Research and Application on HOPSCA model using in suburb area
—Taking the design of Jiangdong district in Yiwu as application case

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If nothing mentioned, the drawings and maps are made by the author.
ABSTRACT

In recent years, with the rapid growth of economy in China, many cities develop towards the direction of diversification of life and culture. Diversification of life means variety of transportation choice, different culture mixture and so on. At present, with the development of suburb areas in most cities, the problems of how to make full use of the land resources and make the suburb area attractive, livable and dynamic becomes more and more important. The thesis investigates if the HOPSCA model is a good choice to achieve the goal. The HOPSCA model of urban complex is a new way to build a diversified, integrated and dynamic suburb in a city. Therefore, the topic about the application of HOPSCA model in a suburb area is well worth researching.

This paper starts with issues at the forefront of the development of suburban areas in the background of rapid city booming and points out the most important problems during the process of development of a suburb area in China. After that, this paper introduces the HOPSCA model of urban complex as a new concept to address the problems. The main theories and application methods are both researched in this paper. Based on the research on urban complex and HOPSCA model and example studies, the paper tries to do a critical research on the development of suburb area by using HOPSCA model as tool, which is mainly about characteristics, advantages and the spatial organization and function organization. Those theoretical tools and example experiences are all applied into the design case in Yiwu for practice.

Key words: Urban complex, HOPSCA, suburb, Yiwu.
Acknowledge

The thesis is temporarily ended. This also means that two years study and life in BTH and Sweden will end soon. Looking back at the past, it’s my great honor to spend my most precious time on this campus, under the influence of brilliant and talented teachers. After two years’ master degree studying, I greatly benefit in both knowledge of urban design aspect and ideological aspect. Those improvements and the care, support and encouragement of the teachers, classmates and friends are inseparable.

My tutor Gunnar Nyström gives me guidance both the topic chose period and the research process. From the topic of the paper, the collection of literature, the framework of the design, thesis structure to the paper finally finished; from the content to format; from the title to punctuations; Gunnar is always painstaking. It is Gunnar who helped me to develop the research ideas, carefully coaching and encourage me. Without the hard work and diligently teaching of Gunnar, I could not finish the thesis successfully. My gratitude for Gunnar’s kindly help on my thesis work is hardly express by words.

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Because of the limit of time and my professional standards, the entire thesis certainly has some not yet discovered shortcomings and mistakes. I urge the teachers and students help me corrected. It will be grateful!
## Contents

**Chapter 1: Introduction** ................................................................. 8
  Background .................................................................................. 9
  Brief introduction of the design area ........................................... 10
  Problems ..................................................................................... 11
    Problems of understanding HOPSCA ........................................ 11
    Problems of the design site ....................................................... 11
  Possibilities for the design site .................................................... 12
  Purpose of the paper ................................................................. 13
  Research question ........................................................................ 13
  Literature review ......................................................................... 13
  Methods .................................................................................... 14
  Frame work ................................................................................ 15
  Main contents of the paper ........................................................ 16

**Chapter 2: Related theoretical review** ....................................... 17
  Mixed-use development .............................................................. 18
  What is urban complex .............................................................. 20
    Multi-functional building ...................................................... 20
    Building complex .................................................................... 20
    Urban complex ........................................................................ 21
  Common urban complex model in China .................................... 22
    Transit-oriented model of urban complex ............................... 22
    Commercial type urban complex .......................................... 23
    Residential and office mixed urban complex ....................... 24
    Business and Office type urban complex .............................. 24
    Exhibition urban complex ...................................................... 24
    Six function mixed HOPSCA model ....................................... 24
Chapter 3: Researches on HOPSCA

The definition of HOPSCA ................................................................. 26
The relationship and differences between HOPSCA and urban complex ......................................................... 27
The characteristics of HOPSCA ........................................................... 28
Internal and external transportation ................................................ 30
  Internal transportation .................................................................... 30
  External transportation .................................................................... 30
The function composition of HOPSCA ............................................ 31
  Internal function composition ......................................................... 31
  External function composition ....................................................... 32
The space composition of HOPSCA .................................................. 33
The comparison between HOPSCA and other common patterns of urban complex ............................................. 35
The advantages and shortcomings of HOPSCA model ................. 36
  Advantages ..................................................................................... 36
  Disadvantages ............................................................................... 37

Chapter 4: Case study .................................................................... 38

Roppongi Hills in Tokyo ................................................................. 39
  Introduction of Roppongi Hills ....................................................... 39
  The master plan and function organization of Roppongi Hills ......... 40
  Internal and external transportation of Roppongi Hills .................. 41
  Space organization and Landscape of Roppongi Hills .................... 42
China Central Place in Beijing ....................................................... 43
  Brief introduce of China Central Place ........................................... 43
  The master plan and function organization of China Central Place ........................................................... 44
  Internal and External transportation of China Central Place .......... 45
  Space organization and Landscape of China Central Place .......... 46
The comparison between Roppongi Hills and China Central Place ............................................................ 47
  Why this two case? ......................................................................... 47
  Comparison between these two cases ............................................ 47
The similarities and differences between successful cases and design site ..................................................... 48
Summary ......................................................................................... 48
Chapter 5: Design Proposal .............................................................. 49
   The framework of the design .......................................................... 50
   Introduction of the site .................................................................. 51
      Location of the site ..................................................................... 52
      Main elements in the city ............................................................ 53
      Traffic situation of the city and the site ........................................ 54
   Analysis and Design concept ......................................................... 55
      Surrounding facilities .................................................................. 56
      Status traffic situation of the city and near the site ....................... 57
      Photos of surrounding areas ....................................................... 58
      Make full use of the underground spaces ..................................... 60
      Living, working, culture, transit and economy mixed area ............. 61
   Design proposal ............................................................................ 62
      Master plan and elevations .......................................................... 63
      Function organization ............................................................... 65
      Space organization ..................................................................... 69
      Internal transportation—road structure and connections ............... 71
      External transportation—the traffic comparison before and after the built of the site .............................................................. 75
      Landscape and green spaces ....................................................... 77
      Bird view and perspectives ......................................................... 79
   The comparison on main indicators among Roppongi Hills, China Central Place and Design site ...................................................... 82

Chapter 6: Thinking of the application of HOPSCA in suburb area ...... 83
   The difficulties of HOPSCA using in suburb area in China .......... 84
   Some suggestion of urban complex construction in China ............. 85
   Expectations of the application of HOPSCA in China .................... 86

Summary ......................................................................................... 87
Conclusion ...................................................................................... 88
References ..................................................................................... 89
Image Source .................................................................................. 92
Chapter 1: Introduction

Chapter one is the introduction chapter, the Background; problems; possibilities will all be illustrated. A brief introduction to the design part is also contained in chapter one. The last part is the methods and main framework of the whole thesis.

This chapter is the brief introduce of the whole thesis. The readers can get the outline of those most important contents of the whole thesis and know what is the thesis is about easily after reading the introduction chapter.
Background

China, one of the world’s fastest growing countries, grows every day, every hour, every minute, and even every second. The urbanism and suburbanization situation is on their ways in China. The city center is suffering from high pressure on traffic, pollution, population and so on. Most of the cities are trying to build a sub-city center in suburb area to reduce the pressure on city center. Based on this background, how to make full use of the land resources in the suburb area and built a really attractive and vibrant new-center becomes a question eager to be solved as soon as possible. Consider the population and traffic characteristics of China, urban complex has been proposed and the HOPSCA model using in suburb area will rising and gradually become the most use model in the future sub-city center construction. According to the research of urban complex, HOPSCA model and the successful case analyzes of Roppongi Hills and China Central Place. The application of HOPSCA model in new suburb area construction in Yiwu city is possible and will be great successful.

Urban complex is a multi-function and high-efficiency complex in a group of buildings which contains more than three functions among commercial, office, residential, hotel, exhibition, entertainment and transportation. By comprehensive coordination of the internal horizontal and vertical transport and using the street life concept to connect various functional spaces, urban complex gains the city district characters. Urban complex has many different types of models which have different main functions. The main models are transit-oriented model; commercial focus model; residential and office mixed model; HOPSCA model and so on. HOPSCA model is a kind of urban complex which contains all those six functions and every function have the same importance, no clearly separation of main function and subsidiary function. HOPSCA model urban complex usually built in the central area of the city or the area which is tended to be a new center, through the reorganization of the space and city functions to encourage the walking distance travelling and reduce the dependence of private cars.

This paper contribute to using HOPSCA model urban complex in constructing a new sub-city center in suburb area to make full use of limited land resources; reduce the pressures of traffic, pollution and population on city center. The HOPSCA model using in city central area had gain a great successful in China. We have to do research and exercise to see if it still works in suburb area when creating a new city center, as the suburb area and central have different attraction and operation mode.

The principal result of this paper is that HOPSCA model urban complex is the perfect fusion of working, living, social activity and entertainment. HOPSCA model using in creating a new city center in suburb area will be a good solution of the conflicts between the land resources and the construction space request; reduce the pressure on city traffic system and also improve the living quality in suburban. The application of HOPSCA model in those cities in China has a vast prospect.
Brief introduction of the design area

The design site is located in a city named Yiwu. It is located in the central area of Zhejiang Province, 110 kms away from Hangzhou, 260 kms away from Shanghai. The geographic center of Zhejiang province is located inside Yiwu. Dongyang, Jinhua, lanxi, pujiang are all the neighbors of Yiwu. The total area of Yiwu is around 1,105.46 square kilometers, and the population is more than 2 million including 740,000 local residents and 13,000 from other countries. It is the world’s largest commodity distribution center and identified as the largest market in the world by the United Nations.

The city is a fast-developing trade city and famous for its small commodity trade. The whole city is divided into seven districts and six towns. Our site is in Jiangdong district, which is suburb area. The total covering area of our site is 141,252 square meters. Around 30 years ago, that area is agriculture land and has a few farmers live there. A few years ago, the government moved all those people to other places and took this area as construction area. But the government has not decided what to build at that time. This site becomes an idle land for years. Recently, according to the information I have got is that the government trying to develop Jiangdong district as a sub-city center. My design proposal is to create a sub-city center by using HOPSCA model.

Detail introduction of Jiangdong district and the analysis of the site can be found in Chapter four—design proposal chapter.
Problems

Problems of understanding HOPSCA
HOPSCA is also a new word in China at present. Some researchers just thought that HOPSCA and urban complex are the same and also did not find out the differences between HOPSCA and other common patterns of urban complex. The explanation and description of HOPSCA are not clear because of the confusions between HOPSCA and urban complex.

