spaces in Taichung old city center to promote active ageing

Colophon

Graduation thesis. Toward an inclusive future

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All start from my personal story

I remember when I was a child, my grandpa is very energetic, he always takes me around, meet his friends and play with me. However, one day, he accidentally tripped by a protruding brick on the road and fractured his leg. Ever since then, he seldom goes out because he feels difficult when he walks, hard to find a rest place if he tried, and he feels really unsafe on the street. He become less active and become like a coach potato. This sedentary lifestyle deteriorate his physical and mental condition. He become irritable, causing relatives to gradually alienate him. I still remember clearly that in the last few years of his life, because of his poor health, he was “trapped” to the care ward of the hospital which make the visiting very limited. In the end, even when he passed away, I didn’t even make it to meet him for the last second.



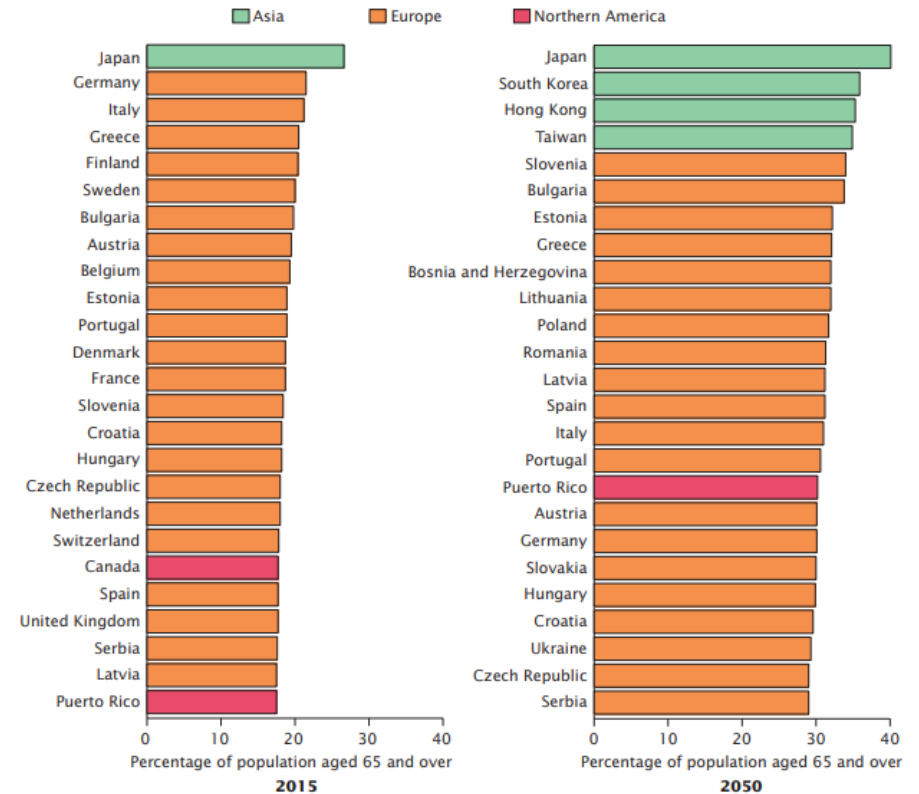
1. MOTIVATION

MOTIVATION

An ageing world

The world population is aging rapidly (Kowal, P., Goodkind, D. and He, W, 2016). Since the beginning of recorded history, young children have outnumbered their elders. In 2020, however, the number of people aged 65 or older will outnumber children under age 5. Driven by falling fertility rates and remarkable increases in life expectancy, population aging will continue, even accelerate(WHO, 2011). Japan is currently the oldest nation in the world and is projected to retain this position through at least 2050. With the rapid aging taking place in Asia, South Korea, Hong Kong, and Taiwan will join Japan at the top of the list of the oldest countries and areas by 2050, when more than one-third of these Asian countries' total populations are projected to be aged 65 and over (Kowal, P., Goodkind, D. and He, W, 2016). see figure.1

There is already a wide published in the media from the social-economical aspect such as increase the expense of health care and pension, and large amounts of academic research papers conduct health, social, housing and mobility relative issues. However, little had been done with the impact of these aging issues on the built environment. Therefore, this project will focus on rethink and revise the contemporary built environment in order to become age-friendly.



Note: The list includes countries and areas with a total population of at least 1 million in 2015.

figure.1 The world's 25 oldest countries and areas 2015 and 2050 (Source: U.S. Census Bureau, 2013; International Data Base.)

2.

**PROBLEM FIELD WHEN AGEING IN THE
CONTEMPORARY CITY**

PROBLEM FIELD WHEN AGING IN THE CONTEMPORARY CITY

2.1 Introduction

In 2018, Taiwan has become the “aged society” as National Union defined with 14% of total population are project to be the elderly. By 2050, there will even become twice the amount of it, with more than one-third of the total population are consisting of the elderly. The aging of society is a positive yet challenging phenomenon. As Mace said in his public speech, “We all become disabled as we age and lose ability, whether we want to admit it or not.” (Ron Mace, 1941-1998) The concept of the universal design pyramid (see figure.2) from Goldsmith also indicates that disabled and elderly people should have been put at the priority as they are among those who experience the greatest difficulties in their daily life in the built environment, if the space is friendly to them then it should be usable for everyone. “Unfortunately, designers in our society also mistakenly assume that everyone fits this definition of “normal.” ”(Ron Mace, 1941-1998) Therefore, from the planner and designer aspects, it is important to create a supported built environment and well-design outdoor spaces which can promote physical activity and helps to preserve and maintain older people’s health and well-being. However, who are these elderly? What does it mean as a well-designed built environment for the elderly? The WHO has defined the elderly as persons 65 years of age or older which, meanwhile, was chosen as the age for retirement in Taiwan. Although, this conventional definition does not justify the variation within the growing group of the elderly, since it is undoubtedly very individual. There is a general process of aging and its impact on the daily life of the elderly.

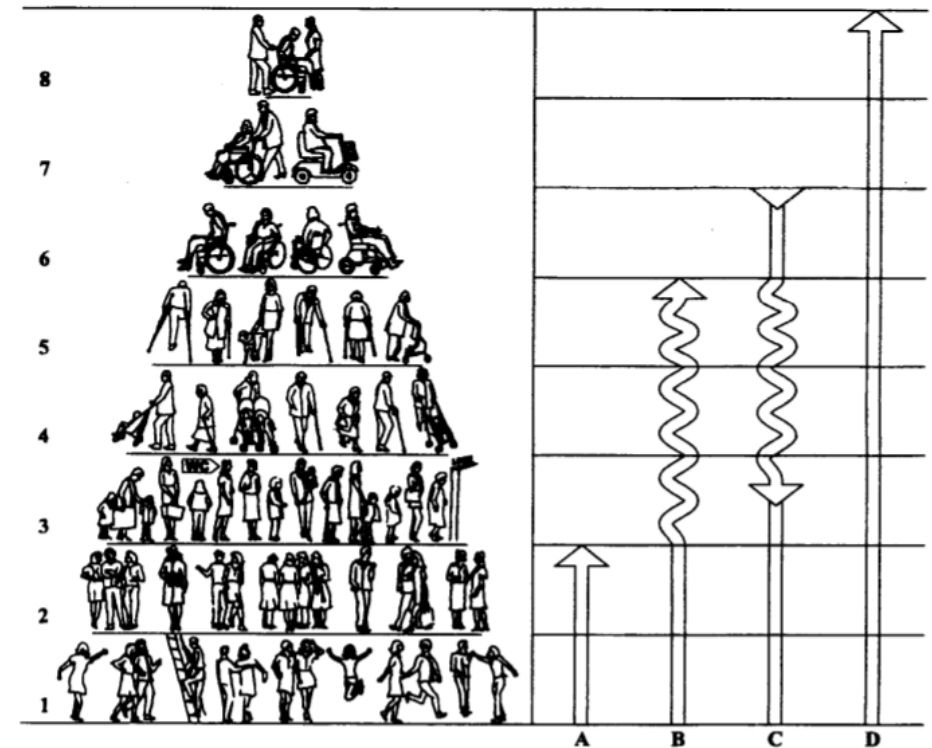


figure.1 The Universal Design Pyramid for inclusive design
(Source: Universal Design Pyramid by Goldsmith as cited in Asiah, 2012)



*“We all become disabled as we age and lose ability,
whether we want to admit it or not.”*

(Ron Mace, 1941-1998)

2.2 The ageing process---becoming older age

There are four-phase of life course (see figure.3), aging can be clearly observed from the third phase which is called "The third age". It refers to the period from retirement to the beginning of rapid decline in physical and mental functions, a period of personal achievement and self-development. (Laslett, P. , 1991) If the third age can develop well, that is, to establish a healthy physical, psychological and social relationship, it can postpone the development to the fourth age and increase the independence on the fourth age which refers to the rapid decline of individual physical and mental functions to the end of life, which is a period of fragility and decline. (Laslett, P. , 1991)

In the Physical area

Conceptually, functional fitness represents the physical capacity that is needed to undertake normal everyday activities, independently and without the early onset of fatigue. The aging process tends to reduce physical fitness (strength, endurance, agility, and flexibility), and results in difficulties in daily life activities and normal functioning of the elderly. (Milanović, Z., Pantelić, S., Trajković, N., Sporiš, G., Kostić, R., & James, N., 2013) The general physical capacity decrease in the aging process include:

- Changes in body composition, reduction in muscle bulk and lean body mass, known as sarcopenia. Body fat may increase.
- Reduction in bone mass and strength with increased risk of fracture; osteoarthritic changes in joints.
- Reduction in kidney function; impaired thirst mechanisms, which increase susceptibility to dehydration.
- Reduced motility of the large bowel; reduced hepatic mass and blood flow (which may affect hepatic metabolism of drugs).
- Nervous system changes, including reduction in cortical function and reduced motor and sensory peripheral nerve function; changes in autonomic function, including control of heart rate and temperature regulation (failure of normal response mechanisms to hot and cold).

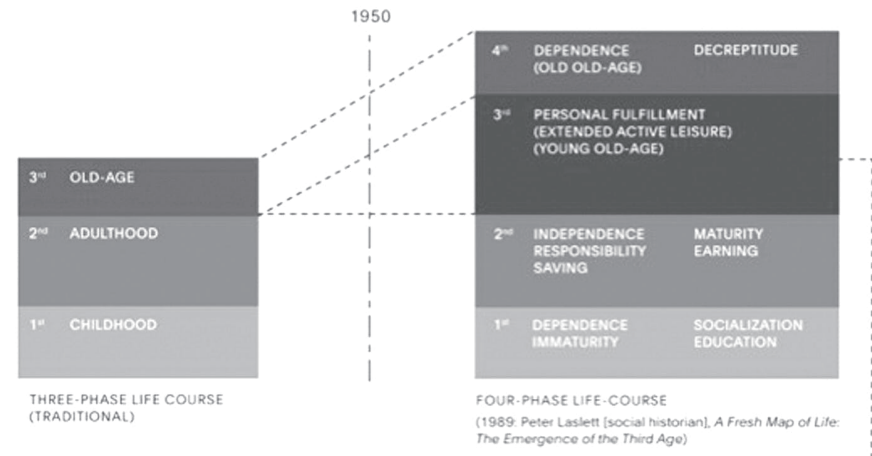
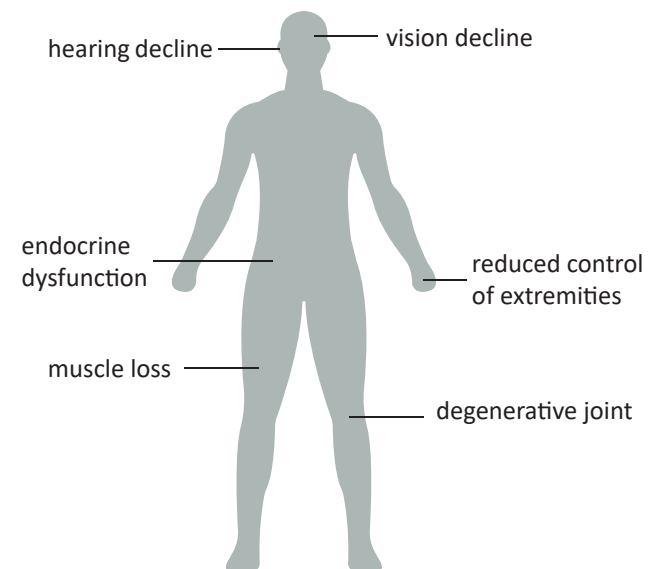


figure.3 Four-phase of life course

(Source: After Deane Simpson, *Young-Old: Urban Utopias of an Aging Society*, 2015; Peter Laslett, *A Fresh Map of Life*, 1989; Bernice Neugarten, *Age Groups in American Society*, 1974)



- Reduced elasticity of the eye's lens; high tone hearing impairment. (Dr Colin Tidy, 2016)

Older person with decrease in physical capacity is less well performance in physical activity, (Milanović, Z., Pantelić, S., Trajković, N., Sporiš, G., Kostić, R., & James, N., 2013) especially the outdoor mobility. (Rantanen T. 2013) A less user-friendly built environment such as long distances, lack of resting places, high hills, stairs, poor street conditions, and busy traffic is less likely to encourage older people to go outdoor and doing physical activity, in return, further deteriorate in physical capacity. As the research indicated, the decrease of physical capacity is not irreversible. With physical activity can help older adults maintain physical capacity (Agency for Healthcare Research and Quality 2002; Lee and Park 2006) which means the physical active elderly is less possible to suffer from the decline of physical capacity. An environment which is easy and enjoyable to go outdoor is important since it encourages the elderly to be physical active. (Liz Cairncross, 2016)

In the psychological area

Psychological aging is an individual's psychological changes caused by biological aging. Changes that occur with age in the functioning of individual organs affect the mood, attitude to the environment, physical condition and social activity, and designate the place of the elderly in the family and society. (Dziechciaz, M., & Filip, R., 2014) However, without mentally prepared, may easily have negative thoughts, become pessimistic, feel fearfulness of new situations and unfamiliar environment, and the further deteriorate in cognitive abilities which resulted in several problems, such as the feeling of loneliness, retirement syndrome, senile depression, dementia and even lead to the suicide of the elderly. (Fushun, Huang, 2011) The general psychological capacity decrease in the aging process include:

- Short-term memory decrease

- Increasing difficulties in adapting to new situations
- Adverse changes in the cognitive spheres
- Adverse changes in the intellectual sphere
- Attention divisibility
- Deterioration of the visual-spatial memory (orientation and wayfinding skills)
- Deterioration of the ability of presenting mental processes

The psychological health is essential to overall health and well-being, as they have been in the prevention of both infectious and chronic diseases. It can be seen that physical activity, like a number of other lifestyle interventions, holds the promise of better psychological health outcomes for older adults. (Lautenschlager, N. T., Almeida, O. P., Flicker, L., & Janca, A., 2004) Therefore, promoting psychological health depends largely on strategies to ensure that older people have the necessary resources to meet their needs, such as providing security and freedom; social support for older people and their caregivers and community development programs. (WHO, 2017)

In social area

Social aging refers to how a person perceives the aging process and how it relates to the society in which they live. (Dziechciaz, M., & Filip, R., 2014) However, with the existing stereotypes of older people and undergo the large change of social connection and family, it often related to the negative image. Especially, since modern society promotes youth, progress, development, efficiency and cost-effectiveness. (Dziechciaz, M., & Filip, R., 2014) Elderly people are easy to suffer from discrimination of the public and lead to social isolation. An elderly person being social isolation is less likely to be personal fulfilled and active, resulted in physical and mental health problems and difficultly return or participant to the society again.

- Losing family members

- Decreasing social networks
- Losing social roles

Although in old age with all the “loss”, a meaningful and creative life can still be arranged in this period. Some researchers indicated the old age is a period of ‘harvesting’ as it accumulates maximum of experiences and social opportunities (A. Nowicka, 2006; A. Kořataj, 2006) which can undertake new social and family roles, engage in the activities of various organizations and associations to help others since they also have a lot of free time. (Dziechciaz, M., & Filip, R., 2014) Increasing social participation and social connectedness also contribute to the well-being of older adults and reduce the social isolation among older people. (Buffel, T., Rémillard-Boilard, S., & Phillipson, C., 2015)

2.3 Society’s prejudice against the elderly

“Old” itself should be a neutral adjective. It is only after combining various cultural and policy factors, and at the same time being subjected to social stereotypes of personal values and physiological characteristics, leading to the imagination, that it is often attached to negative images. As many people putting “aging” the same as to “degenerate” (whether physiological or social aspect), and underestimating the contribution of the elderly to the family and society. This situation indirectly prompting some elderly people to view personal behavior and roles negatively, and restricting individual social participation and physical active, leads to poorer lifestyle and health status. (Chen Jiawen, Zhang Yuyue, Gao Xufan, Lu Luo, 2013) At the same time, the government always takes “care” as the focus of its policy for the elderly, which is a passive and lacking approach, and further facilitates the public, especially the young and the middle-age, associates the elderly with illness, weakness, mentally retarded, forgetful, poor in learning new things, and disability. (McTavish, 1971) However, according to many researches, the elderly’s perceive on aging are far more positive than other age groups (from teenagers, college students, working adults, business executives), and include physical ap-

pearance, Psychological cognition, social participation, and economic security (Lu Luo and Gao Xufan, 2009, 2010; Lu, Kao, & Hsieh, 2010). Therefore, it is important to encourage older people to go outside and interact with the public to show their ability, independence and value. At the same time provide programs that foster intergenerational contact, combined with education about the aging process and its misconceptions also works best at reducing against attitude. (Susan Kelley, 2019)

“We hope to contribute our creativity, our knowledge, and our experience to the society, so that more people can learn how to do things, instead of being the person who beserved... That is strategic planning, planning direction. Because the most difficult part of the service is the front part, how do you integrate it behind the scenes to make its service efficient”

from the interview of a elderly

2.4 Inactive ageing and out-of home mobility

As before in paragraph 1.2 had said, the development of aging process to the frailty stage can be postponed through having healthy physical, psychological and social relationship which also refers to the concept of active aging, encompasses both physical activity and wider social and community participation. (Liz Cairncross, 2016) The daily leisure activities outside the home can help the elderly adapt to the society after retirement, enrich their lives in old age, avoid isolated from the society, meanwhile, have great benefits for their physical and mental health. However, according to researchers from Ministry of Health and Welfare (Yu Jia Chen, Mei Ling Wu, 2017), the general preference of leisure activities of the elderly, as figure.4 shows, is passive or static leisure activities such as watching TV and chatting. Although some elderly people also do walking as leisure activity, there are still 51.8% of elderly people lack of sufficient regular physical

研究者	區域	樣本數	看電視	聊天	散步	看書報	聽收音機	與兒孫同樂	旅遊	運動如登山打拳	種花草如園藝	棋藝如下棋打牌	養魚鳥如動物	影劇	集會敘談	寫作	學技藝	社會服務	其他	計
李瑞金 高金桂	台北市	1979	612	24.56	23.77	18.99	10.35	2.55		5.37	4.45	2.95	2.49	2.29		0.79			1.44	100
詹火生	台北市	1979	163	27.89	8.16		15.79	6.32		7.63	9.21	2.63	5	2.11	7.89		1.32		6.05	100
胡仁傑	台中市	1982	142	29.24	23.39	23.98	10.53			1.17	5.56	0.29	4.68						0.88	100
林松齡	台中市	1983	468	29.48	18.59					16.03	15.06	社團嗜好	3.85	16.03				0.96		
江玉龍 陳宇嘉 張維安	台北市 台中市及 高雄市	1984	747	30.5	23.4	16.6	4.6	7.5	4.2	2.6			5.8	3.1	0.5	1.2				100
陳宇嘉	高雄市	1984	243	29.3	25.5	17.9	5.6	6.7	3.4	3.3	1.2		2.6	3.2	1.3					100

figure.4 The general preference of leisure activities of the elderly
(Source: Ministry of Health and Welfare, 2017)

exercises as Health Promotion Administration of Taiwan indicated. Especially in areas with higher urbanization. This kind of static and passive leisure activities is not only lead to increase the risk of chronic diseases but also harmful to the physiological aging process of the elderly. As previous paragraph had mentioned the physical aging refers to the decline of physical capacity resulted in decrease of physical activity which particularly the outdoor mobility is necessary for accessing commodities, making use of neighborhood facilities, and participation in meaningful social, cultural, and physical activities. (Rantanen T. 2013) Therefore, it is of the up most important to encourage elderly people to be active and provide the inclusive access to the outdoor environment to facilitate elderly people to stay physically active and independent which postponed the aging process and maintain physical, mental healthy and indenpandancy for the elderly people.

2.5 Hope to ageing in place and be independent

Only depend on new types of nursing homes and elderly residential housing is sometimes thoughts as the solution for problems caused by the physical, psychological and social aging process. However, the society and the need of the elderly are changing and more elderly people want to age in local communities and maintain independency and autonomous. The research from Tang & Lee (2011) also indicated, as some papers have confirmed, that most American seniors over 65 years old and post-war baby boomers tend to live in familiar environments for as long as possible, including their homes and communities. Regarding the research in Taiwan, Zheng (2013) interviewed each 150 elderly people in all cities in Taiwan through a field questionnaire survey about their perspective on living arrangements, neighborhood environments, and aging in place. There are 28% of elderly people expressed their willingness to live in nursing homes because they were worried about the burden of caring for their children. However, as many as 72% of the elderly did not consider living in nursing homes and elderly residential housing.(see figure.5)

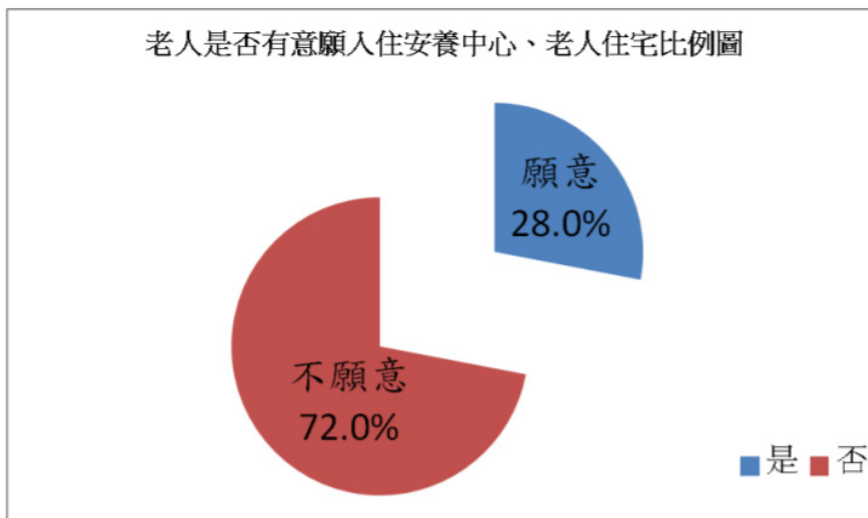


figure.5 The willingness of elderly people to live in nursing homes
(Source: Tang & Lee, 2011)

The main reason is already used to live at home (48.0%), followed by fear of losing freedom and independency (11.3%). The results of the study show that the elderly generally hope to continue living independently at home, rather than leaving the familiar community to re-adapt to the new environment.

“My neighbors in the community have already known each other, and we also have feelings. Especially since I have lived in this community since I was young, I also have deep feelings with this old community that cannot be described in words. Even if the community has something that makes me unsatisfied, these factors alone make me not want to move.”

from the interview of a elderly

2.6 The important of community, neighborhood design and public spaces

For many older adults, walking is the primary mode of mobility (Herbolsheimer, F., Mahmood, A., Michael, Y. L., & Chaudhury, H., 2020), resulted in the restricted of their daily often in the nearby surrounding. At the same time, the physical limitation such as declined in balance, walking performance, endurance, flexibility and strengthen when aging as the previous paragraph had mention, therefore, the community environment become increasingly important for elderly people. (Dominique Hauderowicz, Kristian Ly Serena, 2020; Kerr, J., Rosenberg, D., & Frank, L. , 2012) The built environment, as the research conducted by Kerr, J., Rosenberg, D., & Frank, L. shows that particularly the neighborhood design , is strongly correlated with rates of walking and physical activity that elderly resident undertaken. Meanwhile, public spaces are where activities which as part of active aging take place. However, the understanding of features of neighborhood contexts and urban form that facilitate successfully active aging is less conducted by works. Furthermore, although research from around the world shows how

design can make public spaces more amenable to people when they age, many outdoor environment such as shopping centers or parks still be easily experience as disabling and inhospitable for elderly people, especially with dementia, because they are disorientating, difficult to interpret and navigate, threatening or stressing. (Blackman et al., 2003; Dominique Hauderowicz, Kristian Ly Serena, 2020) As elderly people aged, they tend to spend more time in the neighborhoods around their homes (Dominique Hauderowicz, Kristian Ly Serena, 2020), therefore, consideration of the built environment is specifically relevant for them. Since the decreasing of functional status and health can make them more exposed and threat to barriers. (Burton and Mitchel, 2006)(as figure.6 shows) In fact, the research done by Ministry of Transportation and Communication of Taiwan (2013) underlined that whether elderly people are active or inactive is relatively affected by the built environment, furthermore, the need to go out of the elderly will not be reduced due to the reduction in mobility, however, mobility gradually degrade with age, making it increasingly difficult to move. Therefore, as the research indicated, often elderly people perceived the outdoor environment with common obstacles or unfriendly factors such as poor condition of sidewalks, overcrowding of streets and the threat of bicycles, uneven road surfaces, illegal parking of vehicles, street vendors occupying arcades and other obstacles, are greatly reduce the willingness of elderly people to enjoy going outdoor and stay active. The community and the deign of the neighborhood not only play a vital role of preventing and reducing social aging and social isolation among elderly people, but also important for maintaining the physical health of elderly people. There is a strong argument that it is crucial for elderly people to remain engaged and share in public spaces to see and be seen, to gain casual contacts and acquaintanceship and even chance meeting with other that enliven life whether the usage of public spaces of elderly people is low intensity or not. (Dominique Hauderowicz, Kristian Ly Serena, 2020)



figure.6 Barriers in current built environment which put threat to elderly people
(Source: from author)

2.7 Problem statement

Ageing causes physical, psychological, and social aspects of changing which influence the ease of elderly people's ability to use the environment. However, the design of the current urban environment still mostly supports an able-bodied working population which results in the difficulty for elderly people to maintain being active, independent, healthy, and well-being.

3.

TAICHUNG CENTRAL DISTRICT, TAIWAN
project location



AGING IN TAIWAN

3.1 Introduction

From the perspective of Taiwan, it entered an aging society in 1993. According to the demographic statistics of the Ministry of the Interior, the number of elderly people over 65 in my country has increased year by year from 1.491 million at the end of 1982 to 3.312 million at the end of March 2018, and the proportion has also risen from 7.10% to 14.05%, which means that within these 25 years, it already moved from an “aging society” to an “aged society”. According to estimates by the National Development Commission, it is estimated that the elderly population will exceed 20% in 2026. In this way, Taiwan and Japan, South Korea, Singapore and some European countries will be listed as “super-aged societies.” As shown in Figure 7, according to this development trend, it can be inferred that old age is no longer a special ethnic group, but a prevalent phenomenon. However, the speed of transition from an aging society to an aged society varies among countries. For example, France has experienced 115 years, the United States It took 73 years, the UK 47 years, and Germany 40 years. It is estimated that Taiwan’s aging rate will be much faster than many other developed countries, which only take 25 years. It shows the urgency of established of the age-friendly built environment to respond to the aging of the population. see figure.8 The idea of making the built environment more age-friendly is not completely new. In 2005, through the global Age-Friendly Cities (and Community) project launched in 33 cities, and the idea of age-friendly built environment was developed. Around the world, such communities have alternative names, for example, in the US they tend to be called ‘ livable communities ’ and ‘ lifetime neighborhood ’ in the UK. In Taiwan, since 1999, Ministry of Health and Welfare of Taiwan has responded to the WHO’s project of age-friendly city. It was first piloted in Chiayi City. Until 2003, all 22 counties and cities have joined.

The municipalities and governments have put elderly friendliness into the core of the implementation of the policy, and integrated resources across departments to create a friendly built environment that allows the elderly to maintain health and achieve the goal of “active aging” proposed by the World Health Organization. The main policy is through the formulation and implementation of the senior-friendly city plan. Incorporate active aging into public policies and formulate a policy framework. It can also incorporate the topics of “elderly-friendly”, “dementia-friendly”, and “caring for the city” into the implementation of the plan. However, in the follow-up implementation, the presentation of various results often only focuses on the improvement of the system and single-point facilities or the provision of new activities, such as adding free Low-floor buses, increasing age-friendly restaurants ; introducing multiple activities and courses targeted at elderly people service, etc. (Ministry of Health and Welfare, 2012a). However, when it comes to urban design and residential space planning, it is quite a shallow (or even slogan) discussion, and there is no specific action plan and establishment of a friendly space standard for the elderly in the city. Therefore, even if the concept of a friendly city for the elderly has been implemented through policies and plans in Taiwan for 10 years, nearly 60% of the people still think that the urban built environment is still not friendly to the elderly. see figure.9 The same problem happened in Taichung city as well. But before we get deep into the current urban environment in Taichung. First, will going through the developed timeline of Taichung city in spatial and social context in order to understand the reason resulted in unfriendly environment and high proportion of elderly people. In the next paragraph, I will introduce the historical development timeline of Taichung city. Then, following by the more deep introduction of the social context, culture value, and urban spatial structure and planning in different era.

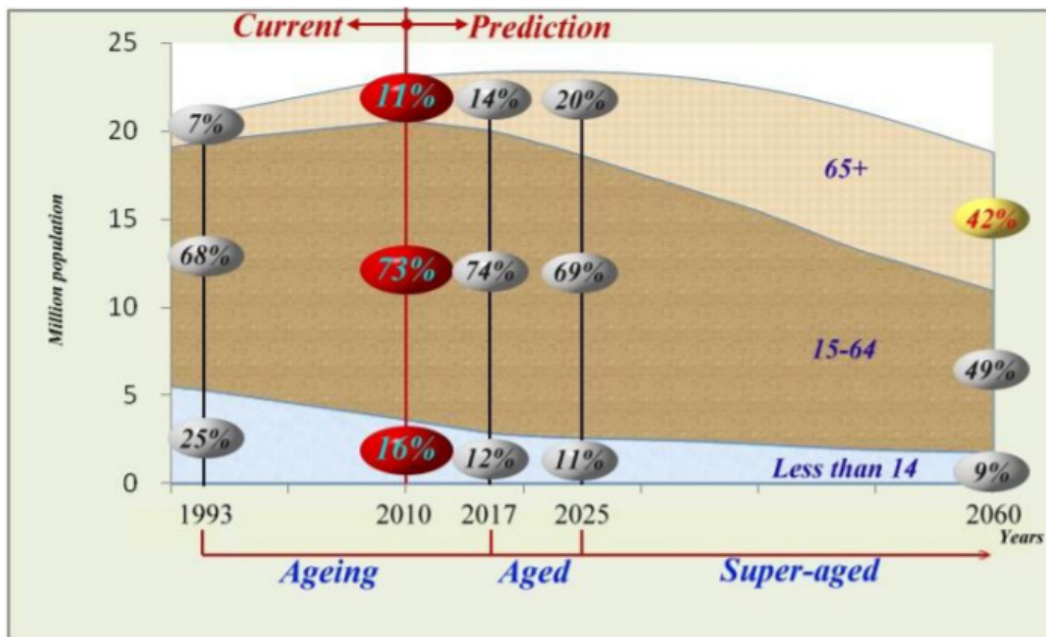


figure.7 The three-stage population age structure change trend in Taiwan
(Source: Ministry of Health and Welfare, 2007)

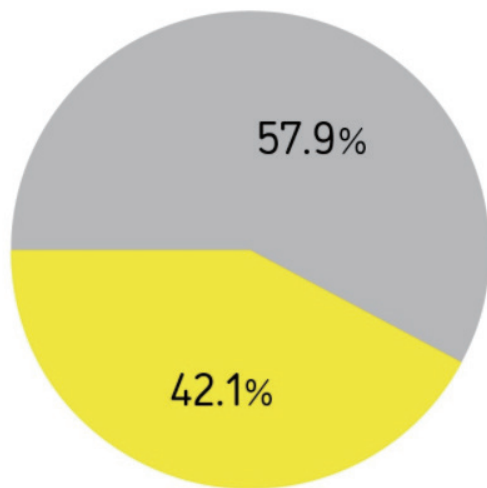
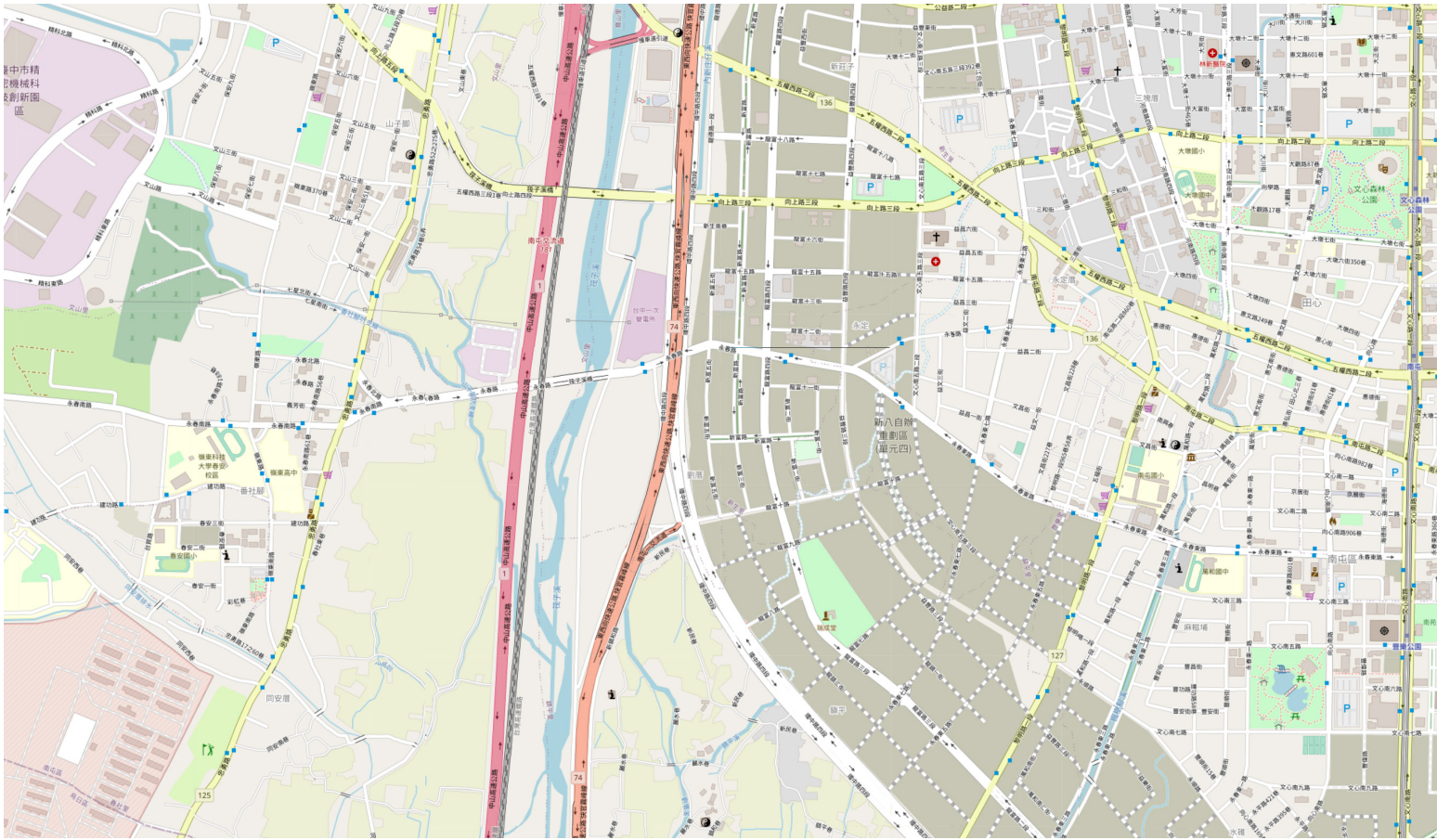


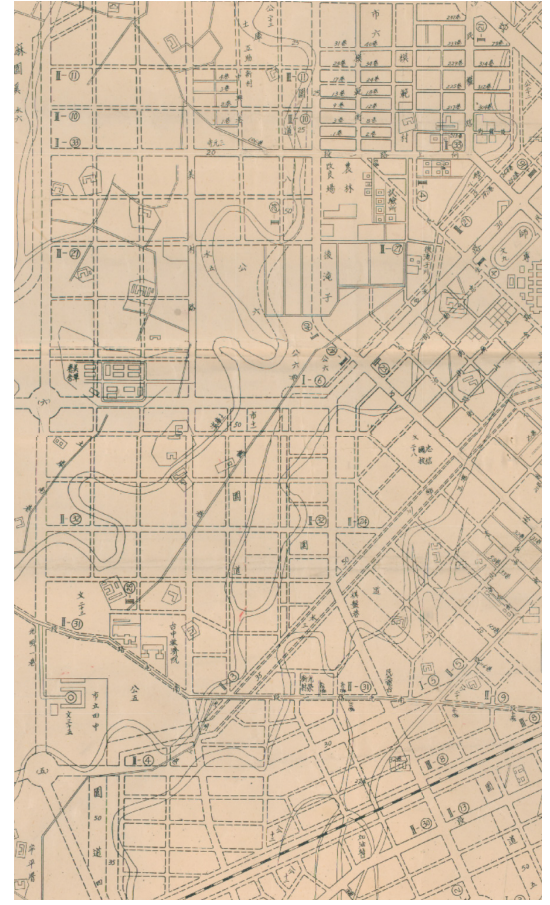
figure.9 A survey of friendliness of built environment to the elderly people
(Source: Ministry of Health and Welfare, 2007)

國別	65歲以上人口占總人口比率 (到達年次)				倍化年數 (年數)	
	7%	10%	14%	20%	7%→14%	10%→20%
中華民國	1993	2006	2018	2025	25	19
中國大陸	2000	2016	2025	2035	25	19
日本	1970	1984	1994	2005	24	21
南韓	1999	2007	2017	2026	18	19
新加坡	1999	2012	2018	2026	19	14
澳洲	1939	1983	2012	2032	73	49
印度	2024	2038	2052	2072	28	34
德國	1932	1951	1971	2008	39	57
英國	1929	1946	1975	2026	46	80
法國	1864	1943	1990	2019	126	76
荷蘭	1940	1969	2005	2020	65	51
瑞典	1887	1948	1971	2015	84	67
加拿大	1945	1984	2010	2024	65	40
美國	1942	1972	2013	2030	71	58
巴西	2010	2021	2031	2045	21	24

figure.8 Years of major countries reaching the standard of ageing society
(Source: Ministry of Health and Welfare, 2007)



Edge city (car oriented design)



America aid after WW2



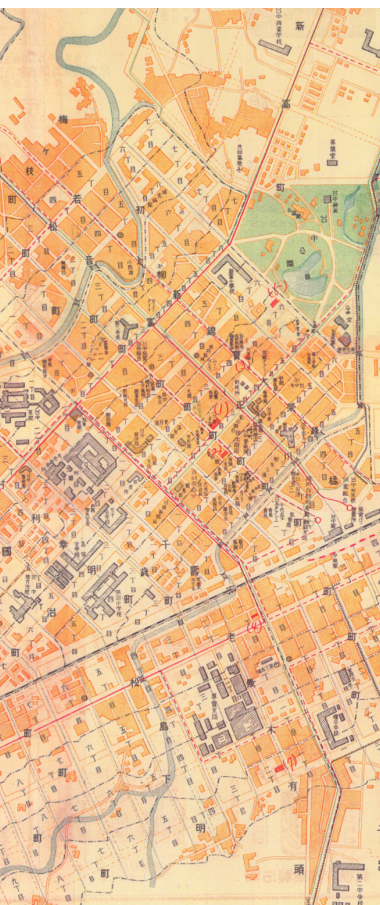
Japan



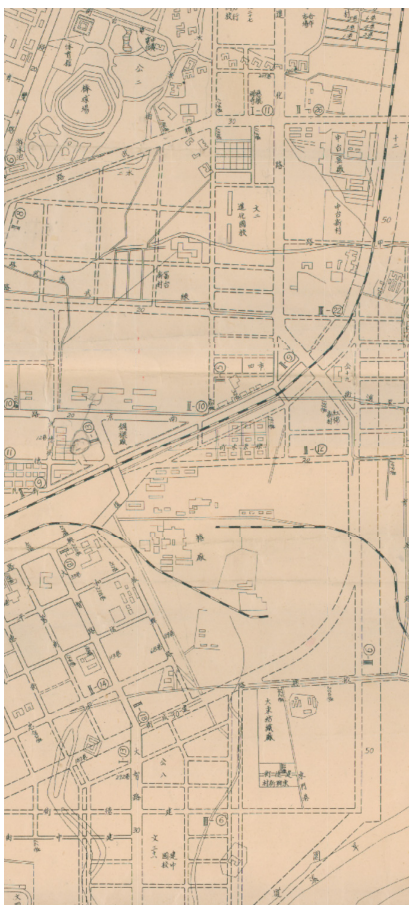
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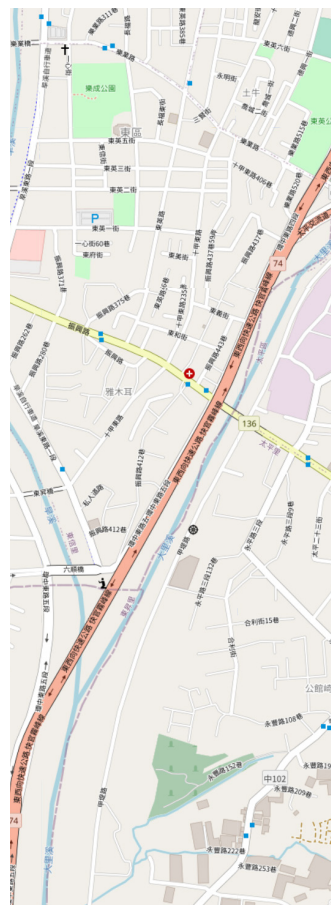
1955



Japanese colonization period - Early years after WW2



America aid after WW2



Edge city



1895

1955

1970

3.2 Spatial development of Taichung city

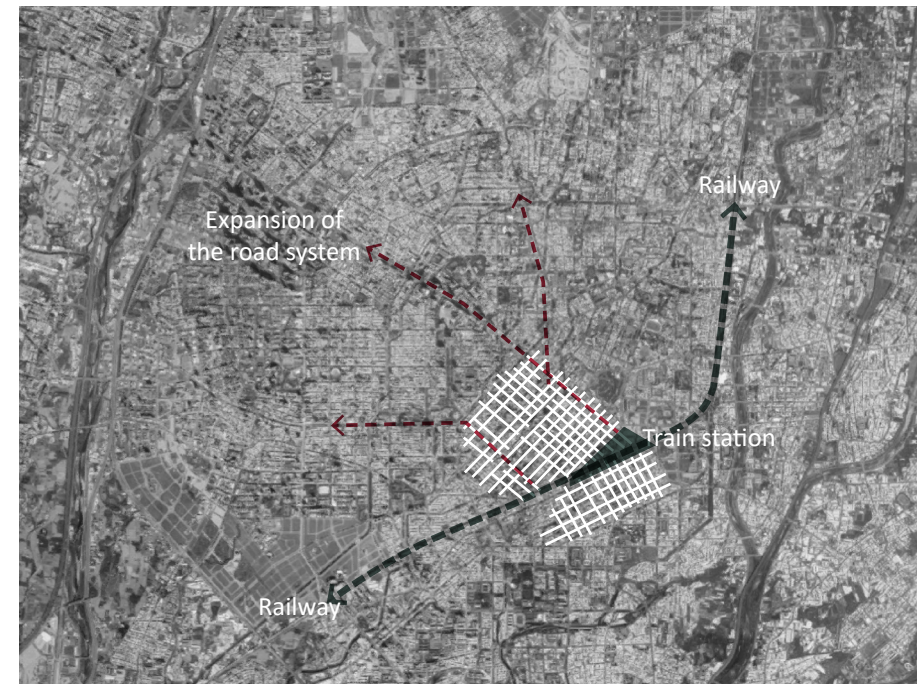
The history of Taichung City originated in the late Qing Dynasty. In 1895, due to the geographical conditions of Taichung and the large number of existing official constructions left by the Qing Dynasty, the Japanese government selected Taichung to implement the city correction plan, renovate the river and design the checkerboard street system(now Central and East district). Meanwhile, constructed the first railway and railway station in Taiwan. Taichung has developed into a modern city since the era of Japanese occupation. With the opening of the railway, commercial activities flourished, and the city and road system expanded outwards, centered on the railway station. Transformed the original chessboard street profile into a radial network of roads. After the Chinese Nationalist Party moved to Taiwan in 1945, the government's planning and construction of Taichung City still followed the existing urban planning during the Japanese Occupation Period, with only minor modifications. The outward expansion of the city along with radial roads and three circular roads closely related to the citizens form the prototype of Taichung City. By the 1970s, changes in the government's economic development policies had a spatial impact on the development of the city. In the peri-urban area, the Taichung Port and Taichung Industrial Zone are built. At the same time, the popularization of automobiles has accelerated the construction of the new road system, creating a series of new main roads connected to the highway network, which has shifted the center of transportation from the railway to the highway system. The development direction of Taichung City moved westward toward the highway, leaving the Central District, which was originally as a transportation node and a commercial core. As a result, a large number of commercial activities have gradually moved westward to the new city center, as well as the population, accelerating the decline of the Central District. Today, the commercial functions of Central District have almost disappeared. The vacancy rate is up to 20%, and the population is only over 19,000. Compared with the total population of more than 2.7 million in Taichung, the decay of old city center is obvious. Moreover, among them, a relatively high proportion of the population is the elderly.

3.3 Japanese colonization period—Early years after WW2 (1895-1955)

Spatial structure

When Japanese troops entered Taiwan, Taichung had relatively few residents and a large number of government offices left over from the previous period, making Taichung an ideal place for the Japanese government to construct the city in central Taiwan. The Japanese government developed the planning on the basis of the Qing Dynasty, including land use, public facilities and road and street profile systems. In terms of spatial structure, a checkerboard shaped has been used for Taichung City. In the initial stage, Taichung city is mainly used to provide housing and daily life needs to Japanese officers. Therefore, residences, parks, shops, and official institutions had been planned for land use. Following with the policy of the railway construction, the station and railway's facilities were included in the planning of land use. As the urban plan continued to be changed and expanded, with the addition of modern urban facilities which are mostly still existed nowadays, such as hospitals, banks, post offices, schools, courts, and prisons, urban functions gradually became complete. The Taichung Railway Station is located in the center of the urban area, which shows that the railway plays an extremely important role in the urban planning. see figure.10 The railway across the railway formed two districts to the south and north of the railway. The northern district was the political and commercial center; the southern district was dominated by industry (1910, Imperial Sugar Co., Ltd., current Taichung Sugar Factory), and the two districts were considered to be important for following stages of the development of Taichung city. The design of the street structure, since the railway passes through the center of the urban area, separated the structure of streets from the south area to the north area. In the north of the railway are grid-shaped streets with a 45° offset from the north-south direction, and the street pattern of the area to the south are aligned with the direction of the railway, which as the second kind of street orientation. see figure.11 In terms of the street profile, three levels are designed: first-class (18 meters wide), second-class (9 meters wide)

, and third-class (7.2 meters wide). see figure.12 and figure.13 However, when planning this plan, pedestrians and bicycles were the main considerations, which resulted in the narrow size of the streets in the current old city center of Taichung City. After World War II, the north area to the railway expanded significantly to the northwest as commercial activities flourished which in response to the expansion of the road system outward with the railway station as the center.



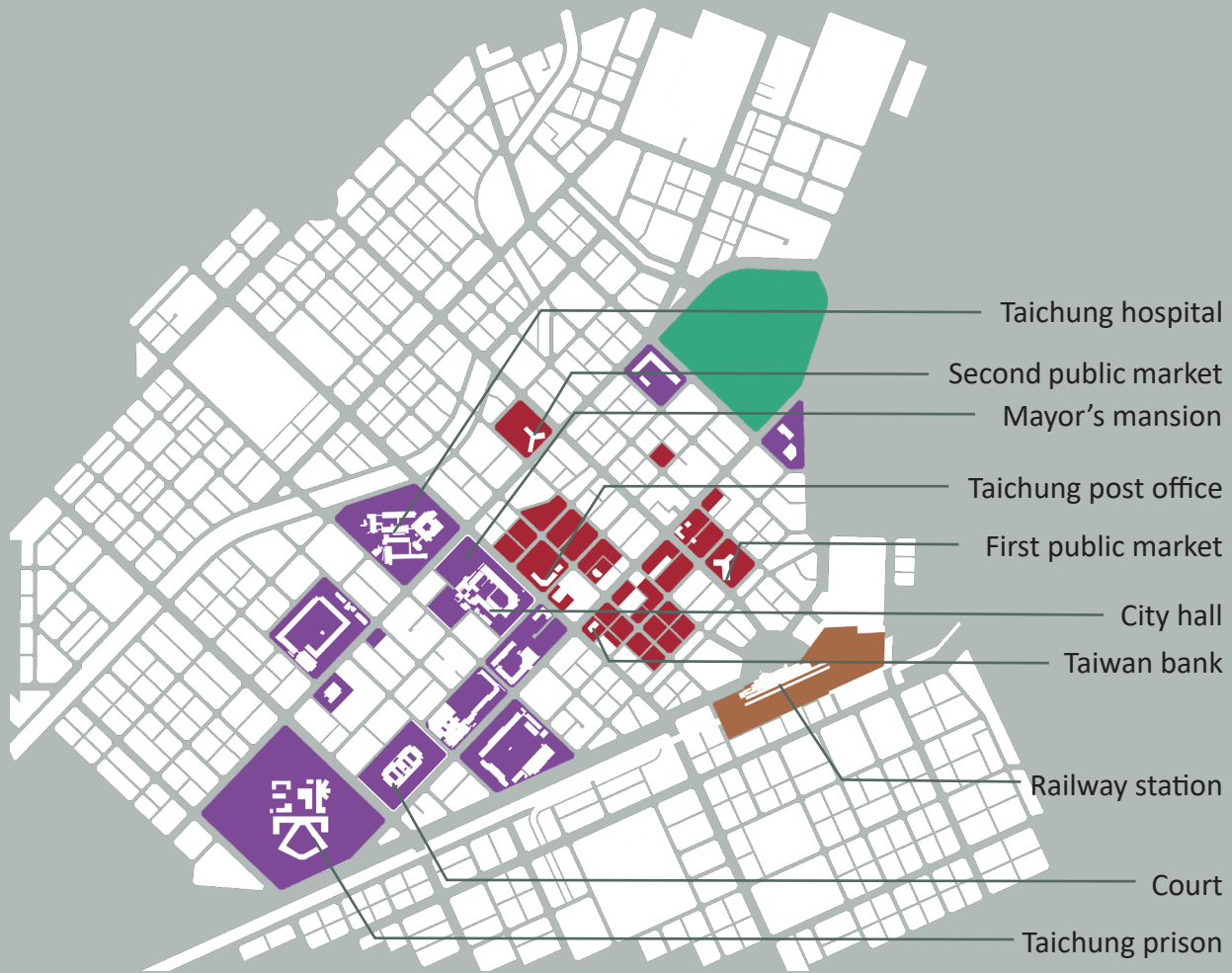
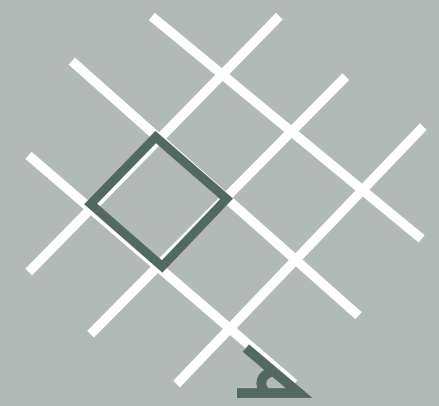




figure.10



-  45° of grid structure
-  90*90(m) building block

*The origin of this 45° orientation: one is the "solar irradiation inference" which is conducive to the improvement the sanitary and increase the sun exposure of the building .

figure.11

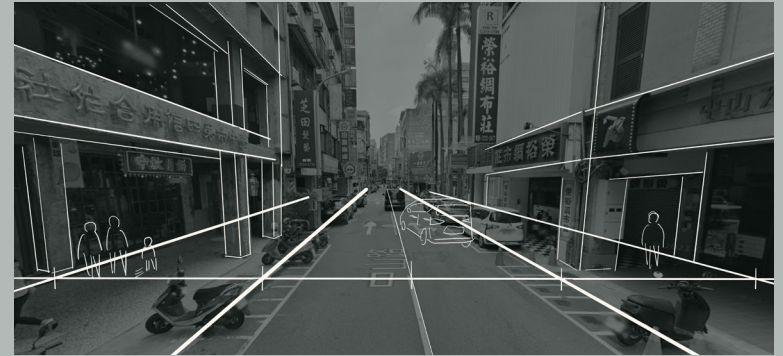


figure.12

- first-class
- second-class
- third-class



Road of first-class (18m)



Road of second-class (9m)



Road of third-class (7.2m)

figure.13

Social and cultural context

In Taiwan, the elders over 80-year-old were born in this era of poor economy, national turmoil, and non-universal education. Additionally, the Second World War and the withdrawal from mainland, most people are forced to leave their homes or faced the separation of relatives in the young age. Hardworking, thrifty, and striving to live are their life goal and characteristics, families and offsprings are the focus of their lives. As the result, most people do not have the habit of traveling or engaging in leisure activities in old age. The types of leisure activities they attend are also relatively limited, most of which are drinking tea and chatting with neighbors at home. As I mentioned in my personal motivation, my grandfather who is also one of this generation, meeting friends is his mainly activity.

“In the past, old people often stay at home. There is no music like it is now! Some of those...that is... in the past the old people just drink tea and chatting, that is almost their leisure activity.”

from the interview of a elderly

Cultural context

Taiwan has always been deeply influenced by traditional Chinese Confucian culture. In traditional Chinese society and culture, the “family” is the core of society. The Analects of Confucius said: “The gentleman should focus on its basics; once the basics are strong, the Way will take shape by itself. Thus, filial piety and brother love forms the roots of benevolence.” Therefore, family ethics is the “base” and the root of value, and family ethics first emphasizes filial piety, reflected importance to the traditional Chinese concept “慈烏反哺” which basically means ‘children repay their parents for their upbringing kindness’, and the individual’s duty of fulfilling filial piety in the family. This traditional concept furthermore affects and forms a Chinese saying “養兒防老” which basically translates to ‘raising a child is an insurance for old age’. (Yiwen, Qiu 2014)

The purpose of having children is to hope that when they are old, they can have children in the family to take care of themselves.

from the interview of a elderly

Since the Tang Dynasty, the scope of the family has been clearly defined in law, requiring children and grandchildren not to share wealth and foreign nationality. Separation from their parents is a crime of unfilial piety, among the “devil” crimes. The Qing law also clearly stated: “Grandparents Those with parents, separate household registrations for children and grandchildren, and those with different property, stick one hundred” (Ye Guanghui, 1997). Therefore, filial piety, this Confucian thought is deeply ingrained in everyone’s heart in traditional Chinese society, which indirectly affects the multi-generation living arrangement in traditional families. At the same time, traditional values believe that after the age of 65 the elderly should retire, because they deserve to take some rest at home and spend their lives in peace and joy with their grandchildren which has generally been seen as an ideal lifestyle for the elderly after the retirement. This traditional value, especially widespread between the generation born before World War 2. Taking my grandparent for example, after my parent married, they put a lot of pressure on my parent to deliver their grandchildren because they think taking care of the third generation as the life’s purpose and meaning, and they put all of the effort still on the family since they believed this is the way to demonstrate their fulfillment.

Our generation, most of people live together in three generations, and elderly people will take care of grandchildren at home. Therefore, after my son got married, I asked him to give birth to a child for me as soon as possible. Like my friend whose life is so good, after retirement, she rest at home and take care of her grandchildren.

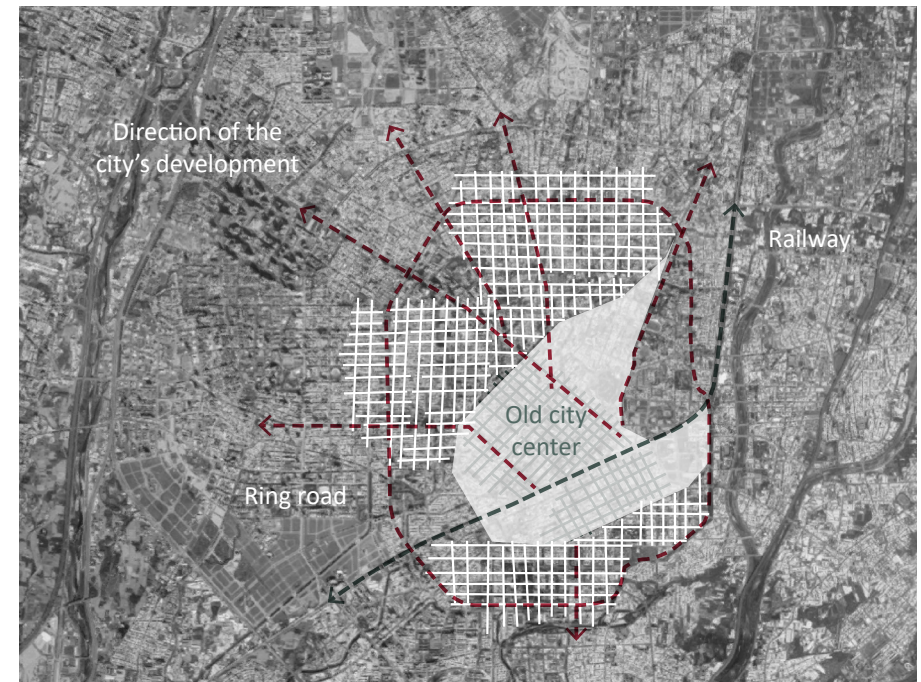
from the interview of a elderly

3.4 America aid after WW2 (1950-1970)

Spatial structure

During the Japanese Occupation Period, Taiwan's rapid social and economic development was driven by the establishment of the transportation system, the successive formulation of urban plans, and the influence of colonial policies. After the end of World War II in 1945, the National Government retreated to Taiwan. Due to turmoil and financial difficulties, the development of the Chung city was in a slow state, which mostly focused on repairing the buildings that were destroyed during World War II. Until the late 1950s, society gradually stabilized, leading to the growth of the economy and the urban space developed rapidly. With the extension of urban functions and scale, the single-core system at that time has gradually been unable to meet the needs of the city's development, therefore, the urban spatial structure has developed a form of single-core radiation supplemented by ring roads. see figure.14 This circumstance also shows that railways no longer be the only means of external communication, with the development of the road system and highways, which have gradually replaced part of the role of railways. The urban plan at that time also subdivided and reorganized existing urban land along with the expansion of land, and the central area (old urban area) was also established at this time. At the same time, a series of policy-oriented construction and urban planning began to be implemented, such as the construction of large amount of processing and manufacturing factories and the concept of building expressways, Taichung Port and Taichung Industrial Zone, a large influx of people led to the gradual saturated of the old urban area. As a result, the existing settlements on the fringe of the urban area and the village began to grow rapidly, laying the foundation for the shift of the city's center to the northwest and a dual-core urban pattern. In the spatial structure planning of this period, due to the influence of radial roads and ring roads, the newly subdivided street profile was not as neat and uniform as the Japanese occupation period.

(120*270 meters long, 60*90 meters wide) And the street profile orientation also gradually changed from 45° to 90°. see figure.15 In terms of land zoning, in addition to public facilities, it is officially divided into five types of zoning: commercial districts, residential districts, industrial districts, mixed districts and agricultural districts. see figure.16 Because of changes in transportation methods and the popularization of automobiles, the importance of the road system has gradually replaced railways. Therefore, the road design was significantly widened compared to the Japanese rule. The road scale is divided into three levels. The first-level is 30 to 40 meters wide; the second-level plan is 18, 20, and 25 meters wide; the third level is with a width of 14.5 and 15 meters. Additionally, there are also streets with a width of 7 to 10 meters. see figure.17



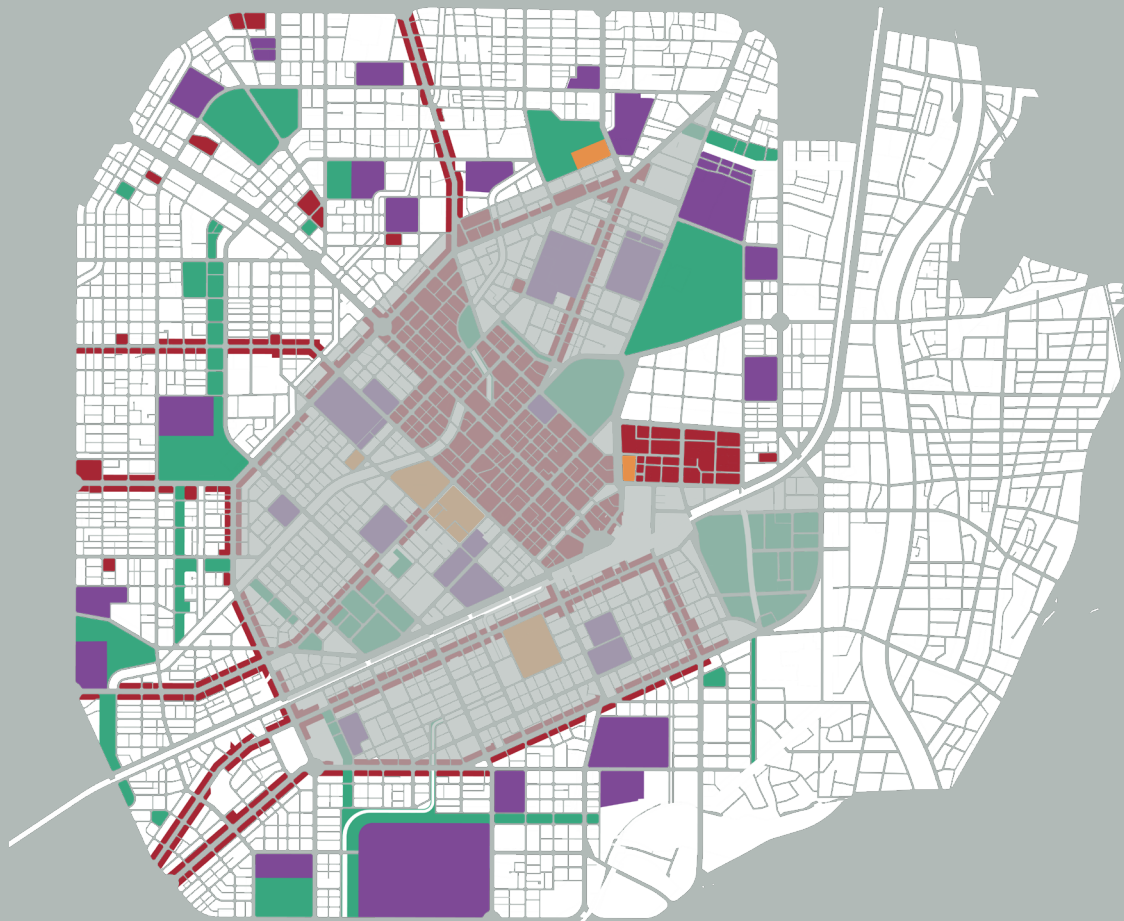


figure.14

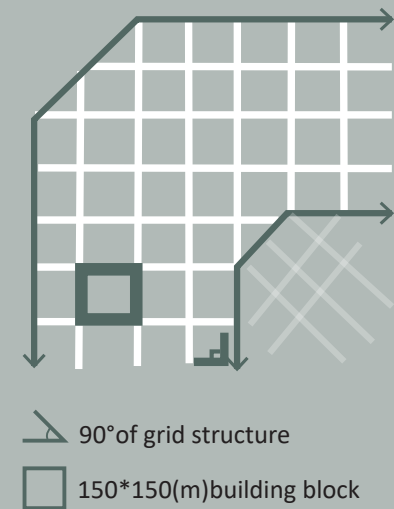


figure.15



figure.16

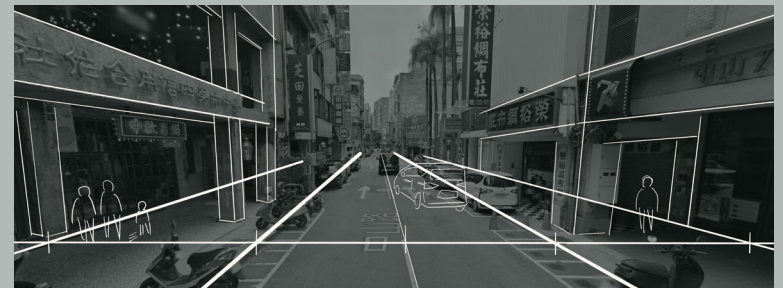
- first-level
- second-level
- third-level
- last-level



Road of first-level(30-40m)



Road of second-level (18-25m)



Road of third-level (15m)



Road of last-level (10m)

figure.17

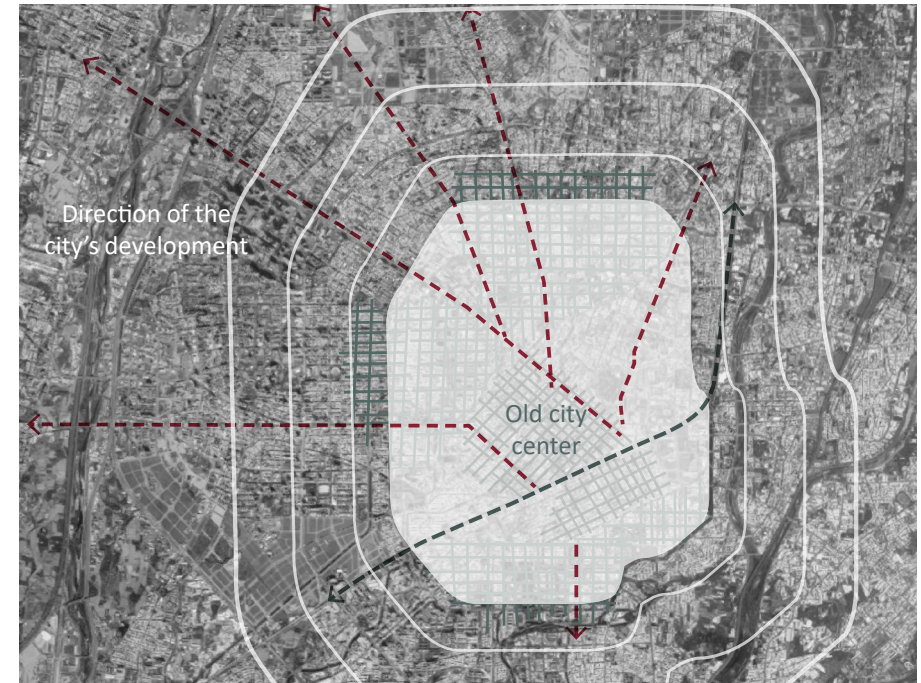
3.5 Edge city (after 1971 - now)

Spatial structure

By 1970, most of the radial roads in Taichung City's main external communication had been completed. Subsequently, the completion of the highway had a considerable impact on the Taichung area and created new industrial areas, communities or urbanized areas. At the same time, promote the widening of the connecting road between the interchange and the urban area, and speed up the construction of the inner and outer ring road system connecting the inner city to the downtown area. At this point, the center of industry and the city and development have moved to the vicinity of the expressway interchange. At the same time, factors such as the gradual saturation of the old core area and high land prices have led to the rapid spread of residential areas, mostly to the northwest (near the expressway interchange). As a result, the population has also begun to migrate from the old city to the newly developed city center (now the Taichung City Government area).

Because of the road system in the old city center was planned during the early Japanese occupation period, the road width was narrow and a unique one-way road design was used. However, the increased reliance on cars has caused the road system in the old city center to no longer meet today's needs, often causing chaos and congestion in traffic in the old city. At this point, the old urban area has gradually declined due to the migration of population and commercial activities, as well as the inconvenience of the transportation system. In the early days, the prosperous commercial streets produced many idle houses due to the gradual relocation of businesses, and the former prosperous shopping malls were gradually dilapidated and abandoned. At the same time, due to the planning during the Japanese Occupation period at that time, mainly commercial, residential space and living facilities were set up, resulting in insufficient space for activities and green spaces in the old urban area. Therefore, the old city center becomes a place that only passes by train or passenger transportation, and

becomes a place that only has a transfer function and does not attract people to stop and stay.



Social context

The "baby boom generation" born at the end of World War II or after the war, compared to the 65-nearly to 80-year-old ethnic group who born at Japanese colonization period, they grew up in a relatively well-developed environment, with good sanitation and medical facilities, and therefore generally have better health conditions than the previous generation. They generally received basic or higher education, meanwhile, with the rise of social-economy in the 1970s, they had better economic conditions. They are likely to have more wealth and high expectations for their lives after their retirement, and want to be independent and active.

Furthermore, the increasing of life expectancy adds more active years to life, making it possible to expand the labor force. (Dominique Hauderowicz, Kristian Ly Serena, 2020) Therefore this new generation of elderly people will have significant impact and force on reshaping of current built environments in order to address their needs. Generally, elderly people of this generation pay attention to health maintenance, and having the knowledge of aging healthily. After the retirement, they are willing to spend time and money on new things that they did not have the opportunity to try when they were young. As the research from Ministry of Health and Welfare of Taiwan shows that in 2005, only 15.7% of the elderly had a preliminary plan for their future retirement life. By 2008, 26.38% of the 55-64-year-old elderly (baby boomers' generation) had begun to make preliminary plans for retirement. Among them, the proportion of people who are thinking to stay at home is declining, while the proportion of people participating in advanced studies and volunteering has increased. At the same time, they actively and independently arranges and collects the information for nursing homes and elderly residential complex.

“Just like having oppertunities to learn! For example, I didn’t know how to play Caspa susun before, but I do now! Hey...I didn’t know Mahjong before, and I used to think that was gambling. But I’m learning now, and it’s like brainstorming and doing arithmetic exercises which is fun! Me and my friend also used to learn calligraphy lessons, and it is good to bring it back now. Meanwhile, now my friend learns photography, he takes a heavy camera, I can also take mine, I can also learn. Through trying new things you can discover and learn a lot of novel things ”

from the interview of a elderly

mobility, and the expansion of interpersonal networks. In addition, the large family is easy to disintegrate, so that family members spend more of their time with non-family members. These changes in the socio-economic environment and cultural values have reduced the number of individual units of interpersonal interaction in the family which its impact on family values cannot be ignored.(Luo L., Xinghong C., 2002; Guangyu S., 1994; Qingxian W., 1972) According to Zhang Zhengming and Ofstedal’s research (1993), in recent years, more and more elderly people and their children no longer regard living together as filial piety. (Guanfhui Y., 1998; Luo L., Xinghong C., 2002; Xianshu H, 2013) Especially in the baby boomer generation, as the last paragraph mentioned, they are financially capable, healthy, well-educated, and at the same time more assertive. Therefore, most of the elders of this generation is capable to maintain well lives after retirement and do not want to be with their children in terms of living arrangements. Although, recently years, more and more adults will want to live with their elders in the hope that the elders can help take care of the third generation, so that they can concentrate on going out to work. Many elderly people are actually unwilling to be just a babysitter for their grandchildren after retirement, and want to concentrate on enjoying their life after retirement, but because of their love, it is difficult to refuse. Many studies have also pointed out that compared with cohabitation, the elders in the same neighborhood are more satisfied with their lives. What’s more special is that these elders not only prefer to live apart from their children, but at the same time, they do not reject the elderly apartments and day care services, and they have a high degree of acceptance.

Cultural context

Nowadays, more convenient of transportation, the easily of social

3.6 Demographic change

The demographic structure of Central District is deeply influenced by urban development. With the shift of the developed center of economy and the relocation of the city government, it can be found that the middle-aged population continues to move out. At the same time, because of the improvement of medical and health care, the average remaining life span has been prolonged, additionally, the elderly are also unwilling to move away from the place where they have lived for a long time. Therefore, population of the elderly continues to grow. see figure.18 To provide senior citizens, full and comprehensive social services, and a friendly urban space environment are urgent issues in the Central District. At the same time, it is also necessary to consider how to retain and attract the young and middle-aged population to the Central District. (Central District Office, Taichung City, 2019)

3.7 Increasing of porosity spaces

In the 1970s, economic growth drove the growth of buildings and cities, and entered a period of urban sprawl. In the course of a series of developments, Taichung Old City was originally an important core of various symbolic activities of urban prosperity, such as economy, commerce, transportation, and life. Suburbanized urban development was driven by the shift of industries to urban fringe areas and the prevalence of private transportation equipment. For more than 50 years after the war, the old urban area, which was originally only 500 hectares, was rezoned by more than 3,000 hectares. However, the population has not grown significantly. The large-scale rezoning has caused the population and industries to continue to flow from the old urban areas to the emerging urban land consolidation areas, and the consumer population has also moved out. At the same time, the newly rezoned areas can provide relatively low-cost land. In addition, after the 1995 Waking Western Restaurant fire, the fire control regulations have become more stringent. Most of the houses in the Central District are old and unable to comply with relevant regulations.

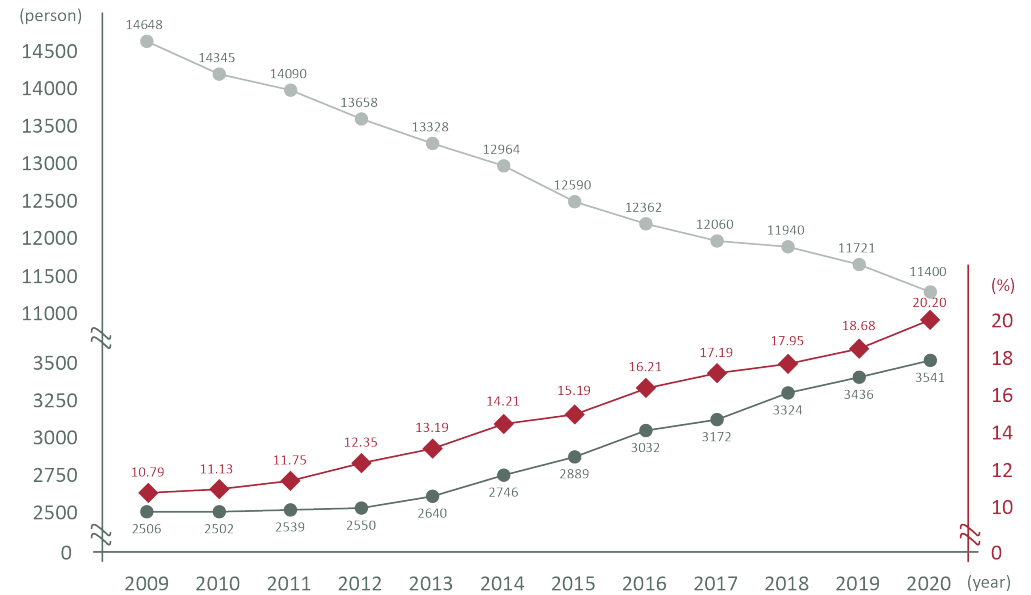


figure.18 The demographic change of Taichung old city center
(Source: Central District Office, Taichung City, 2019)

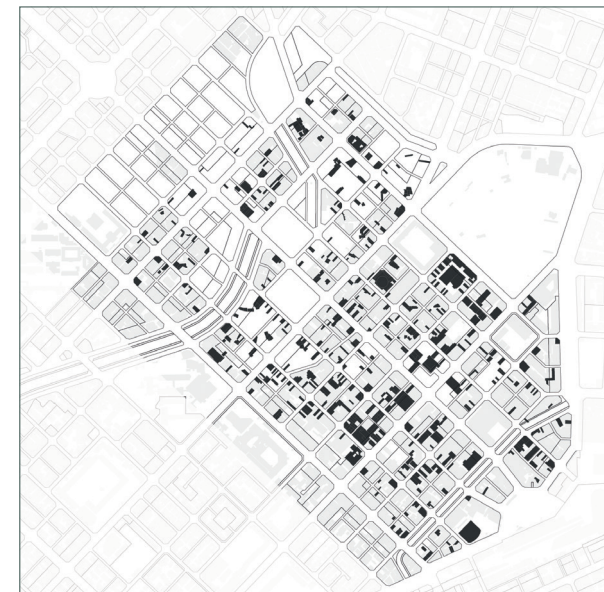


figure.19 The porosity space of Taichung old city center
(Source: from author)

As a result, special industries, department stores, shopping malls, etc., which were originally very thriving, have left the rezoned area. This has also contributed to the gradual decline of the old urban area, and a large number of them are now formed. The scene of idle space. The vacant house becomes an old house if it is left unused for a long time, and the old house becomes ruins after being imprinted with time. If there are more ruins, the whole city slowly dies. With reuse, these porosity spaces also provide an opportunity to redesign current public spaces to create a friendly environment for elderly people and encourage them to stay active. see figure.19

3.8 Taichung old city center regenerated plan

The Taichung City Government is aware of the problem of the decline of the old urban area and therefore planned to implement the “Taichung Old Urban Redevelopment Action Plan” in 2012. Started to renovate old houses, re-rented shops, and formulated a series of activities, hoping to revitalize the old city center, but the results were not good. Until 2017, the Taichung City Government put forward the “Big Station Project”. see figure.20 Transit Oriented Development and the concept of co-station diversion were introduced into public construction, and the new core of the old city and the vicinity of Taichung Station were jointly developed into a livable “TOD low-carbon living capital” “. This includes river improvement projects, opening and landscaping the existing Lvchuan and Liuchuan, adding trails to form an urban blue-green ecological corridor, not only preventing floods, but also adding a green axis in the old city to provide good pedestrian and leisure activities space. At the same time, the blue-green corridor connects the historical and cultural architectural spaces of the old urban area, integrating the urban environment, land use, industrial activities, urban imagery, and architectural landscapes around Taichung Station, serving as a platform for the regeneration of the central district, integrating and driving the old city The cultural and economic development of the district, and the stitching of the urban space on both sides of the old railway, creates a seepage of tourist and recreational crowds, and achieves the revitalization of the old urban area.

臺中是因應鐵路而生的城市
更以小京都為範本進行規劃



figure.20 Big Station Project
(Source: Government of Taichung City, 2017)

4.

PROJECT AIM

AIM AND FOCUS

The aim of this graduation project, derived from the problem statement and the introduction of the Taichung old city center, are as following.

The current built environment of Taichung's old city center has become desolated and devastated due to the relocation of industrial areas, commercial areas and the city center resulted in a large number of young and middle-aged people moved away. Additionally, the messy and out-of-date road design and public spaces have reduced people's willingness to come and use, which accelerated the declined of old city center. Therefore, the current regeneration plan ("Taichung Old Urban Re-development Action Plan") of Taichung old city center is mostly focused on renovation of old houses as used as introducing commercial spaces, and improving and greening the conditional of rivers to create recreational space to achieve the purpose of attracting the population and visitors. However, the livability for the inhabitants is also vital. Especially, the global phenomenon of growing population of elderly people also influenced Taichung old city center, which 20% of the population are consisted of elderly people. For the large amount of elderly population who are the most vulnerable group lived in the old city center. The current built environment of Taichung old city center discouraged elderly people to stay active and reduced the independency and well-being of elderly people.

Therefore, the aim of this graduation project is to establish spatial interventions and design principles on multiple scales for public spaces, based on findings from literatures and practice which is usable for practitioners such as urban designers and planners.

The design for Taichung old city center is also used as a case to show how the interventions could be implemented in the context of a Taiwanese city. The design is an answer to the spatial problems which Taichung old city center is faced with and therefore meets the needs of different population groups including the elderly inhabitants in particular by making use of not only on literature based elderly specific interventions but the user experience of the elderly inhabitants. As the interventions are used to create easy accessible public spaces for elderly, for example, they are just as beneficial for parents with baby carriages, people who are physical impaired and so on.

- Aiming for form general design principles to create a built environment encouraged active aging and aging in place.
- Aiming for understanding behavior patterns of elderly people and the co-relationship between behavior patterns and the physical environment.
- Aiming to adapt general design principles based on the developed pattern from location visit and analysis
- A spatial design based on relevant scientific literatures and researches

5. RESEARCH QUESTIONS

MAIN RESEARCH QUESTIONS AND SUB RESEARCH QUESTIONS

For this graduation project, the main research question is presented in this chapter. Following by the introduction of sub research questions, and the reason why these questions are asked will be clarified. According to WHO, while people ageing, through facilitate active ageing with an age-friendly design since it helps to optimize opportunities for health, participation and security which allow to enhance the quality of their life. Therefore, enable to encourage active ageing plays an important role when creating an friendly built environment for elderly people. Built environment is defined broadly as “the physical form and character of neighborhood” encompassing land use patterns, urban design characteristics, and transportations systems. In studies of urban design, the built environment often highlights the connection between physical space and social consequences. It impacts how society physically maneuvers and functions, as well as less tangible aspects of society. see figure.21 Based on those definitions and the aim of this graduation project which is regenerates the old city center through give the priority of creating the friendly built environment for elderly inhabitants to stimulate active ageing and enhance their independency.

Therefore, the research question is,

“ How to revise public spaces in Taichung old city center through the spatial intervention which gives the priority for elderly people to encourage active ageing and enhance the independancy of them?”

To answer the research question several supporting sub questions will be formed which will provide specific information and knowledge that will be part of the answer of the main research question. The sub questions are speperated into for theoretical framework and for location visit as following:

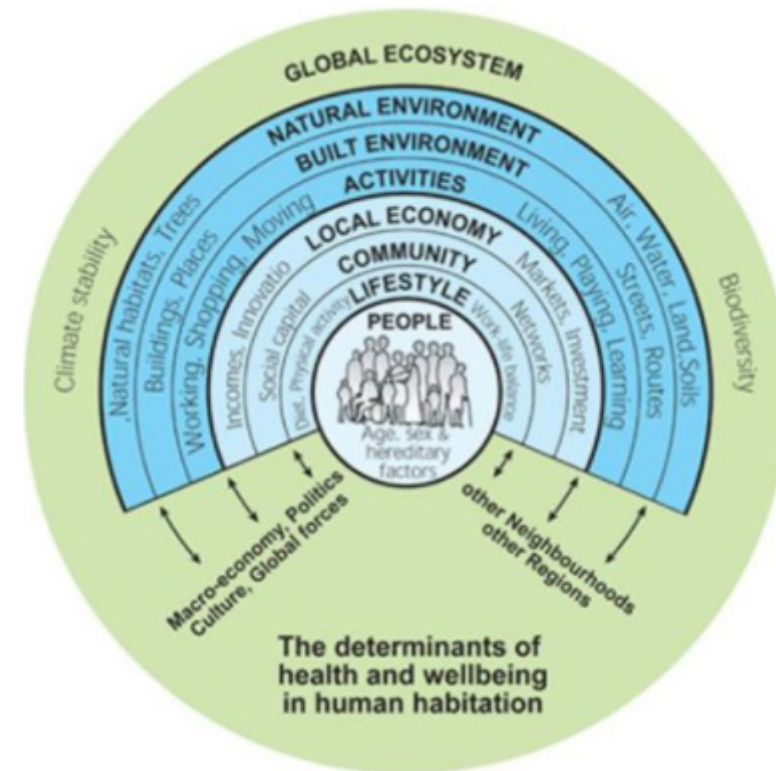


figure.21 5P ecological model of active aging
(Source: Lak, A., Rashidghalam, P., Myint, P.K. et al. Comprehensive , 2020)

Theoretical framework: urban design encourage active ageing

1. What kinds of spatial design interventions in the public spaces are required to encourage elderly people to age actively?

Location visit: analysis of Taichung old city center

2. Where is the frequently visit locations in the daily life of elderly people?

3. How does the spatial quality of public spaces in old city center based on elderly people's daily life affects their behaviors of elderly people?

4. Based on different elderly groups, what kinds of spatial quality is prefer by them which can encourage them to stay active?