Problems of the design site
As the city Yiwu is growing very fast, the pressure of the city road system, the environment within the city area becomes more and more heavy. The suburbanization is on its process in Yiwu. A lot of residential areas were built in the suburb. The government and developers prefer to only have one main function in one piece of land and separate different functions in different areas. The residential area always lack of vitality at daytime and the working area will become a death area at night. The problems listed are the problems I want to address.

Transportation of the city
- Long distance from living area to working area.
- Heavy traffic pressure and terrible traffic situation on city center on evening and holidays
- Terrible traffic jams on most roads in the city on rush hours everyday

Function organization of surrounding area
- The main function of Jiangdong district is residence. The surrounding areas of our site are all single-function areas and lack of function diversity.
- The whole city only has one city center. All the shopping malls, big supermarkets, entertainment bars are in the city center. City center is the only choice when you’re trying to find the big shops, big supermarkets.
- The only public space near our site is the riverside green space. The site area has the problem of lack of squares and green spaces.

Space organization
- Most of the buildings near our site are four floor residence building. The density is quite low.
- Most of the buildings do not have a basement. The utilize ratio of underground space is low.
- The only big green space is the riverside green belt. The greening ratio of the surrounding areas is quite low. The area is not an environment-friendly area.
Possibilities for the design site

Mixed idea
Some scholars prefer to organize life and work in an effective, rational and scientific way. They try their best to fully integrate the various elements of modern life, organically linked up living, working, studying, shopping, leisure and other functions in order to create a modern living space to ensure that all kinds of daily life, including business and public affairs, can be quickly solved within a small range.

The main characters are as below:
①Residential and working areas are close to each other to shorten the travelling time and reduce the transport costs;
②Have complete social supporting facilities while the surrounding human survival resources are more abundant.
③The neighborhood will have various forms of social and public platform and Art Gallery for people to communicate with each other.
④The mixed use idea concerned about the relationship between man and society, nature and cities, and human value, emphasis on resident participation in community development.

HOPSCA model using in suburb area
According to the problems listed before, HOPSCA model urban complex has been proposed. (Zhao, 2010) Urban complex is a multi-function and high-efficiency complex in a group of buildings, which contains more than three functions among commercial, office, residential, hotel, exhibition, entertainment and transportation. HOPSCA is one special kind of urban complex. It is a kind of urban complex, which has six functions, including hotel, office, parking, shopping, convention and apartment. All those six functions work together originally to make the whole area attractive and moving. HOPSCA model urban complex is always built in central area or the areas which area proposed to be a new city center.

HOPSCA integrated those six functions in a walking distance area and offers all living facilities in walking distance, which can make the life more effective. The buildings will always use high technique and tall, which make the density higher and meet the compact city idea. As everyone knows, China has to protect those farm lands and make full use of limited construction lands. HOPSCA model can exploit the underground spaces to make full use of the land resources and meet the goal of built a compact city. As the buildings go higher, they left more open spaces for landscapes in HOPSCA, there will be more green space, which is good for the city. We need green spaces, grass and plants to make our life closer to the nature.
Purpose of the paper

This paper has two purposes.

One is to do a deeply analysis about HOPSCA model and find out the differences between HOPSCA and other common patterns of urban complex. This is done to help the following researchers to have a deep and clear understanding about HOPSCA and easily distinguish those differences.

The other aim is to do contribute on using HOPSCA in constructing a new sub-city center in Yiwu to make full use of limited land resources; reduce the pressures of city traffic system, also the pollution and population pressure on city center.

Research question

According to the background and possibilities listed before, there are two research questions in this article:

1) How can HOPSCA model benefit to the city traffic system and make the suburb area attractive, livable and full of vitality? This question will be answered by deeply study of the special organization and functional organization of HOPSCA and then find out the advantages and disadvantages based on literature review and successful case study.

2) How can HOPSCA model be used in the design of a sub-city center development in Jiangdong district in Yiwu and is it suitable for Yiwu? This question will be answered by practical application of HOPSCA concept in the form of a brief design proposal.

Literature review

In order to do this research, I used a lot of literatures about mixed-use development, compact city development idea, and urban complex, HOPSCA, and the suburb developing status in China. To create an all-around understanding of urban complex and HOPSCA, I also read some literatures about edge city, garden city and urban sprawl. The literature readings served as the theoretical basis for my trying about using HOPSCA model in the suburb area in medium and small cities.

Urban complex is a new research area in China. The major research areas involved many aspects, such as urban planning, land economics, real estate development, construction projects and so on. We can easily find a variety of articles relevant to urban complex in all types of papers and academic journals recent years also. Those articles have variety kinds of contents, such as the introduction of some urban complex cases, investigation report, and some may be just described by the theoretical view. This situation can indicate that urban complex is gradually gaining the academic attention.

Chapter two and chapter three are the results of my literature review.
Methods

Literature review and case study were conducted to collect the necessary information for this paper. This method was chosen, because it fitted best to the purpose of this research. In order to meet the purpose of this research thesis, it was necessary to understand the urban complex and HOPSCA model and the advantages of having urban complex. This can only be done through a literature review and a case study.

The systematic review should identify relevant articles of appropriate quality and should be conducted in an objective way; meaning that the same information could be found by any other researcher. Furthermore, the literature review is not just a series of summaries of relevant articles and books. Main statements which are relevant for the review topic need to be identified and analyzed critically. We should search the same question in different articles and try to get comparative data to real data in order to know the whole of that thing.

Five major electronic bibliographic databases of relevance were searches: National Knowledge Infrastructure (CNKI), VIP Database for Chinese Technical Periodicals (VIP), Chinese education library, BTH school library, and Google scholar. Key words to search the databases where: Urban complex, HOPSCA, mixed-use development, and new suburb built.

Furthermore, there were four journals identified, which underwent a more detailed examination due to their high relevance for the topic: Architecture journal, Urban Environment Design, Planners, and Urban planning forum.

Another source of material was the recommendations from my tutor, and friends working in Construction Bureau and City planning and design Institute of Yiwu China. These recommendations, however, confirmed in principle the selection which was based on the search of the databases. Altogether approximately 130 articles and books were included in a first review of their abstracts.

The numerous databases and search engines provided a large number of related articles and books. Selecting the studies which are most relevant should be part of the literature review. Here the establishment of selection criteria was necessary. The article needs to include (a) a definition of urban complex and (b) HOPSCA model, (c) an analysis of urban complex and HOPSCA, (d) the characteristics, advantages and disadvantages of HOPSCA using in city design. The articles needed to cover at least two of the above selection criteria. After this search process, 50 studies were selected.

The actual review was based on four phases of the process. (a) The city function planning is related to reducing the pressure of the traffic system. (b) The result of deeply understanding of HOPSCA and how it can make a site active around the clock. (c) Analysis about if HOPSCA can be benefited to the city traffic system. (d) The conclusion was drawn based on the findings throughout the analysis.
Frame work

Image 1-2 The frame work of the thesis
Main contents of the paper

This paper is divided into six parts.

Chapter one is the introduction part. In this chapter, I will illustrate the status of Chinese’s suburb contribution situation and the status of suburb traffic situation. Put forward the problems and the possibilities in the first chapter. The literature review and methods are also contained in the first chapter. The aim of part is to summaries and analyzes the literatures and the status. It is like put forward the question part.

Chapter two is the relevant theoretical study part. In this chapter, I will study some theory which is relevant to HOPSCA model: mix-used development, compact city. The most important part of this chapter is the urban complex which is one of the key words of this paper. After those general theoretical studies, this chapter will introduce the definition and the origin of urban complex and give out some urban complex models. HOPSCA is one model of urban complex. In order to research HOPSCA, we need to understand urban complex first.

Chapter three is the HOPSCA part. In this chapter, I will illustrate the definition, characters, advantage and disadvantages’ parts of HOPSCA, the spatial composition and functional composition of HOPSCA. If HOPSCA is chosen as the problem solving solution, we have to know HOPSCA as much as we can in a critical eye and trying to understand its reason and ways to make the spatial composition and functional composition.

Chapter four is the case study part. The Roppongi Hills, Tokyo; and China Central Place, Beijing have been chosen as my study example. The case study will be done in a critical view as also. The case study will focus on the master plan, function organization, internal and external transportation, space organization and land use. The aims of the case studies are to know how this HOPSCA operates and to find out the key of making a successful HOPSCA model in the suburb.

Chapter five is the design part. This one is an attempt of making a HOPSC in suburb areas in some middle or small cities, which also facing those problems such as lack of land; large population compared to the scale of the city, terrible traffic status. The chosen area is located in Yiwu, China. There will be an introduction of the city and the site, design concepts and design proposals. The maps will combine the analyze maps, concepts, master plan, function organization, spatial organization, bird view and so on.

Chapter six is the thinking part. This part will analyze the status when trying to design and built a HOPSC in suburb area. Then give some suggestions in order to help create a successful HOPSCA in suburb area.
Chapter 2: Related theoretical review

This chapter is the literature review chapter. In this chapter I will research on two concepts: mixed-use development and urban complex. The review of mixed-use development is just in the introduction status, and the rest of this chapter will focus on urban complex, because HOPSCA is one model of urban complex.

In this chapter, I will briefly introduce the mixed-use development concept first. Then focus on urban complex. The research of urban complex contains the definition of urban complex, the differences between urban complex, multi-function building and building complex, and the description of common patterns of urban complex.

This chapter is the theoretical background of HOPSCA.
Mixed-use development

Mixed-use development is the natural and traditional state of urban development. It can be traced back to ancient Greece and medieval cities. (Chen, 2010) With the development of the city, mixed commercial, residential complex can be easily found in European cities in the 19th century. Nowadays, with the rapidly development of cities, some problems appear and become more and more serious. Those problems, such as air pollution, rampant diseases, and poor living environment are puzzling the city planners. The idea of “functional partition thoughts” in the “Athens Charter” advised to plan the city by dividing those incompatible functions in different spaces. That idea helped the city to control those different functions in the space and also greatly improved the urban living conditions. (Eizenberg, 2003) After world war II, the modern urban planning choose “functional city” as principle achieve a unprecedented application in Western countries. Soon after, the drawbacks of the “functional partition” are gradually exposed. Many urban planners and other experts found that mixed-use development had many benefits and should be promoted again. The modern sense of mixed use is engendered on the basis of the reflection and criticism of “functional partition” theory.