From the combination of literature review and location analysis on several scales, every answer will be provided.

1. What kinds of spatial design interventions in the public spaces encourage elderly people to age actively?

To answer this question need basic knowledges about what kinds of elements affect the active of elderly people and what kinds of quality do encourage actively elderly people, specifically need to be clarified on the spatial context of public spaces where the neighborhood design play a role of a tool in. Since there are 5 themes with the concept of active ageing, in this sub research question, the main focus is on the physical environment, therefore, the definition of age actively is further established as well the outdoor-mobility.

2. Where is the frequently visit locations in the daily life of elderly people?

People of different age groups will have different daily life, especially for the elderly group. After retirement, they have a lot of time and money to do things that they are not able to do when they are young. Through analysis the location where elderly people frequently visit

help to understand the daily life of the elderly, and at the same time, can analyze and understand the route to these places and the quality of public space on the way. These can be used as an important consideration in the future selection of locations for design interventions.

3. How does the spatial quality of public spaces in old city center based on elderly people's daily life affects their behaviors of elderly people?

Based on the answer from sub research question 2, research into current spatial environment of the old city center. The understanding of this mutual relationship between people and their surroundings is the major concern of behavioral sciences.(Mahmoud, A., 2018) Since people's behavior does affect by the spatial quality of public spaces. Therefore, this study become significant for the designers and planners in order to create enabling environments for the diverse needs of people in the contemporary society. (Mahmoud, A., 2018) Linking the current urban fabric and the spatial quality of public spaces in old city center to the in literature found important evaluation parameters for elderly. Since the fact that walking is the main mean of transportation for elderly, the neighborhood scale of built environment is most relevant. The result will be used to select for specific design implemented locations.

4. Based on different elderly groups, what kinds of spatial quality is prefer by them which can encourage them to stay active?

"Even if we try to separate them into subgroup of the younger old, the middle old and the older old the variations will be as great within each subgroup as between them." (Glenda Laws, 1994) The diversity of elderly people shows the importance of investigate the difference between these elderly group in order to create variation public spaces which offer suitable environments for different elderly groups.

Through research in main three topic and linking the relationship between them. see diagram.1 This graduation report will present the theoretical framework, the location analysis, the design principle and the design proposal. The answer to the research questions are summarized in chapter.8, these are core conclusions of this project.

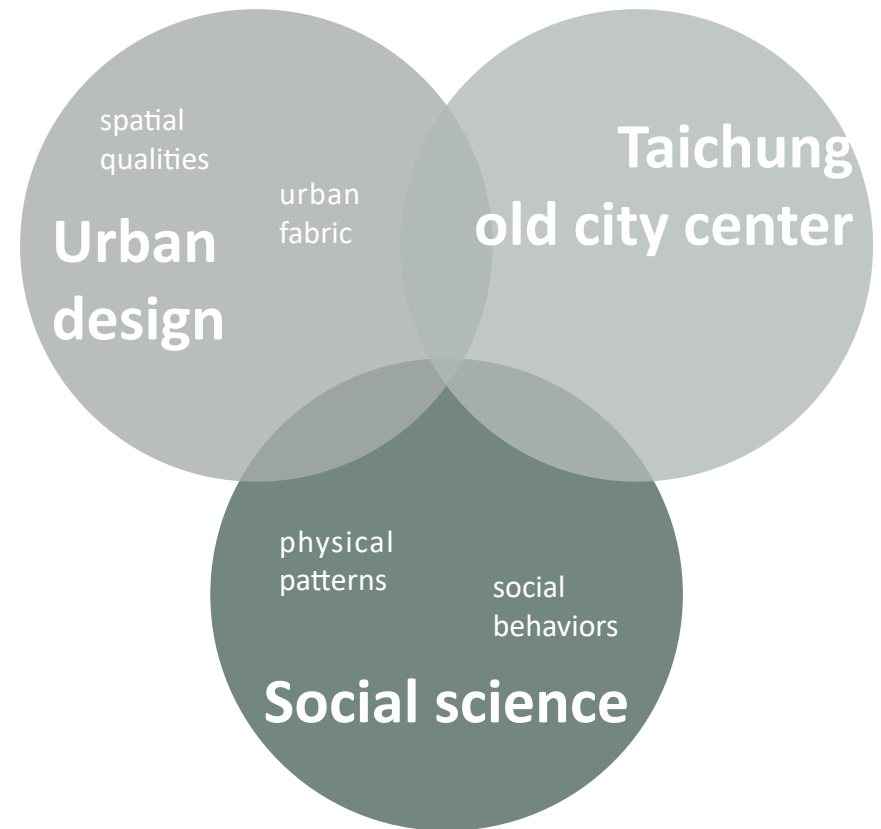


diagram.1 The relationship and link between three topics
(Source: from author)

6. METHODOLOGY & PROJECT APPROACH

METHODOLOGY & PROJECT APPROACH

In order to answer the research questions, different methods are used in this graduation projects. Each sub research question has its own specific method.

The methodology of this project

The entire project is divided into three parts. The project introduction and definition part, the theory and analysis part, and the scenario part. See diagram.2 The project introduction and definition part starts with my personal interest and a global phenomenon. In this case my personal interest of my grandpa who as an elderly facing difficulties in current built environment and the phenomenon of the growing population of elderly people worldwide which also happened in Taichung old city center. The problem also introduced in this part driven by this global phenomenon will end with the conclusion as problem statement. From this the hypothesis and aim of the project arise. Following by, the main research question will be answered by the combination of the theoretical framework and location visit. Both of the theoretical framework and location visit are the base of the theory and analysis part, since they provide the tools to give the answers to the sub research questions. This is further detail elaborate in the paragraph 'Connection of methods and sub research questions.' The results of the theory and analysis part will be a vital input in the scenario part, since the theory and fieldwork not only provide a scientific-practical design, but the skills of creative thinking and inspiration are qualities that play a role in the scenario part. The pattern language is developed through this part together with the design principle to give the backbone for the design. Altogether with the main concept form the design proposal which will result in a design that meets the aim of this project. ' Through spatial

intervention redesign existing public spaces to create friendly built environment which encourage actively elderly people meanwhile regenerate the Taichung old city center.' The design proposal is describe on p.103-107. It proposes several spatial intervention on specific locations. The intervention are scientific-practical based from the theoretical framework and the location analysis (site visit included).

The approach

As mentioned before the theoretical framework and location visit will provide tools to answer sub researchs. The theoretical framework provides exiting theories in scientific literatures which gives knowledge of important element in urban design help to encourage active aging that can be used as the base of design principles. The location visit provide a case where the problem and the possibility presents itself to test and adapt the theories in practice. Different approach are selected to use in the theoretical framework and location visit to obtain certain answer to research questions.

The following shows the overall view of all selected approaches:

- Literature Review **L**
- Cartographic analysis **C**
- Observation **O**
- Mapping GIS **M**
- Documatory and analysis **D**
- Interview **I**
- Socio-spatial study and analysis **S**

Connection of methods and sub research questions

Every sub research question has a different approach. depending on the wanted information and the needed sources to answer the sub research question, the specific approach connected to the sub research question.

1. *What kinds of spatial design interventions in the public spaces are required to encourage elderly people to stay actively?*

Researched relevant scientific literature and theory which can form universal patterns that can be used generally to create age-friendly built environment will be done in order to obtain scientific-based patterns. Then through the location analysis helps to adapt those patterns culturally and even form patterns location specifically to provide the answer.

L

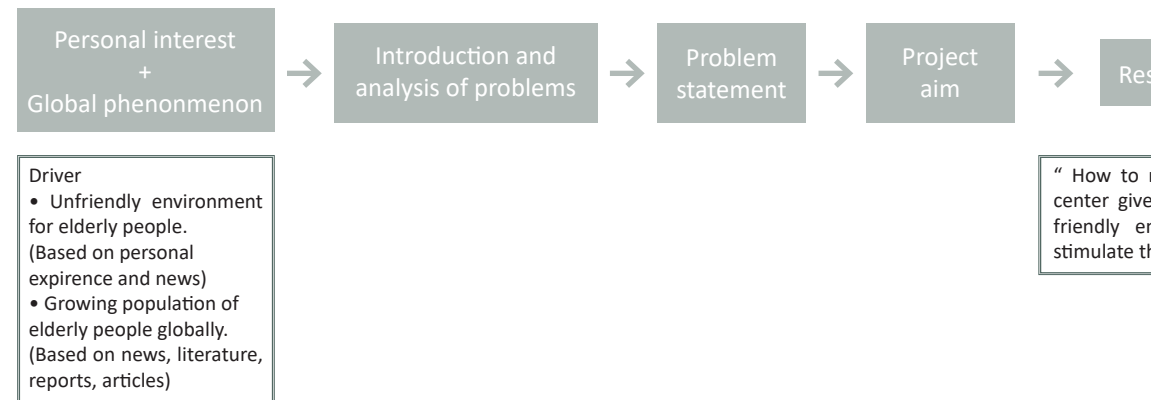
2. *Where is the frequently visit locations in the daily life of elderly people?*

To answer this question, basically is acquired through the location analysis since the aim of this project is to revise current public spaces for elderly inhabitant of old city center to encourage them be active. The location analysis will be done through interview, documentary, and observation of local elderly people. Additionally, the interview with the chief or workers of community centers and elderly supporting organizations also helps to gain informations. Then, through mapping to obtain the overall idea of frequency of locations that elderly visit. Together with the knowledge from socio-spatial studies to analysis and form the pattern language based on daily living of elderly inhabitants.

D O I M S

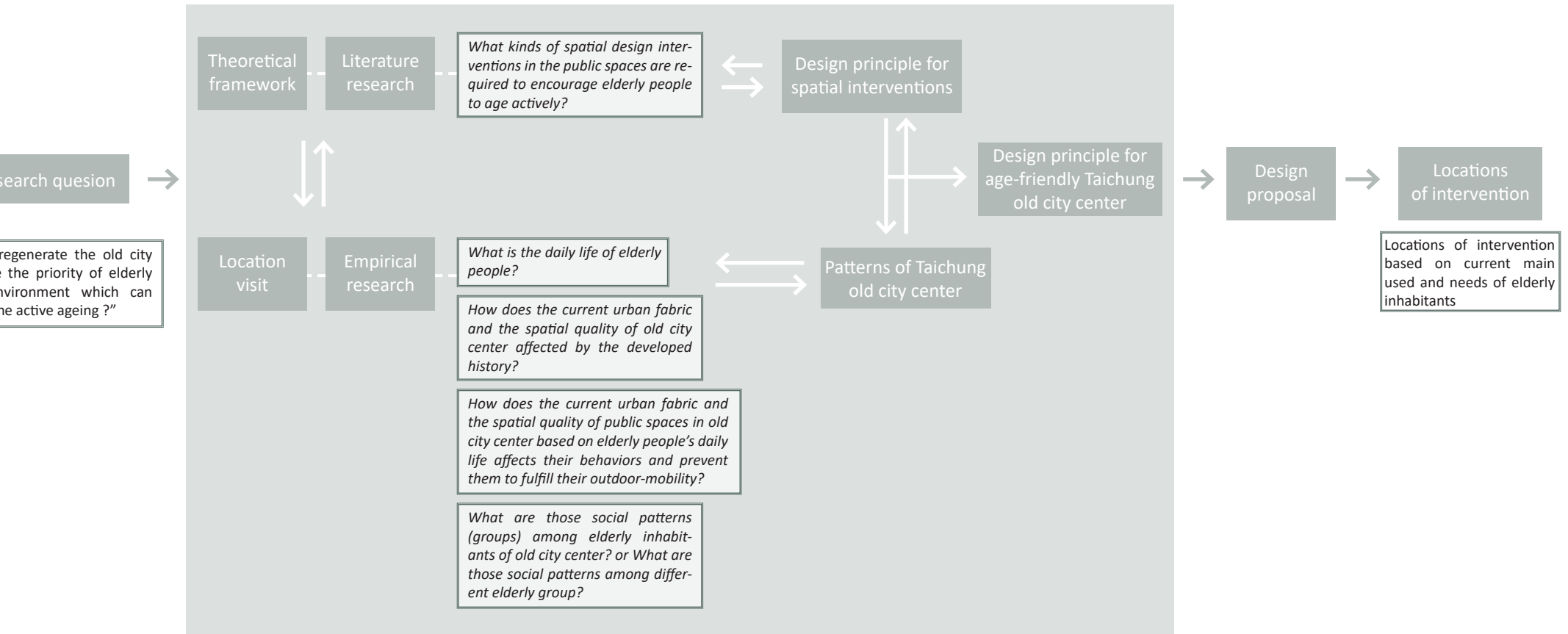
3. *How does the spatial quality of public spaces in old city center based on elderly people's daily life affects their behaviors of elderly people?*

Research into the developed history of Taichung city helps the understanding of the spatial structure and the reasons create current spatial quality in old city center. Following by the location visit with observation to understand how elderly people perceive contemporary built environment, what spatial quality they prefer, and what spatial quality will put them into struggled with the knowledge from literature to understand the reason of certain phenomenon. The mapping



Introduction and definition part

diagram.2 The methodology of this project (Source: from author)



Theory and analysis part

Scenario part

all the result on the map to have the overview of spatial quality of old city center. Together with the answer of pervious question, in the scenario part, provide the criteria for selecting places to apply design interventions.



4. Based on different elderly groups, what kinds of spatial quality is prefer by them which can encourage them to stay active?

The diversity among elderly people especially based on different cultural circumstance. Therefore, the more practically understanding with location visit is a need. Inspired by Christopher Alexander, an Austria architect and design theorist. A series of pattern language will be form through the location visit which can provide more practical knowledge help to redesign public spaces.



RELEVANCE

Scientific relevance

Spatial environment has hardly been the focus of studies into aging issues. (Ron Mace, 1941-1998; UNECE, 2020) Furthermore, there have been hardly successfully translated into the current research and implement related to neighborhood design, although research has been done on the effect of physical environment of elderly people in field such as environmental gerontology. (Ron Mace, 1941-1998; Liz Cairncross, 2016) Therefore, the aim of this thesis is combined findings from environment, planning and social science field, forward putting neighborhood design interventions that encourage active aging among elderly people to help them maintain independent and well-being. A literature by Mitchell & Burton has done a lot of studies on the need of elderly people, and on the current knowledge of best practice for physical environment developed six themes of design principles: accessibility, comfort, familiarity, legibility, distinctiveness, and safety. These design principles help to create an enjoyable outdoor spaces

for elderly people which guarantee the active ageing among them. Although Mitchell & Burton did lots of research to find applicable design and planning patterns for age-friendly neighborhood, the applicability of the framework on an existing neighborhood has not been researched. This thesis focus on this aspect. Therefore, in this research the framework of urban design patterns will be used, together with findings from location visit and analysis which provide practical information. In order to adapt the framework into Taiwanese context, and furthermore, into location specific design patterns to create a scientific based practical solution.

Societal relevance

The global population is ageing. Started in the nineteenth century in the developing world, and more recently in developing countries, this unprecedented demographic change, is already transforming many societies. (United Nations, 2009)

“ The ageing process is expected to accelerate in the near future, particularly in developing countries. Because they have a shorter time to adapt to the changes associated with population ageing, it is urgent that the Governments of developing countries begin taking steps to face the challenges and make the best of the opportunities that population ageing brings.”(United Nations, 2009: p 15) The United Nation has warned the Governments of developing countries in their World Ageing Report 2009. While Taiwan as one of the developing countries is adapting the policy more towards an ageing friendly society, the focus has mainly been on social welfare related issues such as free public transport for elderly and certain pensions. However, these ageing issues and their affects on the built environment of our cities have hardly been covered.

The built environment is one of the crucial aspects which influences inhabitants of urban neighborhoods undertake the amount of activities which indicated in academic research. (Liz Cairncross, 2016, Clarke, P.J., & Twardzik, E., 2021; Jerrett, M., Almanza, E., Davies, M., Wolch, J., Dunton, G., Spruitj-Metz, D., & Ann Pentz, M., 2013) And it is exactly this activity, also known as active ageing which can postpone

ageing causes physical, psychological, and social aspects of changing. This in turn can lead to the preventing and reducing of adverse health outcomes such as admission into an institution or even death which governments and the society as a whole would like to avert.

7.

THEORETIC FRAMEWORK

urban design encourage active ageing

THEORETIC FRAMEWORK

7.1 Introduction

With the growing population of elderly people of the age of 65 or older and greater life expectancy, population aging has become a process without parallel in the history of humanity. (Borst et al., 2008; Zlotnik, 2009) Sadly, a gradually decrease of physical, psychological, and (or) social capacity often become a part of aging process for elderly people. This aging process increases the chance of negative health outcomes such as functional disabilities, forced into an institution, and even death. (Fushun,huang.,2011; Laslett, P. , 1991)

With the growing amount of elderly people, the currently unfriendly built environment become an icreaseing important issue that needs to be addressed. (Ron Mace, 1941-1998; Liz Cairncross, 2016; WHO, 2017; UNECE, 2020) Since elderly people are the most vulnerable group in our society, if the design of public spaces is friendly to them, hereby will be useable to the rest of the other.

The process of ageing can be postponed by healthy and active ageing is indicated through empirical research. (Laslett, P. , 1991; Laslett, P. , 1991) The desire and ability of elderly to be and maintain physically active is described in active ageing. In addition, social participation and engagement in economic activities, such as going to traditional wet markets and working after retired age. (Lu Luo and Gao Xufan, 2009, 2010; Lu, Kao, & Hsieh, 2010; Liz Cairncross, 2016) However, not active sufficently are found among large portions of elderly population. For example, in 2017 , the research done by Ministry of Health and Welfare of Taiwan indicated there are more than 50% of elderly people prefer static leisure activities, and there are around half of elderly people did not engage in regular physical exercises sufficiently as recommand by guideline of Health Promotion Administration of Taiwan. Hereby putting themselves in the risk of rapidly developed

into the forth age of ageing process possibly leading to force into an institution or even death. (Fushun,huang.,2011; Laslett, P. , 1991)

In order to be and maintain active for elderly people, and postponed the development into the forth age which known as a period of fragility and decline. Since physical active is a base for social participation and engagement in economic activities, research needs to be done on the aspect that influence physical active in elderly. One of the aspects is the built environment, especially neighborhood design which has been found has influence on the amount of physical activity undertaken by inhabitant of urban neighborhood. (Liz Cairncross, 2016, Clarke, P.J., & Twardzik, E., 2021; Jerrett, M., Almanza, E., Davies, M., Wolch, J., Dunton, G., Spruitj-Metz, D., & Ann Pentz, M., 2013) However, there is few studies into urban design with the main focus on elderly people. (Ron Mace, 1941-1998; UNECE, 2020) Futhermore, there have been hardly successfully translated into the current research and implement related to neighborhood design, although research has been done on the affect of physical environment of elderly poeple in field such as environmental gerontology. (Ron Mace, 1941-1998; Liz Cairncross, 2016)

The aim of this actively research is to forward put neighborhood design intervention that stimulate active ageing among elderly people, combining the finding patterns from location in aboard arrey of environment, planning and social science field. In order to achieve this aim, a reliable and scientific based definition and measurement of active ageing will be established in following paragraphe 7.2 to help clarify focus domains in this graduation project. When trying to stimulate active ageing, the establishment of outdoor mobility goals of elderly that they want to achieve is required. The goals will be elaborate in paragraphe 7.3 with the following of research into the role of urban design in fulfilling these goals. The research will give primarily on recent reviewed literatures and will result in neighborhood design re-coomandation of public spaces which el derly are or will living in with encouraged effect of age actively.

The result of this part of thesis is a summary of neighborhood design intervention that stimulate active ageing among elderly people followed by the basic design principle for further research. The conclusion and basic design principle will be highly useful in terms of elderly friendly development and public spaces improvement of the neighborhood in the design proposal. However, from the perspective of built environment, the often difficulty to adapt the findings into real practice is the most notable shortcoming in research to date. Therefore, the design principle catalogue will be further visualized at the end of this chapter, followed by the location visit and analysis in the next chapter to test and adapt the design for Taichung old city center.

7.2 Active ageing

While people growing old, the process as active ageing helps to optimize the health, participation and security for elderly people. (WHO, 2002) It is shifting the strategy planning from a “needs-based” approach (which assumes that older people are passive targets) to a “rights-based” approach that recognizes the rights of people to equality of opportunity and treatment in all aspects of life as they grow older. (WHO, 2002) As previous chapter has mentioned, there is a 5P ecological model of active ageing with 5 themes following as: Person, Prime, Process, Place and Policymaking. see figure.22 Different themes have different domains that need to be concerned. From the aim and research objective in this graduation project, spatial context plays an important role, meanwhile it is also vital with the understanding of human’s behavior. ‘Place’ and ‘Person’ will be the main focus, the integration of two of them will form ‘Process’ which should also be considered. Therefore, the concept of active ageing in this project encompasses physical activity, wider social and community participation and economical engagement. Physical activity, social participant, and economical engagement as much of the research shows, is mostly based on outdoor mobility which with sufficient amount has positive effect on physical, cognitive, and emotional health of older people. A design of built environment can enable older adults to carry out the

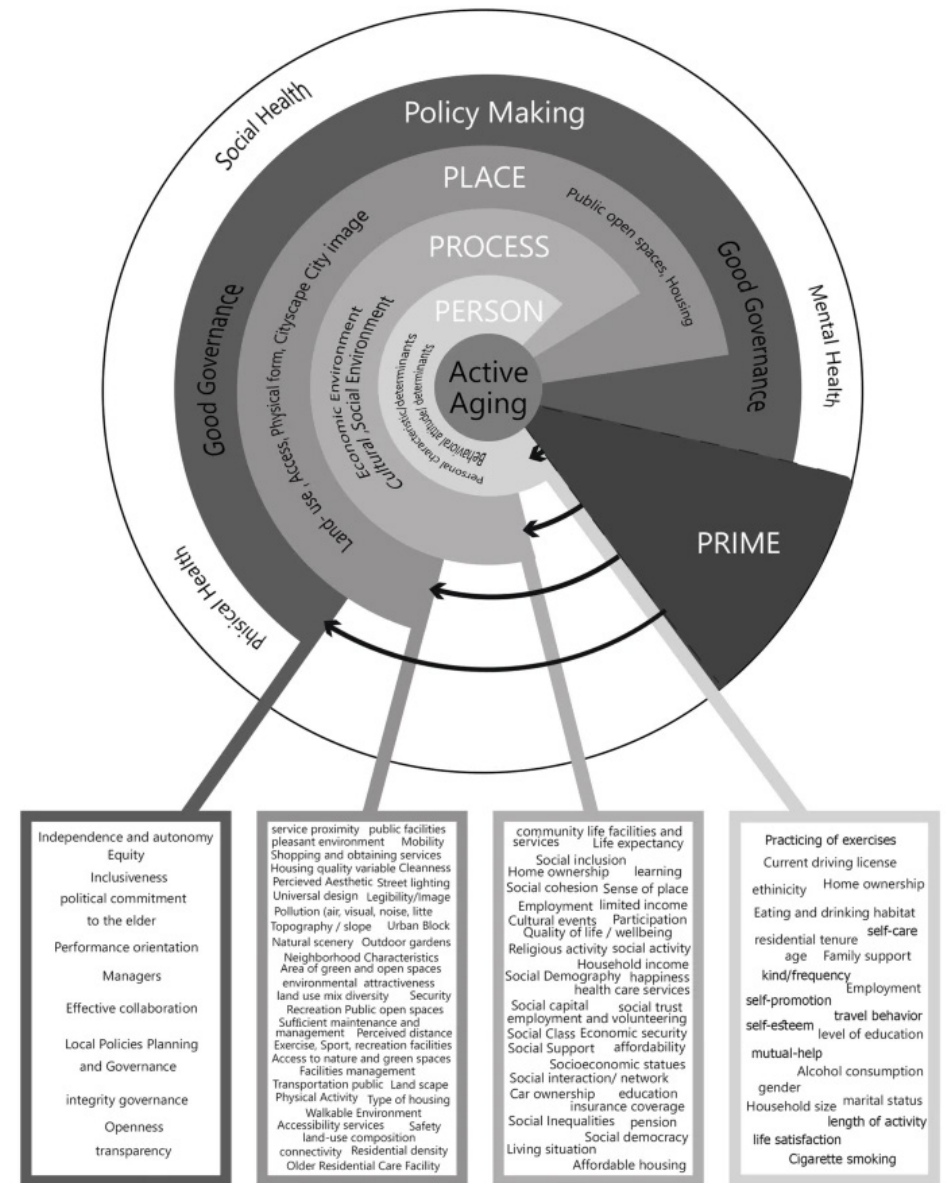


figure.22 5 themes of active ageing
(Source: BMC Public Health , 2020)

activities of daily living and facilitate both physical, social, and economical activities is vital. (Liz Cairncross, 2016)

7.3 Outdoor mobility

Mobility goals

For autonomy and well-being, outdoor mobility is a vital prerequisite. Mobility is of the up most crucial for elderly as it promotes active and healthy ageing which can postpone the development into frail old age. (Fushun, Huang, 2011; Laslett, P., 1991) The definition of mobility goals is needed in order to increase the outdoor mobility of elderly people.

Markets have been found in many researches as the most common destination for trips. (Anqiang, W., Lixi, S. 2018; Burton and Mitchell, 2006) Other important destinations are the hospital, community center, temple, a park and visiting friends and family. However, the majority of elderly people also regularly go out without having a particular purpose in mind and just for going out its own sake (Michael, Green and Farquhar, 2006) which also be observed through the location visit.

Main mode of transportation

Walking is the most common mean of transportation and physical activity for elderly people when trying to reach their outdoor mobility goals. (Anqiang, W., Lixi, S. 2018; Burton and Mitchell, 2006) Elderly people are often limited to their nearby surroundings for the daily activities with walking as their major mode of transportation. Meanwhile, ageing causes physical, psychological and social aspects of changing which influence on the ease of elderly people's ability to use their action space. Action space can be defined as the spatial unit of physical activity places, which a person or a group of persons has visited in a certain period of time. (Dijst, 1995; Rooij and Tacken, 1998) Consequently, the environment of the neighborhood becomes drastically significant for elderly people. (Liz Cairncross, 2016; Burton and Mitchell, 2006)

7.4 The influence of neighborhood design on outdoor activities

Numbers of conditions have influence on outdoor activities. Among them, physical environment stands as one factor that influences the activities to a varying degree and in many different ways. (Liz Cairncross, 2016) Several research studies are found indicated the physical form of neighborhood design influences physically active and walking behaviors among residents (Liz Cairncross, 2016, Clarke, P.J., & Twardzik, E., 2021; Jerrett, M., Almanza, E., Davies, M., Wolch, J., Dunton, G., Spruitj-Metz, D., & Ann Pentz, M., 2013) and that it is playing a key role in enhancing the long-term health and wellbeing of residents. (Liz Cairncross, 2016) Design of neighborhood physical environment is particularly important for elderly people since elderly people are likely to stay in their home and neighborhood, and decreasing functional ability in ageing process can make them more vulnerable to barriers in them. (Burton, Mitchell and Stride, 2011) The next paragraph focus on the suggested principle of neighborhood design for the age-friendly environment which can reduce the barriers that elderly people faced in the public space, and at the same time, encourage active ageing and enhance independency for elderly people.

7.5 Spatial design intervention

Burton and Mitchell are the first researcher discover six design principles that are essential for age-friendly neighborhood meanwhile maintain physical active and independency for elderly people, namely, accessibility, comfort, familiarity, legibility, distinctiveness, and safety. It does not explicitly mention about the application of these design principle from the literature that was reviewed. In order to structure the found community design interventions that encourage active ageing among older people, these themes and the scale on which the interventions act will be used in, which will be visualized in table 1 at the end of this chapter.

7.5.1 Accessibility

Accessibility refers to the extent to which streets enable older people to visit any kind of necessary facilities and services which they wish or need use, no matter they have any physical, sensory or mental impairment. (Burton and Mitchell, 2006)

Moving through the neighborhood

As previous had mentioned, elderly people are more dependent on walking when they trying to reach their outdoor mobility goals. In this case that the street become very crucial (Burton and Mitchell, 2006) to perform activities of daily living. It is more easier to have direct and connected street with only a few intersections and blind bends. (Burton and Mitchell, 2006) Meanwhile, the walking area for elderly pedestrians is a need since it offer a safe feeling and encourage outdoor activities. (Yu Jia Chen, Mei Ling Wu, 2017) It is better to install a gentle slope than a staircase when it comes to an inevitable circumstance of level change, meanwhile there should be clearly marked and install with handrails and the surface should be non-slip (Mitchell & Burton, 2010).

In the case that the outdoor mobility goals are or cannot be located within a walkable distance, the vital is the proximity of a public transport stop nearby. (Burton and Mitchell, 2006) To remain active in the larger community and independent in one's neighborhood, adequate public transportation is crucial. Elderly even report that the safe feeling and the willingness to travel out of their neighborhood decrease if a public transport stop can only be reached through walking a long distance. (Michael, Green and Farquhar, 2006).

Local services and facilities

With local markets and services, offer places for elderly people to walk, to meet others, and to maintain active hereby facilitating active ageing. (Michael, Green and Farquhar, 2006) The finding from Pearce (1982) shows that elderly people are more likely to use local facilities which is accessible with walking distance from home, shop more

frequently and make regular visit to medical facilities. Therefore, it is essential to present shops and services on the walkable distance when it comes to design accessible neighborhoods. The fact that participants in the Senior Walking Environment Assessment Tool (SWEAT) study underlined the importance of accessible facilities and services which even said that the ability to walk to needed services plays a role when making decision to live in a specific neighborhood. Moreover, the lack of accessible facilities in an area is linked to the decrease of motivation to walk to local amenities which on the other hands, increased isolation. (Michael, Green and Farquhar, 2006; Burton and Mitchell, 2006; Dominique Hauderowicz, Kristian Ly Serena, 2020) Depending on the consulted sources of information differs the definition of walkable distance. Generally, studies show the certain ideal distance for essential and secondary services and facilities to elderly inhabitants. (Borst et al., 2009; Burton and Mitchell, 2006; Carstens, 1985) However, a study from taiwanese researcher, adapt the recommend distance based on Taiwanese cultural context, this walkable distance to primary services and facilities should located no more than 400m. Followed by the secondary services and facilities, including a park or other form of public space, library, dental clinic, optician, places of worship, and community and leisure facilities, which if they are not able to be within 400m, the distance should be no more than 800m. (Anqiang,W., Lixi,S. 2018)

These findings have been visualized with figure.23

Social participant

Social participation does not necessary refer to formal or civic engagement. It can be seen as more informal way of interacting with friends and neighbours, walking in the neighbourhood, and using public spaces which is important for elderly people to reduce social isolation. Belonging to a social network can 'make people feel cared for, loved, esteemed and valued which has a powerful protective effect on health'. (Wilkinson, R. G., Marmot, M. G., World Health Organization., 2003)

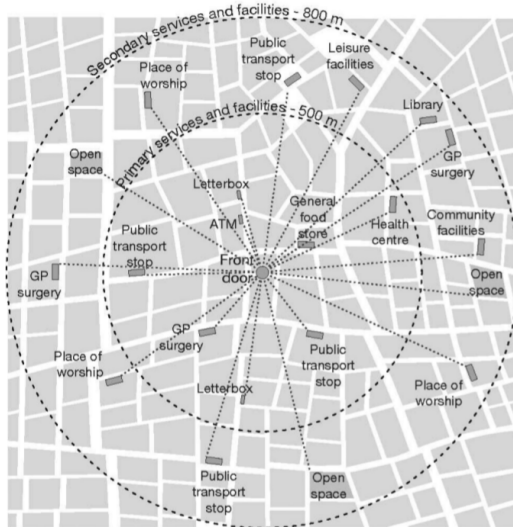


figure.22 Ideal distance of essential and secondary services and facilities to elderly (Source: Borst et al., 2009; Burton and Mitchell, 2006; Carstens, 1985; Anqiang,W, Lixi,S. 2018)

To conclude, accessible neighborhood should have a safe, gentle, and clear walking environment, a walkable distance of local services, facilities, and public transportation, and able to participate social activities. (Burton and Mitchell, 2006; Wilkinson, R. G., Marmot, M. G., World Health Organization., 2003)

7.5.2 Familiarity

Familiarity refers to the extent to which streets are recognisable to older people and easily understood by them. (Burton and Mitchell, 2006) Age-related declines in wayfinding skills can make it difficult to learn to navigate in these new, unfamiliar environments, therefore, elderly people tend to stay in the familiar local community when they grow old. (Wiener, J.M., Pazzaglia, F., 2021)

Familiar surrounding

Any change in the neighborhood design should be small scale and incremental, and should incorporate local forms, styles, colors and materials. (Burton and Mitchell, 2006) see figure.23 Meanwhile, the use of certain color and the contrasted color helps to create familiar surrounding. In particular, the red and yellow end of the spectrum is valued.



figure.23 Landmark as familiar surrounding (Source: from author)

7.5.3 Comfort

Comfort refers to the extent to which streets enable people to visit places of their choice without physical or mental discomfort and to enjoy being out of the house. (Burton and Mitchell, 2006)

Green spaces

Relaxation and stimulation can be provided through green spaces in the neighborhood (Marion Preez, 2016). Spending time within green spaces for walking, socializing, and enjoying the sunshine has positive effects on the physical and mental health of all and especially for the elderly and people living with dementia being outdoors can support stress relief and boost mental and emotional well-being. (Marion Preez, 2016)

Informal spaces

Traditional squares sometimes is less preferable than informal spaces for elderly people. Not all of elderly people are able to enjoy socially demanding situations with unfamiliar people such as attending community center, and preferring less challenging activities such as posting a letter or going to the corner shop. They are intimidated in formal settings because they are afraid of not always understanding what is required of them in demanding environments. (Burton and Mitchell, 2006)

Resting points

Being able to find a place to rest in the neighborhood is important for elderly people which benches must be placed. Not only with benches in the park, but also on the route to their outdoor mobility goals and in waiting spaces of public transport stops. (Burton and Mitchell, 2006) see figure.24

Comfort to be the pedestrian

When pedestrians must share pathways with other road users such as bikes, cars, or runners, they may feel uncomfortable and insecure.

(WHO, 2006) Especially, for elderly people who are confronted with multiple deficits in functioning such as declines balancing and walking performance. This is the reason to advise separated sidewalk from other lines and with buffer zone between. Furthermore, The sidewalk should be wide and bordered to provide secure footing. (Burton and Mitchell, 2006)

Public toilets

For elderly people, with the decrease of physical body function increases the need of public toilets. (Burton and Mitchell, 2006)

To conclude, comfort neighborhood should provide green spaces, informal spaces, sufficient resting points and public toilets, and the comfortable pedestrian paths. (Burton and Mitchell, 2006; WHO, 2006; Marion Preez, 2016)



figure.24 resting point
(Source: Burton and Mitchell, 2006)

7.5.4 Safety

Safety refers to the extent to which streets enable people to use, enjoy and move around the outside environment without fear of tripping or falling, being run-over or being attacked. (Burton and Mitchell, 2006) In particular, in several studies and reports from elderly people indicated safety as their biggest concern which limits their walking for everyday activities as well as exercise. (Burton and Mitchell, 2006; WHO, 2006; Liz Cairncross, 2016; Borst et al., 2009)

Safe crossroad with noticeable traffic signal

It is important to realized the need of safe crossings. Each pedestrian crossroad with audible and visual signals are necessary. (Burton and Mitchell, 2006) see figure.25 Sufficient waiting area in the busy traffic crossroad is also essential since it increase the sense of security.



figure.25 safe crossroad with noticeable traffic signal (Source: Burton and Mitchell, 2006)

Lightening

Better lighting is crucial in the public space. Especially, as you age, you need more light to see as well as you used to. Outdoor lighting is used for both home security and to help keep someone (especially an older person) from tripping and falling and possibly injuring themselves, therefore, increase feelings of safety and security. (Esther Kane, 2018; Burton and Mitchell, 2006)

7.5.5 Legibility

Legibility refers to how well roads help older people understand their whereabouts and identify where to go. And to prevent their spatial disorientation, confusion and anxiety.(Burton and Mitchell, 2006) Especially, with deterioration of the visual-spatial memory (wayfinding skills) of elderly people, legible neighborhood become very important. (Dziechciaz, M., & Filip, R., 2014; Burton and Mitchell, 2006)

Street layout

The intelligibility of the neighborhood is enhanced by small blocks laid out on an irregular grid with few crossings.(Mitchell & Burton, 2006) see figure.26 They were often thought of as short, narrow, and gently winding streets. It's more interesting than long, wide or straight streets, so it helps keep older people focused so they don't get lost. (Mitchell & Burton, 2006) Streets with different building designs, shapes, colors and sizes are considered more interesting to walk and may also serve as effective signposts.(Mitchell & Burton, 2006)

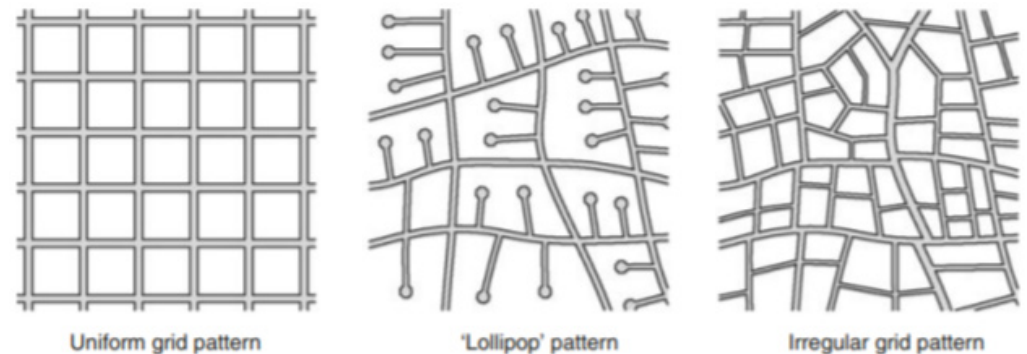


figure.26 street layout (Source: Burton and Mitchell, 2006)

7.5.6 Distinctiveness

This theme related to the previous theme of legibility. Distinctiveness relates to the extent to which streets give a clear image of where they are, what their uses are and where they lead. (Burton and Mitchell, 2006) The diversity of the various portions of the neighborhood is more easily grasped by people's attention and concentration, which improves direction and navigation. (Mitchell & Burton, 2010)

Landmarks and Wayfinding points

Distinctive streets reflect the local character of a place which with a variety of uses, historic, civic and distinctive buildings and structures/aesthetic and practical features, such as trees and street furniture that give own identity to streets or buildings within within the overall characters of the neighbourhood. (Burton and Mitchell, 2006) see figure.27 These kinds of feature buildings and objects are represented as the landmark or wayfinding points which play a key role in assisting orientation since they help to distinguish different parts of the neighbourhood. (Burton and Mitchell, 2006)



figure.27 safe crossroad with noticeable traffic signal
(Source: Burton and Mitchell, 2006)

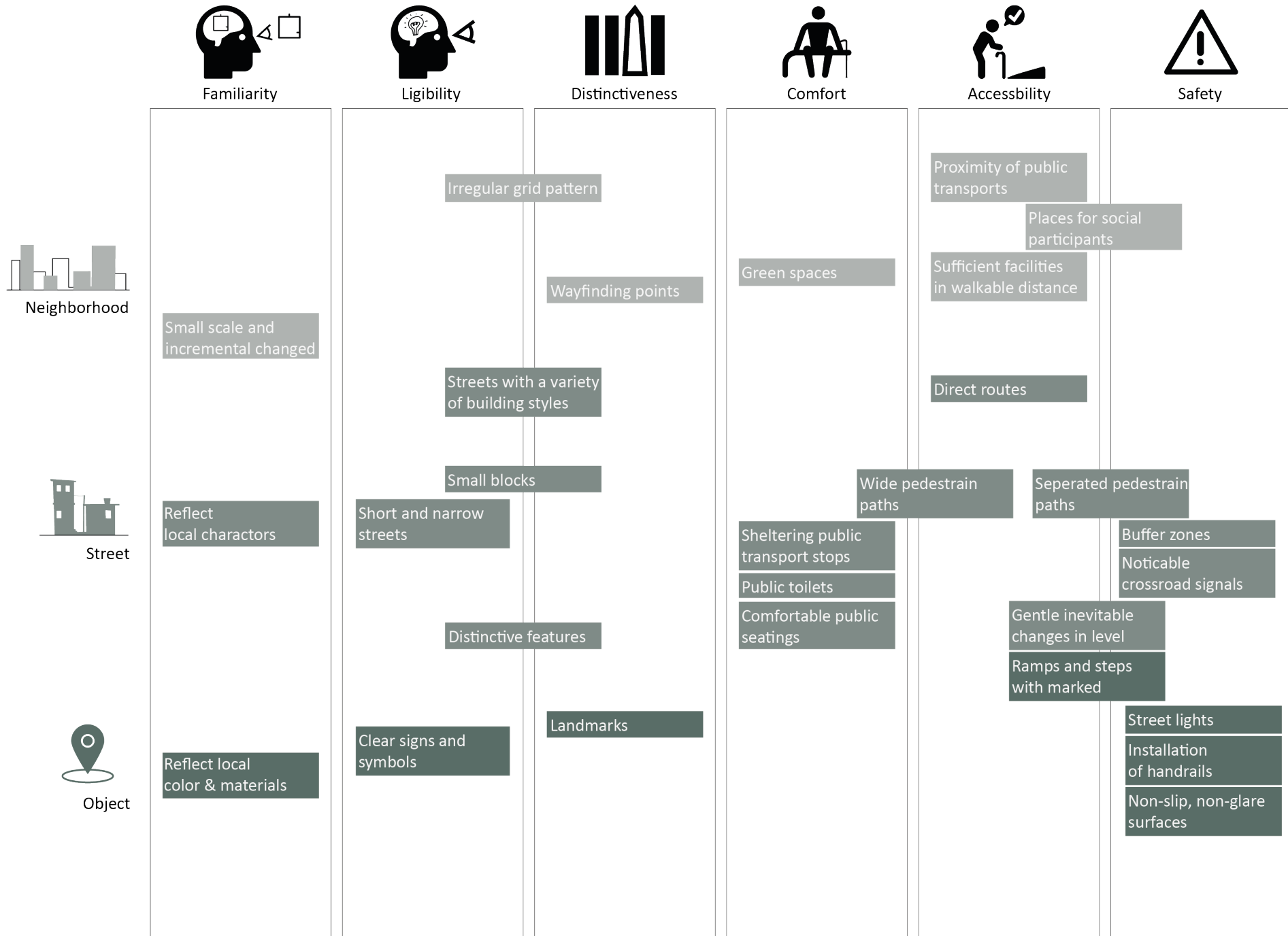


table.1 The general design principle for inclusive neighborhood design (Source: from author)

7.7 Conclusion

Physical active particularly able to walk, climb stairs and perform outdoor mobility which is necessary for accessing commodities, making use of neighborhood facilities, and participation in meaningful social, cultural, and even economic activities. (Liz Cairncross, 2016; Rantanen T. 2013) Several research has indicated that an environment which is easy and enjoyable to go outdoor is important since it encourages the elderly to be physical active. (Liz Cairncross, 2016; WHO, 2017; UNECE, 2020) With the growing amount of elderly people and greater life expectancy, the currently unfriendly built environment become an increasing important issue that needs to be addressed. (Ron Mace, 1941-1998; Liz Cairncross, 2016; WHO, 2017; UNECE, 2020) Therefore, urban design can be a powerful tool to facilitate active ageing. (Liz Cairncross, 2016)

Because ageing causes physical, psychological and social aspect of changing, walking become the main mean of transportation and physical activity for elderly people. (Anqiang,W., Lixi,S. 2018; Burton and Mitchell, 2006) Furthermore, most of the action spaces of elderly people are limited in the neighborhood. (Liz Cairncross, 2016; Burton and Mitchell, 2006) Therefore, urban design interventions with the main purpose of encouraging active ageing should priority put focus on neighborhood scale.