Modern zoning practices assigned land uses according to functions. Houses were segregated from commerce, work, school, hospital and other facilities. ‘From the 1910s through the 1950s finely mixed land uses were rare in new developments. In the 1960s and 70s, mixed-use re-emerged as a tool for city centers revitalization.’ (Miller, 2003, pp 4-5) In 1961, Jane Jacobs’(1989) influential The Death and Life of Great American Cities argued that a mixture use of functions is vital and necessary for a healthy urban area. In the late 1970s and 80s, mixed-use buildings were built on small scales. ‘In the 1990s to 2000s, mixed-use emerged as a key component of Transit-oriented Development (TOD), Traditional Neighborhood Development (TND), Livable Communities, and Smart Growth principles.’ (Miller, 2003, pp9)

“Mixed-use development” means a development consisting of one or more lots, developing as a cohesive project and designing with a blend
of various compatible uses such as commercial, residential and institutional. In the book *Mixed-use Development: New Ways of Land Use*, Robert E. Witherspoon (2008) gives out a definition of mixed-use development: 1) It has three or more significant revenue-producing uses, such as retailing, office, residential, culture and entertainment. 2) Have significant functional and physical integration of project components. 3) Development in conformance with a coherent plan. There are three approaches to Mixed-use Development today: increase the intensity of land uses, increase diversity of land uses, and integrate segregated uses.

Mixed-use development can be divided into three types based on its scale: mixed-use building, mixed-use parcels or sites, mixed-use walkable transit areas.

Mixed-use district mostly located in the city central area or the downtown area. It is always located near the transit spot and will have the character of high density to meet the compact concept. Those functions in a mix-used district will be connected by pedestrian roads, which will not be disturbed by other traffic roads. The area is developed based on a developing plan for the whole district. (Wang 2010) Mixed-use development idea has a lot of advantages: It activates urban areas during 24 hours of the day, increases housing options for diverse household types, reduces auto dependence, increases travel options, and creates a local sense of place. (Miller, 2003)
What is urban complex

The generation of urban complex is closely related to the social, economy and history. The emergence of the urban complex is the inevitable outcome of the city form develops to a certain stage. When the population continues accumulating, the land resources become more and more limited. As a result, urban complex appears in the central area of the city. Nowadays, some planners think that urban complex, building complex and multi-functional building were the same concept. However, in my opinion, they are different concepts with really closed relationship with each other.

Multi-functional building

Multi-functional buildings are buildings, which have one main function and some other functions to support the main one. It is one building type that appears because of the low utilization rate of single function buildings. Multi-functional buildings improve the utilization rate by reorganizing the space in a rational way, adding some relevant functions, using more related facilities and technical measures. (Pan & Shi, 2010)

Multi-functional buildings not only organized and coordinated a variety of useful features in specific limited space, but also achieved the purpose of land conservation. The Capital Gymnasium (image 2-4) in Beijing is a multi-functional building which combined the functions of sports competition, arts performance, large-scale exhibition and national fitness all together through spatial transformation and renewal of equipments.

Building complex

According to the book Encyclopedia of American Architecture, building complex is a group of buildings, which have one or more functions and sets together to be a group.( Packard, Korab, Hunt, 1994) Building complex can be classified into two types: monomer type (single building) and group type (a group of buildings).
Monomer typed building complex (image 2-5) is a building which has different functions between different floors or different room in the same floor. Those functions are separated but also related with each other. Group type building complex is a group of buildings, which are mutual related in general plan, building styles and other aspects. All those different function buildings become a unified complex through planning and the appearance between each other.

Building complex can be regarded as a combination of buildings by simply superposition of different functional spaces. Those spaces do not have a complementary relationship with each other and have not constituted a system. There are some notable features the building complex has: do not have a strong relationship with the city space; lack of effective integration of urban functions and public spaces; the logical of system integration and organizational structure is not strong; the changes of local parts only have little effect to the whole group.

Building complex is suitable for those medium-developed cities. Function composition is selected according to regional characteristics. Choosing hotel, office building or shopping center as the core is the most basic type.

**Urban complex**

Urban complex is a multi-function and high-efficiency complex which contains more than three functions among commercial, office, residential, hotel, exhibition, entertainment and transportation. The planners aim to establish an interdependent and interactional dynamic relationship between each function. Urban complex is the organic combination of a variety of functional spaces in one or a group of buildings. (Liu, 2011) (Pan& Shi, 2010) By comprehensive coordination of the internal horizontal and vertical transport and using the street life concept to connect various functional spaces, urban complex gains the district characters which those general building groups do not have. Urban complexes organic combine internal transports with external open spaces; extend the value of interior space by the effective linkage with open spaces and the city transportation system. Urban complex also pays attention to the contact between the landscapes and the transport system to create a complex, unified and efficient overall space. From the city perspective, urban complex can reduce the pressure on traffic because of its mixed function organization and commendable connection with the city public transportation system. From function composing perspective, the function and spaces are interdependence and be complementary in advantage aspects. From the perspective of building form, urban complex can be landmark buildings and have some influence in the surrounding areas. (Pan& Shi, 2010)
Common urban complex model in China

With the rapidly develop of economic and the accelerating growing speed of city renewal the construction of Chinese cities, urban complex becomes more and more important. Urban complex has many different types of models, which have different main functions. I will classify those models into six main models.

Transit-oriented model of urban complex
This model of urban complex always exists in the transit core area or in the important transit cross in the city edges which is the main transform station of the city and the external transport. (Li, 2010) The area of a transit-oriented model urban complex located has a lot of characteristics: huge population flux, centralization of multi transport ways, high strength of land use and construction. Transit oriented model of urban complex always acts as a transportation hub, so that it should be easily transformed into a variety of transport modes within a radius of 500 meters. The distance between the metro, intercity rail, urban public transport, private transport and subway should be less than 10-minutes walking distance. From the function morphology perspective, this kind of urban complex is general considered as the window of the city and bears the important task to enhance the first image of the city. (Li, 2010)

Beijing Dongzhimen (image 2-7, 2-8) urban complex is constructed relaying on the transport hub. It contains super high-rise office building, luxury apartments, five-star hotels, large commercial centers and some
other features. The integration way is using city platform concept to organize the city space in multi-dimensional ways and rational organized the dense flow of people in the transport hub in city core area at the same time. The core space of the first floor is the transport hub. Upper is open space, which combines landscapes, squares, internal pedestrian transport as one. Around the center, there is a porch connected the south commercial district, twin office tower, hotel and north commercial district together, which is hopeful for all those functional areas to reach the maximum commercial value. This project also provides a new idea for the integrated urban complex in the transport hub.


**Commercial type urban complex**
This kind of urban complex chose commercial as the main function but also have some office, conference and some other subordinate function. This kind of urban complex is one of the important places to gathering the population flow.

The Cloud Nine shopping center is the most famous urban complex in Shanghai because of its unique design and superior location. It is located in the Changning district, west side of Zhongshan Park. It covers an area of 25,899 square meters. It has four floors underground, ten-storey podium and 58-storey commercial tower. As the main commercial center in Zhongshan park commercial district, the function of Cloud Nine shopping mall is positioned as a commercial, casual western district of Shanghai, which integrated the business, entertainment, cultural and residential functions together. It is a veritable city within a city.
Residential and office mixed urban complex
Consider the emergence of small and medium-size enterprise and the requirements of the integration of living and working space, a small office-home-office design concept has been put forward. This kind of urban complex combined the working space and living space together. SOHO is one example of this kind of urban complex. SOHO is a model take residential and office as the main functions, together with other subordinate facilities to create a living-working mixed complex.

Business and Office type urban complex
This type of urban complex always chooses business and office as the main functions and also has residential function. The buildings will always be tall buildings and have podium in the first two or three floors. There will be a lot of people gathering in this area and need a large amount of parking place in the daytime. But in the evening, those business and office buildings will be totally empty.

Exhibition urban complex
The main function of convention type urban complex is exhibition. The location should have convenient traffic and have a lot of parking spaces. There will be a great amount of population gathering in the area when the exhibition is hold. There also need to have some shopping, leisure and public service area.

Six function mixed HOPSCA model
This model will be detail introduced in chapter three.

No matter which model the designers choose the emergence of urban complex shows that Chinese cities are developed in the land intensive and function integration direction.
Chapter 3: Researches on HOPSCA

This chapter is the main theoretical chapter of the whole thesis. This chapter is the deeper research of HOPSCA model. As I wish that everyone can understand my thesis no matter if you have the background knowledge of urban design or not, this chapter started by introducing the definition of HOPSCA to let everyone get the initial understanding of HOPSCA. As some researchers in China just equaled HOPSC with urban complex, I also have one part to illustrate the relationship between them. This chapter shows the result of my researches on HOPSCA on aspects: the function organization of HOPSCA, the space organization of HOPSCA, the main characteristics, the advantage and disadvantages of HOPSCA. As HOPSCA is a model of urban complex, in order to distinguish HOPSCA with other patterns of urban complex, a comparison among HOPSCA and other patterns of urban complex is done in the end of this chapter. It is much easier to find the advantages of HOPSCA according to the comparison table.
The definition of HOPSCA

Strictly speaking, HOPSCA is not an English word. We could not find this word in any English dictionary. CBD is an abbreviation of Central Business District. Central Business District is a descriptive phrase. Different from CBD, HOPSCA is short for six words. All the six words are nominal words. Every letter has its own meaning: H is short for Hotel; O is short Office; S is short for Shopping mall; and A is short for Apartment. Based on those literatures, there are different understands about the letter P and C. Some think that P is short for Parking while the others take the meaning park instead. The meaning of this park is similar to garden as green space for having rest and enjoying the nature. For the letter C, there are three kinds of ideas: Club, Convention, Culture and recreation. (Sun, 2011) (Liu, 2011) Actually, the concept of HOPSCA focuses on the function and domain complex. All those functions mentioned before are commonly seen in a HOPACA model and it’s no matter the exactly what every letter means. We need both parking space and green space in HOPACA model and the same as convention, club and culture.

According to the analysis of the available information, the currently accepted theory is that the word HOPACA is first appeared in the description of the La Défense, Paris, France. At beginning, La Défense is using the model of the Rockefeller Center, Manhattan as the basic model. Then the designers trying to combine the model with the current geographical environment, the culture of France, create an urban complex model which has six functions.

The general understanding of HOPSCA is a multi-functional, high efficiency, complex and unified urban complex model. It is a model combined hotel, office, park, shopping, convention and apartment together to establish a multi-functional, modern and comprehensive urban multi-dimensional spatial architecture union. The relationship between those functions and spaces is complementary. In the future, HOPSCA model definitely will improve such as change the numbers of functions it contains. It will probably improve to have eight functions or reduce to five instead. In this article, we thought the HOPSCA has six functions which every letter in the word means.
The relationship and differences between HOPSCA and urban complex

Nowadays, we can easily find the word HOPSCA in most commercial real estate advertisements. The frequent appearance situation of the word HOPACA sometimes misleads the public thought that HOPACA is an abbreviation of urban complex. But we should really consider the small differences between them in order to help us understand HOPSCA model more clearly.

Based on the preceding description, urban complex is generally evolved from early multi-functional buildings and building complex based on the development of the city and the objective needs of city functions. The functions, models and types which urban complex and HOPSCA contain are not the same.