In this chapter, through literature review from different fields such as environment, planning, gerontology and social science integrated and formed the theoretical framework with around 28 different basic design interventions for neighborhoods which facilitate ageing actively. The basic design intervention are been categorized into six themes: Accessibility, Familiarity, Comfort, Safety, Legibility, and Distinctiveness. see table.1 Especially in literatures, the themes of design interventions related to accessibility and safety are crucial prerequisites for active ageing in the neighborhood built environment. (Burton and Mitchell, 2006; Burton, Mitchell and Stride, 2011; Liz Cairncross, 2016; Borst et al., 2009).

Meanwhile, the determining accessibility related factor in stimulate

individual to be outdoor and walk to a certain destination is the proximity of close services and facilities to living places of elderly people. (Borst et al., 2009)

On the other hand, busy traffic streets, unsafe crossroads, without a waiting area of a crossroads, and insufficient lighting are majority of safe related concerns. (Burton and Mitchell, 2006; Burton, Mitchell and Stride, 2011; Borst et al., 2009) Therefore, separated pedestrian path, installation of lighting system, encourage slow traffic, and controllable and noticeable pedestrian crossing are equally important. (Burton and Mitchell, 2006; Burton, Mitchell and Stride, 2011)

The developed framework in this chapter can be used as a base assessment to evaluate problems existing in current built environment of the location. The analysis and result from location visit in the next chapter can provide creating and practically thinking to solve these problems. Furthermore, the location visit also shows whether the framework should be adapted.

7.7 Suggestions and reflections for the design of elderly friendly living environments

Literatures found accessibility, comfort, familiarity, legibility, distinctiveness, and safety are the crucial themes in the design for elderly friendly living environments. These themes with 28 design principles are present as a general assessment into analysis to determine the design task. However, the great variations in elderly population group, and also the difference of behaviors in different cultural context need to be further researched and clarified in order to obtain more practical understanding of current situation of local elderly inhabitants which helps to adapt these design principles location specific.

Therefore, in the next chapter, the location visit will be done in order to obtain the practical knowledge about real situation of elderly inhabitants of Taichung old city center. With the gaining knowledge which allow to do the design intervention that is more suitable for the location of this graduation project.

Although, the design principles developed in this chapter will be suitable for every places with different kinds of circumstances, it still provide a preliminary information and the assessment about how to improve the physical environment which can become more friendly and enjoyable for elderly people in general.

8. LOCATION VISIT & ANALYSIS



LOCATION VISIT & ANALYSIS

In this chapter, the link between the problem statement and the actual situation in Taichung old city center will be demonstrated. With location, visit to understand the spatial quality on street scale and the daily life of elderly people and their behavior, in order to answer the research questions. The research questions can not be answered through a single observation, one time interview or one documentary. Therefore, this entire chapter with the combination of different fieldwork 's methods through several times of location visit gives the overall answer to the research questions.

In the following paragraph, 12 trips had been done with 12 formal interview which to obtain the information with can not be observed on the street, 3 documentaries which to record the sequent movement of elderly people, 7 informal chats which to obtain the further information of certain phenomenon.

Interpret the core of research questions

- *Where is the frequently visit locations in the daily life of elderly people?*
- *How does the spatial quality of public spaces in old city center based on elderly people's daily life affects their behaviors?*
- *Based on different elderly groups, what kinds of spatial quality is prefer by them which can encourage them to stay active?*



- **FOR WHOM?**
- **AT WHERE?**
- **BY HOW?**

8.1 Introduction

The great variations in elderly population group highlight the importance of visiting the location in person. The field-work provide the opportunity to understand the actual situation of elderly inhabitants, as well as understand and experience the state of public spaces in Taichung old city center. First of all, need to understand the numbers of neighborhoods and the range of each neighborhood in the old city center, there are currently a total of 8 neighborhoods which have been divided as figure.28 shows. Different neighborhoods will have different representatives. Local residents usually go to a representative if something happens or needs to respond to a situation, and the representative's obligation is also to visit local residents from time to time to check on life situation of every inhabitant. Therefore, the representative is the person closest to and most familiar with the daily life of the inhabitants. During the location visit, if considering the actual situation, there may be no elders who are willing to cooperate with interviews or can not find a place where with elderly people. These representatives can be visited first, as a preliminary understanding of this place and inhabitants.

Then, an analysis of the density of the elderly inhabitants was done see figure.29, which can be used as a basis for organizing maps with location visit routes and areas. Meanwhile, the map of the density of the elderly inhabitants can be used as one of the consideration elements in the selection of public spaces for improvement, as the reference for the improvement order and urgency of public space.

The following 4 paragraphs will demonstrate the location visit based on different themes which are observation of random street lives, observation of street lives in specific locations, observation of relation between street lives patterns and spatial qualities, and special street lives patterns.



figure.28
8 neighborhoods
in old city center

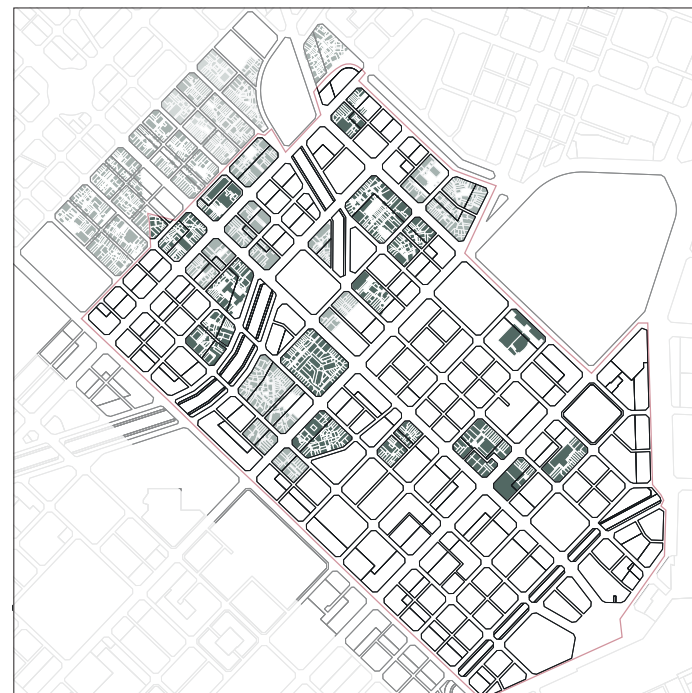


figure.29
density of the elderly inhabitants

8.2 Random street lives- Observation (first iteration)

Since walking are main mode of transportation for elderly people, their movement are limited in their neighborhood. Based on the information of the residential density distribution map of the elderly, roadmap of the observation has been made. see figure.30 There are 7 routes in total. Each one is along a street where more elderly people live to observe the match of streets with more elderly residents and streets with more movement of elderly people.



figure.30
route map for the observation

11.00 - 14.00

a.



b.



c.



d.



e.

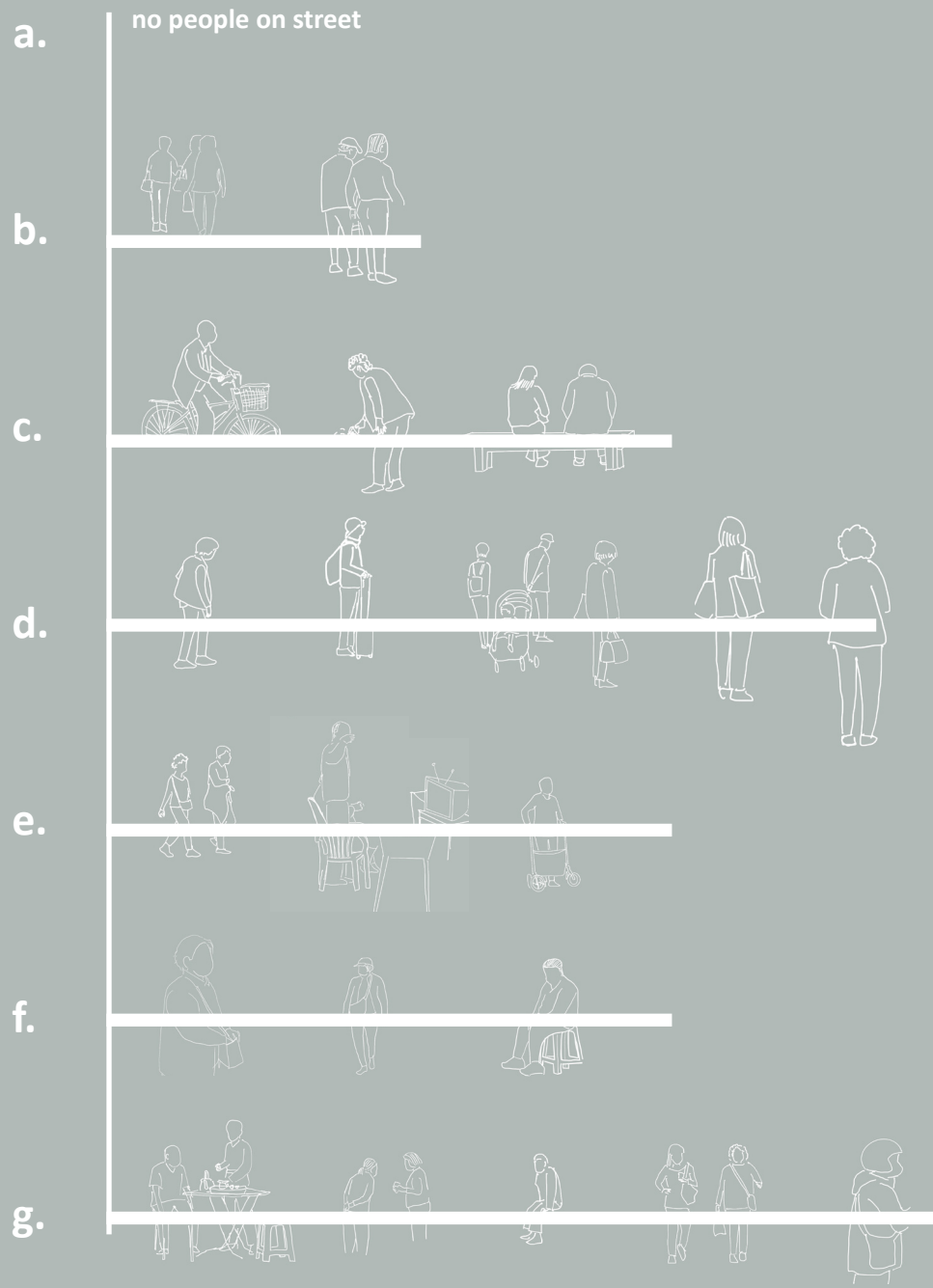


f.



g.





a.
b.
c.
d.
e.
f.
g.

no people on street

Frequency used of streets: $g > d > e > c > f > b > a$

- walking home with friends after a meal
- having a walk with friends around
- riding a bicycle with knowing where to go
- watering plants in front of her house
- taking a rest on public seats
- walking to destination
- standing and waiting for something
- standing and waiting for a bus
- standing and waiting for a bus
- walking to destination
- sitting and chatting with friends
- standing and waiting to cross a road
- standing
- walking and window shopping
- sitting in front of her house
- sitting and chatting with friends
- standing and chatting with friends
- sitting on planter
- buying meals and walking home
- buying deserts from a street vendor for grandchild

Walking 9 Standing 14 Sitting 6 Cycling 1



figure.31
movement of
elderly people

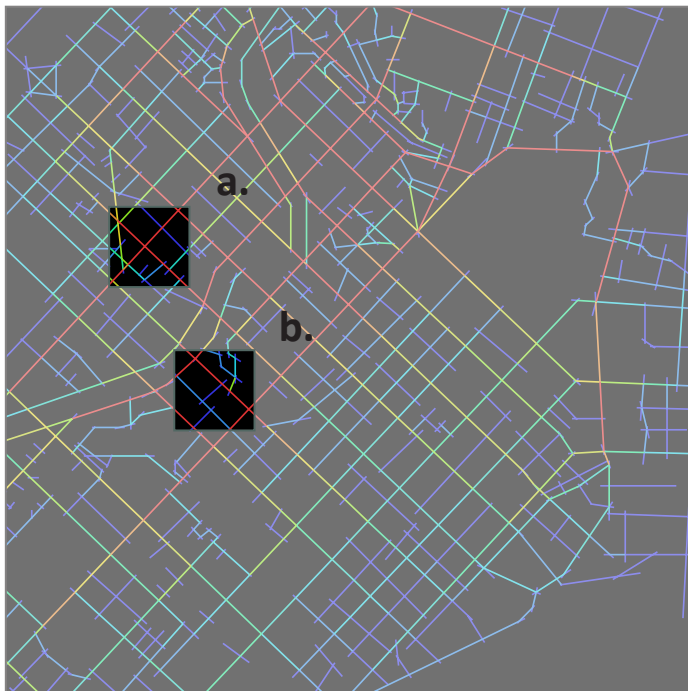


figure.32
movement analysis
with space syntax

The movement of elderly people see figure.31 does not all matched with the result from the space syntax analysis see figure.32 which are street a., and b. respectively. Especially with road a has drastical-ly difference between in reality and in space syntax analysis.

Since the major concern of behavioral sciences is the understanding of this mutual relationship between people and their surroundings. (Mahmoud, A., 2018) The quality of physical environment becomes one of crucial elements that determined the movement of elderly people.

When walking through street a., a series of photos show in figure.33, can discover the space of pedestrian arcades is occupied by the store as a commercial space. Which is as an outdoor extension of the internal store areas, such as an outdoor dining area or kitchen. Even if not used as an extension of commercial spaces, it often becomes a parking area for motorbikes or a storage space for all kinds of things. It can be seen that, as shown in the figure, the space which remain as a passable part of the pedestrian arcade is often less than half. Meanwhile, if it is currently not the store's business hours, you can often see that the space of the pedestrian arcade is dark, and the visibility is almost none. Sometimes, there is even certain height different in pedestrian arcades which elderly people may easy trapped by them. Not to mention how danger it will be if this height different happened in a place without certain visibility. In addition, the entrance of the arcade after the crossroad is directly used as a parking area for motorbikes, and there is absolutely no space for people to walk through. As previous chapter had mentioned walking as the main mode of transportation for elderly people. The current quality of physical environment of street a., especially concerned the walkability and safety issues which related to the walking performance of elderly people, may decrease the willingness of elderly people to use the street.

However, with the situation of street b., as a series of photos show in figure.34, can discover the quality of physical environment is better than street a. in terms of the accessibility and safety. The space is brighter and without height different, although the walkable area is also only half remained.



figure.33



figure.34

But still can see some elderly people pass by. Then what lead to this mismatch phenomenon to the space syntax analysis. When walking through street b. can be found that most of the ground floor is private living space. Although, there are few as commercial used, the types of commercial space here are also not relatively to necessary services.

Overall conclusion:

In this part of observation about the random street lives. Record the street space and the use of the street by taking photos. Then analyze the number of elderly people to understand the frequency used of streets, and compare with the result from space syntax. After finding that street a and street b have different findings, analyze the photos

to find the reason. Eventually comes up with a hypothesis.

The hypothesis is, the physical quality of the environment and the use of the space on the ground floor of the pedestrian arcade both affect the frequency of a street used by elderly people.

8.3 Street lives on specific action spaces

- Interview, Documentary & Observation(second iteration)

As previous paragraph had mentioned, there are 8 different neighborhoods in Taichung old city center. Each neighborhood has a representation which is called ‘里長’ in chinese. This person manages the entire neighborhood, and often needs to make contact with the inhabitants of the neighborhood, so he/she has a good understanding of the daily life of the local elderly people. In order to have the information about action spaces of elderly people. The interview with ‘里長’ had been done and are presented as follow:

Interviewer: May I ask if there are any specific places in the old city center where the elderly often go to?

Interviewee: The places where the elderly often go are the following locations: community centers, elderly activity centers of different non-governmental organizations, the Second Market (which is the traditional wet market), Taichung Park, and the trail of Midorikawa. But, to be honest, there is very little places for the elderly in the old city center.

Based on the result from the interview. Targeted 4 specific locations which as the figure.35 shows to observe elderly people pattern in specific locations. Each location will be observed around the following four themes:

1. The number of elderly people
2. The mode of transport of elderly people to get to this place
3. The gender ratio of the elderly people
4. Certain specific social or physical patterns

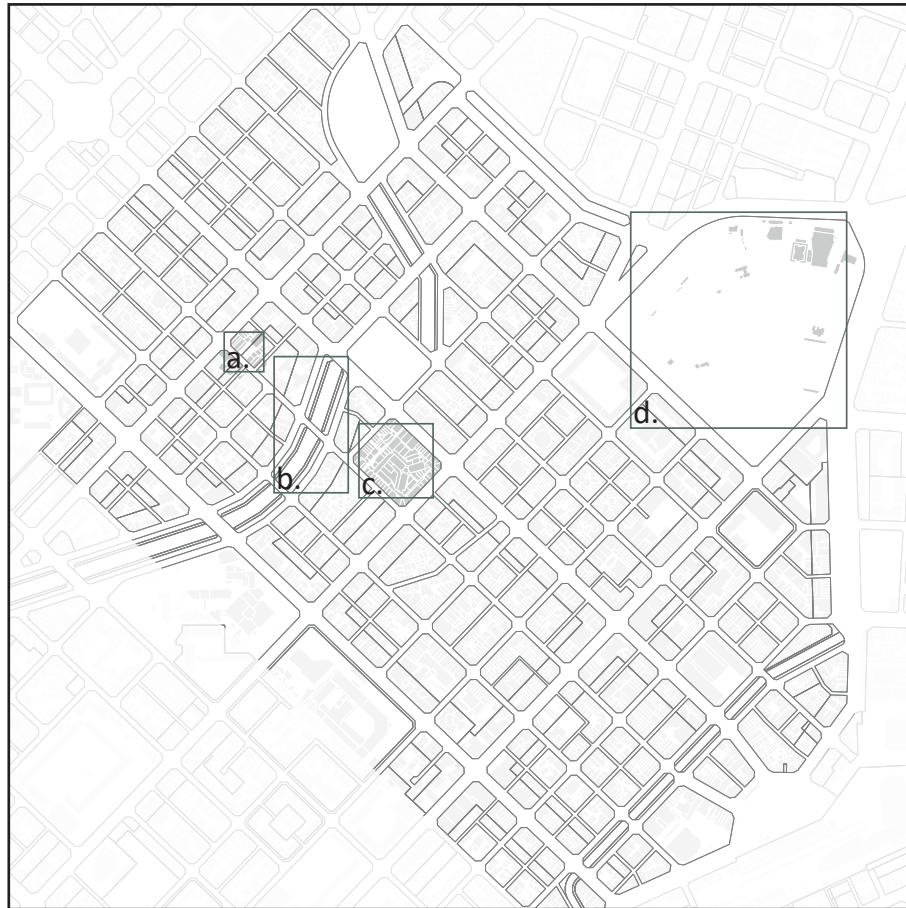


figure.35
map with 4 specific action spaces for the observation

Location a.---Community center

The community center is located at the basement of the temple. It hold different free activities and courses for elderly people specifically every Thursday from 9 to 12 in the morning, followed the “Long-term Care policy” from the government. Activities and courses are all free of charge, and even provide a free meal afterwards. Therefore, it is popular among elderly inhabitants.

Documentary and Observation

This documentary and photos were taken on Thursday (2nd, December) from 9 to 12 in the morning.

At the end through calculation find the total amount of elderly people attend the activity are 40, and the male to female ratio is 1:3. The preliminary inference to this phenomenon is these activities are more attractive to female elderly people. After days of observation in different places discover this is not a single case, therefore, the further accurate information to explain this phenomenon, an interview with elderly people will be conducted and a map with figures and data will together to demonstrated the result in p.85.

The analysis of the documentary shows 4 modes of transportation that elderly people use to get to the community center: on foot, taking a taxi, riding a motorbike, and cycling. see figure.36 The majority of elderly people prefer to walk and riding motorbike to the community center.

Additionally, there is another interesting finding that half of the elders will pray at the center in the temple before moving to the entrance of the basement. This phenomenon can also be found in other locations. Therefore, the analysis and further explanation will be conducted and demonstrated in p76.

Because of the location of community center is at a basement, the

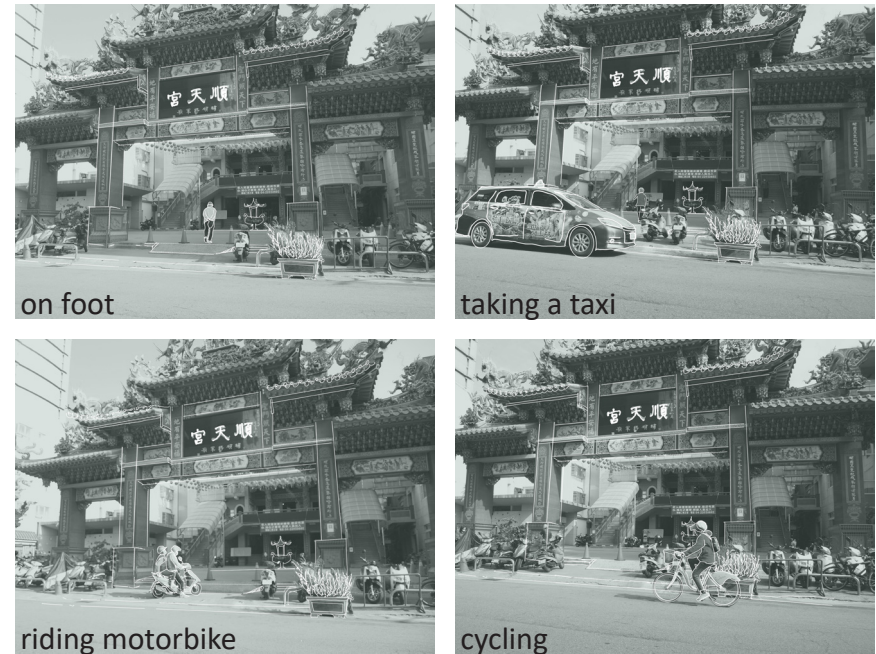
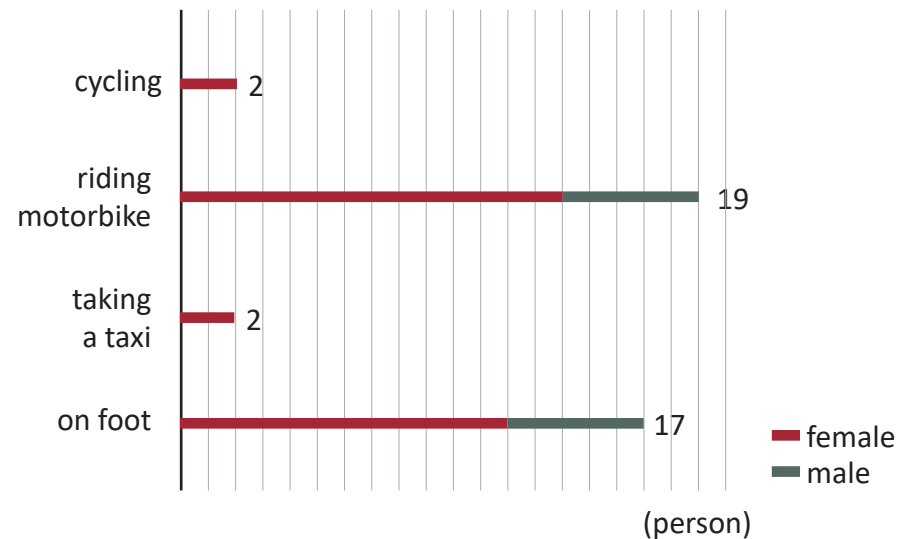


figure.36
4 modes of transportation that elderly people use to get to the community center



moving from ground floor to the underground floor is required. There are two ways to do this, through a elevator or through a staircase, and currently there is only 1 elevator is provided which result in the waiting line of the elevator. The activity space is large and with sufficient lighting.

Meanwhile figure.x demonstrate gender gap in participation. Additionally, male elderly people who attend the activity with 6 of them come with their wife (see figure.37) which means with certain condition such as attending with another family member may raise the willingness of male elderly to take part in these activities.

Additionally, a interview with one of elderlys after this activity provides further informations:

Interviewer: How do you feel about the courses and activities this community center offers?

Interviewee: We all think it's really great to have these activities and courses since it provides the opportunity to move your body and do exercises! Exercise for your health! A free meal is been provided after which makes it even more valuable! Moreover, while join these activities, you also can chat with others and sharing about the recent life. It's a pity that there is only one day a week for this activity, haha! When the epidemic was severe before, these activities were canceled, and I was really disappointed at that time.

Overall findings:

- There are 4 mode of transportation that elderly people used to get to a certain places: walking, taking a taxi, riding a motorbike, and cycling.
- The inconvenience of the location of the community center.
- Gender gap in participation.
- These activities are valuable for elderly people since they provide elderly people with social participants.



figure.37 gender gap in participation

Location b.--- The trail of Midorikawa

The trail of Midorikawa is a public space that has just been completed in recent years. It is one of the improvement locations in the first phase of "Big Station Project" which is Taichung old city center regeneration plan.

This place offers inhabitants a new activity space. Therefore, it is very popular among inhabitants which elderly people are included, and is often a place for inhabitants to take a walk.

Documentary and Observation

This documentary and photos were taken on Thursday (1st, December) from 10 to 12 in the morning.

The information from interview does not reflect on the real situation at the trail of Midorikawa. From the observation, this public space is pretty empty see figure.38, only with few people pass by. see figure.39 The preliminary inference is that the time of the observation is not match to the time when elderly people use this public space, or it is because the epidemic, everyone is afraid to go out.

In order to understand the reason behind this phenomenon, an interview with a elderly people is done.

Interviewer: I heard that this is a place where residents often come for walks. But when I did the observation at 10-12 in the morning, I did not find anyone taking a walk, just some passing pedestrians. Would like to ask if you know the reason?

Interviewee: Haha, one of the reasons is that you go at the wrong time. Most of the elders go for a walk around 6 in the morning, or around 7 after dinner. But there's another reason because it's not Christmas yet? So the municipality has blocked more than half of the space in order to make Christmas decorations here, resulting in fewer people coming. However, since the completion of this place, the local



figure.38



figure.39

*elders have one more place to go for a walk, which is really good.
Especially this space was built in recent years, the environment is well
maintained.*

Overall findings:

- The usual time for elderly people to have a walk is around 6 in the morning, and around 7 in the evening.
- Elderly inhabitant is glad that the trail of Midorikawa provide a new place for physical activities which meanwhile is well maintained.
- This public space will be block during certain festivals.

Location c.--- Second Market (tradotional wet market)

As a traditional wet market, the Second Market plays a very important role in the daily life of Taiwanese. Especially for the elderly, if they are looking for a place to buy daily necessities, such as vegetables, meat, snacks, meals, dry goods, Chinese herbal medicines or kitchen utensils, the traditional market will be the first option that comes to mind. The traditional wet market not only sells fresh ingredients or daily necessities, but also has many vendors selling food, just like a place with several small open restaurant inside. see figure.40

Documentary and Observation

This documentary and photos were taken on Tuesday (30th, November) from 9.30 to 11.30 in the morning.

The observation finds 3 modes of transportation that elderly people use to get to Second Market: on foot, cycling and riding a motorbike.

Through the caculation with the documentaries find the total amount of elderly people come to Second Market during this morning period are 170, and the male to female ratio is around 1:3. Additionally, because the Second Market is a listed historic building, the clean and well maintain environment, meanwhile with many well-known open resturants inside. Therefore not only elderly people will come to Second Market, but also tourists and young people.

Main reasons that elderly people come to Second Market are buying fresh ingredients such as meat and vegetable, and buying/having a meal from/in a open resturant. In Taiwanese traditional culture, cooking is something only should done by female. Therefore, it can be observed that the people who come to the Second Market for the first reason are almost all female elderly people. see figure.41 The majority of those who came to the Second Market just to buy or have meals were more male elderly people. see figure.42 However, through observation also discover, traditional market not only serve as a grocery



figure.40
Small open restaurants.



figure.41
Female elderly buying vegetable and fruit.



figure.42
Male elderly people buy or have meals inside a small open restaurant.

place, but also provide elderly people a place for informal social participants. see figure.43 The female elderly is buying the vegetable while chatting with the vendor, and the conversation lasted about half an hour.

As previous paragraph had mentioned, the pattern that elders will pray at the censer in the temple can also be observed in Second Market which highlight the importance of temple belief culture in the daily life of the elderly. see figure.44 It can be found that in the daily life of Taiwanese people, temples are often found in important public activity spaces. This pattern will be further analysis and demonstrate in p..

In addition, another discovery is that every 2 weeks on Tuesdays, there will be free services provided by hospitals in the Second Market to measure blood sugar, blood pressure and health consultations for the elderly. This free community health service is very popular among the elderly. As figure.45 shows many elders waiting in line at the medical service station.

Overall findings:

- A traditional wet market plays an important role in the daily life of elderly people.
- A traditional wet market is a place where elderly people buy daily groceries and meals.
- A traditional wet market is a place where elderly people have informal social participants.
- Temple belief culture among elderly people.
- A traditional wet market is a place where welfare services for the elderly are provided.



figure.43
A female elderly is buying the vegetable while chatting with the vendor



figure.44
A female elder pray at the censer in the temple



figure.45
Many elders waiting in line at the medical service station.

Location d.--- Taichung park

Taichung park is the only park nearby the old city center, and its total area is around 110m². It consists of 14 different activity spaces of variation sizes, and there are 8 entrance of this park in total. With this large park, photos taking and documentary were done while walking around. Only 4 entrance which are located on the side close to the old city center will be observed and further analysis based on five themes that had been raised previously.

Documentary and Observation

This documentary and photos was took on Monday (6th, December) from 11.30 to 13.30 around noon.

The observation finds 2 modes of transportation that elderly people use to get to Taichung park: on foot, and riding a motorbike. However, with the majority elderly people reach Taichung park by walking, only one elderly is through riding a motorbike.

When walking through different activity spaces a phenomenon was been found. Different groups of elderly people exist in different activity spaces. see figure.46 For example, groups of grandparent and grandchildren can be found in children playground, several small groups of male elderly people sitting and chatting in a rest place with shades of trees. For the rest of elderly people are formed in the group with 2 people and having a walk around the park, and sometimes taking a rest on seats with shades of trees.

Meanwhile, there are 2 interesting finding: One is that some elderly people come to the park to walk their dogs and chat with other dog keepers. see figure.47 Another is that around 12 o'clock, several elderly people walk across the park with their grandchild. The reason behind is that there is an elementary school beside the park. Therefore, after school at 12:00, there will be elderly people who will pick up the children and walk home through the park. see figure.48

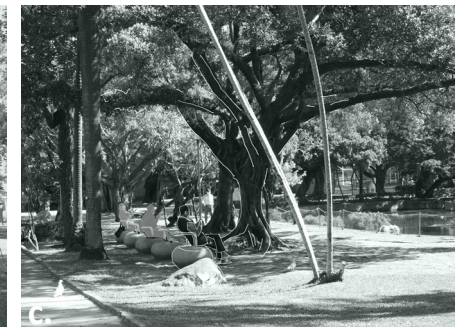


figure.46

- a. Groups of grandparent and grandchildren in children playground.
- b. Taking a walk in group with 2 people.
- c. Taking a rest on seats with shades of trees.
- d. Small groups of male elderly people in a rest place with shades of trees.

Additionally, a chat with one of male elderlys who sitting and chatting in a rest place with shades of trees, provides further informations:

Interviewer: I heard that this is a place where elderly people often come. Are there any regular activity courses for the elderly here?

Interviewee: Every morning at about 5-6 o'clock, there will always be a Tai Chi group for the elderly at the lawn next to the lake, and a teacher will do qigong here to help elderly do some exercises to maintain their muscles and bones. (the lawn see figure.49)

Interviewer: Do you guys gather here regularly to chat every day? Is there any special reason why so many male elders gather here to chat?

Interviewee: That's right! We really come every day arond noon. Because after I go out to buy food, I'll just come over by the way to gather with friends to have a meal and chat. Since this park is the only nice public space nearby! The space is relatively large, you can eat and chat with many different friends at the same time, and then there are also tables and chairs that you can use, and there are toilets close by. Moreover, If you want to walk all of the sudden, the park also provide a safe and comfortable environment such as a trail for you to walk around.

Overall findings:

- There are 4 kinds of elderly group in the park: grandparents and grandchildren group, male chatting and having meal group, taking a walk and exercise group, and walking a dog group.
- This park is a only nice outdoor public space with sufficient facilities and spaces where elderly people able to do physical activity such as taking Tai Chi lessons.

The analysis of public spaces with certain qualities that is prefer and not prefer by elderly people will be demenstrate in p.



figure.47
Walking their dogs and chat with other dog keepers



figure.48
Elderly pick up the children and walk home through the park



figure.49
The lawn where elderly taking Tai Chi lessons

Conclusion:

In this part of observation about the street lives in specific location. Each location is observed with the following four themes:

1. The number of elderly people
2. The mode of transport of elderly people to get to this place
3. The gender ratio of the elderly people
4. Certain specific social or physical patterns

Through taking photos and documentaries record the movement and the ways of elderly people using these locations in particular. Meanwhile, some random chats with elderly people help acquire informations which can not be observed.

The following shows the conclusion overall:

- Walking, cycling, and riding a motorbike are the major means when elderly inhabitants moving through neighborhoods. Therefore, the design proposal of the street scale need to be focus on these 3 main types of users.
- There are currently 4 different kinds of elderly groups when it comes to using physical activity spaces: grandparents and grandchildren group, male chatting and having meal group, taking a walk and exercise group, and walking a dog group. Therefore, the design proposal of the spot, such as new green spaces or informl social spaces, need to consider these 4 different user groups. There are 2 kinds of elderly groups when it comes to attend social participant: elderly people who enjoy attending social participant, and elderly people who do not enjoy which they probably prefer informal social participant.
- The community center, the trail of Midorikawa, Second market, and Taichung park are all important for elderly inhabitants which will be visit almost daily. In the other words, places of government or non-government organizations provide social activities, walking trails, traditional wet markets, and green spaces are crucial in the daily life of elderly people, because these places each provide the daily

necessary services for the elderly. Therefore, these places will be the main focus in future proposal of design intervention.

- The majority of participants in activities hold by government or non-government organizations are female. The reson behind this phenomenon will be further research in following paragraph. Then through design proposal which help to reduce the happening of this phenomenon.

8.4 Taichung old city center's patterns

- Relation of street lives patterns and spatial qualities

The understanding of this mutual relationship between people and their surroundings is the major concern of behavioral sciences. (Mahmoud, A., 2018) Since people's behavior does affect by the spatial quality of public spaces. In turn the public spaces will meanwhile reshaped by the behaviors of users. A single behavior and its related spatial qualities is already present the complexity. Taichung old city center with large amount of elderly people, and each of them have different behaviors, and behaviors even changed in different spatial environments. This is such a complex system. A way to understand and possibly control complex systems is by using patterns. Every single pattern present a rule covering one working piece of a complex system. Patterns are documented solutions obtained under different conditions, as Salingaros described. Such empirical rules, representing regularities of behavior, are called 'patterns'. (Salingaros, 2008)

It is essential to create links between different patterns in order to create a 'language' between these patterns. This linking network('languages' in between the patterns allow the patterns to strengthen each other. It will be like words without grammar rules if the linking networks is missing between patterns. That is why connections between the patterns are made.

The patterns are built up as following:

The title - related spatial quality

Description of the pattern / Two photos present spatial quality

Interviews which also reflect to this pattern / Description of spatial quality

Some qualities are good which can be used as in design proposal, but some are not well that need certain important. However, there are also some pattern without specific relation ship with spatial qualities which will also been demonstrate, since all patterns provide practical

information and can bring certain idea and inspiration to the design interventions.

The patterns developed in the following pages are specific for the project location, Taichung old city center. Since the generic patterns (design principles) already been made in the previous chapter through the literature research.

Through the combination of generic patterns and specific patterns can complete the pattern language which can be implement to revise current built environment of Taichung old city center toward age-inclusive city.

Growing potted plants

- Using plants to decorate the environment

From several observation on the street, discover the behavior of several female elderlys are taking care of potted plants in front of their houses. Thuz, comes up with this pattern that they like planting plants, especially in the space in front of their houses to decorate environment. The interviews also reflect back on this pattern.

"I spend a lot of time everyday taking care of these plants, and I frquently go to the flower market to buy new plants. I feel very happy when taking care of them as you can see how lovely and nurturing these plants are."

"I always plant some plants and vegetables on the roof of my house. Taking care of these plants is really relaxing."



In the photo, shows a lot of potted plants on the both sides of the street for decoration. The decoration of green pot with the hanging type can also be found on walls. Not only the elderly people enjoy this green space, it is also popular among the pass-by people.

Socializing with others on the street

- Self-made, small and informal social spaces

From several observation on the street, discover the behavior of several male elderlys are chatting and making tea with friends in a self-decorated, small and informal social space located at a street corner. Thuz, comes up with this pattern that they like socializing with others on the street, especially in the self-made small space at the street corner located closed to their houses.

"It's boring to stay at home all the time. There is nowhere near where to hang out with friends and chat and make tea. So when I saw this street corner near my home, an idea suddenly came out that I could use the extra tables and chairs at home and the TV that that was originally going to be eliminated to build a small outdoor space. It's really great here. My friends and I come here every day to make tea, chat and watch TV."



In the photos that these spaces are usually on one side of the street, or a small porous space on the side of the street. Tables and chairs will be placed in these spaces, and there will also be appropriate covers on the top to reduce the heats and to prevent the rain. Some will do environmental greening, and some will put extra recreational items, such as TV.

Walking next to a driving car - Unfriendly pedestrian arcade

From several observation on the street, discover the behavior of lots of elderly are directly walking on the street, and even walking next to a roaring car. It can be seen that the walkability of pedestrian arcades is bad, as previous paragraph also mentioned. Resulted in this dangerous pattern which definitely need to be revised. The interviews also reflect back on this pattern.

"To be honest, most of pedestrian arcades in the old city center are occupied, such as parking motorcycles, so there is no way to place seats. The elderly or passers-by even need to walk on the street, which is very dangerous."

"When walking on the pedestrian arcade, the space is frequently of different heights. Every time you have to go up and down, it is really dangerous, and it is also very inconvenient for the elderly. Sometimes, a small step will make them fall!"



In the photo, shows all kinds of things be placed in pedestrian arcades, such as motorbikes, potted plants and even vendors. Only about half of the space left which is walkable. Sometimes there is a height difference in walking area. If meanwhile encounter a area without sufficient light, it is very dangerous for the elderly people.

Standing on the street - Lack of waiting spaces and reminding system for coming buses

From several observation on the street, discover the behavior of several elderly are standing on the street beside a bus stop or a crossroad. It can be found that there is no waiting space for a bus stop or a crossroad. Resulted in elderly people waiting a bus in the street area which is a dangerous pattern need to be revised. The interviews also reflect back on this pattern.

"Sometimes you have to wait for the bus to go to class. But there is no waiting area at all, you can only stand on the road next to the stop sign. If there are many people standing very close to the car, it's really dangerous! Then we can't see the car coming, the sign is not clear, we don't know what car is coming, and it's very dangerous to stop the car."



In the photos that these spaces are usually on one side of the street, or a small porous space on the side of the street. Tables and chairs will be placed in these spaces, and there will also be appropriate covers on the top to reduce the heats and to prevent the rain. Some will do environmental greening, and some will put extra recreational items, such as TV.

Sitting in a place within shades

- spaces with covers to prevent heat and rain

From several observation on the street, discover the behavior of several elderly are sitting in the place within shades, such as shades of trees. Thuz, comes up with this pattern that seats should be placed with the shaded places to prevent heat and rain.

The current situation of old city center is lake of sitting and resting places. Therefore, if new seats are to be added in the future, they must also be placed in shaded places.



In the photo, shows people taking a seat for rest in the place with shade, especially the places with trees nearby are very popular and always crowded with people.

Street without lives - street missing desirable functions

As previous paragraph had mentioned some streets are not used as often as expected. Even though there are a lot of residents nearby, the street does not attractive to inhabitants. Streets of this type can often be found where there are many shops left for rent that have closed down, or the funtions of these shops are not necessary for local residents. For example, a specialty store or a restaurant that only opens at night.

"I lived here for over 50 years and never went downstairs to the street and take a walk. I didn't even know what they were selling in shops. Because it is a street for night market, shops are only open at night. And I hardly go out at night. So there is no chance to go, and it is impossible to go. During the day, there were basically no shops open in the street, and the whole street feels like not even existing. So no one wants to go during the day at all."



In the photos that these shops are all close in the day time and only open at night. when walking through this street in the morning, can see no one is using these spaces, and even no one pass by.

Standing and chatting - Lack of informal social spaces to stay

From several observation on the street, discover the behavior of lots of elderly prefer to chat with others in the middle of pedestrian areas on the street. These elderly people always standing while have a conversation. When looking at their surrounding physical environment can discover the places always without public seats which may result in this pattern.

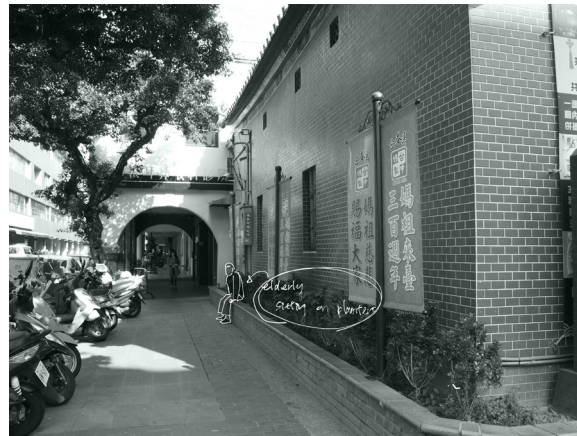


In the photo, shows two female elderly standing in the middle of walking areas and have conversations. Their surrounding is without any seat. And the conversation left for around 20 minutes.

Sitting at nowhere - Lack of public seats

From several observation on the street, discover the behavior of several elderly are sitting in random places on the street, such as planters or even curbs. Meanwhile, several interview reflect about the lack of public seats on the street. This reduces the willingness of elders to go out and be active, and also limits the range they can go on foot.

"Because when we went to the traditional wet market, we walked a long way, and there was a seat next to Meichuan, so she(interviewee's mom) could sit and rest. Otherwise, when we usually walk on the street, we don't dare to walk too far because we can't find a place to rest. And my mother has a little difficulty in moving."



In the photos the space on the street is without a seat. Resulted in the situation shows on the photot that elderly people are sitting on planters. Sometimes, even can find elderly people sitting on curbs.

Walk their bikes - street without a bike lane

From several observation on the street, discover the behavior of elderly people who is cycling without riding on their biking but walking their bikes on the street, and even next to a roaring car. This pattern is similar to the pattern of 'walking next to a driving car', which can be seen that there is no cycling path on the street. Resulted in this dangerous pattern which need to be addressed through design interventions.



'Female only' activities (Almost no male elders attend social participants)

From several observation in action places, such as community centers and activity places of non-government organization, discover the phenomenon that seldom male elders attend activities. Therefore, an interview was be done with one male participant.

Interviewer: The number of male elders participating in activities is much lower than that of female elders. What do you think is the reason behind?

Interviewee: Generally speaking, male elderlys just don't like being restrained! They prefer to be free to do whatever they want. Participating in this kind of activity seems like an obligation which people will feel pressured and have to stay through the entire activity. It's hard to say that one left halfway because he felt bored or do not like the course today. But if there are family members or friends who are able to come together, certainly will stimulate the willingness to come.

Therefore the hypothesis is:

To reduce this phenomenon with encourage female participants to ask their partners to join activities together or to hold activities in the place where male elderly often visit or to adapt current physical environment of activity spaces to the one that male elderly prefer and enjoy.



Second market tells me where I am

- A special building as a wayfinding point

From several interview with elderly people, discover the behavior of lots of elders prefer to use a specific building, such as historical buildings, as the reference when they are trying to remember a route to a new place. Some elderly people also reflect about now the environment is changing too fast, and sometimes the new buildings and new spaces do not follow the characteristics of the old spaces, which makes it even more difficult to find the way.

“I will look at the road signs or prominent landmarks to identify the way, especially if it is the first time to go to that place and I need a way to remember the route, such as Central Bookstore, a relatively large and well-known historical building. When I need to take a bus, I will also take a picture of the bus stop, and remember the location of getting on and off. Sometimes, when I was afraid that I would not be able to remember, I would even write down the road names in a small notebook to remind myself.”



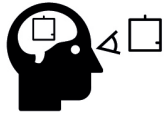
Can I borrow the toilet? - Lack of public toilets

From several interview with elderly people, discover lots of elders complain the difficulty to find a public toilet. Since the public toilet will only be in the park, and there is only one park in Taichung old city center which bring a lot of trouble to elders and decrease their willingness to go out.

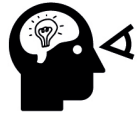
“Every time I go out, I really want to go to the toilet and I can't find a place to go. As a result, I have to remember to go to the toilet before I go out, which is really inconvenient.”

“That's right! There are really no toilets along the way here, only the parks have toilets. However, there is only one park here.”





Familiarity



Legibility



Distinctiveness



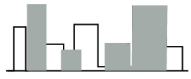
Comfort



Accessibility



Safety



Neighborhood



Street



Object

A special building as a wayfinding point

'Female only' activities

Doing Qigong on the lawn every morning

Lack of informal social spaces to stay

Lack of public seats

Lack of public toilets

Plants to decorate the environment

Male talking political issues in green spaces

Enjoy public spaces around their house

Self-made, small and informal social spaces

Spaces with covers to prevent heat and rain

Lake of waiting spaces for bus stops

Lake of reminding system for coming buses

Unfriendly pedestrian arcades

streets without bike lanes

Lake of waiting spaces for crossroads

street missing desirable functions

Enjoy walking around in the alley

table.2 Patterns of Taichung old city center (Source: from author)

Ordering the patterns

There are two things essential in order to complete the use of patterns. First, the connection between different patterns. Second, the co-relation between generic patterns and specific patterns.

For ordering these Taichung old city center's patterns will follow the same layout as the layout of developed generic patterns (design principles) from previous chapter. Placed into 6 themes on three different scales in order to be easy incooperated with generic patterns. see table.2

8.5 Overall conclusion:

FOR WHOM? AT WHERE? BY HOW?

FOR WHOM? It is still hard to define the actual numbers of different groups among elderly inhabitants. With the location visit discovered 4 different social groups in Taichung park, 1 social groups in Second market, and 2 social groups who are participants join activities hold by community center. However, these groups are not necessarily unrelated, and there may even be substantial overlap. For example, a female elder I interviewed went to the market to buy vegetables almost every morning, except for Thursday mornings, when she regularly went to participate in community-organized activities. In the afternoon, she often went for a walk in the park. Therefore, it should be understood that the variations still exist in a ethnic groups, so when designing, must always do the location visit to understand the real users. But in this graduation project, the group that has been observed so far will be main consideration. And in the future design proposal, improve the existing space to meet their needs.

AT WHERE? The frequently visited locations based on daily life of elderly people had be mentioned previously which are places of government or non-government organizations where provided social activities, walking trails, traditional wet markets, and green spaces. Meanwhile, the observation adding the new idea of locations which is the informal social spaces because as previous mentioned not all of elderly people enjoy to attend formal social activities, some of them

feel the small, self-made and informal spaces where they can enjoy social connection with their friend are more comfortable. However, the current situation is the lack of these informal social spaces in Taichung old city center which will be one of main concern in design proposals. In addition, do not forget the crucial of the street since it is the 'space' that elderly people have to pass through to go to the daily visited locations. Therefore, streets which connected between areas with high density of elderly inhabitants and their frequently visited locations will also be the one of the main focus.

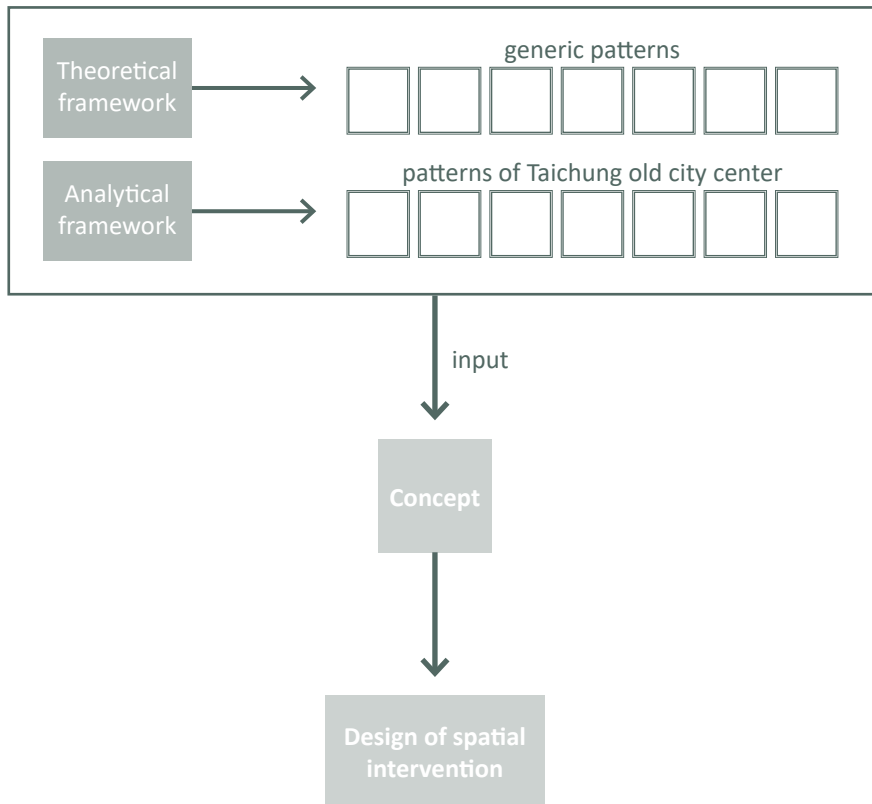
BY HOW? The elements that can help elderly people to enjoy and feel comfortable in the outdoor public spaces is a need. With the overall findings, especially the reflection from elderly people through interview and informal chat, certain crucial elements coming up which also demonstrate in Taichung old city center's pattern framework.

Namely: green in the public space, comfortable public seats, sufficient public toilet, walkable pedestrain arcades, accessible informal social spaces and so on. All of these elements can be placed in three different scales which can be used in the design proposal to rivise current public spaces in Taichung old city center. In order to create enjoyable outdoor environment for elderly inhabitant which encourage active ageing.

9. DESIGN CONCEPT & PROPOSAL

9.1 The concept

The theoretical framework is concluded as generic pattern and analytical framework is concluded as patterns of Taichung old city center, both are the core of research and analysis phase. This core is the input in the spatial concept. The concept function as an inspiration to find order in the pattern. The pattern are linked to the concept and will give form to the design of spatial interventions. see figurex.



Taichung old city center is the core for this graduation project. In order to revise current public spaces in Taichung old city center to encourage elderly inhabitant to become and stay active, it is essential to determine which hindrances they themselves are experiencing in the public space throughout a day. That is why the concept is based on the real daily routine of elderly inhabitants which with the specific time node demonstrated action spaces they used, their transport means, and their experience while using public spaces.

The information is collected through interview which demonstrating the current situation of a daily life as both male and female elderly inhabitant. Then, compared with the ideal situation of a daily life of an elderly inhabitant to discover problems in current public spaces, and search for opportunities and inspirations of spatial intervention that can improve current qualities of life of not only elderly people but all inhabitants.

The layout will be first to show what a female elder and a day as male elder is doing on a specific time node with their feeling while using these public spaces, then demonstrate transport means they use for moving from one place to another.

Then, concluded together with patterns of Taichung old city center to find out which spatial intervention is needed in order to achieve the goal of ideal situation.

A real day of a female elderly inhabitant



6AM
At home



7AM
At home



9AM
At traditional wet market



Once a week
9-12AM
at community center



1PM
At home



*no public spaces can
enjoy with friends*

boring



9PM
At home

A real day of a male elderly inhabitant



6AM
At home



7AM
At home

boring

*no public spaces can
enjoy with friends*

*hard to walk at
outdoor spaces*



11AM
At traditional wet market



1PM
At park



2PM
At home



9PM
at home



7AM
At home



11AM
At traditional wet market



Stages of becoming old

The first stage: Self-sufficiency—50~65

Elderly people are completely self-reliant at this stage. They live in their own homes, and apartments. They do not need support to manage the task of daily living such as household chores and errands. Therefore, at this stage, the vital thing is to encourage elderly stay active in order to ensure their continued independence and healthy ageing. They should exercise regularly. They need social participant and engaged with the community around them.



50~65

Accessibility:

Facilities and services within 1000m
(15mins walking distances)

Safety:

Seperated footpaths and bike lanes

Comfort:

Enjoyable outdoor public spaces with green or covers

The second stage: Interdependence—66~80

Elderly people may notice the initial stages of memory loss and the physical changeing of ageing may result in the increaseing difficulty for their daily living. Therefore, at this stage, seniors begin to need some support from other people such as caregivers and the freindly physical environment. Additionally, they will begin to feel emotional strian: anxiety, depression, or loneliness which with a nearby social spaces such as community center for them to remain socailly active can help to prevent. Meanwhile, since there will be a noticable physical, psychological changing for elderly people which accessible medical services become inportant for them.



66~80

Accessibility:

Facilities and services within 800m
(10mins walking distances)

Safety:

Handrails, non-slip surface, slope re-
place stair, and street lighting

Comfort:

Public seats, public toilet every 400m

Legibility:

Wayfinding points

The third stage: Full dependence—over 80

At this stage, elderly people will need fullly support. They may still be able to age in place, with in-home nursing or other community-based services such as food delivery or shuttle bus to community center. The medical support close by is also vital at this stage.



over 80

Accessibility:

Facilities and services within 400m
(5mins walking distances)

Safety:

Elevators

Comfort:

food delivery or shuttle bus

Currently, the average life span of taiwan elderly people is 80 year-old, therefore, need to consider about all stages of elderly people and their need.

'AN IDEAL DAY OF ELDERLY INHABITANTS'



6AM
At home



7AM
At green public space



8AM
At traditional wet market



9AM – 2PM
At social public space



5PM
At social public space



9PM
At home

9.2 Spatial interventions in the concept

In order to make sure the feasibility of improving the current life quality of elderly inhabitants to the ideal situation, certain spatial intervention has been introduced. The input of generic patterns from the theoretical framework in chapter 7 which with six themes that help to create an inclusive neighborhood for elderly people. Furthermore, patterns of Taichung old city center from location visit and analysis in chapter 8, which gives more practical understanding of certain difficulties that elderly inhabitants of Taichung old city center have encountered. From them, give the emphasis on certain subjects that need to be focus in the graduation project which are:

- Infrastructure and public transport | Accessibility
- Morphology | Legibility, distinctiveness, familiarity
- Public (social) + green spaces | comfort
- Pedestrian + bike paths and crossroads | Safety

Infrastructure and public transport | Accessibility

Regarding the theme of accessibility, from the concept, the most relevant is the accessible facilities and services such as a walkable distance of market, clinic, community center and public transport stop. According to literature a walkable distance is considered to be a maximum of 800 meters, or 10-15 minutes. (Borst et al., 2009; Burton and Mitchell, 2006) However, from the interview, the walkable distance for elderly inhabitants is around 600 meters when there is no rest place in between to the destination. Therefore, the following analysis of the accessible facilities and services will base on this.

Morphology | Legibility, distinctiveness, familiarity

Regarding the theme of Legibility, distinctiveness and familiarity, from the concept, the most relevant is the material and the texture which been used in the revise of public spaces and buildings that need to be incorporated with existing forms, styles, colors and materials such as using more woods and bricks. Moreover, to preserve spare buildings

and reuse them instead of tearing it down, since they can serve as wayfinding points for elderly inhabitants.

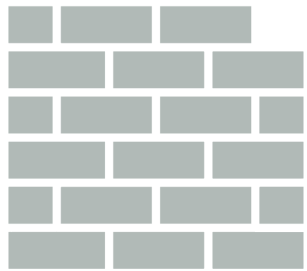
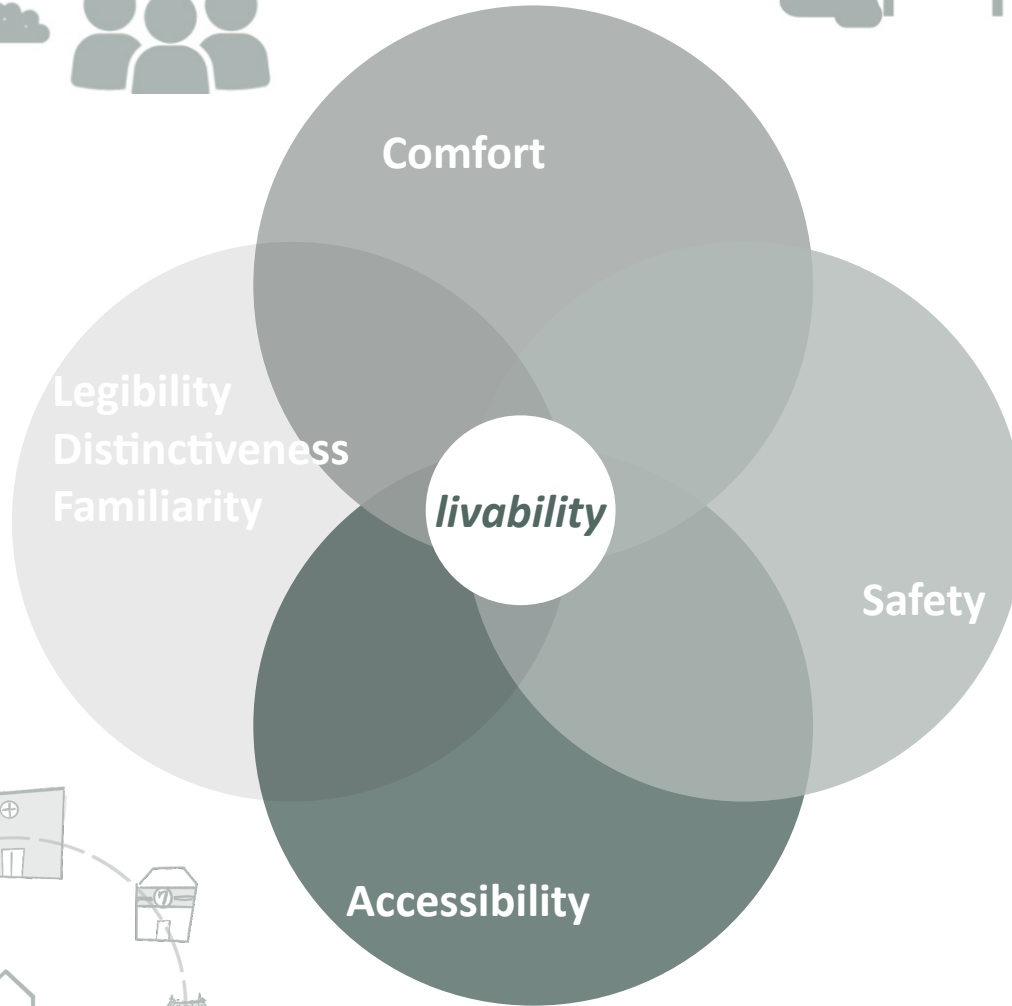
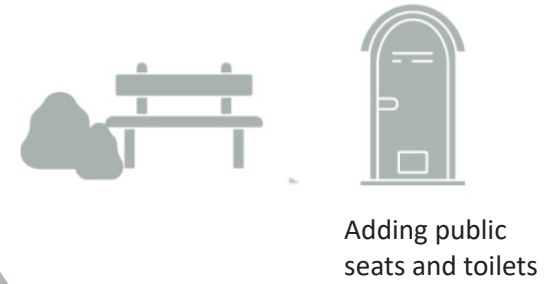
Social (public) + green spaces | comfort

In terms of the theme of comfort, as the concept had mentioned, there is currently lack of social spaces and green spaces in Taichung old city center. Meanwhile, the insufficiency of public seats and toilets also had been reported by elderly inhabitant. Therefore, the following will analyzed current porosity spaces in old city center as opportunity to reuse those spaces for new social spaces and green spaces.

Pedestrian + bike paths and crossroads | Safety

Regarding the theme of safety, from the concept, as elderly inhabitants have encountered in current built environment is the unsafe pedestrian paths and lack of bike paths which discourage them to be active and unable to enjoy the outdoor public spaces in their neighborhoods. At the same time, some crossroads are without noticeable sign which make crossing the street very danger for not onlt elderly people but all local inhabitants. The idea of the 'Superblocks model' in Barcelona give an inspiration in this theme which it creates the slow traffic zone within several blocks to provide the better environment for the pedestrians and cyclists, and to keep the car to the outside ring road. This idea encourage inhabitants no matter elderly or not to use the outdoor public spaces and reduces the safety issues in the neighborhood. Therefore, in following paragraph will do the analysis to find out areas where have opportunities to become slow traffic zones. In paragraph 10.2 will also further explain the implementation of this new idea as design of spatial intervention.

All of the spatial intervention are based on the concept and will be linked to generic patterns from theoretical framework and even specific patterns of Taichung old city center to adapt to local environments.



9.3 Backbone action spaces

Looking at facilities and services in Taichung old city center, these action spaces are mostly the reason that elderly inhabitants going outside daily, which meanwhile guiding the route of elderly inhabitants through their neighborhood.

The maps on the following pages show the locations of facilities and services in Taichung old city center in order to analyze the sufficiency within the walkable distance for elderly inhabitants. The facilities and services have been divided into 3 classes within different walkable distances. The primary service to which elderly people go daily will be within a walkable distance of 300 m in which parks, community centers, convenient stores and supermarkets, restaurants and traditional wet markets will be placed. The secondary services such as leisure places, post offices, banks, and shops should be located within the walkable distance of 600 m. Finally, with other facilities and services such as hospitals and schools should be accessible within a walkable distance of 1000 m.

Additionally, a location map of current bike rental stops will also be done to analysis the accessibility for elderly inhabitants. Since, the new idea of providing new rental electrical bikes at current bike rental stops will be introduced. Currently, more elderly people are using motorbike when moving through the neighborhood which reduced the possibility for elderly people to become physical active, caused the parking issue in the pedestrian arcade, meanwhile create lots of pollution which certainly decrease the livability for all inhabitants. By introducing the new rental electrical bike may encourage not only elderly people but all local inhabitants to embrace a healthier lifestyle which certainly help them to become more active and improve their well-being, at the same time improve the livability of Taichung old city center.

Meanwhile, through identify the location of these facilities and services and overlapping all of them, which as figure.x shows, can get a

grip on certain streets that is frequently used by elderly inhabitants.

In the next paragraph 9.4, with the map of frequently used streets, the concept of ' Super block s' from Barcelona can be proposed and implement to create several slow traffic zones (medium blocks) which provide friendly physical environment and improve the livability for not only elderly people but all inhabitants. Futhermore, since there is a lack of social spaces and green spaces in old city center, the frequently used streets for elderly inhabitants can served as one of crucial criteria when choosing the location of design intervention for revised or create new public spaces such as social spaces and green spaces on the way of these streets.

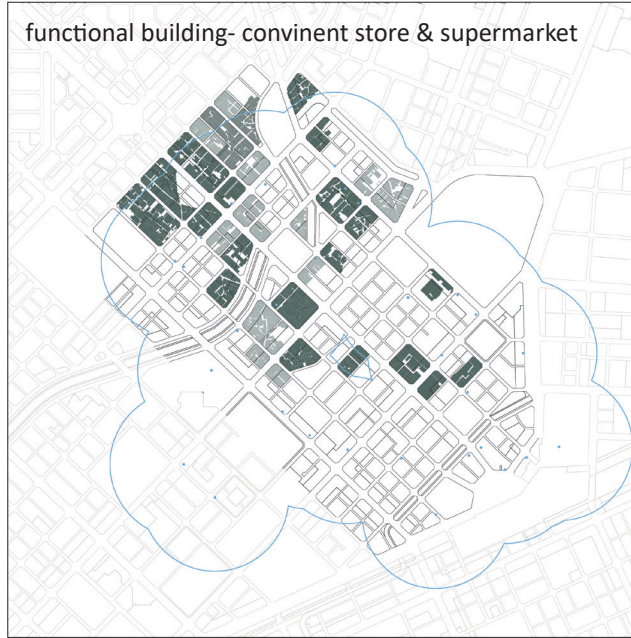
Primary facilities and services

--- 300m walking distance

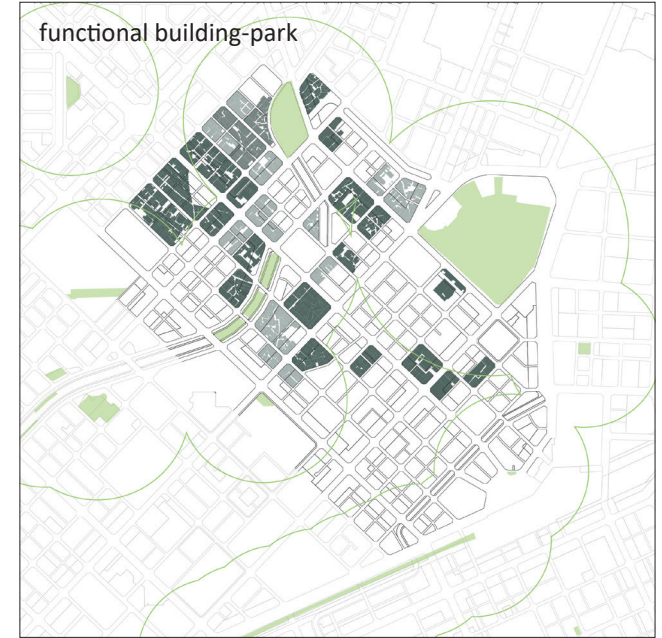
Maps besides show the locations of several primary facilities and services to analyze the accessibility of them for elderly inhabitants in the neighborhood. Currently, primary facilities and services which are convenient stores, supermarkets, parks, restaurants, traditional wet markets, and community center are all quite sufficient in an approachable distance for elderly inhabitants.

Although a few facilities and services are out of the 300m serving radius for some neighborhood, for elderly inhabitants, these facilities and services are still within a walkable distance.

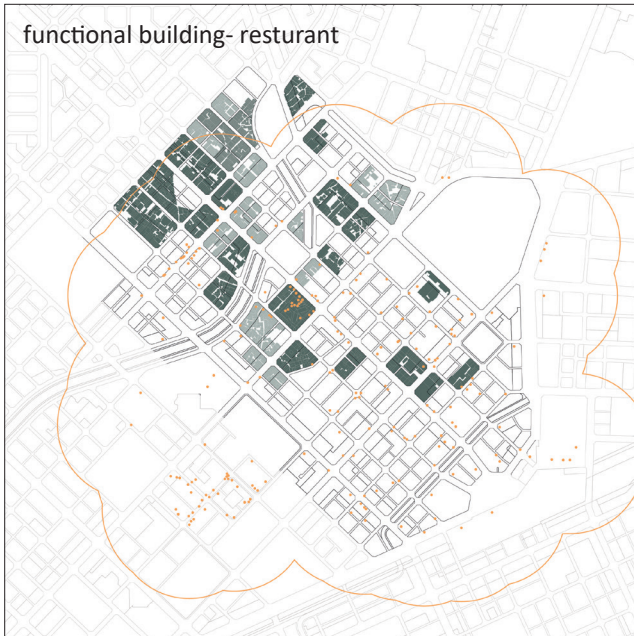
functional building- convenient store & supermarket



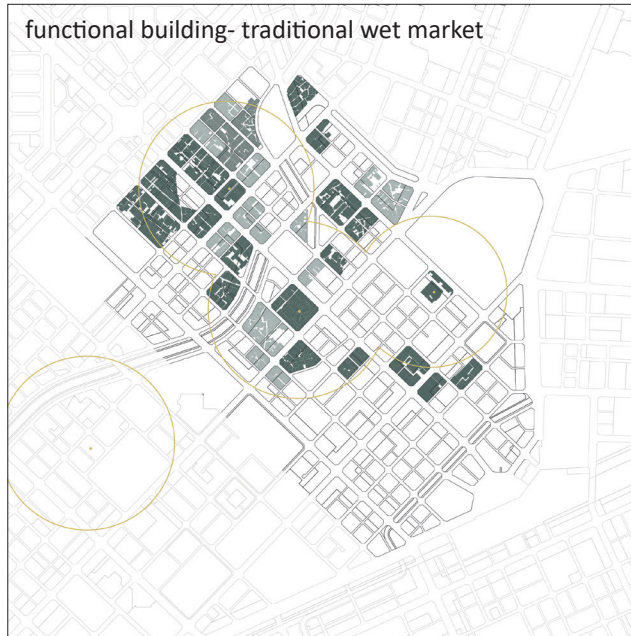
functional building-park



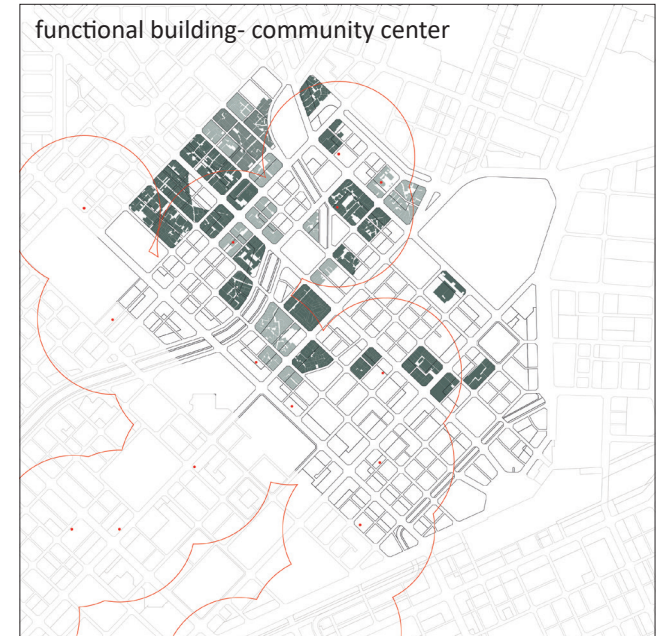
functional building- restaurant



functional building- traditional wet market



functional building- community center

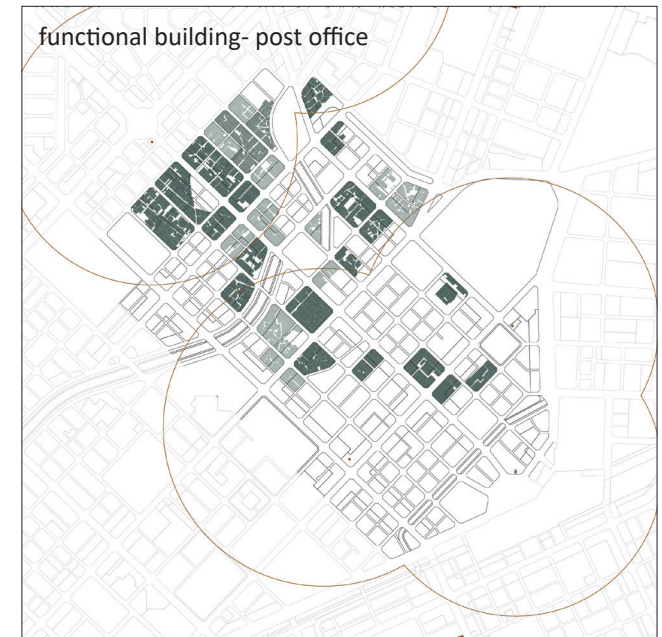
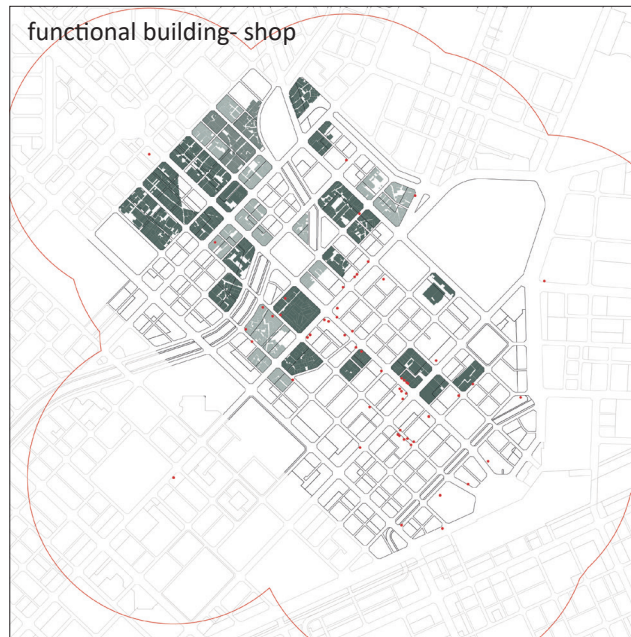
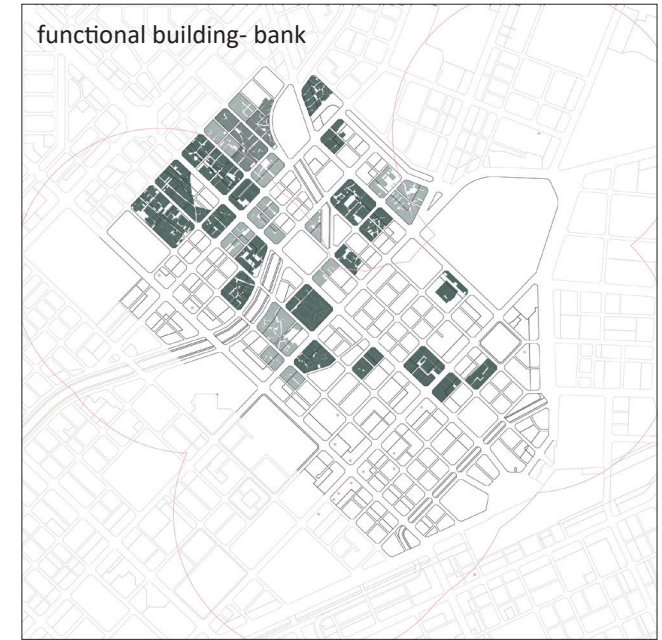
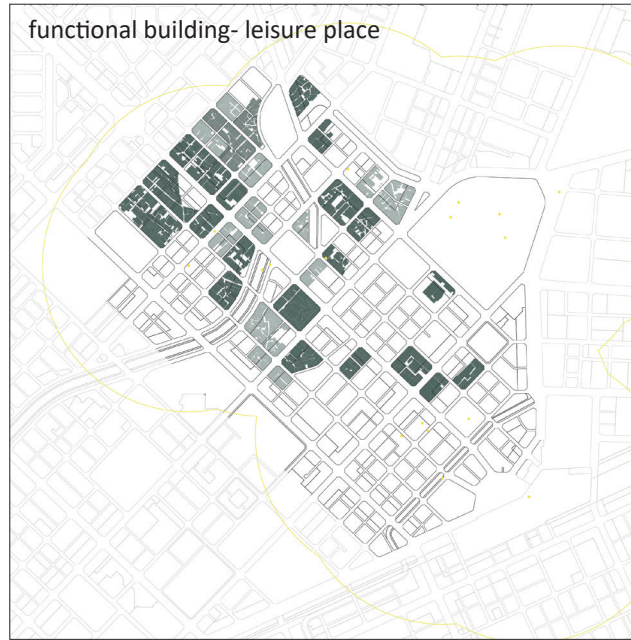


Secondary facilities and services

--- 600m walking distance

Maps besides show the locations of several secondary facilities and services to analyze the accessibility of them for elderly inhabitants in the neighborhood. Currently, secondary facilities and services which are leisure places, banks, shops, and post offices are all quite sufficient in an approachable distance for elderly inhabitants.

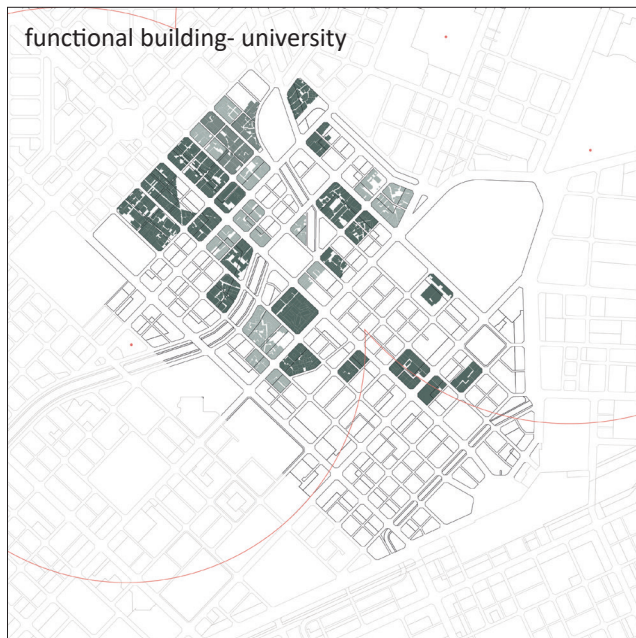
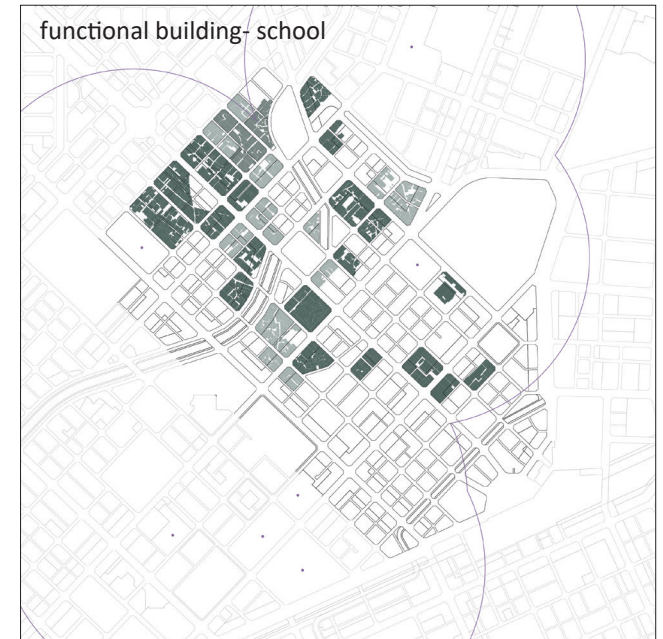
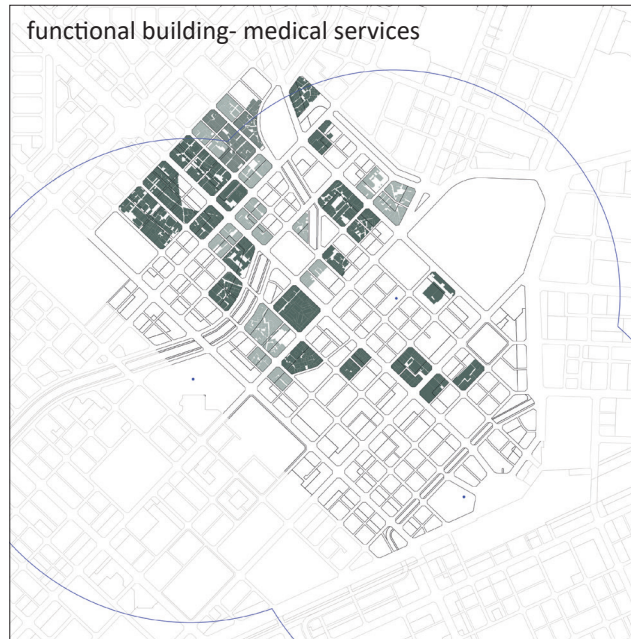
Although a few facilities and services are out of the 600m serving radius for some neighborhood, for elderly inhabitants, these facilities and services are still within a walkable distance.



Other facilities and services

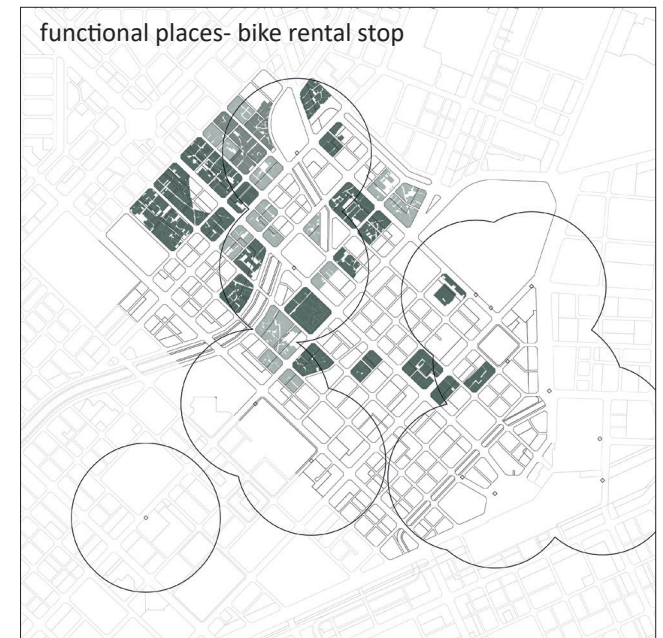
--- 1000m walking distance

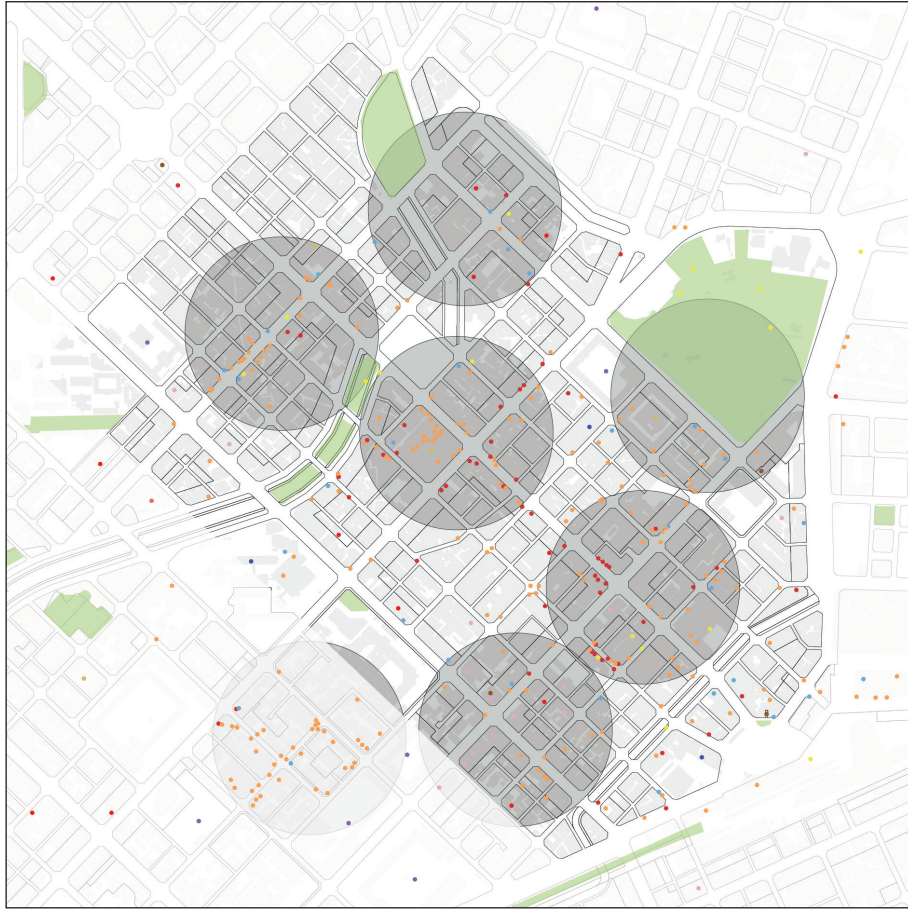
Maps besides show the locations of several secondary facilities and services to analyze the accessibility of them for elderly inhabitants in the neighborhood. Currently, these facilities and services which are hospital and schools are all sufficient in an approachable distance for elderly inhabitants.