Firstly, we can easily find the differences among multi-functional buildings, building complex, urban complex and HOPACA by their definitions. The definitions of them have been illustrated before.

Secondly, the functional composing modes of HOPSCA and the general patterns of complex are different. The main functions of HOPSCA are those six constant functions. The relationships between those functions are equal and complementary on the advantage parts. Different to HOPSCA model, the relationships between functions of those general patterns of complex are not equal. There will have main functions and subordinate functions. Those functions do not constitute a complementary relationship with each other.

Thirdly, the HOPACA model urban complex can create an operating system inside by itself. Such as it can have a supporting interactive among living, shopping and landscape; the hotel, office, park and shopping functions can create a new three-dimensional way of life by themselves. The relationship between those six functions can be unattached one another, influenced each other and complementary to each other. In the general patterns of complex, those subordinate functions exist to support the main function.

Fourthly, HOPSCA model urban complex is one of the efficient intensification organization forms of city buildings. It has the character of sustainable development. Every function of those six main functions
can become a small general pattern of complex. Those small general patterns of complex can be composite into a whole HOPSCA urban complex.

There are three similar parts between HOPSCA and general patterns of complex:
1) They are both uniforms, which composited by a number of functions and spaces. They all overcome the limitations of single function buildings.
2) They both strengthened the integration of building, city life, culture and landscape.
3) They both are the result of the planners approach to achieve land intensification and multi-functional land use.

Multi-functional building, building complex and general pattern of urban complex are all the basic of the emergence of HOPSCA. Even though, HOPSCA is not equal with those general patterns of complex. It also belongs to the urban complex area. HOPSCA is just a special model of urban complex.

The characteristics of HOPSCA

1) Huge scale, mixed use and have the characters as a small city.
HOPSCA has a full range of supporting for living and working, so there need to be a multi-functional area. There need to have office building for working, shopping mall and super markets for commercial, apartment for living, fitness area for exercise, and so on. (Zhao, 2010) (Li, 2010) It is a small city inside the big city. (Sun, 2011) HOPSCA has a lot of characters the same as the city. As the small area needs to contain such many functions and city characters, HOPSCA always has a huge scale outdoor space and big scale tall buildings. Because of the expansion of building scales, the inter space also has a comparatively bigger scale in order to match the scales for the whole HOPSCA. In the other way, the big scale can fit the multi-functional features. Those big opening spaces can be the gathering places. (Pan & Shi, 2010)

2) High-tech facilities and high-intensity development
The buildings in HOPSCA model are concentrated. HOPSCA is often composed by several connected buildings groups. In order to meet different needs of living, working, business, leisure, consumption in such small area, the density of HOPSCA is always high. HOPSCA pays attention to the equilibrium of land use and trying to use the land as effective as possible. Different functions in the same block can cater to the needs in different time to different people. The population of daytime and night and the population on working days and weekends can be complementary based on different functions in HOPSCA. Thus, HOPSCA can make full use of the space and avoid the waste of limited land resources.
HOPSCA is a collection of high-tech and high intelligence facilities. Its advanced facilities fully reflect that the progress of science and technology is an important factor of the emergence of HOPSCA. Those tall buildings need to use high-tech to build and maintain.

3) Access tree transportation system
HOPSCA always connected with the main city by high speed roads, metro, and a lot of public transportations to make itself as a really convenient high reachable district. The organic planning of the basement, underground spaces, over-head bridge, passing space inside the buildings, outdoor public spaces, parking spaces inside HOPSC and the streets, metro of the city composed a complete set of an access tree system. This transport system breaks the single-level concept of the traditional street, creating a changeful three-dimensional transport space. (Zhao, 2010)( Li, 2010) (Pan & Shi, 2010) Tree system transport is similar as the traffic network.

4) Full of green spaces and well designed landscapes
The application of modern urban design, environmental and behavioral theory when doing landscape and environment design is an important feature of HOPSCA. HOPSCA breaks the traditional concept of single buildings but takes all the buildings as a group and trying to create a livable environment by using artworks, street furniture, planting, paving, lighting and so on. The building groups and the main parts of landscape in HOPSCA model also take on the historical responsibility of the urban civilization and economic development. (Pan & Shi, 2010)

5) Landmark and have huge economic and social effects
Building groups of HOPSCA always can become the landmark buildings for area nearby because of their recognizable height or shape. (Zhu, 2010) HOPSCA is the gathering land of commercial, population and wealth. It can greatly achieve the urban and social value. (Tirrell, 2003) The multi-functional area can greatly show the consumer habits of the city so the HOPSC can create huge economic benefits and driven variety of related industries. In many cities, HOPSCA always represents a kind of urban culture. At the same time, it can solve a range of issues of the city, such as employment, tax and then bring enormous social benefits. (Zhao, 2010) (Pan & Shi, 2010)
Internal and external transportation

The traffic situation of HOPSCA can be divided into two aspects: the internal transportation and external transportation.

Internal transportation
The internal transportation of HOPSCA is the access tree transportation system. The access tree transportation system means to use the underground pass, over bridge, streets and pedestrians to connect all those upper ground and underground spaces together. This access tree transportation system breaks the concept of streets on one plan and formed a changeable street space.

Those second-floor pedestrian passes, over bridges, upper corridors and other kind of aerial pass ways will not only make the high-level part of buildings have a convenient transportation but also reduce the interference of walking people, bicycle and vehicles and achieve the separated pedestrian and vehicle traffic.

External transportation
As the HOPSCA is mainly built in the city central area or new built city center, the external transportation of the HOPSCA area should be really convenient. There will have metro lines and a lot of bus lines to connect the site area with the other parts of the city.

Besides, there will also have a lot of people who prefer driving to the HOPSCA area. The HOPSCA area should have adequate parking spaces for private cars. It is easily to find underground garages in most HOPSCA cases. Underground parking is the representation of making full use of the limited resources. Using underground garages not only provide adequate parking spaces for vehicles but also left more spaces for the other functions.

Image 3-3 internal transportation of HOPSCA
Source: http://xiaozu.renren.com/xiaozu/176065/334657905
The function composition of HOPSCA

As HOPSCA is an important part of the city, besides the functions inside HOPSCA, the whole model also has a lot of city functions. This section, we will discuss the function composition of HOPSCA from the internal function level and the external city level.

Internal function composition
HOPSCA model rationally allocated and organized those six different functions together via different time period to ensure that all those functions can run in-time and actives systematically. In particularly, HOPSCA integrates office, living, commercial and entertainment features together so that those depression functions on non-working hours can be utilized and achieve the whole area 24 hours of prosperity. (Liu, 2011)(Wang, 2010) The integration of working and other functions can improve the overall efficiency of the whole site. I divided those inside functions into 4 main functions as below.

1) Commercial function
The shopping stores, supermarkets and restaurants composed the commercial function in HOPSCA. Commercial function is one of the important parts in daily life. Those shopping stores, supermarkets and restaurants can provide living, entertainment for the HOPSCA to meet the needs of daily life. Commercial functions can provide services and facilities to the other functions and enhance the synthesis level of the whole area. (Wang, 2010) Whether there is a convenient business services is an important factor to consider when the customers choosing hotels and apartments. Besides, the commercial function can attract sufficient population for the whole area which is very meaningful for the improvement of activities and the reputation of the HOPSCA.

2) Office function
Office function is one of the dominant functions of HOPSCA. The main figure of office function is administrative office and business office, including offices, meeting rooms and business center. Among all the components, the office is the basic facility of the administrative and commercial business: office room attracts companies, which can provide a lot of working chances; conference room is setting to meet the demand for small meetings; business center aims to meet the needs to handle temporary business work. Office function can afford support for the other functions such as hotel, shopping, restaurants and so on. Office function is suitable for a variety of mixed developments, no matter it is in the city center, new built center or industrial center. Office function can establish the competitiveness of HOPSCA and improve the attractiveness. (Wang, 2010)

3) Living function
Living function is composed by apartments and hotels.
Apartments and office mixed can be a way to reduce congestion, which is caused by private cars on peak period. Apartments can accommodate a fixed group of consumers in HOPSCA. The living function of those
apartments played a key role for the prosperity of themselves and the surrounding area. Hotels provide changeable resident population for HOPACA. The public facilities of HOPSCCA such as restaurant, entertainment, fitness and services can be shared with hotels to provide more complete service. In addition, hotels and other functions can work together and make HOPSCA maintain prosperity and vitality.

Living function can balance the activities of daytime and night time to avoid the death of HOPSCA in evening.

4) Landscape function
The landscapes in HOPSCA make the whole area as a garden. The designers use roof gardens, green façades and small parks to make the whole HOPSCA area closer to the nature and more suitable for living. Good landscape is the main consider aspect when people choosing the apartment. Those green spaces can provide enjoyable outdoor spaces for the residents. Have landscape function of HOPACA meets the nature friendly city and the garden city concept.

**External function composition**
Carrier function
The HOPSCA should be a small center of the surrounding areas. It should show the cultures and the characteristics of the surrounding area. As the carrier of information, finance, insurance, technology, business, commercial, residential, exhibition, entertainment and other urban functions, HOPSCA provided material conditions and the environment spaces for people to carry out various activities.

Transport function
As we all know, HOPSCA is always located near the city main road, metro, public transports. It has intensively needs on internal and external transportation. HOPSCA would probably be a transport hub, which is closely connected with the whole city.

Social influence
As a landmark of the locating areas, HOPSCA has a big impetus, and definitely can lead the direction of urban development, cause the enhance value of the surrounding area and promote the upgrade of regional industrial. As a venue for social activities, the functions and spaces of HOPSCA can definitely influence the surrounding areas, even the whole city.
The space composition of HOPSCA

In general, participation of so many functions will inevitably lead to the conflicts and problems between the environment and space. The advantage of HOPSCA integrated design is that it can avoid such contradictions and problems through rational design. The space of HOPACA can be divided into three categories: public space, functional space and transport space.

There are three kinds of spatial forms in HOPACA: vertical form, horizontal form and three-dimension form.

Vertical form means organizing the functions and spaces in a vertical way. Usually the buildings will have a tower structure and using vertical transport such as elevators and stairs to connect different spaces. Because of the scarcity of land resources in the city area, most buildings always have a vertical form when organize spaces. Some ultra-high-level buildings have hotel, office, shopping center, roof garden and underground parking all in one building. (Guo & Wu, 2011) From a certain sense, ultra-high-level building can be the symbol of urban economic developing level. Some experts disagree with this spatial organization.
form because of its super expensive developing cost. They also illustrate that the structure of ultra-high-level buildings can last for hundreds years but most inside facilities can only work for a decade or two. It is extremely hard and expensive to fix and maintain those facilities.