Bike rental stops

Maps besides show the locations of bike rental stops to analyze the accessibility of them for elderly inhabitants in the neighborhood. Currently, the amounts of bike rental stops are not enough which some neighborhoods are out of serving radius. Therefore, there will be added new bike rental stops in design proposal based on the map of frequently used streets to provide sufficient services for elderly inhabitants meanwhile promote new transport means.





all functional building



frequently used streets

9.4 Design proposal

Introduction

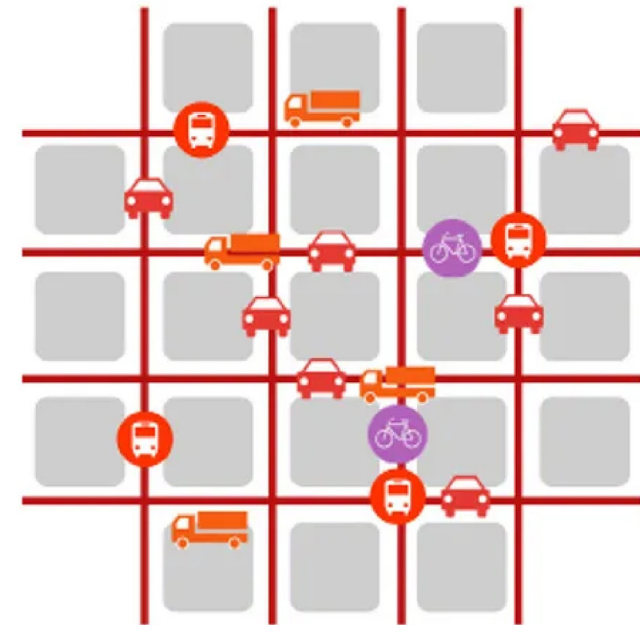
The aim of this graduation project is to redesign the currently public spaces in Taichung old city center to be more friendly for elderly inhabitants. Based on the concept and backbone action spaces, design interventions are proposed which can be presented into 4 topics

- The patch — slow traffic zones
- The line — streets
- The spot — social spaces and green spaces
- The dots — facilities

All topics in the design proposal are inspired by the concept of the 'Super blocks' from Barcelona that previous paragraph had mentioned which is to redesign the current car oriented urban environment (see figure.x) to more non-car user friendly design layout. By combining several small block to create a 'super block' which refers to the topic of 'the patch'. Inside this 'super block', the slow traffic streets are created which refers to the topic of 'the line', and only slow transport means are allowed, such as walking and cycling, except for freight vehicles. Outside of this 'super block', 'ring roads' will be created for cars to use, therefore, the traffic function for car user is still remained. (see figure.x) Meanwhile, since car lanes are removed from streets, the extra spaces are formed and can be provided as new public spaces. Furthermore, the spared spaces connected to these slow traffic streets or street corners can be served as new social spaces for inhabitants which refers to the topic of 'the spot'.

Three domain help to achieve this model:

- Improving public transport system and facilities
- Changing infrastructure and system of the road
- Concentrated car park or parking on the edge of block



Current Model



Superblocks Model

The municipality of Taichung has announced a new car park plan and will be finished at the end of 2022. (see figure.50) The idea behind this plan is to remove parking spaces along the road in order to expand the space for non-car users which brings the opportunity to try-out the 'Super blocks' idea in design proposal. Moreover, this new car park not only served as the location for car parking but also combining the function of public transport stop and meanwhile with public green spaces surrounded. The new car park is located next to the current leisure trail along the river which provide the opportunity to create new continuous linear green public spaces that may be the new core of Taichung old city center in the near future.



figure.50
new car park plan
of Taichung old city
center

The patch

The patch is inspired by the concept of the 'Super blocks' from Barcelona that previous paragraph had mentioned. Since the new car park plan from the municipality will be finished soon in 2023, and the idea of removing parking spaces on the street certainly helps to reduce the volume of the car flow on the street which provide opportunity to create slow traffic streets. Through transform streets within several blocks which eventually can achieve the proposal of 'the patch'. Currently, the block is with the size of 90m*90m (see figure.51) which surrounded by car oriented roads which is lack of comfortable and safe environment for elderly users. By combining blocks next to each other, meanwhile revise the street in between to slow traffic design which can create 'a patch' that with safe and comfortable public spaces for non-car users. (see figure.52)

The line

The current layout of roads is mainly designed for car users. (see figure.53) Car lanes occupied most spaces on the street, and the rest spaces used for car parking. Therefore, other users have no choice but to walk or cycle next to roaring cars. Additionally, although there is a design of pedestrian arcade, it often be occupied by motorbike, food stands or personal stuffs of house owners which leave no spaces for passing through.

Thus, the proposal of design interventions for the line is to revise current road system into more safe and comfortable street layout for non-car users which elderly people are included. (see figure.54) Based on 'the patch' proposal which the line will be divided into three level— green lines, yellow lines, and red lines.

The red line is the road which open for all users, since these roads are essential for maintaining the traffic function. Although these roads will still remain as more car oriented, the layout of these roads will be revised with the separated pedestrian paths and bike paths to improve the safety issues of them. The yellow line is slow traffic street which cars are allowed to pass through these streets with limited speed under inevitable circumstances, except freight vehicles.

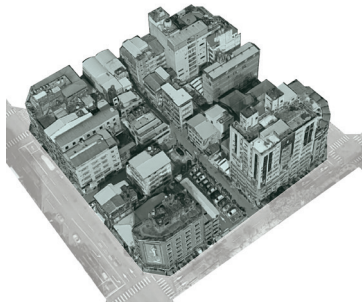


figure.51
combination of
major roads and fre-
quently used streets

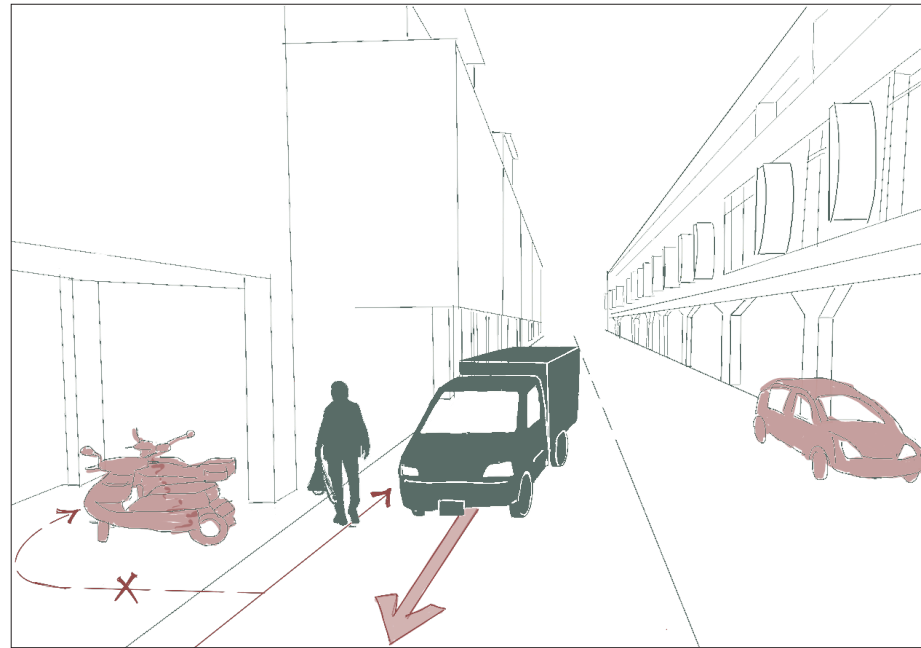


figure.53
current layout
of roads

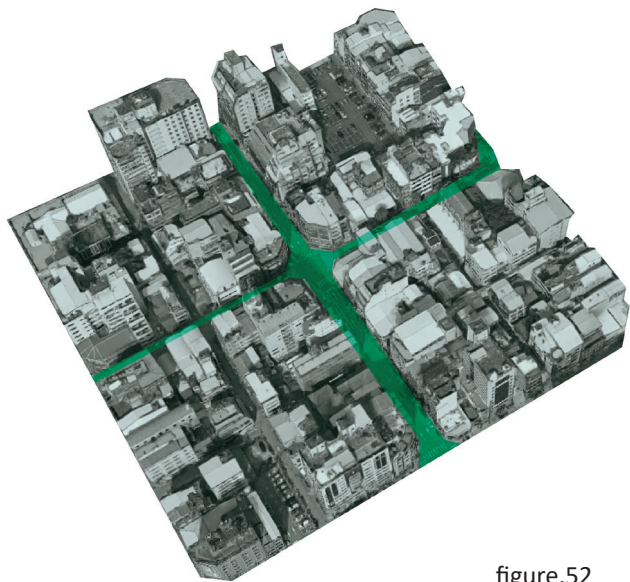


figure.52
slow traffic zones



figure.54
vision layout
of roads

The green line represents as no car street which only allow for cyclists and pedestrians.

The spot

The spot is represented as social spaces and green spaces which are enjoyable places for elderly inhabitants that can encourage them to go outside and be active. The introduction of the concept of 'Super blocks' had mentioned, these spaces are generally located at street corner or current spare spaces within 'the patch'. Since the design proposal of the line has reduced the space for car which means the possibility to expand walking and cycling spaces, meanwhile also provide opportunity to create new public spaces at street corner or at the connected spare spaces.

The dot

The dot means the facility which can improve the comfort and safety of current physical environment for elderly inhabitants. The dot is more present as the location with detail design which will be combined with other 3 topics, such as public seats and toilets along streets (the line), social spaces, and green spaces (the spot).

All topic are related to each other with the topic on small scale embedded in the topic on medium scales, and further embedded in larger scales. Altogether can revise current public spaces of old city center to age friendly environment.(see figure.55)



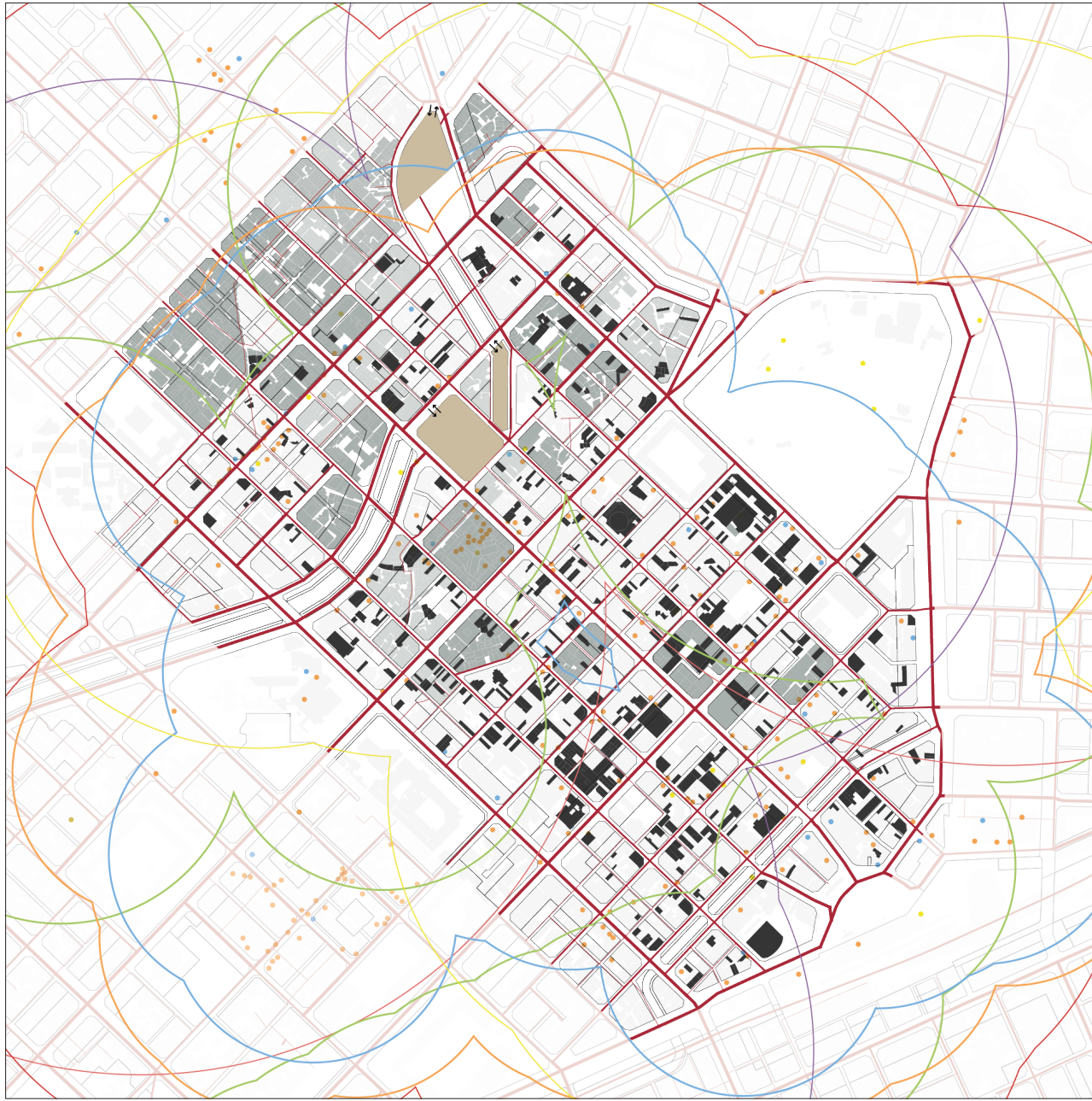


figure.55
overlapped map with all design proposals

10.

ENVISION

**route toward active ageing and inclusive
future**

10.1 Introduction

In this chapter, will demonstrate the design intervention which helps to achieve the vision toward the inclusive old city center.

The design intervention will be introduced based on design proposal of 4 topics. Since the design intervention of 'the dot' is embedded in others, it will be firstly additionally introduced in paragraph of Materialisation. The other topics will then be demonstrated with the order of the patch, the line, and the spots. As 'the patch' can only be achieved with the help of spatial interventions of 'the line', 'the spot', and 'the dot' which all of them will be included and mentioned in design intervention of 'the patch'.

Application of design principles and patterns

While the design proposal of 4 topics seem to meet the task of this project, the design needs to be tested, implemented and visualised on street level to make sure design interventions do meet the requirements of design principles for elderly friendly public spaces. And as a result showing how the design principles can be used in the practice of urban designers and planners.

As the design principles and pattern are already been demonstrated in previous chapter, they however will be explicitly named when showing designs in each topic. The choice of using certain principles and patterns are directly derived from the design task and the concept of this project. From going through different scale and determined current obstacles are preventing the public spaces from being age-friendly.

The found obstacles and the design will be discussed and visualised in paragraphs 10.2, 10.3, and 10.4.

Materialisation - the dot

To make sure the revised public spaces will be recognisable on street level for elderly inhabitants meanwhile meet the requirements expressed in the principles, a constant materialization is used, although, some might be slightly changed based on the current morphology of the street. Firstly, the use of green is important for the attractiveness

and comfort of public spaces. The choice of trees and plants can additionally help with recognisability. However, the tree that has been used on the road or the street need to be further considered with safety issues since some trees with lower branches may cover the sight of road users which may lead to a dangerous circumstance. Therefore, the one main type of tree the "Liquidambar formosana" (see figure.56) and hedge the "Duranta plumieri" (see figure.57), which are already prevalent used on the roads are chosen and will be used in the design intervention for streets. Furthermore, a currently used feature street lighting (see figure.58) has been selected and will be used on the major roads which specifically can work as environmental feature meanwhile provide necessary lighting at night. For the other slow traffic street, the selected street lighting will incorporate with the local feature. Same as for choosing the types of public seats and pavement will also first consider to incorporate with the existing forms, colors and materials. But when choosing the pavement, with the design principle from safety theme need more consideration of non-slip, non-glare surface.

There will be no difference from material for roads and for bike lanes but in order to make bike lanes more recognizable for users it will be marked with red color, and the border between the footpath, bicycle lane and car lanes, green buffer planting area are designed with the use of a concrete band which can not only enhance safety but also improve the quality of environment.



figure.56

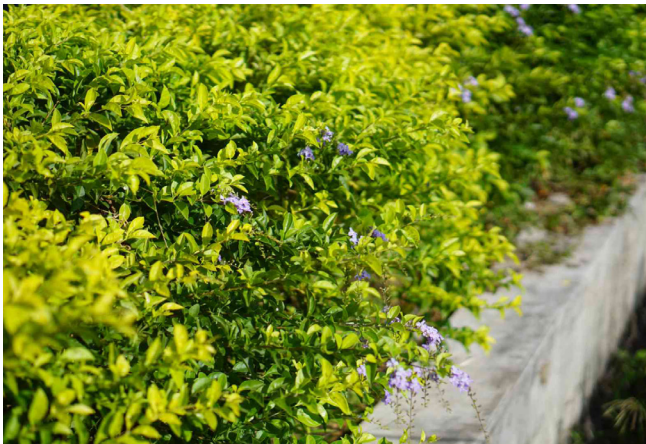


figure.57



figure.58



10.2 The patch—slow traffic zone

The design of the built environment in Taichung old city center is currently car-oriented based. As figure.59 shows, cars are allowed to go through every street and roads, no matter how width the roads and streets are. It is really dangerous for the non-car user, especially when the street is too narrow and most of the time do not have separated footpaths or bike lanes. In Taichung old city center, it is prevalence to discover elderly people walking or cycling next to a roaring car which put the threats to their lives. In order to revise the current environment to become friendly for elder inhabitants which encourage them to stay and become active, the design intervention was proposed in previous chapter which is inspired by the concept of 'super blocks'. The vision of 'the patch' is to create certain bigger blocks with slow traffic system which elderly inhabitants can feel safe and enjoy the outdoor public spaces. The size of each patch should be within 5 mins walkable distance, which is around 300 m.

The current model of traffic system (see figure.59) which indicate the width of the road, and the map of major roads in old city center area which indicated certain roads need to remain the accessibility for cars since these roads are served as links for connected to other areas. Both maps provide information for decided where to create slow traffic zones and the size of them. Additionally, the road connected with the new and the existing car parks also need to remain accessible for cars. (see figure.60) Then, the preliminary patches are decided with new arrangement of traffic system around this area. (see figure.61) Next, the accessibility of facilities and services for elderly inhabitants within each patch need to be guaranteed. As figure.62 shows, although some facilities and services are located at the boarder of patches, it also can be seen as the opportunity to encourage elderly people to be active, since the route to these action spaces are inside the patch (slow traffic zone) which is more comfortable and safe for elderly inhabitants.



— major road (more than 10m)
— streets (7-9m)
— alleys (less than 6m)

figure.59
combination of
major roads and frequently used streets



figure.60
car parks in old city center

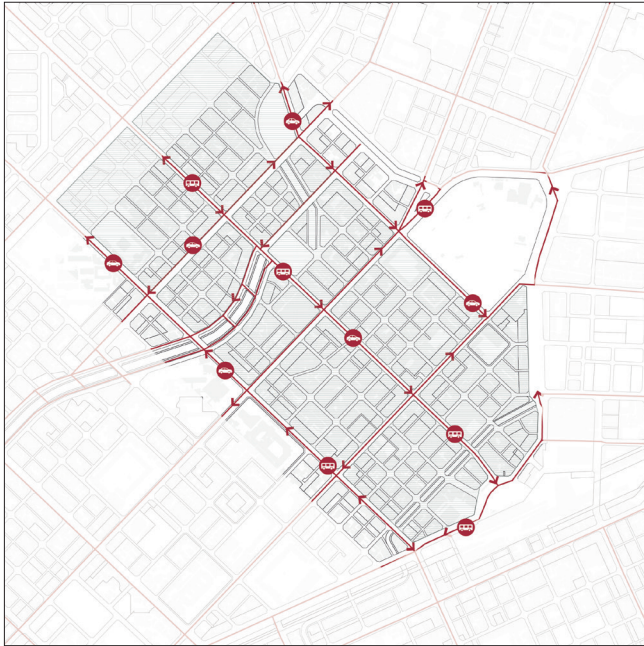


figure.61
car accessible roads

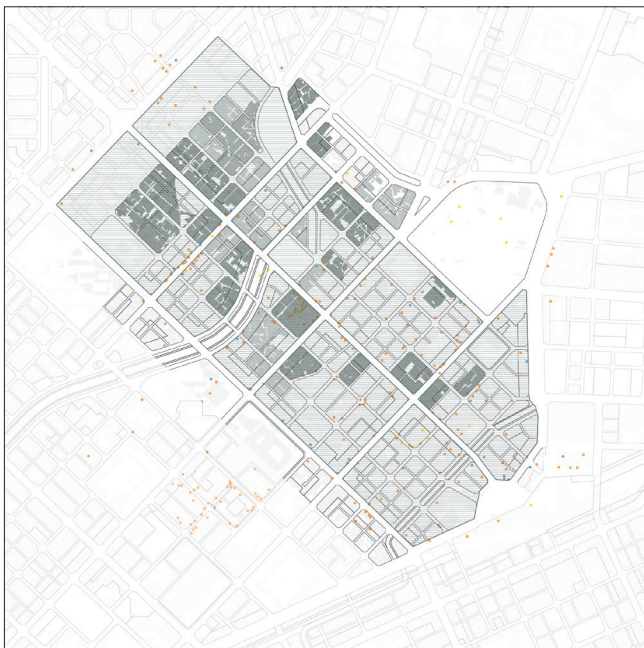


figure.62
preliminary patches

However, based on figure.62, there are still some facilities and services located within the patch, such as convenient store, traditional wet markets, and restaurants which they need to restock the goods. Therefore, the accessibility for cars (freight vehicles) of streets which connected to these facilities and services should remained. Since the car lane will still be designed in these streets which can be used when emergency or inevitable situation happened. see figure.63

Although, the car lanes will remain in major roads and service streets, the current layout of them will be revised in order to guarantee the safety and accessibility elderly people and other users. For the rest of narrow streets (alleys), cars will be forbidden, and only walking and cycling are allowed. The revision design of all these roads will be further explained and demonstrated in detail in the vision part of 'the line'. see figure.64

Within each patch, there should be at least located with one social spaces which can provide elderly people to have social connection with other that can certainly reduce social isolation. As figure.x shows, there are currently 4 patches where elderly inhabitants lived have no social space. Therefore, there should be a new social space added in these patches. The location of new social space will be decided based on the map of current spare spaces in Taichung old city center. Meanwhile, although some patch currently have indoor social spaces, they only accessible in limited hours, therefore, there will be added new social spaces in these patches. In the vision part of 'the spot' will explain the design intervention for these new created social and public spaces more detail.

The design principle and patterns that included in this spatial design intervention are





figure.63
slow traffic streets

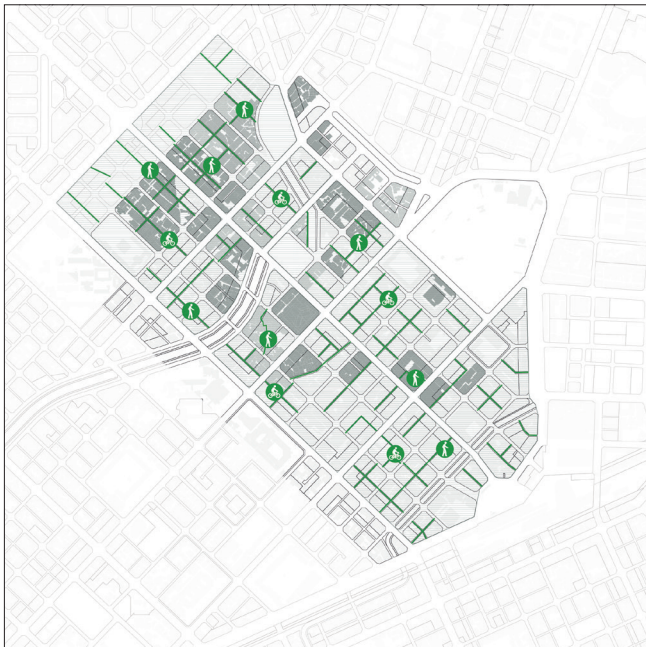
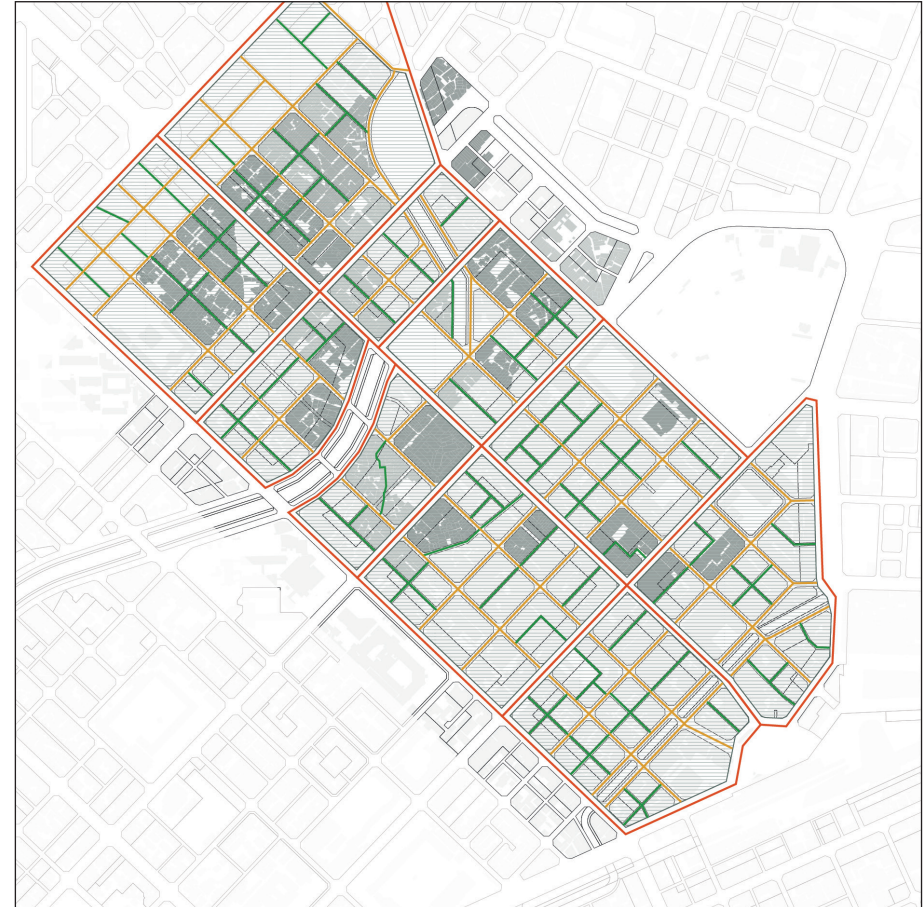


figure.64
no-car alley

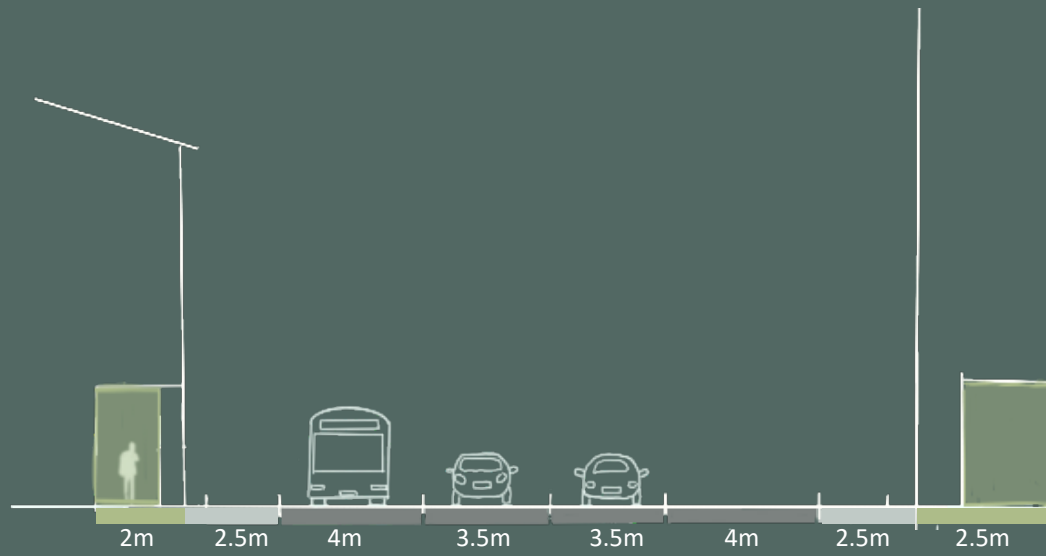
10.3 Vision— the line

Based on the design proposal of 'the line', the road will be classified into three level— green lines, yellow lines, and red lines. In the vision part of 'the patch' already indicated roads which will remain as major roads that refers to red lines, and roads which will limit the accessibility for car but remain the function for freight vehicles in order to restore goods that refers to yellow line. The rest of the street which seems to be like an alley will only allow pedestrians and cyclists to use. The figure.65 shows the new plan for design intervention of the road.

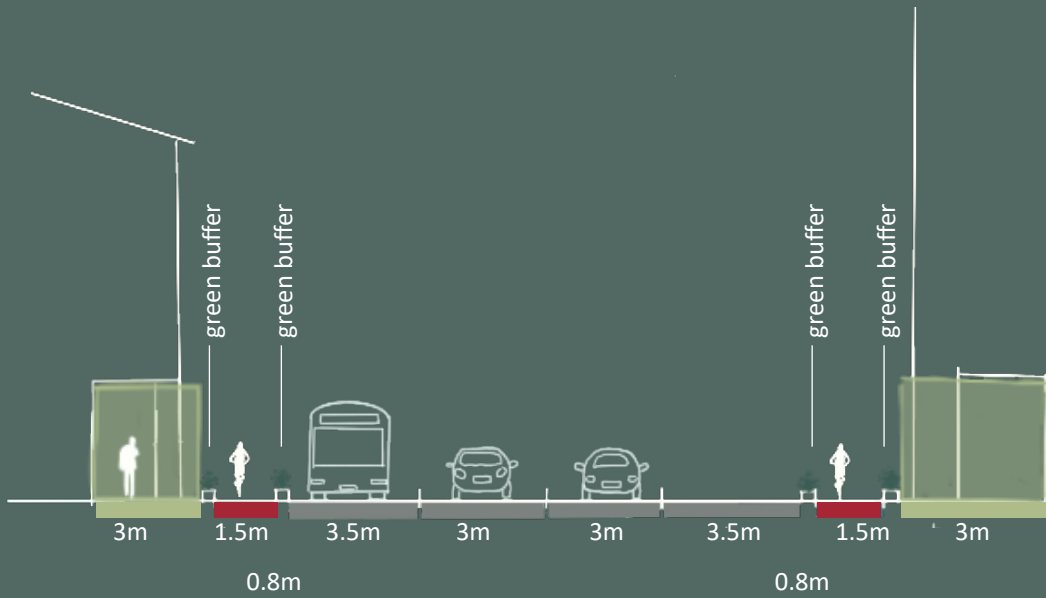


vision map of new road design proposal

The red lines



current road layout



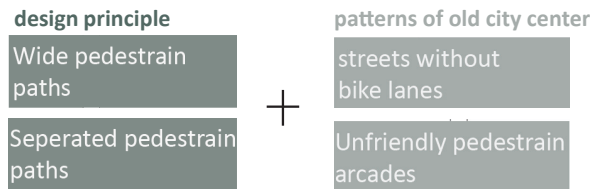
vision road layout

The red line

The red line is the current major road with total 20m width. The current layout of the road is two car lanes in each single way. The inner car lane is 3.5m width, and the other is 4m width. The 4m width car lane is also the one which buses mostly used on the road. In addition, there is a 2.5m width space of car parks along the road. The space for pedestrian has only be designed within the arcade which is 2m width. Although it seems like the accessibility for pedestrian has been guaranteed, most of the spaces are currently used for parking motorbike, be occupied for personal used by house owner, and be occupied for commercial used by stores. Therefore, when the space is too narrow to walk through at some pedestrian arcade, elderly people will choose to walk on the road which means directly walk beside cars since there is no buffer zone to separate the walking area from driving area that really put the threat to lives of elderly people.

Moreover, the bike lane is also missing on the layout of the road currently which in the other words, cyclists need to share spaces with car users on the road that frequently resulting in the occurrence of car accidents.

The revised design of the major road is based on the design principle and patterns of old city center which are listed below.



The section on the left shows the current and revised layout of the major road. Car lanes will all be remained because the necessity for maintain the traffic volume in this area, since these roads served as the main connection to other areas. Currently, the road is lack of the walkability for the elderly pedestrian and the safety of the public environment is also not be enough considered. Therefore, the spatial intervention of the major road will narrowed down the car lane to

reduce the traffic speed for the safety issue, on the other hand, may able to encourage people to embrace slow traffic, hereby to reduce the traffic volume within these roads. The new car park plan from municipality which allow to remove current car parks along the road to add new bike lanes with 1.5m width and enlarge pedestrian paths. The planting belt in-between the car lane and the bike lane, and the bike lane and footpath are served as the buffer to separate them all in order to create comfortable and safe public environment for elderly inhabitants, meanwhile to prevent motorbike to park in the arcade. Additionally, these red line are mostly also used for bus routes. Based on the patterns of old city center, the spatial intervention of these road also need to consider the waiting space at the bus stop.

patterns of old city center

Lake of waiting spaces for bus stops

Meanwhile, there will be some crossroads on the red line, and the crossroad is the one of the most dangerous places for elderly people when it comes to the safety. Based on the design principle, every crossroad need to be secured with noticeable signals.

design principle

Noticable crossroad signals

Moreover, there will also be psychological declined when people getting older which is the ability of finding their way. Therefore, based on the design principle and patterns of old city center, it is important to set wayfinding features such as specific types of plants or special street furnitures which will be detailed explained in following perspectives.

design principle

Distinctive features
Reflect local color & materials

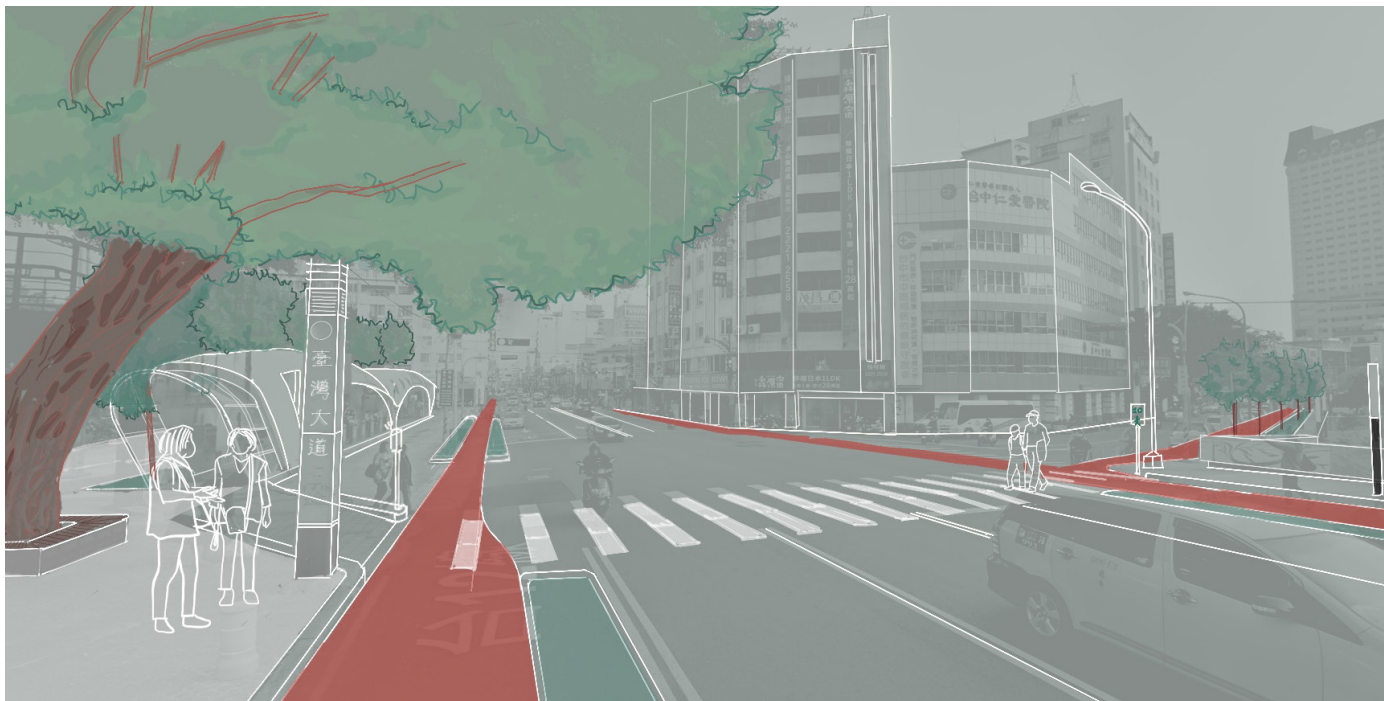
+

patterns of old city center

A special building as a wayfinding point



The road is currently lack of bike lane, meanwhile the safety issue is also a concern. The design intervention is to reduce a car lane for the green buffer zone and the cycling space in order to improve safety and comfort of physical environment for elderly people. Currently, there are some street furniture which can be use as the wayfinding point in order to enhance the legibility for elderly inhabitants. The tree will also be remain as they improve the quality of the public space.



design principle

- Wide pedestrian paths
- Separated pedestrian paths
- Noticable crossroad signals
- Distinctive features

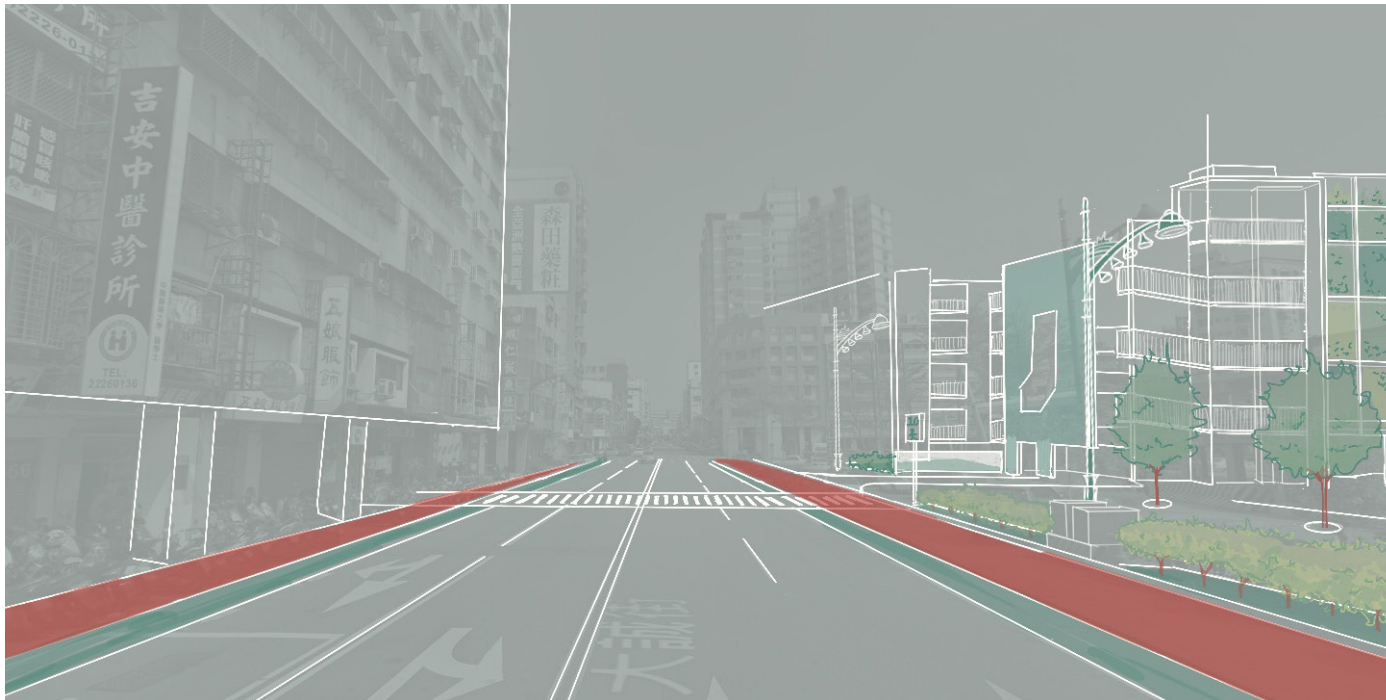
patterns of old city center

- streets without bike lanes
- Unfriendly pedestrian arcades





The road is currently lack of bike lane, meanwhile the safety issue is also a concern. Since the road will be next to the new car park, the parking area beside the road will be reuse for green buffer zone and the bike lane in order to create safe and comfortable public environment for elderly people. Meanwhile, there will be a new green public space where elderly people like to go, therefore, the safe crossing need to be guaranteed since elderly people need to walk across road to reach this park. Currently, there are street furniture which can be wayfinding point for elderly people will be preserved.



design principle

- Wide pedestrian paths
- Separated pedestrian paths
- Noticable crossroad signals
- Distinctive features

patterns of old city center

- streets without bike lanes
- Unfriendly pedestrian arcades
- Plants to decorate the environment





The road is currently lack of bike lane, meanwhile the safety issue is also a concern. The design intervention is to reduce a car lane for the green buffer zone and the cycling space in order to improve safety and comfort of physical environment for elderly people. The safety of the crossing also need to be improved with adding noticable signal. Currently, there are some street furniture which can be use as the wayfinding point in order to enhance the legibility for elderly inhabitants. The tree will also be remain as they improve the quality of the public space.



design principle

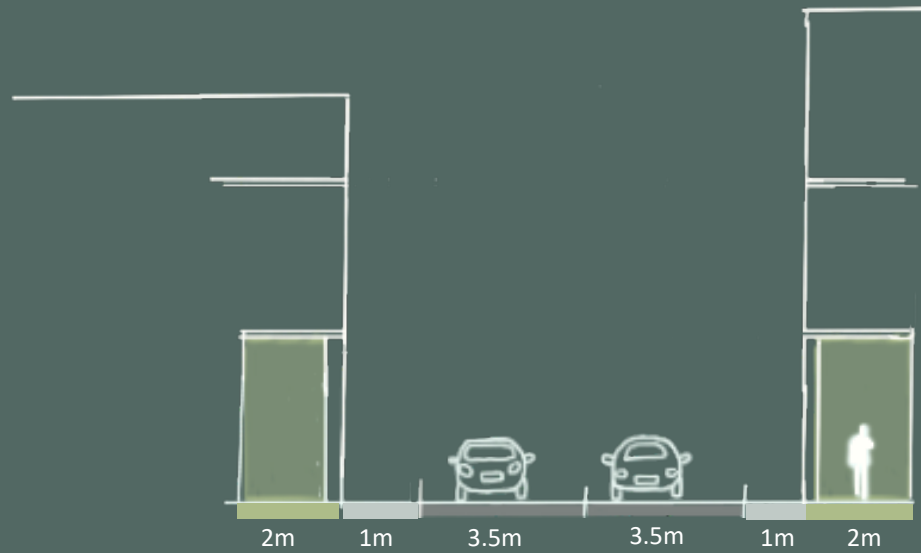
- Wide pedestrain paths
- Seperated pedestrain paths
- Noticable crossroad signals
- Distinctive features

patterns of old city center

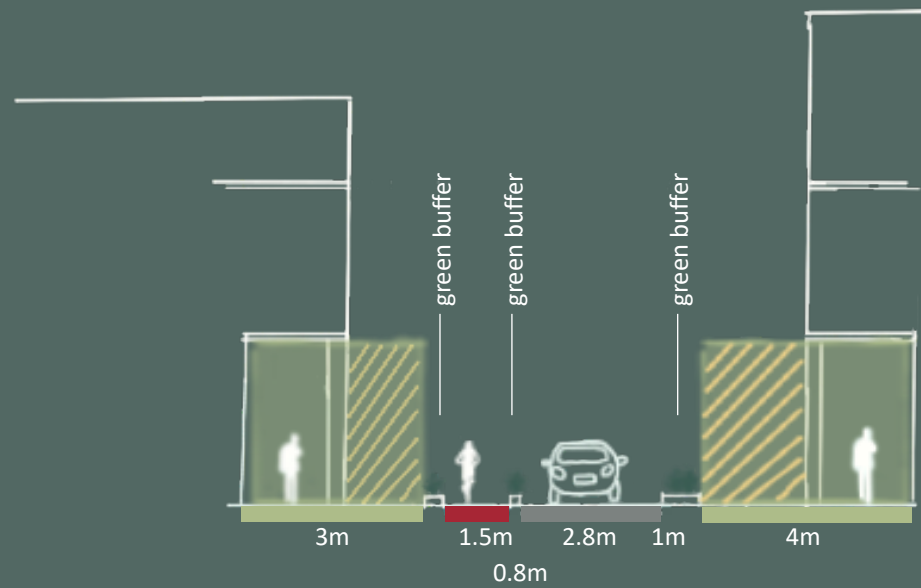
- streets without bike lanes
- Unfriendly pedestrain arcades



The yellow line



current road layout



vision road layout

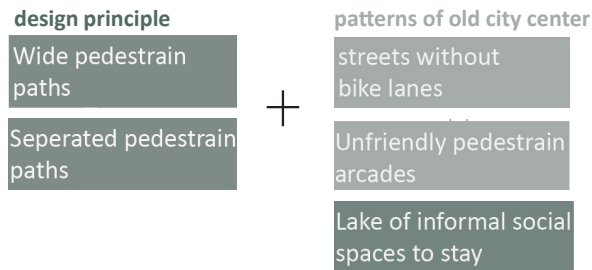
The yellow line

The yellow line served as the route which elderly people used to reach essential services and facilities daily. Therefore, the spatial intervention will be more emphasized on pedestrian and cyclist oriented street design to creating safe and comfortable physical environment for them.