Horizontal form means organizing the functions and spaces in one plane. In this form, those buildings should keep harmonious and uniform through the style of façade and the skyline. HOPSCA with this kind of spatial form always has a big scale of land use. From the urban design perspective, the designers can effectively control the façade and the height of buildings to make the whole area inosculated with the districts nearby.

Three-dimension form is a combination of vertical form and horizontal form. This kind of form organizes the functions and spaces along the plane and vertical direction. This kind of spatial form makes the whole HOPSCA as a coordinated and harmonious by using the inter penetration of different buildings and over bridges.
The comparison between HOPSCA and other common patterns of urban complex

From the table below, we can find that compared with the other common patterns of urban complex, HOPSCA have more advantages. But in the future, with the development of the city and construction technique, there will emerge more effective patterns of urban complex.

<table>
<thead>
<tr>
<th>Location</th>
<th>HOPSCA</th>
<th>Commercial type complex</th>
<th>Residential type complex</th>
<th>Transit-oriented type complex</th>
<th>Business type complex</th>
<th>Convention type complex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>City center</td>
<td>CBD</td>
<td>Old city renewal area</td>
<td>Transit hub</td>
<td>CBD</td>
<td>Areas which have good transportation</td>
</tr>
<tr>
<td></td>
<td>CBD</td>
<td>New built sub center</td>
<td></td>
<td></td>
<td>Government office area</td>
<td></td>
</tr>
</tbody>
</table>

| Transportation | The internal and external transportation. The internal transportation can cooperate with the city road system and metro lines. Have a lot of parking place | Dependent on the city public transportation. Big amount of people on weekends and holidays, few people on working days. Parking space is not enough. | Few people on working time but need a lot of parking spaces at night. It will cause a big population flow on rush hour. | The transportation is always divided in different floors. Need a lot of parking space all the time. | Lots people and need a lot of parking space on working time but little people at night. It will also cause a big population flow on rush hours. | Lots people and need a lot of parking spaces during the exhibition period. Empty on the other times. |

<table>
<thead>
<tr>
<th>Function</th>
<th>Have six functions</th>
<th>Main function is shopping</th>
<th>Main function is dwelling</th>
<th>Operate as transit hub</th>
<th>Main functions are business and office.</th>
<th>Main function is exhibition</th>
</tr>
</thead>
</table>

| Characteristics | The relationship between all those functions is complementary relationship. The whole area is active all the time | The activity of the whole area is depending on the shopping function. | High dependence on the transportation. Activity is depending on the living function. | High dependence on the transportation. Activity is depending on working function. | High dependence on the transportation. Activity is depending on exhibition. | |

Table 3-1 The comparison between HOPSCA and other common patterns of urban complex
The advantages and short comings of HOPSCA model

Advantages

1) Efficiently use of land resources
HOPSCA combines a lot of functions together in one area and greatly reduces the distance between the functions and spaces. The site can be planned and exploited as a whole which can admirably economize the land resources, make full use of building spaces to maximize the investment returns of the land. (Pan & Shi, 2010)

Consider the urban expansion situation of Chinese cities, the tenser and tenser status quo of land resources, construction of a compact city and make efficient use of land resources is becoming an urgent task at present. Even in the United States which has larger per-capita land resources, also proposed “smart growth” planning model, which means to implement the compact community, reduce the development cost and environmental cost, mixed land use and other principles, and implement the most stringent urban planning with the most stringent farmland protection. Highly intensive HOPSCA with a variety of urban functions provides a new way of thinking for the transformation of the old city and the update of the land use.

2) Improve the traffic
The functions of HOPSCA are highly mixed and intensive, and the density is relatively high also. This kind of organization way leads walking become a more effective and convenient way to work, do shopping, leisure and have entertainment. It can effectively reduce the pressure of the roads, especially during the peak period, thus changing people’s traveling habits of transportation and reduce the time waiting for the traffic, which greatly improves the efficiency of life and work. (Pan & Shi, 2010)

3) Optimize the structure of urban space
With the development of urbanization and the growing of urban scale, single-core development showed out more and more disadvantages. In single core city, the central area is under enormous traffic and environment pressure. The residents need to spend a lot of time in commuting.

HOPSCA is always built in the city center, sub-city center and other main areas. Through the coordinated development of public transport, HOPSCA is benefited to reduce many problems arising in developing the single-core city. (Pan & Shi, 2010) It can also promote the city developing into the era of multi-core by forming a multi-core spatial structure and a netlike city function system. In the context of large-scale new construction in China, the new built centers may have some problems such as lack of population, inadequate facilities. HOPSCA with its composite value, spatial integration capabilities, the advantages on gathering the resources and population is helpful to get rid of the problems in new construction area.
4) **Improve the quality of urban public space**
The public space is the soul of HOPSCA. In order to obtain maximum benefits, the investors will have a high requirement on the quality of the public space of HOPSCA and also invest more money on the construction of public spaces to attract a large number of people. (Pan & Shi, 2010)

Because of the characteristics of the HOPSCA public space, those public spaces can faultlessly integrate with the urban public spaces. The quality of urban public space can be improved when the investors trying their best to improve the public space of HOPSCA and create a varied and high-quality modern urban landscape.

**Disadvantages**

1) **High invest cost in construction.**
As the HOPSCA always has a big scale than normal commercial building or shopping malls, the construction cost will be huge. The sale of the apartments can be put into the construction, but the return of the other functions will be a long term.

2) **Be the reason which causes the urban expansion**
Having HOPSCA in suburb area may cause the sprawl of the city. Because of multi-core city, the city will become bigger and bigger and have a higher requirement for the construction of the city infrastructures. Because of the urban sprawl, the main road which connected the city center and the sub-city center will be under a high pressure. If the organization of HOPSCA and the city center is unsuitable for the city, HOPSCA may also cause a more terrible traffic jam. (Kiderra, 2004)

3) **Make the rent of surrounding areas high**
As the modern HOPSCA built, the surrounding areas will improve. Those shopping centers in HOPSCA will cause the suddenly increase of the rent of the apartments in HOPSCA or even those nearby apartments.

4) **Break the peaceful atmosphere of suburb**
The HOPSCA is a 24 hour active area. This may interrupt the peaceful atmosphere in the suburb area.
Chapter 4: Case study

Nowadays, the design and construction of HOPSCA in China are still in the initial exploring stage, especially the application of HOPSCA in suburb area in medium and small cities. As a city designer, we need to continue research on those successful cases in big cities in China and also those most successful ones in other countries in order to better use of them in suburb area.

This chapter is the case study chapter. In this chapter, I will analyze two successful cases: one is Roppongi Hills, and the other one is China Central Place. This two cases will be studied separately first. A comparison between them will be made after the study. The last part is the similarities and differences between the design site in Yiwu and these two successful cases. Finding the similarities and differences between the design site and the successful cases can help us find the right way to do the design based on the study of Roppongi Hills and China Central Place.
Roppongi Hills in Tokyo

Introduction of Roppongi Hills
Roppongi Hills (六本木ヒルズ), located in the Roppongi District, Tokyo, which is a large shopping district. For many years, the streets of this area have been very narrow, and the buildings are outdated and high density. It was built over the course of three years between 2000 and 2003 and was opened on April 23, 2003. Since Roppongi Hills opened, this region gains new vitality and became a new shopping center and tourist center in Tokyo. (Chu, 2009)(Pan& Shi, 2010)(Wang, 2011)

The main purpose of Roppongi Hills redevelopment is to create a "city within a city". It is one of the biggest urban complex cases in Japan and one of the world’s famous old city reconstruction projects. Roppongi Hills is completed by a number of design companies such as JERDE and KPF. It covers an area of 116,000 square meters containing 737,900 square meters of construction area, including 295,700 square meters of office; 130,500 square meters of residential; and 91,200 square meter of commercial and 53,200 square meter of hotel. About 20,000 people working here and the average daily access population is 100,000. (Pan& Shi, 2010)(Zhu, 2007) The buildings in Roppongi Hills include the TV Asahi headquarters, 54-storey Mori Tower, Grand Hyatt Hotel, Virgin Atlantic, Studios, boutiques, themed restaurants, Japanese garden, office buildings, art galleries, outdoor theater, a collection of residential, open space, streets, public facilities and so on.

<table>
<thead>
<tr>
<th>Covering area</th>
<th>116,000 square meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction area</td>
<td>737,900 square meters</td>
</tr>
<tr>
<td>Floor area ratio</td>
<td>6.36</td>
</tr>
<tr>
<td>Green area ratio</td>
<td>26%</td>
</tr>
</tbody>
</table>

Image 4-1 Bird view of Roppongi Hills (Left)
Source: http://www.keguan.jst.go.jp/kgjp_lifestyle/kgjp_lifestyle_other/7801/
Image 4-2 Mori Tower in Roppongi Hills (Right)
Source: http://oursurprisingworld.com/japan-skyscrapers/
The master plan and function organization of Roppongi Hills

Image 4-3 is the master plan of Roppongi Hills. From the master plan, we can find that the design of Roppongi Hills is followed the mixed-use development concept.

In the middle of Roppongi Hills is the main official building—Mori tower. Its total area is nearly 300,000 square meters, which occupied 38% of the total construction area and nearly 14,000 people work there. Plus the employees of commercial, cultural, education and other offices, daily totally working population in Mori tower is up to 21,000. (Zhu, 2007)(Wang, 2011)

There are four residence buildings in the north part of Roppongi Hills. The construction area of the apartments is 130,000 square meters, which occupied about 17% of the total construction area. About 3,000 people live here. (Zhu, 2007)(Wang, 2011)

There also have TV Asahi, Grand Hyatt Hotel and Mohri Garden in the middle parts of the area. The middle part of Roppongi Hills is the main commercial area. The north part is mainly for transportation, and the south part is mainly for residence. The whole area is a mixed-use area which has all the functions HOPSCA has. All those functions are connected with each other and support each other. All the functions are operated as a system.

Image 4-3 Mater Plan of Roppongi Hills
Source: http://www.roppongihills.com/
Internal and external transportation of Roppongi Hills

Image 4-4, 4-5 and 4-6 shows the internal pass way of Roppongi Hills. The pedestrian street goes through the central area of Roppongi Hills and using the winding down section, the staggered stairs and corridors to make a complex and changing spaces; using active curve to guide visitors experience the full enjoyment of shopping, beauty and the living space. The façade of the pedestrian road is decorated by some stone so that the whole street will have European style. The soothing curves make the whole pedestrian street in an elegant atmosphere that can be attractive to visitors.

Image 4-4, 4-5, 4-6   Internal pass way of Roppongi Hills
4-4 (left) Source: http://wuhelo100.blog.163.com/blog/static/334550820103231651165/
4-5 (right upper) source: http://www.douban.com/note/193964174/
4-6 (right down) source: http://www.gac-arch.com/article/2010-8-20/567-1.html

Image 4-7 Metro line of Roppongi Hills
Source: http://mice.academyhills.com/?page_id=720

The combination with the subway transportation system and the urban public transport system is taken into account when planning. This makes Roppongi Hills easily to be reached by public transportation. There are 12 car parks, 2762 parking places opening 24 hours every day. (Li, 2010)(Zhu, 2007) The customers can park their car directly in the parking lot of different floors and access their favorite space fast and convenient. In addition, there is also 50 motorcycle and 332 bicycle parking spaces. The taxi riding and car hire also providing people with a variety of transport options. (Zhu, 2007) It is really convenient to go to Roppongi Hills.
Space organization and Landscape of Roppongi Hills

Image 4-8 shows that The Roppongi Hills is a three-dimensional building which is mainly formed by high-rise building.

From the function organization image of Mori Tower and the Gate Tower, we can find out that Roppongi Hills really make good use of the underground space. Most buildings will have two underground floors. The upper floors are all ways mix used. There will have different function in different floors. It is the integration of mixed-use development idea and compact city idea.

Roppongi Hills remained those existing water and green spaces and integrated them with surrounding parks and squares, making half of the whole area used as open space. The Mori Garden is also kept and integrated into the design and then open to the public.

There are a large number of artificial environments on the top of most buildings and have. Those green spaces are not simply decorated with grass and flowers but work as planting field, have fruit trees and even streams, ponds and fishes. Those roofs become a space for the residence and tourists to experience the rural life.

This kind of intensive and efficient use of space also benefit to the heat island effect. Image 4-11 shows the surface temperature of Roppongi Hills and the surrounding areas. According to the image, the surface temperature of Roppongi Hills is lower than the surrounding areas.
China Central Place in Beijing

Brief introduce of China Central Place

China Central Place is located near the East 4th road beside the Tonghui River. (Image 4-14) It is completed at the end of 2007 and is one of the 60 major projects in Beijing. It is 900 meters away from the China World Trade Center. The traffic of China Central Place is very convenient: Jingtong high speed road is nearby, and it is accessed by metro line one and a large number of buses.

As one of those important construction projects in Beijing, the aim of China Central Place is to create a new urban space using HOPSCA model, and develop a close association with the surrounding environments. (Image 4-13) The China Central place is designed by Kohn Pedersen Fox Associates, New York.

Image 4-13 The bird view of China Central Place

Image 4-14 The location of China Central Place

Image 4-15 The perspective of China Central Place
Source: http://www.officecx.com/huamao/index.htm
The master plan and function organization of China Central Place

The map on the right side is the master plan of China Central Place. From the master plan, we can find that China Central Place is constituted by six functions: hotel, office, landscape, exhibition, shopping and apartment. It is a case which uses HOPSCA model. The whole area is divided into three zones layered in the area: office buildings to the south; hotel, shopping and landscapes in the middle; and residential buildings to the north. Looking at the bird view and the master plan together, we can find that the building height and the floor area ratio in the middle area are both less than the high-rise office buildings in the south and the residence and the business building in the north area. The hotel, landscape and shopping area are acting as a transitional space.

Those residential buildings are all located in the northern part and have a relatively independent space. The landscaped in the middle are settled in different height. This kind of different layout not only formed a pleasant public space but also gives the human beings and green plants a change to enjoy more sunshine.

<table>
<thead>
<tr>
<th>Covering area</th>
<th>166,000 square meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction area</td>
<td>760,300 square meters</td>
</tr>
<tr>
<td>Floor area ratio</td>
<td>4.58</td>
</tr>
<tr>
<td>Green area ratio</td>
<td>40%</td>
</tr>
</tbody>
</table>


Image 4-16 Master plan of China Central Place
Internal and External transportation of China Central Place

The internal transportation is separated into car driving roads and pedestrian roads to make the area more safety. There is an underground pass connected the Office building and the metro line 1.

Car driving: The underground parking areas are connected with each other and have different numbers of entrances and exits based on different functional areas. The totally parking spaces are around 5,000 and have a completed guidance system to avoid loss of drivers.

Pedestrian: Completed guidance system makes people walking without fear of disorientation. The 45° diagonal axis and the landscapes not only attracts the people to the China Central Place, but also linked the commercial area, office area and hotel area together.

Image 4-19 Metro station and bus stations around China Central Place

Metro Line 1 has a station near China Central Place and there also have four bus stations surrounded. It is really convenient to reach China Central Place by public transportation. It is also convenient to come by private cars. The East forth ring road is close to the site and is only 20 minutes drive from China Center Place to the airport. There are around.
Space organization and Landscape of China Central Place

Image 4-20 shows the floors of those main buildings in China Central Place. From this image, we can find that the residential buildings and office buildings are more than 25 floors. The Hotel and the business building are around 15 Floors. The other buildings are low buildings. Compare with Roppongi Hills, the floor area ratio will be a little lower. China Central Place makes good use of the underground spaces. Most buildings will have one floor underground. The main commercial building has three floors underground: the first floor underground is for shopping, the second and third floor underground for parking.

Image 4-21 Satellite view of China Central Place (Left)
Source: http://map.baidu.com
Image 4-22 Green space on the roof of Hotel (Right upper)
Source: http://www.ky-cgs.com/_d272085605.htm
Image 4-23 Roof Garden of China Central Place (Right down)
Source: http://www.ky-cgs.com/_c_sOpOdjil25lH7R6NzdUGq0hrXU9_rmXVZ5iyrdox41FU=.jpg

From the upper images, we can find that the China Central Place plant a lot of green vegetations on the roof of most buildings. About 80% of buildings have roof gardens on the top. Roof gardens not only can effectively solid suspended dust and particulates, but also can alleviate the shortage of urban greening land and benefit to absorb the storm water. Beijing will have a hot summer so that the effects of roof garden are more prominent.
The comparison between Roppongi Hills and China Central Place

Why this two case?
Roppongi Hills is a typical case of those successful HOPSCA cases outside China. Because of the population density, city environment and some other backgrounds of Japan is similar with China’s, Roppongi Hills is suitable to be a reference example.

China Central Place is designed by American company—KPF, but it is a case which considered the characteristics of Chinese city and integrated the western state-of-the-art design concept with the elements of China. It is one of the successful HOPSCA cases in China, so it is suitable to be a reference example also.

Comparison between these two cases
From the table on the right side, we can find that the project size, function composition of HOPSCA in China and Tokyo are almost in the same level. In the old site preservation, landscape and open spaces’ aspects, especially in the composition of commercial functions, China Central Place is weaker than Roppongi Hills. The commercial area of Roppongi Hills is dispersed, but China Central Place is still using the centralized form, which will cause a large flow of people gathering and have a big impact on the other functions.

<table>
<thead>
<tr>
<th></th>
<th>Roppongi Hills</th>
<th>China Central Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Tokyo, Japan</td>
<td>Beijing, China</td>
</tr>
<tr>
<td>Transportation</td>
<td>4 metro line</td>
<td>One metro line</td>
</tr>
<tr>
<td></td>
<td>large amount of buses</td>
<td>large amount of buses</td>
</tr>
<tr>
<td></td>
<td>high-speed road, city main road</td>
<td>high-speed road, city main road</td>
</tr>
<tr>
<td>Aim</td>
<td>Renewal of old residential area</td>
<td>Renewal of old industrial area</td>
</tr>
<tr>
<td></td>
<td>New tourist and shopping center</td>
<td>New working and shopping center</td>
</tr>
<tr>
<td>Designer</td>
<td>DERDE, KPF</td>
<td>KPF</td>
</tr>
<tr>
<td>Built year</td>
<td>2003</td>
<td>2007</td>
</tr>
<tr>
<td>Covering area</td>
<td>116,000 square meter</td>
<td>166,000 square meter</td>
</tr>
<tr>
<td>Construction area</td>
<td>737,900 square meter</td>
<td>760,300 square meter</td>
</tr>
<tr>
<td>Floor area ratio</td>
<td>6.36</td>
<td>4.58</td>
</tr>
<tr>
<td>Parking place</td>
<td>2820 in total</td>
<td>5400 in total</td>
</tr>
<tr>
<td>zoning</td>
<td>Three districts, five blocks</td>
<td>Two districts, five blocks</td>
</tr>
<tr>
<td>Function</td>
<td>Construction area</td>
<td>Proportion</td>
</tr>
<tr>
<td>Hotel</td>
<td>53,200 square meter</td>
<td>7%</td>
</tr>
<tr>
<td>Office</td>
<td>295,700 square meter</td>
<td>38%</td>
</tr>
<tr>
<td>Landscape</td>
<td>50,300 square meter</td>
<td>6%</td>
</tr>
<tr>
<td>Commercial</td>
<td>91,200 square meter</td>
<td>12%</td>
</tr>
<tr>
<td>Residential</td>
<td>130,500 square meter</td>
<td>17%</td>
</tr>
<tr>
<td>Convention</td>
<td>37,800 square meter</td>
<td>5%</td>
</tr>
<tr>
<td>Others</td>
<td>129,500 square meter</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>788,200 square meter</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4-1 The comparison between Roppongi Hills and China Central Place
Construction area plus landscape area is the total area
Source: data collect from literature review and internet
The similarities and differences between successful cases and design site

The similarities and differences between successful cases and design site in Yiwu on the background aspect. The blue area shows the similarities, and the green area shows the differences between them.

Different from Tokyo and Beijing, Yiwu is a small city in China. Although the site scale is similar with Roppongi Hills and China Central Place, we still cannot just copy the design from those successful cases. We should consider the city scale when doing the design proposal in our site.

Summary
This chapter is the successful case study chapter. Roppongi Hills and China Central Place has been chosen as study cases. The analyses of those two cases focus on the master plan, function organization, internal and external transportation, land use and landscapes. The study of successful cases can help us to deeply understand HOPSCA model, learn from the successful cases and finally benefit to the design in Yiwu.