The street is with total 9m width. Currently, the street layout is two car lanes in one single way. Both car lane are 3.5m width with extra 1m width spaces beside which a lot of cars used as temporary parking spaces. The space for pedestrian has only be designed within the arcade which is 2m width.

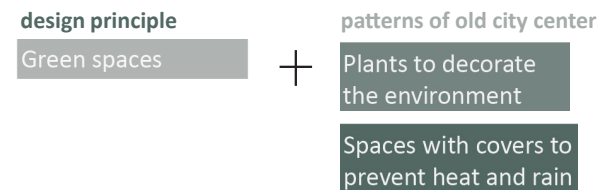
Although it seems like the accessibility for pedestrian has been guaranteed, most of the spaces are as previous mentioned generally occupied by motorbike, be used as personal spaces by house owner, and be occupied for commercial used by stores. Therefore, also resulted in the situation of elderly people have no choice but walk on the road beside cars since there is no buffer zone to separate the walking area from driving area that caused lots of safety issues for elderly people. Moreover, the bike lane is also missing on the layout of the road currently which in the other words, cyclists need to share spaces with car users on the road that frequently resulting in the occurrence of car accidents.

The revised design of the street is based on the design principle and patterns of old city center which are listed below.

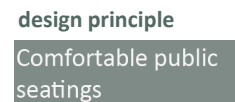


The revised design of streets, car lanes will all be reduced into one as the traffic volumes are not heavy in these streets. Therefore, with the

remaining one car lane will be enough to keep the traffic flow smoothly. Currently, car parks along the street will be removed based on the new car park plan from municipality which create extra spaces that can be used. These spaces will be used for new bike lanes and the extension of current pedestrian arcade based on the patterns of old city center. Since in the concept of 'Super blocks' had mentioned these extension of slow traffic spaces can be social spaces which provides elderly people to sit and stay to enjoy the outdoor environment or the terraces as outdoor dining spaces and so on. All this fuctions areal-low elderly people to enjoy the soical interaction with others. Meanwhile, there will be a planting belt in-between in order to keep the pedestrian and cyclists away from cars to secure their safety. In addition, these social public spaces will be shaded by green or some hand made decoration covered which currently founded in the neighborhood to prevent the heat in the noon, since the specific climate in Taichung which it will become quite hot during that period. At the same time, green can not only improve the quality of public spaces but also the health of elderly people.

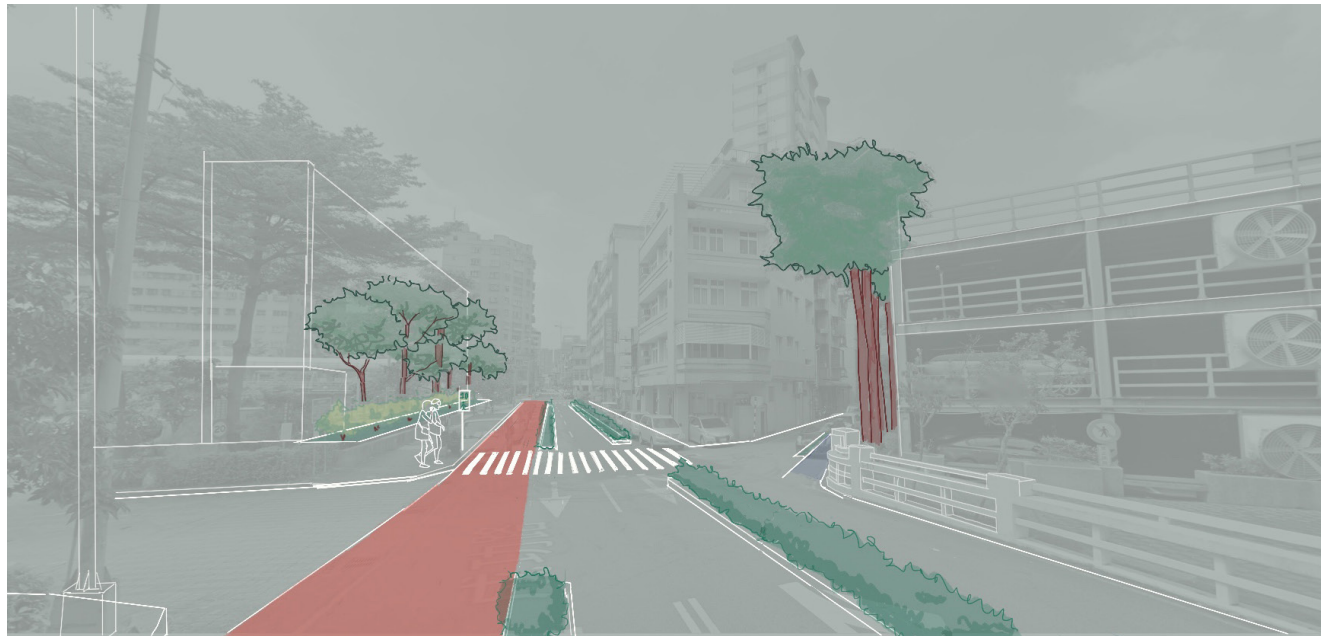


As previous had mentioned when people getting old, they may lose body strengthen which make them easier getting tired. Since these streets are daily used by elderly people to reach their action spaces, based on the design principle, improving the comfort of current public environment of streets by providing public seats become important.





The road is currently lack of bike lane, meanwhile there is a safety issue of the crossroad. The design intervention is to reduce a car lane for the green buffer zone and the cycling space in order to improve safety and comfort of physical environment for elderly people. The safety of the crossing also need to be improved with adding noticeable signal. Currently, there is one special type of trees which can be use as the wayfinding point in order to enhance the legibility for elderly inhabitants, at the same time, able to improve the quality of the public space.



design principle

- Wide pedestrian paths
- Separated pedestrian paths
- Noticeable crossroad signals
- Distinctive features

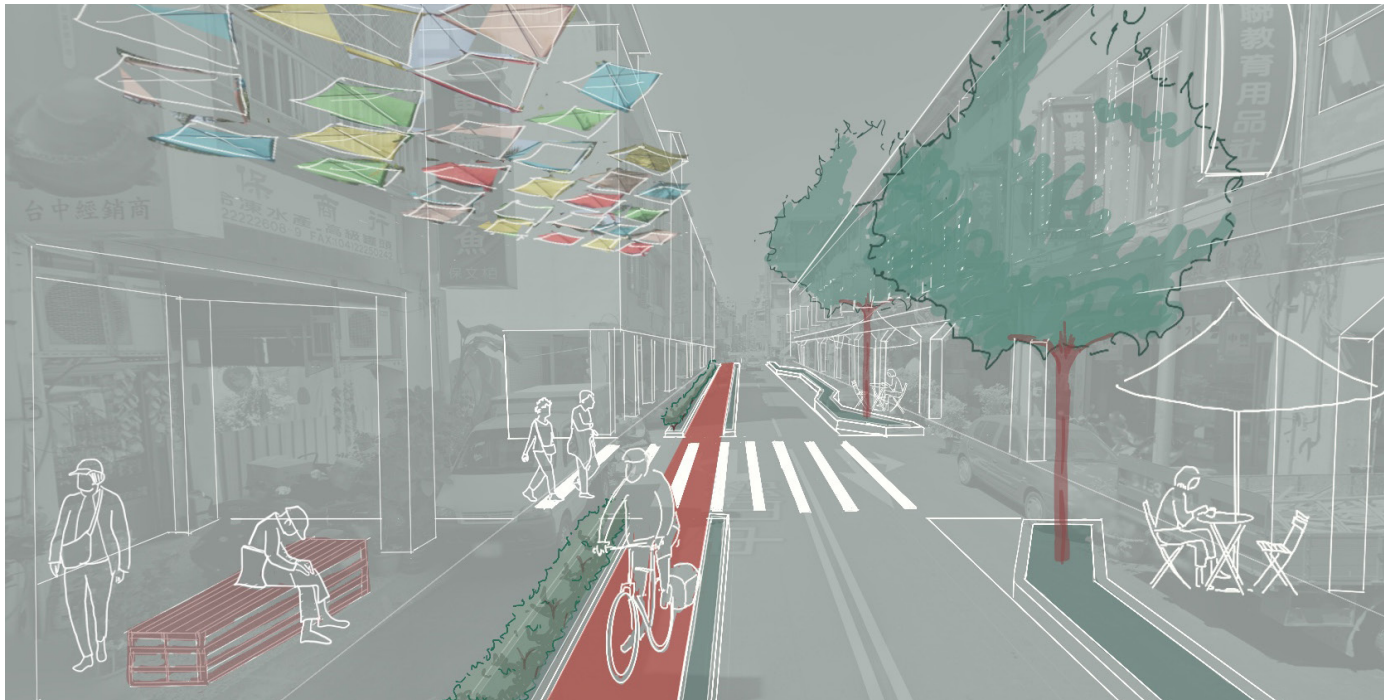
patterns of old city center

- streets without bike lanes
- Unfriendly pedestrian arcades





The road is currently lack of bike lane, the walkability of pedestrian arcade is also bad, and there is a missing of a safety crossroad. The design intervention is to reduce a car lane for the green buffer zone and the cycling space to improve safety and comfort of physical environment for elderly people, meanwhile there will be added with noticeable signal at the crossroad. Currently, there is no green, therefore, will be added a specific type of tree which can served as the wayfinding feature. Additionally, this road is next to the traditional wet market where elderlt people visit frequently, design intervention will be focus on to create the public space where attract elderly people to use and to stay.



design principle

- Wide pedestrain paths
- Seperated pedestrain paths
- Noticable crossroad signals
- Distinctive features

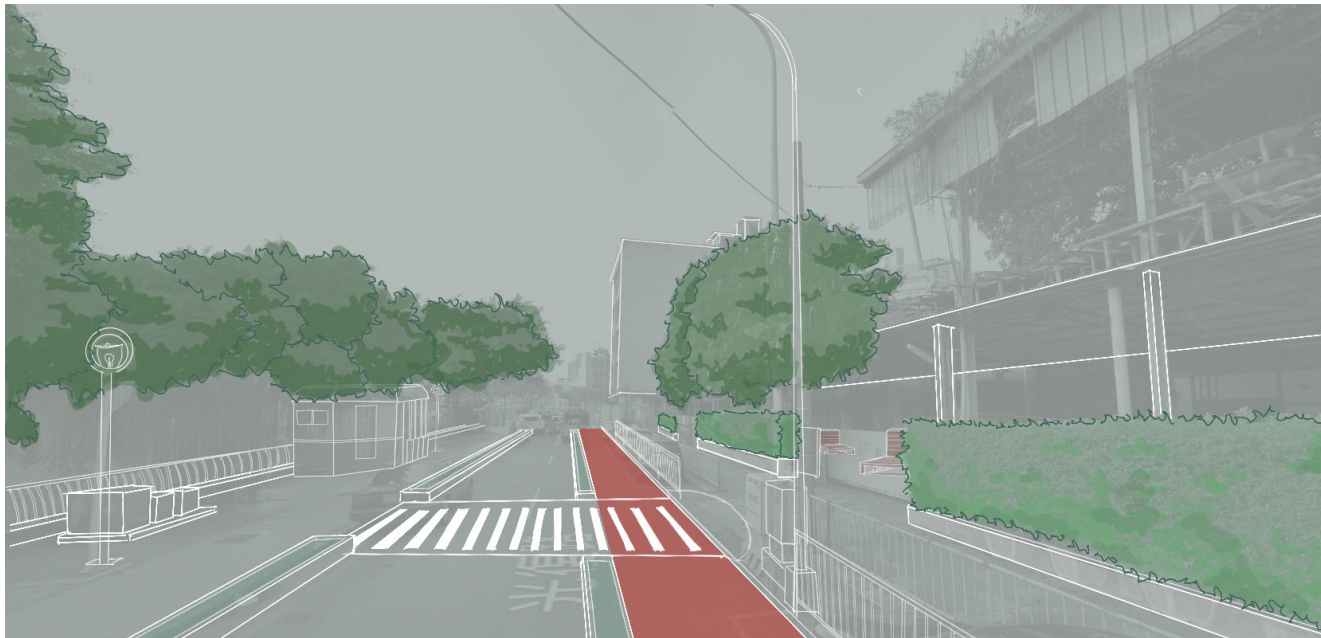
patterns of old city center

- streets without bike lanes
- Unfriendly pedestrain arcades
- Plants to decorate the environment
- Self-made, small and informal social spaces
- Spaces with covers to prevent heat and rain
- Lack of public seats





The road is currently lack of bike lane, meanwhile there is a safety issue of the crossroad. The design intervention is to reduce a car lane for the green buffer zone and the cycling space in order to improve safety and comfort of physical environment for elderly people. The safety of the crossing also need to be improved with adding noticable signal. Currently, there is a special street light which can be use as the wayfinding feature. Meanwhile the green in public space will be pre-serve which able to improve the quality of the public space.



design principle

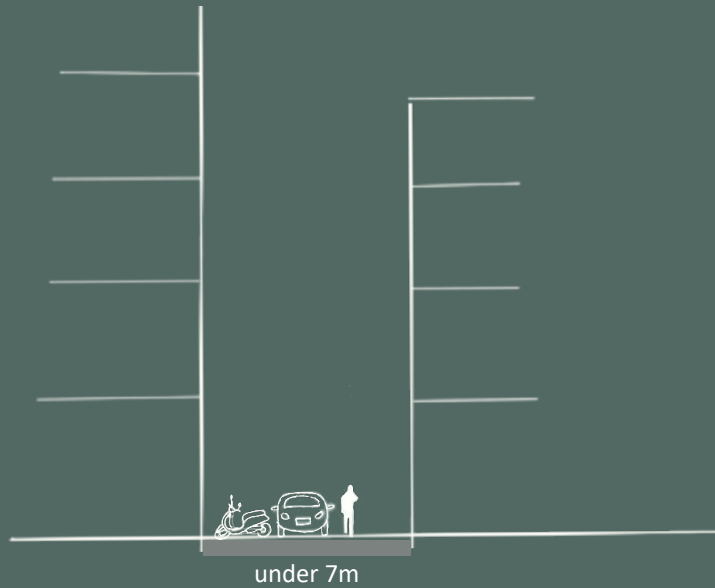
- Wide pedestrain paths
- Seperated pedestrain paths
- Noticable crossroad signals
- Distinctive features

patterns of old city center

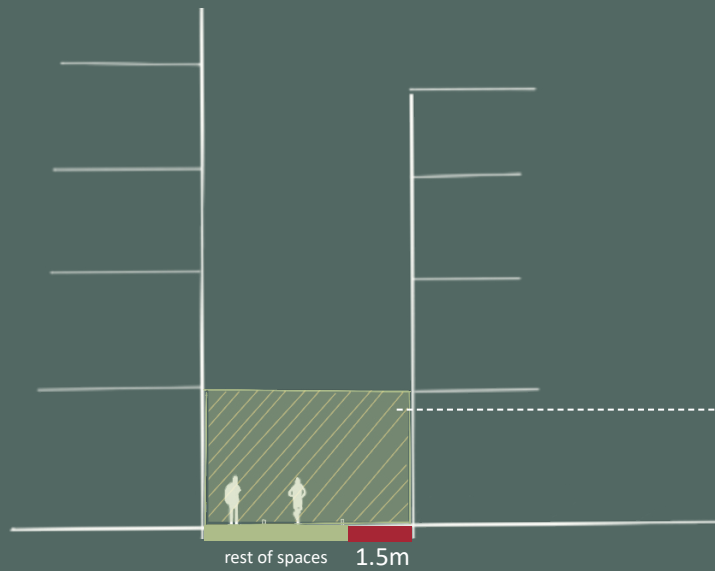
- streets without bike lanes
- Unfriendly pedestrain arcades



The green line



current road layout



cars are only allowed to use in emergency circumstance

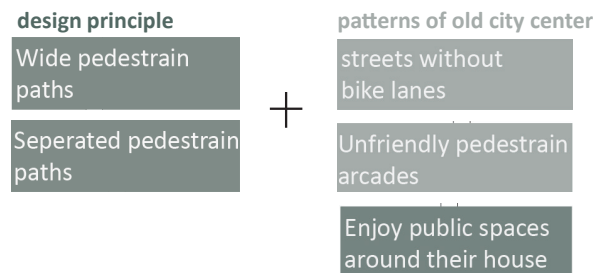
vision road layout

The green line

The green line is an alley which directly connected to the house of elderly inhabitants. It is the public space which most closely to elderly people's daily life. As patterns of old city center has demonstrated, some elderly people really like to take a walk around their houses. Some will even put a chair at the front door to enjoy the nice weather, sunshine, and the atmosphere in the alley. Since the alley play such an important rule in elderly's daily life, the spatial intervention will focus on creating a more safe and comfortable physical environment for them.

Currently, the green line (the alley) with the width which is under a total of 7m. The street layout is designed as an entire area with pedestrian, cyclist, motorbike users, and car users sharing the same space which most of the time as pedestrian need to be really careful for the coming cars or motorbikes. The non-divided street layout and careless drivers which worsen the safety issue for elderly pedestrians. For the crossroad, a sign or signal is also missing to serve as a remainder of the coming car for pedestrians.

The revised design of the street is based on the design principle and patterns of old city center which are listed beside.



The revised design of alley which will become only accessible for pedestrians and cyclists. Cars will be prohibited in this area since the alley is used by elderly inhabitants constantly. The alley will become not only the place for passing by but also the places where elderly

inhabitants able to stay for social engagement with others.

patterns of old city center

Lake of informal social spaces to stay

Self-made, small and informal social spaces

Since the alley going to be a long-stay public space for elderly people, the comfortable seats, the shade, and the green are vital element as well when designing spatial intervention for these alleys. The shade is to prevent the heat around the noon, and the green not only can improve the environment's quality but also enhance the health of elderly people as previous had mentioned. Additionally, the pavement will also be designed with different material from roads in order to clarify this specific non-car area, meanwhile also increase the legibility for elderly people.

design principle

Green spaces

Comfortable public seatings

Distinctive features

Reflect local color & materials

+

patterns of old city center

Plants to decorate the environment

Spaces with covers to prevent heat and rain

Lack of public seats



The alley is the public space which directly connected to the place where elderly people lived. Elderly inhabitants enjoy walking at the alleys around their houses. Therefore, based on the design principle and the patterns, the design intervention is to transform the alley into a non-car area where elderly people can enjoy without fear.



design principle

Wide pedestrian paths

Separated pedestrian paths

Green spaces

Distinctive features

patterns of old city center

Lack of public seats

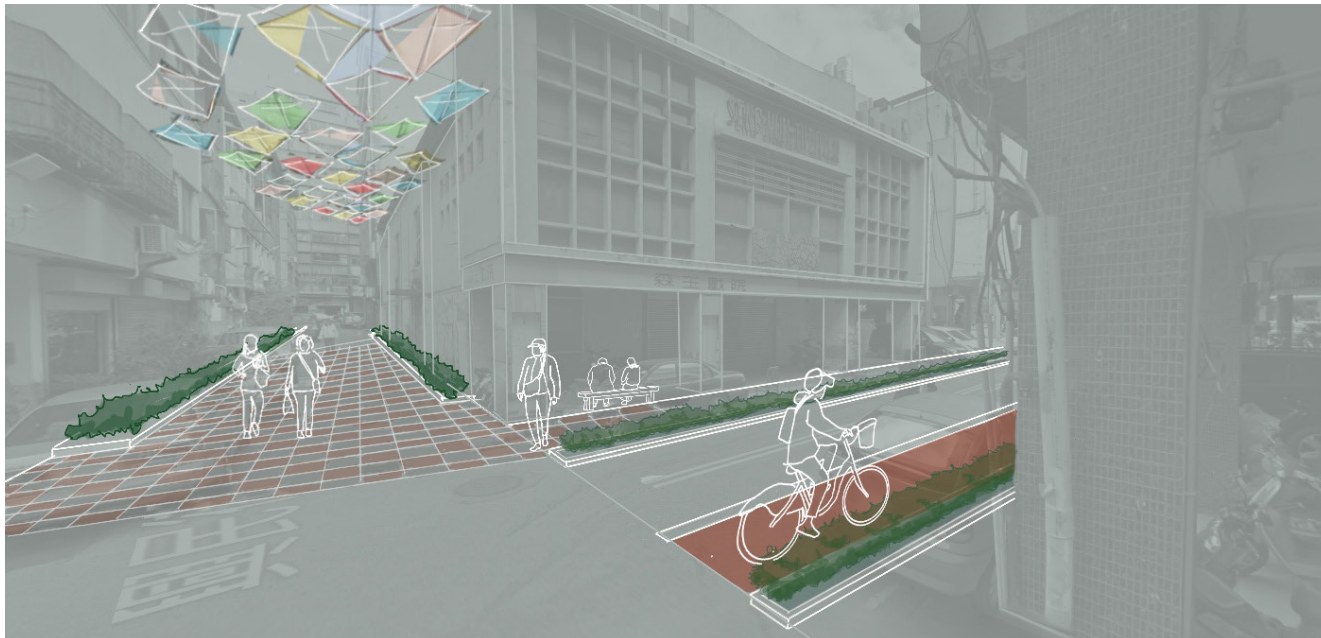
Unfriendly pedestrian arcades

Enjoy public spaces around their house





The alley is the public space which directly connected to the place where elderly people lived. Elderly inhabitants enjoy walking at the alleys around their houses. Therefore, based on the design principle and the patterns, the design intervention is to transform the alley into a non-car area where elderly people can feel safe to enjoy.



design principle

- Wide pedestrian paths
- Separated pedestrian paths
- Green spaces
- Distinctive features

patterns of old city center

- Lack of public seats
- Unfriendly pedestrian arcades
- Enjoy public spaces around their house



10.2 Vision— the spots

As in design concept had mentioned, Taichung old city center is currently lake of enjoyable and accessible public spaces for elderly inhabitants. Although from the analysis of action spaces, public spaces which provide elderly people for social engagement are sufficient within the service radius of each neighborhood, the current design of street layout and the limited service hours of community centers restrain elderly inhabitant from being active and fulfilling their outdoor mobility goals. Previously, as the design proposal of ‘the patch’ had mentioned there will be at least one social public spaces in each ‘patch’. Although there is already a community center in some patches, with the limited service hours which still need to be added a new social public spaces for elderly inhabitants.

The design proposal of ‘the spot’ is generally based on the design principle and patterns of old city centers which demonstrated below

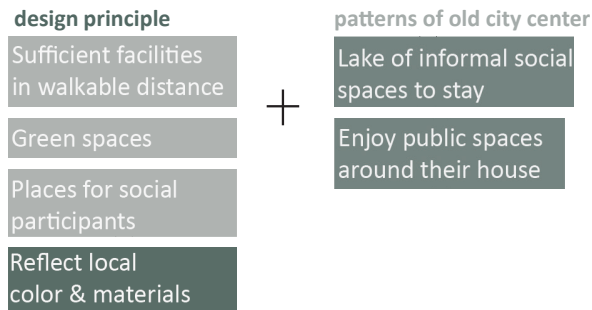


Figure X. beside shows new added social public spaces which are marked with red color. The functions of these social public spaces will be decided based on the surrounding facilities and services which allow to increase the synergy of them. Each of social public spaces will be detail elaborated with the the description, eye level view, and the design principle and patterns of old city center that it followed. Additionally, as older elderly people may encounter difficulty to go out with the functional decline of their body, by providing the shuttle bus service from social public spaces can help the older elderly people to remain active and healthy.

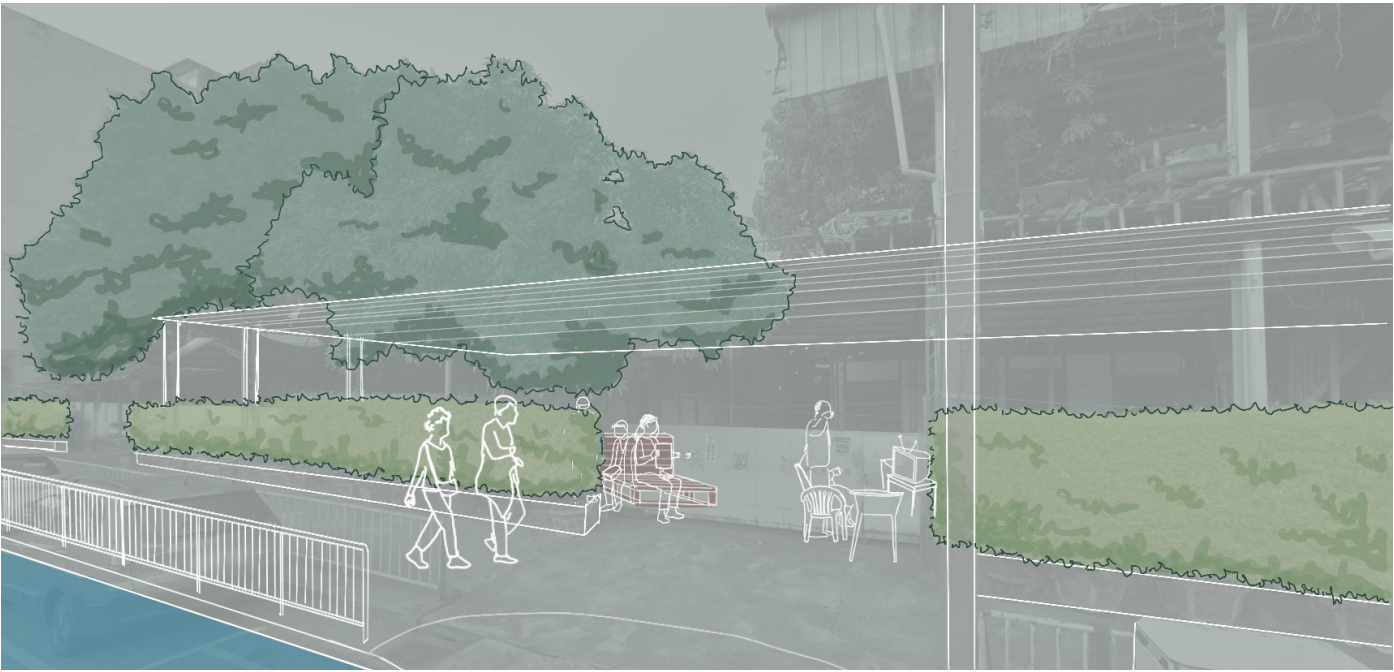




This spare space is next to a green trail and surrounded all by residential buildings. Currently, this place already have a lot of green exist which is suitable to take a rest and have social activities for elderly inhabitants. Especially, based on the patterns of old city center, current participants in community centers are majority female since male elderly prefer to discuss political issues with others at green public spaces. Therefore, it has better chance to become a new community center where provides chance for all elderly people to enjoy social connection with others. Additionally, since elderly people like to decorated their public spaces, while transform this current spare space into a nice community center which facilitates elderly inhabitants to have social participant, and to create a place with belongingness in the neighborhood.

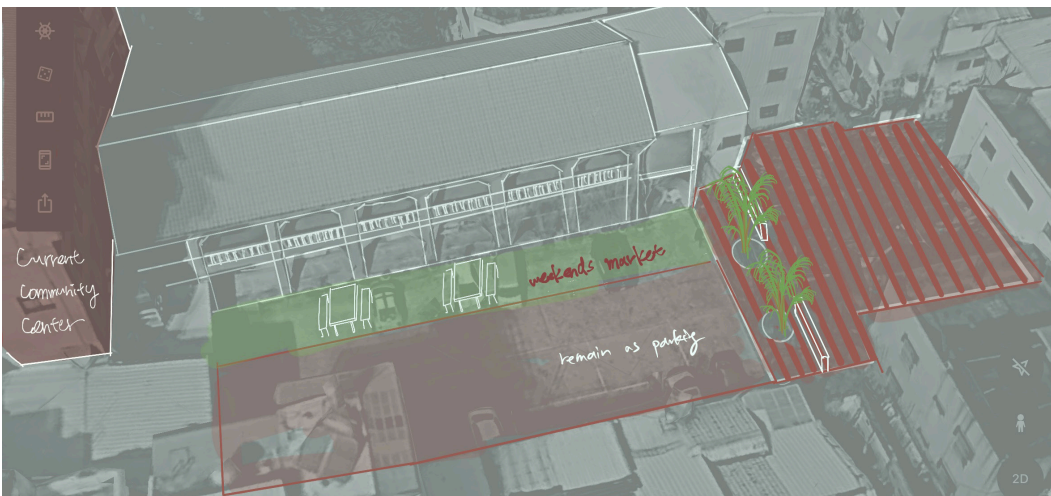
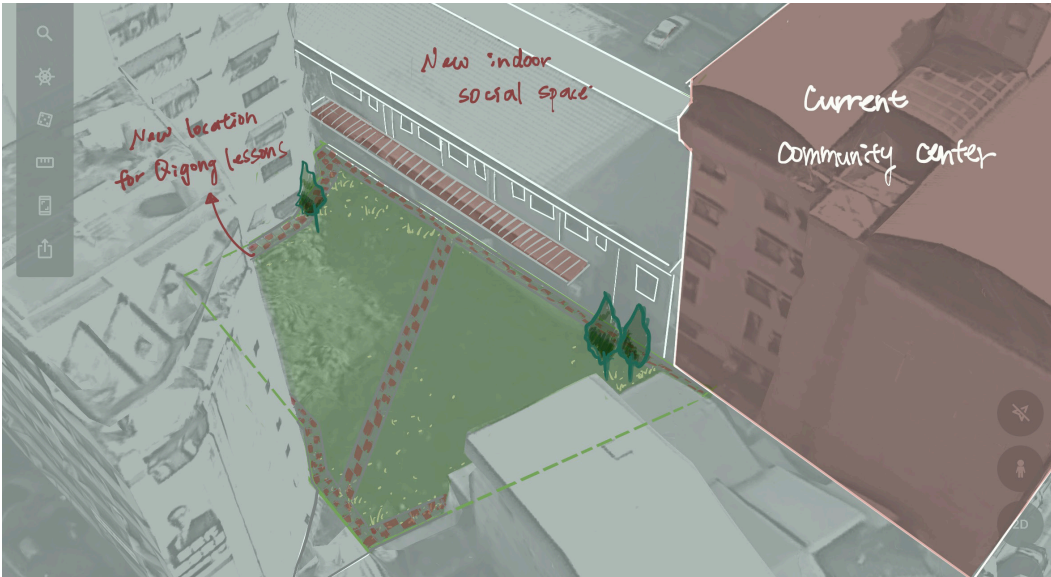
patterns of old city center

- 'Female only' activities
- Male talking political issues in green spaces
- Self-made, small and informal social spaces
- Plants to decorate the environment



Incorporated with local styles, colors and materials





This spare space is next to a community center where currently provide elderly specific classes on weekdays. Since elderly inhabitants who lived nearby come to attend activities daily at the community center beside, this spare space can be transformed with different function. This spare space is be divided by a historical building which currently do not have any function. One area of it is a car park with a large wood deck beside which now not really be used, and another area is a lawn. From the patterns of old city center, elderly people like to attend Qigong lessons which is practice on the lawn. This spare lawn, therefore, has chance to become the new place where elderly inhabitants can join Qigong lessons in early morning then attend the activity in community center beside. The car park area will remain for weekdays as it is the parking space for the people who work in community center, but at the weekends it can be used for temporary activities such as the weekend market. Some small scale initiatives which already hold these activities before, and they are all popular among not only elderly people but also inhabitants and tourists.

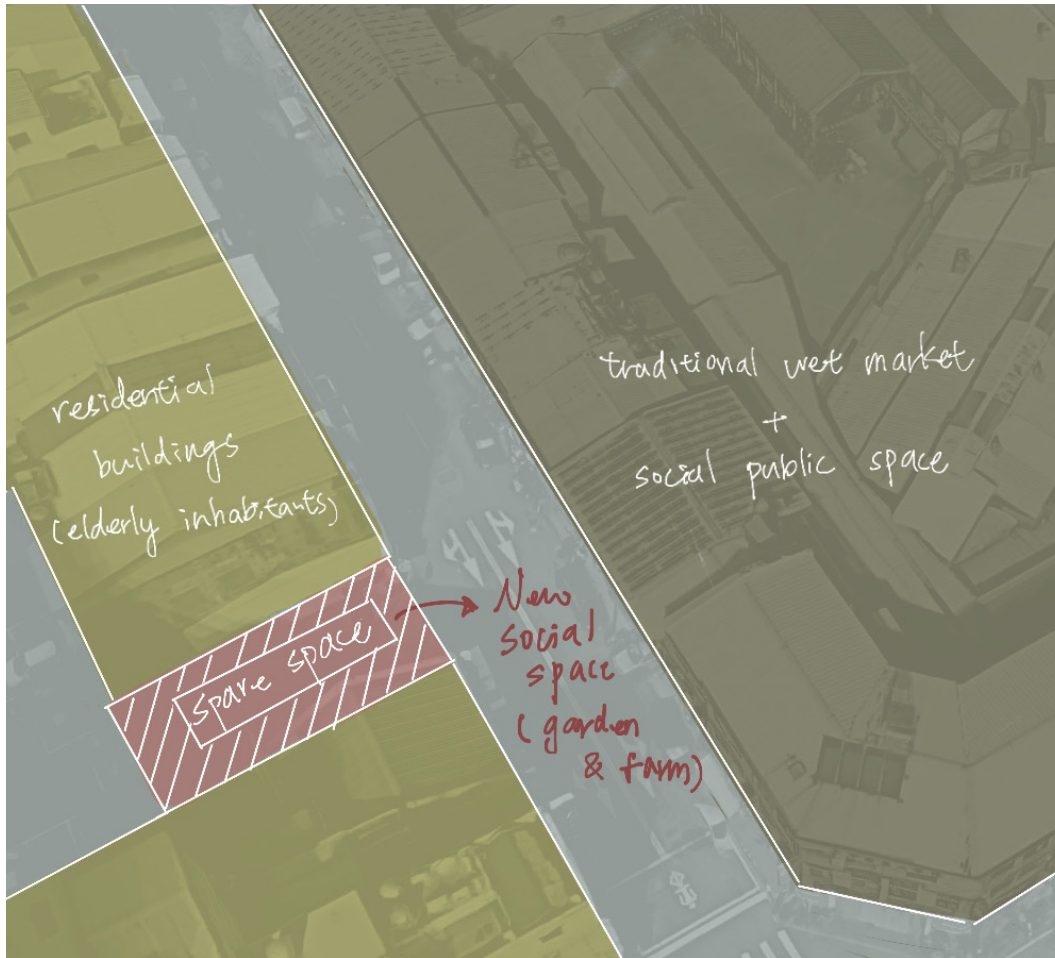
patterns of old city center

- Doing Qigong on the lawn every morning
- Self-made, small and informal social spaces
- Plants to decorate the environment



Incorporated with local styles, colors and materials





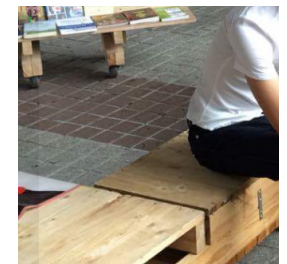
This spare space is next to a traditional wet market where elderly people get groceries daily. The traditional wet market is also a place where elderly people go to buy and enjoy meals. Additionally, this place also provide medical service which provide basic health examination. Currently, there is already a social space in the traditional wet market, therefore this spare space can be use with other purposes. Based on patterns of old city center, elderly people like gardening such as grow fruit and vegetable on the rooftop or growing plants at the front door. Therefore, this spare space can be use as a public garden where elderly people can come do some planting activities. Meanwhile, this place can also be a weekend market where sell the own grow food beside. Public seats also need to be added in roder to create comfortable environment.