<table>
<thead>
<tr>
<th></th>
<th>Roppongi Hills</th>
<th>China Central Place</th>
<th>Design site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Japan</td>
<td>China</td>
<td>China</td>
</tr>
<tr>
<td>City</td>
<td>Tokyo</td>
<td>Beijing</td>
<td>Yiwu</td>
</tr>
<tr>
<td>Population of the city</td>
<td>13 million</td>
<td>20.18 million</td>
<td>2 million</td>
</tr>
<tr>
<td>Scale of the city</td>
<td>Big</td>
<td>Big</td>
<td>Small</td>
</tr>
<tr>
<td>Site location</td>
<td>Suburb</td>
<td>CBD area</td>
<td>Suburb</td>
</tr>
<tr>
<td>Site covering area</td>
<td>116,000 square meter</td>
<td>166,000 square meter</td>
<td>141,252 square meter</td>
</tr>
<tr>
<td>Aim of the site</td>
<td>New tourist and shopping center</td>
<td>New working and shopping center</td>
<td>New built sub-city center. Shopping center</td>
</tr>
<tr>
<td>Transportation</td>
<td>Convenient: 4 metro line large amount of buses high-speed road, city main road</td>
<td>Convenient: One metro line large amount of buses high-speed road, city main road</td>
<td>Convenient: 4 bus lines High-speed road City main roads</td>
</tr>
<tr>
<td>Surrounding area</td>
<td>High density</td>
<td>Near CBD center</td>
<td>Low density Buildings surrounded are around 4 floors</td>
</tr>
</tbody>
</table>

Table 4-2 The comparison between successful cases and design site
Chapter 5: Design Proposal

This chapter is the design chapter. The design is done based on the literature review and successful case studies. As the case study, the design is focused on the master plan, function organization, internal and external transportation, land use and landscapes. This chapter will first introduce the location of the site and state the reason why choose this location. After the introduction of the location is the design concept and then followed by the master plan and other necessary maps. The last part of this chapter is the comparison of main indicators among the design site, Roppongi Hills and China Central Place.
The framework of the design

This chapter is divided into four parts. The first part is the introduction part. The introduction of the location of the design site is in this part. The convenient public traffic situation and the distance from the main elements in the city is also in the introduction part to show the reason why our site is suitable to be a new sub city center.

The second part is the site analysis and design concept part. As the site area is already been an empty area, the analysis will focus on the traffic situation aspect and have some photos to show the surrounding elements. There will also have traffic situation comparison to show how the new built sub city center can affect the traffic of the city. There are two design concepts of the design: make full use of underground space, mixed-use new center.

The third part is the design proposal part. This part focuses on the master plan, the function organization, public space organization, internal transportation and landscapes.

The fourth part is the comparison between the design site, Roppongi Hills and China Central Place. A comparison table is used to help us easily find the differences among them.
Introduction of the site

Location of the site
Main elements in the city
Traffic situation of the city and the site
Location of the site

Jiangdong district is located in the east side of Yiwu and is firstly founded in the year 2001, it is conterminous with the city Dongyang in the east. Choucheng district, choujiang district, niansanli district and fotang town are also conterminous with Jiangdong district. The covering area of Jiangdong district is 91.6 square kilometer, including 7 communities and 53 villages. The total population of Jiangdong district is 270,000. This district is really a lucky land. The only university, the best high school, the biggest hospital, the international expo center, yiwu natatorium and the TV center are all located in Jiangdong district. The culture center covers 1.32 square kilometer is under construction. Jiangdong district is also called the community of United Nations because of the big amount of the permanent living tradesmen from different countries.
Main elements in the city

As Yiwu is not a big city. It only has one main city center in the middle of the city. There is a train station in the north and a small airport in the northwest.

After the expansion of the city, the original city center, Xiuhu square cannot meet the needs of economic and social development of Yiwu city. Finding a place to create a new center is the inevitable trend of history.

As the train station and the airport is in the north and northwest part, recent years, the city government built a sub-city center in the west part of the city in order to reduce the pressure of the city center. The sub-city center is still developing. There is only a big supermarket and a huge residential area there. Most of the citizens still prefer to go to the city center to shopping, eating and having entertainment.

As the city center and the sub-city center is far away for the citizen living in east part and the east part is a big residential area now, it is necessary to have a center in the east part.

Straight-line distance from the site to the train station is 10.4km, from the site to the airport is 9km, from the site to the city center is 5km.
Bus lines across the site

There are four bus lines, which have stops around the site. According to the map below, we have direct buses connect the train station, the city center, the international trade city and our site. It is convenient to visit the site area by public transportation.

The site is close to the city belt way and is along the planning metro. The entrance of the high speed way is nearby. It is also easily to find if you come from other nearby cities.

Integrated transportation plan of the city
Analysis and Design concept

Analysis of the site
Surrounding facilities
Status traffic situation of the city and near the site
Photos of surrounding areas

Design concept
Traffic situation comparisons before and after the HOPSCA built
Make full use of the underground spaces
Living, working, culture, transit and economy mixed area
Surrounding facilities

- City gym
- Convention and Exhibition Center
- City library
- Expo center
- Primary school
- Culture center
- Site
- Residential area
- Landscape
- Public parking
- Middel school
- Christian church
- Primary school
Status traffic situation

According to the investigation of transport in Yiwu, the situation is similar as other cities. The most transport reason is going for working and study in the morning and back home in the afternoon. Based on the result of Yiwu comprehensive transportation planning and design survey report, the residents’ travel period is showing in the graph below.

The area which our site located is a block with a dense road network and relative urban traffic system. Shangbo road is a city lifestyle main road. It takes the response of the important public transport corridor of south and north part of Yiwu river. Binwang road is a city transport style road. It will take the response of the main axis of Jiangdong district. There are a lot of traffic problems along the binwang road and shangbo road which is relevant to our site.

1. Most of those vacant lands as well as non-motorized trails on both sides of the road are often occupied by container cars. This situation will bring greater obstacles of the whole travel system of Jiangdong district.
2. There are little public transport lines along Jiangdong road, which is not conducive to the travel of the peripheral residents.
3. Most of the land near the site was leased for consignment ministry.

According to the figure, the morning and evening peak travel is particularly huge, especially the evening peak. The evening peak hour travel accounted for 13.21% of the total amount of all day trip. Adding all peak hour travel together, then it accounted for 42.06% of the total amount of all day trip.
Photos of the surrounding area (1)

A: Residential area near Zongze East Road
B: Street view of Jiangdong Road
C: Street beside Jiangdong road
D: Street inside a residential area
E: Street view of Shangbo Road
F: TV tower of Yiwu
G: Yiwu International Expo Center
H: View of Yiwu Natatorium
Photos of the surrounding area (2)

A: Street view of 37 Provincial Road
B: Street view of Jiangdong Road
C: Wall beside Jiangdong Road
D: Entrance of residential area
E: Space in front of restaurant which is used as parking area
F: Gate of Qingkou primary school
G: Street view of Jiangdong Road
H: Street view of 37 Provincial Road
Make full use of the underground space

As the emphasis of the function, the underground space is closely connected with the function on the ground. The main functions of underground space have six types: commercial, culture, parking, storage, public facilities and sunken plaza. The functions of the underground spaces also have the characteristics of functional hierarchical distribution. Usually the first one and two floors will be the supplementary of the function of the ground while below the second floor will mostly be parking and service space. From the economic point of view, the first two floor underground is thought to be high-quality space which we should be proactive in the rational utilization of it.

Case: In the center of Chicago, the planner transformed a parking area into a new urban public space and remain the functionality of parking under the city park and forming a three-dimensional model of the development of urban space.
Mixed use area

With the improvement of the urban function and the regional transportation conditions of Jiangdong district. The Jiangdong district gains the unprecedented opportunities for development. Jiangdong road will become a comprehensive city lifestyle main road in the future. It will not only carry an important transport function and the main place of public life, and will also become a main axis of the economic development of the city. As an important area along the Jiangdong road, the construction and development of the study site should towards the direction of coordination of life, economic, transportation and nature to achieve the well-rounded urban life and promote the concept of improving both the transportation links and economic development. We wanted to make the site as a comprehensive development area which displays the beautiful scenery of the new era of Yiwu’s urban construction achievements in long-term.
Design proposal

Master plan and elevations
Function organization and activity
Use of public spaces
Internal transportation—road structure and connections
External transportation—the traffic comparison before and after the built of the site
Landscape and green spaces
Bird view and perspectives
As the design model is HOPSCA model. There will be all six functions in the site. The Hotel is in the west corner. Office function is mainly located in the west part. All parking areas are in the underground space. There will not have any parking area on the surface of the site. As the site is a walkable and environment-friendly site, we do not advise cars to drive across the site. In the middle of the area is a small park, which can be used to have rest, entertainment, and also some public events. Most of the buildings have commercial function on the first two or three floors. Some shopping building will have more space for the shopping function. Convenience function is contained by the buildings in the east corner and also those office buildings. There are apartments on most of those buildings.
ELEVATION

Elevation on Jiangdong Road

Elevation on Shangbo Road
FUNCTION ORGANIZATION

A: The first two or three floors will be shopping area, and the upper floors will be office.

B: The first two or three floors will be shopping area, and the upper floor will be apartments.

C: The whole buildings are shopping and restaurants. There will have outdoor restaurants in the public spaces.

D: The main function of this area is business. The first some floors will be shopping, but the upper will be business area and have convention areas.

E: This is the main park of the whole site. This park can be used to hold some public events while it still can be a quite good space for rest and enjoy the environment.

F: This part is mainly the hotel area. There is a main hotel building in this area. The rest buildings will have shops and entertainment facilities.

<table>
<thead>
<tr>
<th>Function</th>
<th>Construction area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>121,859 square meter</td>
</tr>
<tr>
<td>Office</td>
<td>82,049 square meter</td>
</tr>
<tr>
<td>Residential</td>
<td>138,269 square meter</td>
</tr>
<tr>
<td>Business</td>
<td>88,202 square meter</td>
</tr>
<tr>
<td>Hotel</td>
<td>59,065 square meter</td>
</tr>
</tbody>
</table>
Full use of underground space

First floor underground

Second floor underground

Most of the underground spaces are used as parking spaces. Nearly 3500 cars can park underground. Among them, 2180 car parking spaces are on the first floor underground, and the other 1320 spaces are on the second floor underground. The underground space under the central park is used as underground shopping. The space under the hotel will be the extension function of the hotel such as have an underground spa or small bar.
Function organization of each building

This picture shows the elevation of different buildings and shows the functions of different floor. Different functions are ordered in different floors in the same building.

Here we separated the functions as the main functions. As the hotel building, the first two floor will be restaurants and entertainments, which is an additional function of the hotel. The main function of the building is hotel, so it only has one main function in the building. Restaurants, entertainment and shopping are all colored as the commercial function. Office and convention function is colored as the same color.
Activity of the site in different time period

These four maps on the left side show the activity of the site in the different time period.

From 6:00 to 8:00, the most active area will be the residential part and the main park. There will have someone running or doing morning exercise in the park. Those restaurants in block C which offering breakfast will be also active in the morning time period.

During 8:00 to 17:00, the whole area will become busy. Some working in those offices in block A; some doing shopping in those shopping parts in block B, C and F; some will have meetings and other business talkings in block D and also some have rest in the park.

During 17:00 to 22:00, the whole area is still busy. Shopping and entertainment operates in block A, B, C, D and people are having evening exercise such as walking and rest in the park.