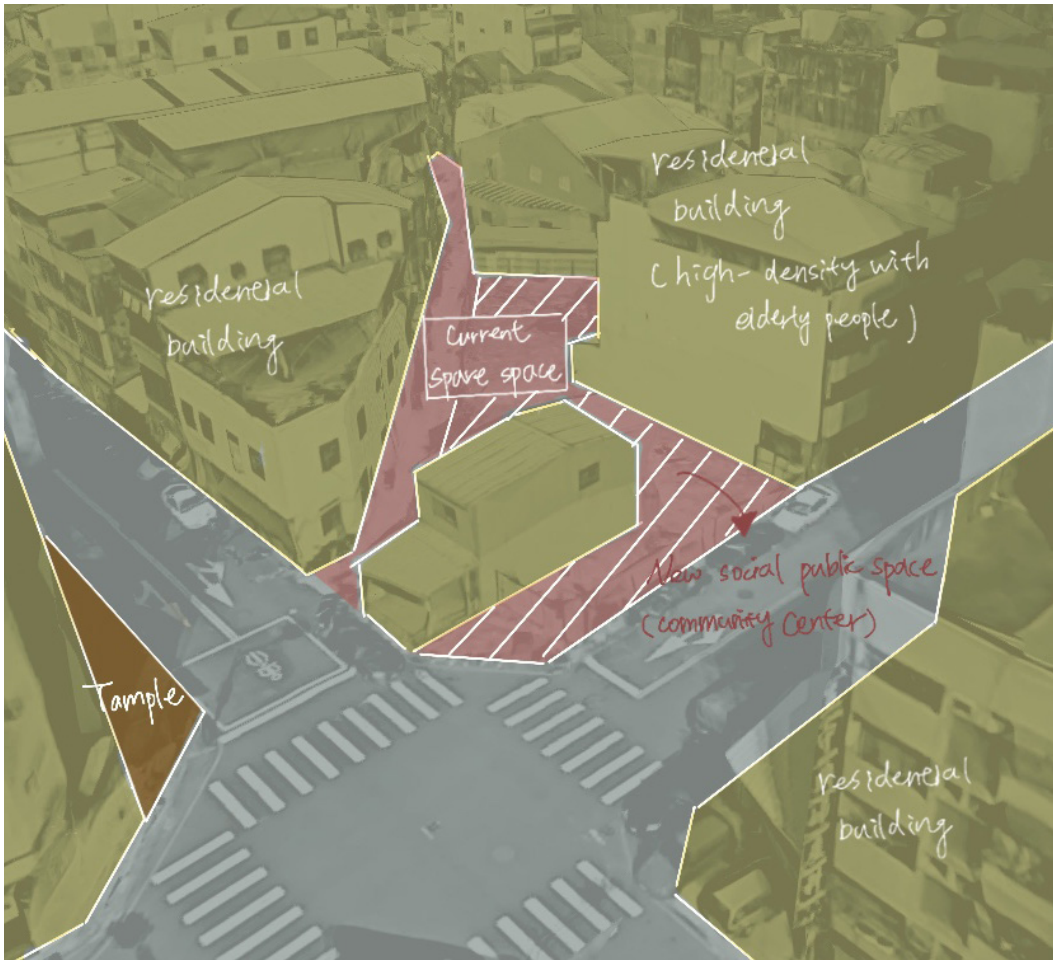
patterns of old city center

- Plants to decorate the environment
- Lack of public seats
- Self-made, small and informal social spaces



Incorporated with local styles, colors and materials





This spare space is in the middle of the residential area with high density of elderly people. Currently, this area is lack of public space where elderly people can have social participant with other. Meanwhile, the spare space is located at street corner where with the temple beside. The temple is vital for elderly people where they visit daily, therefore this spare space can be reused as social public space where provide elderly people a space to have social life which can encourage them to stay active. Based on the design principle and patterns, public seats and public toilets will be added, at the same time, there will be the cover on the top of the social space in order to prevent the heat. Additionally, the design intervention will be incorporated with local color and material as wayfinding feature.

patterns of old city center

Lack of informal social spaces to stay

Enjoy public spaces around their house

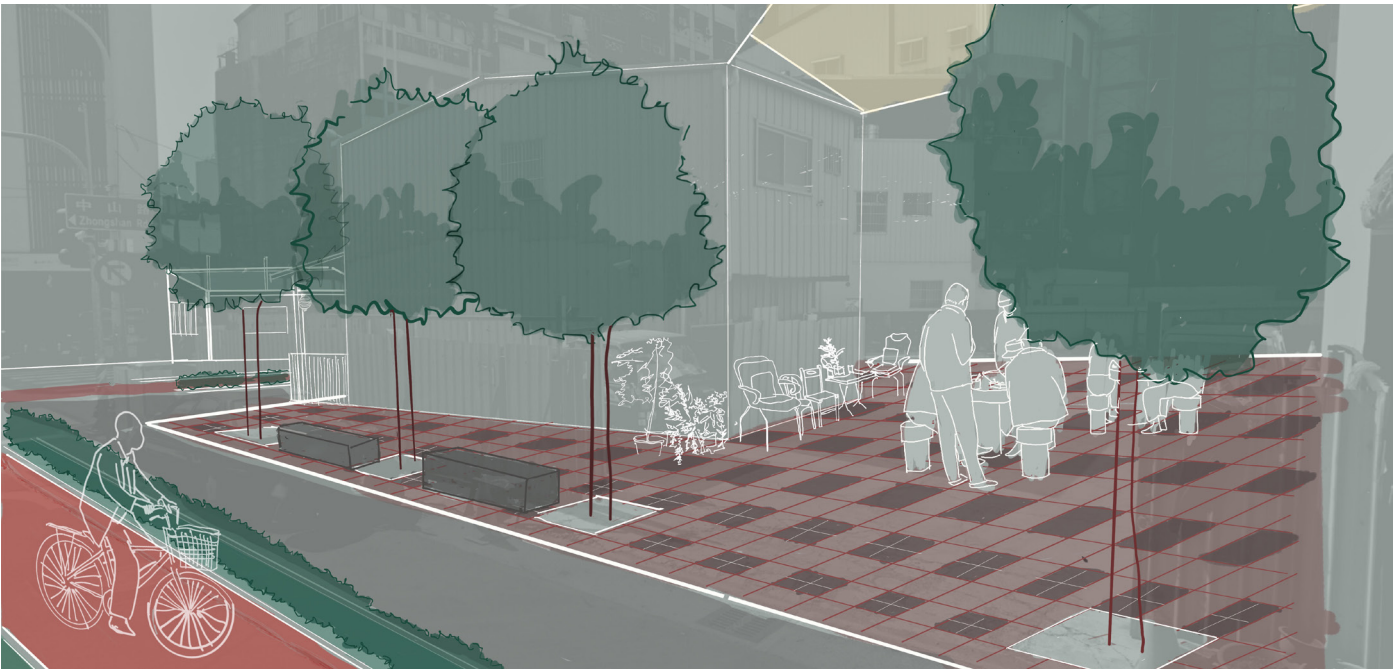
Self-made, small and informal social spaces

Plants to decorate the environment

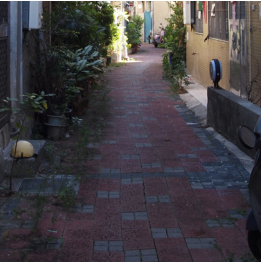
Spaces with covers to prevent heat and rain

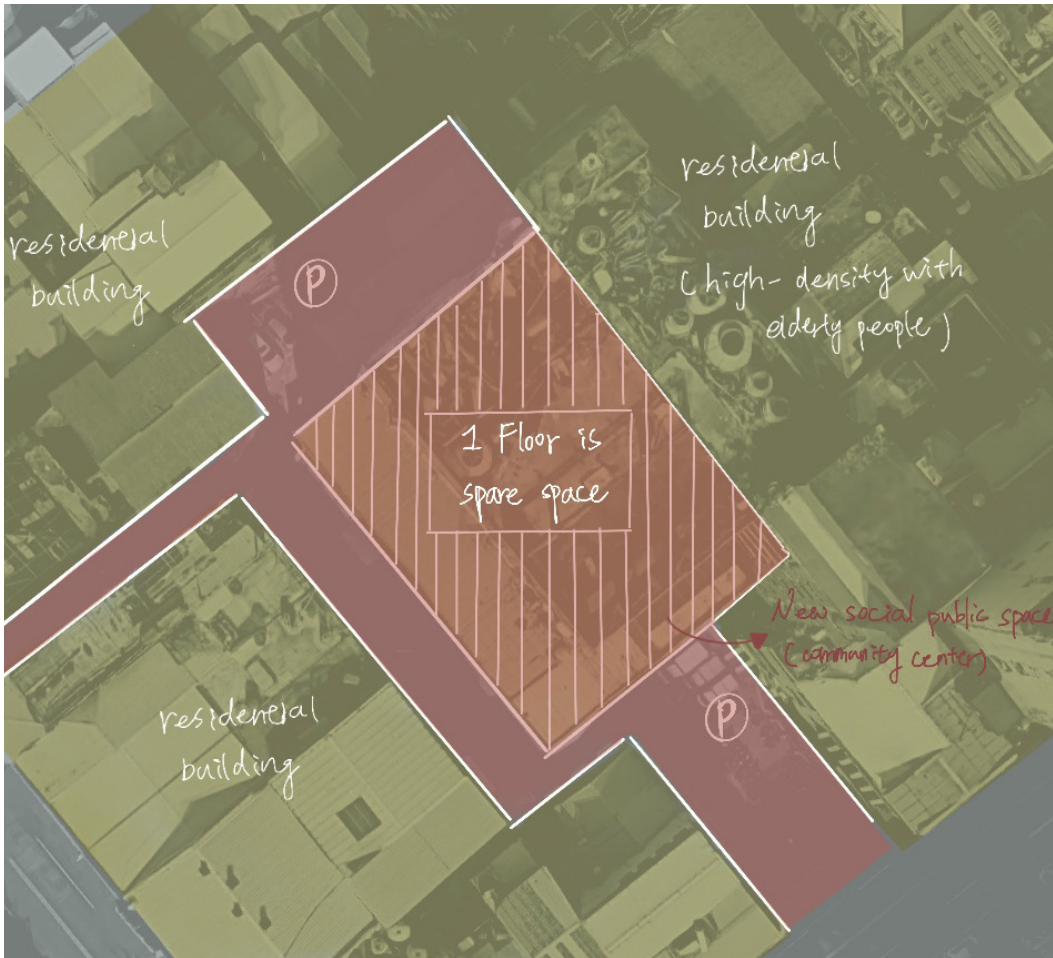
Lack of public seats

Lack of public toilets



Incorporated with local styles, colors and materials





This space is in the middle of the residential area with high density of elderly people. Currently, this space is used as car parks. With the new car park plan from municipality which the space can be released and reuse as social spaces since there is a lake of public space in this area where elderly people can have social participant with other. Based on the design principle and patterns, public seats and public toilets will be added, at the same time, there will be the cover on the top of the social space in order to prevent the heat. Additionally, the design intervention will be incorporated with local color and material as way-finding feature.

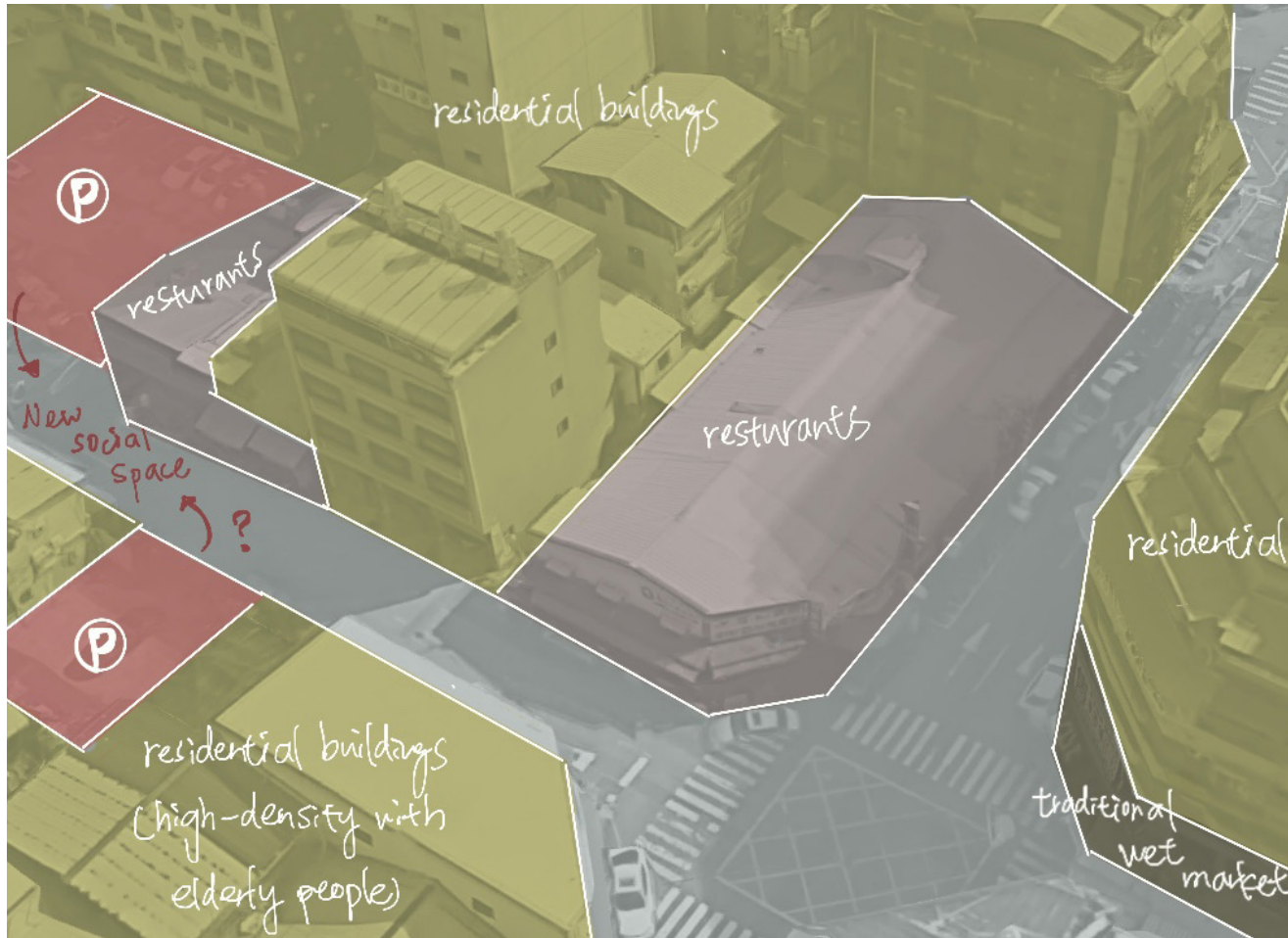
patterns of old city center

- 'Female only' activities
- Male talking political issues in green spaces
- Self-made, small and informal social spaces
- Plants to decorate the environment



Incorporated with local styles, colors and materials

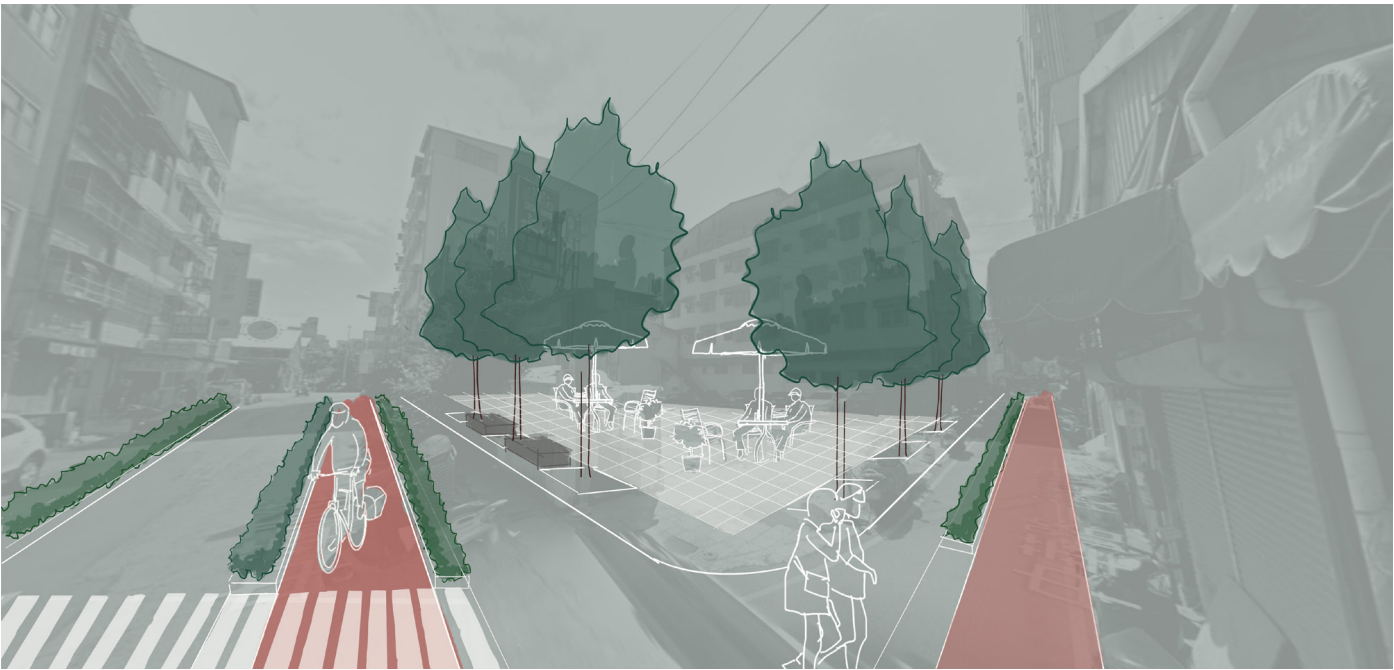




This spare space is currently closed to a traditional wet market where elderly people get groceries daily. The traditional wet market is also a place where elderly people go to buy and enjoy meals. Additionally, this place also have a lot of restaurants which elderly people buy meals daily. Therefore, this current spare space can be reused as a social space where allow elderly people enjoy their meal with their friends or having social activities after their meal time.

patterns of old city center

- 'Female only' activities
- Male talking political issues in green spaces
- Self-made, small and informal social spaces
- Plants to decorate the environment



Incorporated with local styles, colors and materials



REFLECTION

The purpose of this chapter is to look back at the research done for the graduation project and reflect if the used approach has worked to achieve the aim set at the beginning of the project. Meanwhile, additionally give recommendations on what can be learned for future research and graduation projects. The reflection and recommendations will focus on four aspects which have been set in the Graduation Manual Master Architecture, Urbanism and Building Sciences at Delft University of Technology academic year 2021-2022 (TU Delft faculteit Bouwkunde, 2021)

- Aspect 1 the relationship between research and design.
- Aspect 2 the relationship between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS).
- Aspect 3 Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.
- Aspect 4 Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.
- Aspect 5 Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.

The relationship between research and design

In the development of this graduation project, the combination of different types of research methodologies has played an important part. The literature review has firstly been the basis for the definition of the problem statement, research question, and has been done to establish principles of design intervention in the public space encourage elderly people to age actively and healthy.

The literature research and location visit put forwards themes on which the urban analysis and design intervention of Taichung old city center was based. Furthermore, by translating the literature findings from field such as gerontology into spatial design principles the findings have been directly implemented in the design.

Next to the literature research, the analytical framework which done with the location visit such as interviews and field works form the patterns which gives the adaptation for design principle based on location specific context, at the same time, have been used to established the design task. The combination of these different types of research methods has strengthened the design directly. There are however some aspects of interest for discussion and reflection which will be further demonstrate in Aspect5.

The relationship between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)

In 2018, Taiwan has become the “aged society” as National Union defined with 14% of total population are project to be the elderly. By 2050, there will even become twice amount of it, with more than one-third of the total population are consist of the elderly. The ageing of society is a positive yet challenging phenomenon. As Mace said in his public speech “We all become disabled as we age and lose ability, whether we want to admit it or not.” (Ron Mace, 1941-1998) The concept of the universal design pyramid from Goldsmith also indicates that disabled and elderly people should been put at the priority as they are among those who experience the greatest difficulties in their daily life in the built environment, if the space is friendly to them then it should be usable for everyone. “Unfortunately, designers in our society also mistakenly assume that everyone fits this definition of “normal.” ” (Ron Mace, 1941-1998) Therefore, from the planner and designer aspects, it is important to create a supported built environment and well-design outdoor spaces which can promote physical activity and helps to preserve and maintain older people’s health and well-being.

Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.

This project is in the Design of the Urban Fabrics graduation studio. Design and analysis are important and interwoven in this studio which

integrating evidence and imagination throughout the process, meanwhile, put learning from and with the place central. The main focus of the UF studio is through re-reading, de-constructing, reassembling and interpreting based on the socio-spatial and cultural layers and evolving material layers to achieve workable transformation. As this graduation project has chosen transformation into age-friendly environment as a topic with specific location of Taichung old city center which directly fit into the profile of the studio. The studio methodical line provides the knowledge of how to integrate the theory and the practicality as the chosen research method and approach of this graduation project are literature review and location visit which meanwhile allow to develop the design intervention more scientific based.

Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.

Scientific relevance

Spatial environment has hardly been the focus of studies into ageing issues. (Ron Mace, 1941-1998; UNECE, 2020) Furthermore, there have been hardly successfully translated into the current research and implement related to neighborhood design, although research has been done on the affect of physical environment of elderly people in field such as environmental gerontology. (Ron Mace, 1941-1998; Liz Cairncross, 2016) Therefore, the aim of this thesis is combined findings from environment, planning and social science field, forward putting neighborhood design interventions that encourage active ageing among elderly people to help them maintain independent and well-being. A literature by Mitchell & Burton has done a lot of studies on the need of elderly people, and on the current knowledge of best practice for physical environment developed six themes of design principles: accessibility, comfort, familiarity, legibility, distinctiveness, and safety. These design principles helps to create an enjoyable outdoor spaces among them. Although Mitchell & Burton did lots of research to find applicable design and planning patterns for age-friendly neighborhood, the applicability of the framework on an existing neighborhood

has not been researched. This thesis focus on this aspect. Therefore, in this research the framework of urban design patterns will be used, together with findings from location visit and analysis which provide practical information. In order to adapt the framework into Taiwanese context, and furthermore, into location specific design patterns to create a scientific based practical solution.

Societal relevance

The global population is ageing. Started in the nineteenth century in the developing world, and more recently in developing countries, this unprecedented demographic change, is already transforming many societies. (United Nations, 2009)

“ The ageing process is expected to accelerate in the near future, particularly in developing countries. Because they have a shorter time to adapt to the changes associated with population ageing, it is urgent that the Governments of developing countries begin taking steps to face the challenges and make the best of the opportunities that population ageing brings.”(United Nations, 2009: p 15) The United Nation has warned the Governments of developing countries in their World Ageing Report 2009. While Taiwan as one of the developing countries is adapting the policy more towards an ageing friendly society, the focus has mainly been on social welfare related issues such as free public transport for elderly and certain pensions. However, these ageing issues and their affects on the built environment of our cities have hardly been covered.

As academic research has shown that the built environment is one of the crucial aspects which influences inhabitants of urban neighborhoods undertake the amount of activities. (Liz Cairncross, 2016, Clarke, P.J., & Twardzik, E., 2021; Jerrett, M., Almanza, E., Davies, M., Wolch, J., Dunton, G., Spruitj-Metz, D., & Ann Pentz, M., 2013) And it is exactly this activity, also known as active ageing which can postpone ageing causes physical, psychological, and social aspects of changing. This in turn can lead to the preventing and reducing of adverse health-outcomes such as admission into an institution or even death which governments and the society as a whole would like to avert.

All the steps undergone during this graduation projects have been

focused on the relationship between the spatial design of the built environment and the societal desire to let the growing group of elderly age actively and consequently enhance their independence.

Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice

First of all, many of the design principles found have never been tested in the reality of the public space for a city. Therefore, there is no guaranteed the causality that the design and implementation of the principles will lead to active ageing.

Secondly, the design catalogue should not be considered to be a set handbook which can't be changed since the practice of urban planning and design and academic research constantly evolves.

And finally, while the location visit, circumstance such as the weather, the time and so on will influence the data such as behavior of elderly people while using public spaces greatly. Although these influence can be overcome by visiting the location with different time and day, still cannot really including all the situation. Take the experience that done with this project for example, during the location visit, there is always with the nice weather which with the lack of information about the real circumstance of a rainy day. The alternative way have been used to address this situation is to do the interview with inhabitants in order to understand where will they go or what will they do with such a bad weather. Then, the information can be more completed and persuasive. At the same time, when doing the interview, might encounter some difficulties when it comes to approaching the interviewers. This circumstance also happened during the location visit which I found out it is quite difficult to reach out to elderly inhabitants since most of them do not want to have contact with strangers. From the experience gaining through this project is firstly try reach them through community centers. Since the community center is the place where elderly people go daily and the responsible person inside is also the one who has closest relationship with elderly inhabitants which allow to obtain the preliminary information. Then, after several

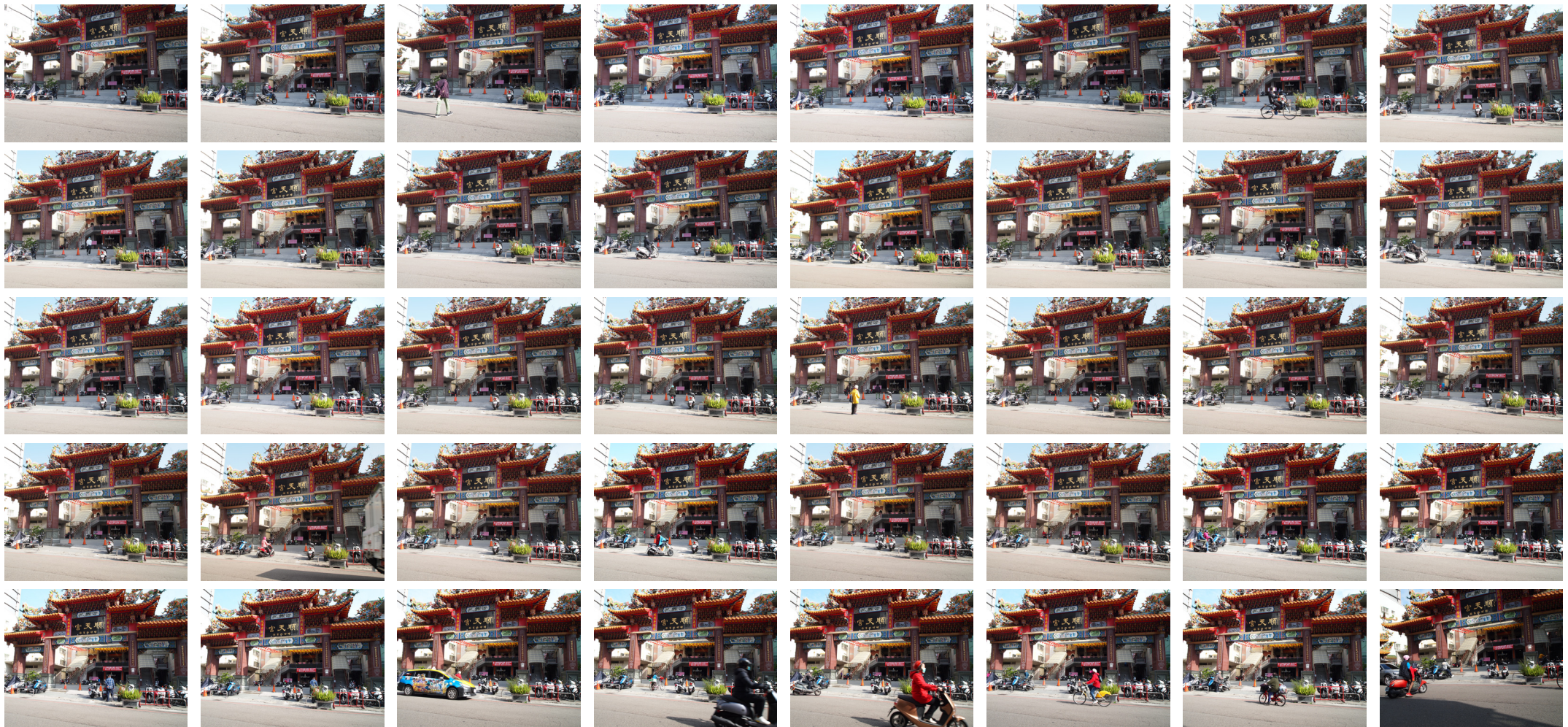
location visit, interviewee will become more closer to elderly inhabitants which at the next stage, allow the interview successfully be done. However, still need to know that the information is not 100% accurate since only elderly inhabitants who attend the activity are be included and can be reached. The design intervention which based on the field work may not really meet all the need of elderly inhabitants. Therefore what we can do is try our best to reach different elderly. As Glenda Laws said "Even if we try to separate them into subgroup of the younger old, the middle old and the older old the variations will be as great within each subgroup as between them." (Glenda Laws, 1994) Thus, in this graduation project, design principles that developed from literature review allow the design intervention which can certain transform current physical environment become more inclusive with more general based. For the further detail quality of the public space that elderly inhabitants prefer may not reach all the expectation which can only based on the result from the location visit meanwhile incorporated with the existing form and fabric.

BIBLIOGRAPHY

- Burton, E. & Mitchell, L. 2006. Inclusive urban design streets for life, Oxford, Architectural Press.
- Burton, E. J., Mitchell, L. & Stride, C. B. 2011. Good places for ageing in place: development of objective built environment measures for investigating links with older people's wellbeing. *BioMed Central Public Health*, 11, 1-13.
- Borst, H. C., Vries, S. I. d., Graham, J. M. A., Dongen, J. E. F. v. & Bakker, I. 2009. Influence of environmental street characteristics on walking route choice of elderly people. *Journal of Environmental Psychology*, 29, 477-484.
- Buffel, T., Rémillard-Boilard, S., & Phillipson, C. (2015). Social isolation among older people in urban areas. A Review of the Literature for the Ambition for Ageing programme in Greater Manchester, University of Manchester Institute for Collaborative Research on Ageing, Manchester.
- Carstens, D. 1985. Site planning and design for elderly: Issues, guidelines and alternatives, New York, Van Nostrand Reinhold.
- Central District Office, Taichung City (2019) Analysis of the general situation of promoting the welfare for the elderly
- Chen Jiawen, Zhang Yuyue, Gao Xufan, Lu Luo (2013) Isn't it useful when it's old? A Study on the Optimum Ageing Process of the Elderly in Taiwan
- Clarke, P.J., & Twardzik, E. (2021). The role of the built environment for healthy ageing: barriers and enablers
- Dijst, M. 1995. Het epische leven: actieruimte alsintergrale maat voor bereik en mobiliteit, Delft, Delft University of Technology.
- Dominique Hauderowicz, Kristian Ly Serena(2020) Age-inclusive public space
- Dziechciaz, M., & Filip, R. (2014). Biological psychological and social determinants of old age: Bio-psycho-social aspects of human ageing. *Annals of Agricultural and Environmental Medicine*, 21(4).
- Esther Kane (2018) Outdoor Lighting For Aging In Place. Article on Senior Safety Advice website. <https://seniorsafetyadvice.com/outdoor-lighting-for-aging-in-place/>
- Fushun,huang.,(2011)The Phenomenon of Psychological Ageing of the Elderly and Its Countermeasures
- Glenda Laws (1994) Oppression, knowledge and the built environment, *Political Geography*, Volume 13, Issue 1, Pages 7-32, ISSN 0962-6298, [https://doi.org/10.1016/0962-6298\(94\)90008-6](https://doi.org/10.1016/0962-6298(94)90008-6).
- Herbolsheimer, F., Mahmood, A., Michael, Y. L., & Chaudhury, H. (2020). Everyday Walking Among Older Adults and the Neighborhood Built Environment: A Comparison Between Two Cities in North America. *Frontiers in public health*, 8, 564533. <https://doi.org/10.3389/fpubh.2020.564533>
- Jerrett, M., Almanza, E., Davies, M., Wolch, J., Dunton, G., Spruitj-Metz, D., & Ann Pentz, M. (2013). Smart growth community design and physical activity in children. *American journal of preventive medicine*, 45(4), 386–392. <https://doi.org/10.1016/j.amepre.2013.05.010>
- Kerr, J., Rosenberg, D., & Frank, L. (2012). The Role of the Built Environment in Healthy Ageing: Community Design, Physical Activity, and Health among Older Adults. *Journal of Planning Literature*, 27(1), 43–60. <https://doi.org/10.1177/0885412211415283>
- Kowal, P., Goodkind, D. and He, W. (2016) An Ageing World: 2015, International Population Reports. U.S. Government Printing Office, Washington DC.
- Lak, A., Rashidghalam, P., Myint, P.K. et al. Comprehensive 5P framework for active aging using the ecological approach: an iterative systematic review. *BMC Public Health* 20, 33 (2020).
- Laslett, P. (1991). A Fresh Map of Life: The Emergence of the Third Age.
- Lautenschlager, N. T., Almeida, O. P., Flicker, L., & Janca, A. (2004). Can physical activity improve the mental health of older adults?. *Annals of general hospital psychiatry*, 3(1), 12. <https://doi.org/10.1186/1475-2832-3-12>• Liz Cairncross (2016). Active ageing and built environment
- Mahmoud, A. (2018). The Impact of the Built Environment on Human Behaviors. *International Journal of Environmental Science & Sustainable Development*, 2(2), 29 - 41. doi:<http://dx.doi.org/10.21625/essd.v2i2.157>
- Marion Preez (2016) Creating successful outdoor spaces. Blog on Dementia Services Development Centre. <https://dementia.stir.ac.uk/blogs/dementia-centred/2016-11-04/creating-successful-outdoor-spaces>

- Michael, Y. L., Green, M. K. & Farquhar, S. A. 2006. Neighborhood design and active aging. *Health & Place*, 12, 734-740.
- Milanović, Z., Pantelić, S., Trajković, N., Sporiš, G., Kostić, R., & James, N. (2013). Age-related decrease in physical activity and functional fitness among elderly men and women. *Clinical interventions in ageing*, 8, 549–556. <https://doi.org/10.2147/CIA.S44112>
- Tang, F., & Lee, Y. (2011). Social support networks and expectations for ageing in place and moving. *Research on Ageing*, 33(4), 444-464.
- Trafiałek E. Starzenie się i starość. Kielce: Wydawnictwo Uczelniane Wszechnica Świętokrzyska; 2006 (in Polish).
- Yiwen, Qiu (2014) Where does the long-term care of the elderly go under the change of family?
- Ming-Ming Lai, Shi-Ying Lein, Siok-Hwa Lau, Ming-Ling Lai, “Modeling Age-Friendly Environment, Active Ageing, and Social Connectedness in an Emerging Asian Economy”, *Journal of Ageing Research*, vol. 2016, 14 pages, 2016. <https://doi.org/10.1155/2016/2052380>
- Nowicka A. Starość jako faza życia człowieka. In: Nowicka A (ed.). *Wybrane problemy osób starszych*. Kraków: Oficyna wydawnicza „Impuls”; 2006.p.17–25 (in Polish).
- Rantanen T. (2013). Promoting mobility in older people. *Journal of preventive medicine and public health = Yebang Uihakhoe chi*, 46 Suppl 1(Suppl 1), S50–S54. <https://doi.org/10.3961/jpmp.2013.46.S.S50>
- Rooij, R. M. & Tacken, M. Seamless travelling for the elderly. *Colloquium Vervoersplanologisch Speurwerk*, 1998 Delft. CVS, 873-890. Burton, E.
- Susan Kelley (2019) Education, interaction with older people reverses ageism
- Wilkinson, R. G., Marmot, M. G., World Health Organization., WHO Healthy Cities Project., & WHO International Centre for Health and Society. (2003). *The solid facts*. Copenhagen: World Health Organization, Regional Office for Europe.
- WHO (2011) Global health and ageing
- <https://patient.info/doctor/disability-in-older-people>
- UNECE, 2020, <https://unece.org/population/news/growing-old-city-age-friendly-environments-are-needed-create-sustainable-and-smart>
- WHO (2011) Active ageing: A policy framework

APPENDICES



Photos took in community center



Photos took in Taichung park

11/30 訪談華山基金會中區站的站長

應該說中區是全國最小的里，只有8個里。而老人家的部分都是因為以前的人留在這裡工作，然後後來就留在這裡沒有離開。所以我們華山基金會是專門照顧這些老人家中失能、失智以及較為弱勢的長輩，像是經濟弱勢。以我來說，目前服務的就是其中的78位長輩，不包含就是一些獨居但是經濟上無虞的長輩或是有跟子女同居的長輩，這些非關懷對象的長輩我們會建議他們去老人關懷據點。像是我知道在這附近的話，禮拜四的早上有大誠的社區關懷據點。然後像是向上基金會，在公園路，他們是周一到周五都有，每次都大概15-20位，目的就是讓老人活動活動，像是一些帶動唱或是跳舞。還有一個是聖心基金會，它其實是一個天主教教會團體，主要是辦長青學院的課程，然後是需要付費的，但對於長者就是有提供較便宜的費用讓他們有地方去學習。所以可以發現這些不同的協會基金會還是會分層，像是針對健康老人、亞健康老人跟弱勢老人。通常弱勢老人他們就是比較走不出來，所以都是由我們走去案家。而亞健康及健康的長輩是他們可以去長青據點及社區關懷據點。所以長青學苑及社區關懷據點是針對健康的老人，然後他們願意學習，想去增加知識，然後也走得出去。在這邊，第二市場往前通常都是較安靜而且街友較多，而第二市場後邊比較多老人集中在這裡。像是合作大樓，在澄清醫院附近，那一帶附近也蠻多流鶯的還有一些老人其實都在那邊，還有開萬大府大樓以及以前的小北百貨面有一棟大樓也是，就是比較多老人會聚集的地方。因為就是這邊，比較多老人難找地方住，所以他們也只能租像類似是高雄城中城的概念的大樓，屋齡也都是50年的老建築。中區這邊繁榮過後已經沒落了，然而老人已經在這邊生活了大半輩子，所以這些老人也都留在這邊走不掉。

Q. 我之前來的時候有看到似乎有長者在這邊做事？

A. 我這邊的長輩比較特別，因為他們都是獨居老人，所以坦白說也都沒有家屬在陪伴，然後剛好我這邊因為只有我一個站長在經營，所以那時你看到的其他人都是志工，他們就是會來幫我整理東西。因為有時候我的事情真的太多，所以我會請像是住在附近的長輩，有時候他們也是看到我這麼忙，就會想要幫忙，因為他們也閒著不知道做甚麼。所以有時候我就會請他們幫我年信封。然後他們就是通常都是下午會來我這邊，尤其在疫情還沒爆發前，他們還會固定來我這邊泡茶，就幾個長輩這樣。但是後來因為疫情的關係，所以目前就都暫停了。但是長輩其實已經習慣來我這邊，所以現在的狀況是有時候長輩可能會經過我這裡的時候就會進來喝個茶、吃東西、聊聊天這樣，就變成一個休憩站的概念。有的時候一些長輩也會拿著信件請我幫他們讀出來給他們聽，有一些不識字的長輩。或是有一些長輩搞不懂社會福利，他們也會來詢問我，像是低收入戶甚麼時候可以開始申請之類的。所以我們這邊也有點像是資源連結點這樣。像是這些長輩啊，他們來幫忙其實也都很開心，因為有個事情讓他做，讓他們保持精力並發揮自己的能力。

Q. 那來這邊幫忙的長者都是如何過來的呢？

A. 它們通常都是步行、騎腳踏車或是騎機車

Q. 那來這邊幫忙的長者性別比例大概是？

A. 好像一半一半耶。因為其實我服務的78位長輩當中2/5是男生，然後3/5是女生。然後可能因為我是女生的關係，雖然有2-3位男長輩固定會來我這邊幫忙，大部分的男長輩可能會不好意思自己一個人過來這樣。但是一些體力活，像是搬東西，搬跟發送便當之類的，有的時候就會有一些男長輩過來幫忙，真的輕鬆很多。

Q. 這附近有沒有友善長者的活動地點？

A. 非常少。我知道只有2個，而且還是8個里共用的。主要是因為中區的地太小了。尤其這邊以前是熱鬧的商業密集區，不可能有規畫綠地。

另外特別的是，我服務的老人大部分都不愛去社區服務據點，因為通常去據點的老年人都很喜歡八卦，喜歡聊自己家的事，像是提到兒子跟媳婦這禮拜回來看我啊之類的。而我服務的這些長輩他們因為都自己一個人，所以他們也沒有這類的話題可以分享，也比較不願意去分享去八卦這方面的事情，或是也比較不願意去被別人問到家裡的狀況。

還有就是中區這邊治安很差。

12/1 路上遇到散步的老人跟他閒聊

Q. 你平常都在這邊散步嗎？

A. 對啊!我就住在旁邊而已。平常沒事的時候就在附近走一走運動，跟附近認識的一起。就是在附近走來走去這樣。

Q. 你目前是跟您先生一起住？

A. 對啊，這棟房子就我跟我先生住而已，因為小孩也都長大了，搬出去了，我們也不想黏著他們，也不想麻煩他們或跟他們要錢。

Q. 請問您住在哪？

A. 光復里。里長家就在我家附近，旁邊灣過去有一個旗子還有紅紅的海報那個就是里長家。

Q. 您平常還會從事甚麼別的休閒活動嗎？

A. 我平常就是做做家务。阿我也很喜歡種這些，這些綠色的植物。在我家門口前面都是我種的植物。平常我就這顧他們，澆澆水，然後他們就會生小果實，很可愛。我特別喜歡種這些綠色的植物，看到他們就心情好，身體好。有時候，因為我在公路局上班，認識很多人，他們都會來找我泡茶聊天這樣。偶爾一些比較年輕的人，也會來找我一起出去玩這樣。我們這邊真的很有人情味，左鄰右舍也都認識這樣。大家都很和氣。

Q. 您平常會去附近的市場買菜嗎？

A. 很少，如果要吃飯，我都會在這附近的路邊，常有人在賣吃的，就會在附近買著吃。

12/1 在柳原教會與一位老爺爺訪問

Q. 請問您今年幾歲?

A. 我今年快90歲了

Q. 請問您住哪裡?

A. 我住附近繼光街那邊。

Q. 您平常都是如何外出的?

A. 我都是用走路的，但是不能走很久。大概都在附近走，5-10分鐘的路程。

Q. 您平常還會從事甚麼別的休閒活動嗎?

A. 我平常就是會去上課，去參加教會的課程，除了這個教會，還有一個位於民族路的教會。

Q. 您都是如何得知這些課程資訊的呢?

A. 平常去教會的時候會有人告知我，或者是會有布告欄上面會張貼。

Q. 您平常一周參加幾次這種課程?

A. 一周2次。

Q. 您平常除了來上課，還會額外從事一些戶外活動嗎?

A. ㄟ，散步，偶爾會去綠川附近散散步，大概早上7-8點的時候，會跟朋友一起去散步。

Q. 那你目前是自己一個人住嗎?

A. 我跟我孫子一起住。

Q. 您平常在外面活動的時候是否感到舒適?

A. 我感覺路面上很危險，常常很多車子都違停，常常沒地方走，所以平常我在走路時自己都要特別小心注意。

12/2 大墩社區發展協會 順天宮地下室 一對母女

Q. 請問您今年幾歲?

A. 我今年60歲，我媽媽92歲了

Q. 請問您住哪裡?

A. 我住附近繼光街那邊。

Q. 您平常都是如何外出的?

A. 我都是用走路的，但是不能走很久。大概都在附近走，5-10分鐘的路程。

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