During 22:00 to 6:00 next day, the site will be not so active. Those living parts will still work and some of those entertainment parts such as pubs and night clubs. Most of the site will be quiet in order to make sure that everyone has a good sleep.
PUBLIC SPACES

Under the new situation, whom is the one the urban public place services to? and how to service? are reseachable questions. As for the citizen, those giant plazas which pursuit beautiful plan and grand style only have a little contribution to the city's life quality. Most of those giant public spaces lack of dynamism and lifeless in reality. Those public spaces which convenient, accessible, suitable for rest and have a friendly scale are the most valuable public space. Only this kind of public spaces can be satisfied with the city.

The public space must be built based on people oriented and in order to meet the needs of citizens. As a system, the basic requirements should include the following aspect: sufficient numbers of spaces and can ensure more people to enjoy the public space; the public spaces should not be huge but small and trying to cover as even as possible in different areas; the connection between those public spaces should be convenient and built as a complete system.
Using of public spaces
ROAD STRUCTURE

Although we have car driving roads in the site, but we still advise those cars not to drive across the site. The main concept of this site is walkable, environment friendly, car-free space. We advise the residents or guest in the area can enjoy their live by walking without cars.

Most of the streets are straight one, which is designed to meet the thought of choosing the shortest way to reach the aim when possible. This kind of straight line across cannot only protect the grass but also can show main directions and make all spaces accessible. As another reason, regular form is the most beautiful form in the world.

Those car traffic roads are used to connect the main road and the surrounding areas nearby. They are the continuing of the roads outside our site.
Plan and section of different type of roads

Road type A

Road type B

Road type C
Chapter 5: Design proposal

Perspectives of street space
Inside connections

The application of modern urban design, environmental and behavioral theory when doing landscape and environment design is an important feature of HOPSCA. HOPSCA breaks the traditional concept of building facade but take all the buildings as a group and trying to create a livable environment by using markers, street furniture, planting, paving, lighting and so on.

The buildings in different blocks are connected with each other by big over bridges. Those big over head bridges can have both shopping function and passing function. The facade of the bridge can be used to do advertisement. The buildings in the same block are connected with each other by small bridges to make the buildings as a unique one.

As the underground area has been separated into four different blocks. Each block will have its own entrance on the ground.

- Over bridge
- Entrance of underground parking
- Inside pass
The traffic situation of Yiwu city is a little different with the other cities. The city is famous for the small commodity wholesale market and landmark of the city is the international trade city. The United Nations referred to the international trade city as the world's largest small commodity wholesale market in 2005. There are more than 620 thousand shops in the international trade city and there are more than 200,000 people visiting the international trade city. More than 60% of the residents in Yiwu is doing wholesale business in the international trade city. The development of the city relies on the development of the small commodity wholesale trade. As to Yiwu, the busiest space in the daytime is not the city center, is the international trade city area. The government is in the city center so that the city center is also a main direction in rush hour. As most people live in the west side and the south side of the city, but the international trade city is in the east side, so that the most crowed streets in rush hour are those roads which connected the west part and the east part.

After the develop of our site, there will attract more people live in the east side. The travel distance from home to the international trade city will be short, which can reduce the traffic pressure on the west and east direction roads.
Traffic comparison on evening and holidays

Before the development of the site

After the development of the site

Red: the speed is super slow  Orange: the speed is slow  Green: the speed is fast

The city only has one city center in the middle of the city. All those main facilities such as the government, the main shopping center, main supermarket, Public security bureau, main city park, people’s squares are all in the city-center area which made the city center a super crowded area. Two years ago, another big supermarket built in the west part of Yiwu and soon that area become another choice for supermarket shopping. As there is only one big supermarket, it cannot reduce the pressure on the city central area. Until now, the most crowded area in the evening and holidays is the city center. All the roads in the city center will be super crowded and will cause terrible traffic jam.

After the development of HOPSCA in Jiangdong district, the site area will become a sub city center. In this center, there will have shopping mall, theater, restaurant, public square, office, big parking area and also apartments. This full equipped sub city center will definitely reduce the pressure on city center and become a really attractive sub-center. Because the development of the new site will take a long time, so the change of the traffic situation will change gradually.

Remarks: The status traffic situation map is made according to the live traffic conditions on google map and my living experience. The traffic map after the development of the site is made by imagination, which is an expectation.
LANDSCAPES

The main design concept of the whole city built an environment-friendly city and green city idea. The precondition of urban construction and industrial developments should be protecting the environment. In this design, the green space organization principle is using green plants to form a space corridor to show landscape affinity and create a natural and organic but also expressed respect for the urban space and nature.

The central landscape scenery is formed by a lot of geometrical green spaces with a lot of tall trees and flowers. Those large lawns are not only open recreational space also the space for holding large events and performance. The trees on the lawn can be used as the background for the big green stage.

The entire green corridor used ordered shape to achieve a simple and neat visual impression. The green corridor chooses both evergreen and deciduous plants to make the whole area more similar to the nature and full of vitality for different seasons.

Most buildings will have green roof. Some are simple one, which is not accessible. Some are roof gardens, and people can rest and enjoy their live there.
Detail plan of roof garden and square
BIRD VIEW OF SURROUNDING
Chapter 5: Design proposal

Perspectives of the whole site
Perspectives of main green space
The comparison on main indicators among Roppongi Hills, China Central Place and Design site

Table 5-1 is the comparison on main indicators among Roppongi Hills, China Central Place and the design site. Dislike Tokyo and Beijing, Yiwu is a small city, so the floor area ratio is lower than both Roppongi Hills and China Central Place. As Yiwu different from the other cities, it is a commercial city and about 60% people are doing business in the International Trade City, the proportion of office function is much less than Roppongi Hills and China Central Place, but will have a lot of business and commercial spaces. From the table, we can find that, the proportion of those functions in the design site is in the middle between the proportion of Roppongi Hills and China Central Place. As the design site is proposed to be a new sub city center, consider the public transportation system in Yiwu, there is no metro in Yiwu, the parking place of the site is more than Roppongi Hills but less than China Central Place. The parking places in our site is used by the business and shopping people in daytime and used by the residence in the evening.

<table>
<thead>
<tr>
<th></th>
<th>Roppongi Hills</th>
<th>China Central Place</th>
<th>Design site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Tokyo, Japan</td>
<td>Beijing, China</td>
<td>Yiwu, China</td>
</tr>
<tr>
<td>Covering area</td>
<td>116,000 square meter</td>
<td>166,000 square meter</td>
<td>141,252 square meter</td>
</tr>
<tr>
<td>Construction area</td>
<td>737,900 square meter</td>
<td>760,300 square meter</td>
<td>492,401 square meter</td>
</tr>
<tr>
<td>Floor area ratio</td>
<td>6.36</td>
<td>4.58</td>
<td>3.47</td>
</tr>
<tr>
<td>Parking place</td>
<td>2820 in total</td>
<td>5400 in total</td>
<td>3500 in total</td>
</tr>
<tr>
<td>zoning</td>
<td>Three districts, five blocks</td>
<td>Two districts, five blocks</td>
<td>Five blocks</td>
</tr>
<tr>
<td>Function</td>
<td>Construction area Proportion</td>
<td>Construction area Proportion</td>
<td>Construction area Proportion</td>
</tr>
<tr>
<td>Hotel</td>
<td>53,200 square meter 7%</td>
<td>79,700 square meter 10%</td>
<td>59,065 square meter 11%</td>
</tr>
<tr>
<td>Office</td>
<td>295,700 square meter 38%</td>
<td>192,600 square meter 23%</td>
<td>82,049 square meter 16%</td>
</tr>
<tr>
<td>Landscape &amp;square</td>
<td>50,300 square meter 6%</td>
<td>66,400 square meter 8%</td>
<td>34,991 square meter 7%</td>
</tr>
<tr>
<td>Commercial</td>
<td>91,200 square meter 12%</td>
<td>242,000 square meter 29%</td>
<td>121,859 square meter 23%</td>
</tr>
<tr>
<td>Residential</td>
<td>130,500 square meter 17%</td>
<td>218,000 square meter 26%</td>
<td>138,269 square meter 26%</td>
</tr>
<tr>
<td>Convention</td>
<td>37,800 square meter 5%</td>
<td>8,000 square meter 1%</td>
<td>15,820 square meter 3%</td>
</tr>
<tr>
<td>Others</td>
<td>129,500 square meter 15%</td>
<td>20,000 square meter 3%</td>
<td>72,382 square meter 14%</td>
</tr>
<tr>
<td>Total</td>
<td>788,200 square meter 100%</td>
<td>826,700 square meter 100%</td>
<td>527,392 square meter 100%</td>
</tr>
</tbody>
</table>

Table 5-1 The comparison on main indicators among Roppongi Hills, China Central Place and Design site

Construction area plus landscape area is the total area
Chapter 6: Thinking of the application of HOPSCA in suburb area

This chapter shows my own thinking about the application of HOPSCA in suburb area in medium and small cities. This is the chapter given out some of my own thinking after the research of HOPSCA, the study of successful cases and the design practice in Yiwu. This chapter is written for the other researchers to going deeper research after reading my thesis. Hope the research on the application of HOPSCA in suburb area in medium and small cities in China can go further.

This chapter will first illustrate the difficulties I found when we trying to use HOPSCA in suburb area and then give out some of my suggestions. The last part of this chapter is an expectation of HOPSCA application in China.
The difficulties of HOPSCA using in suburb area in China

As the suburbanization situation in China is still in the beginning status, there are a lot of problems needs to be solved when developing the suburb area.

1) Incomplete traffic system
Compare with some developed counties, China is still in the low level of organizing the traffic system. The suburb areas are just started to be developed. The roads connecting the suburb area and the city central areas are not suitable for the rapidly developing situation. Some cities may just build supper wide road to make the suburb area accessible.

If we trying to using HOPSCA model when developing the suburb area, that will make that area as a new sub center of the city. Without a complete traffic system, HOPSCA model will lack of attraction and become a new empty area. A successful HOPSCA model needs to have a good traffic system to make the area active. So the HOPSCA model using in suburb area should gain the support of the government and trying to complete the traffic system and increase the connection between the suburb area and the central area.

2) Lag of living service facilities
Nowadays, the developing of suburb area in China mostly focuses on built a lot of living areas. Though HOPSCA model will have shopping, entertainment, office and some other functions, but the basic living facilities such as health care, education, public transport are lagging behind.

Without those basic living service facilities, HOPSCA model cannot attract people to live and working there. The most important aspect to choose an apartment is the basic living facilities nearby.

3) Different living levels in suburb area
Decades before, the suburb area is agriculture land, and the residents there are farmers. Few years before, some middle class started to move to suburb area. The government trying to plan a lot of high density buildings in the suburb to reduce the population pressure of the city central area. In those apartments there will live the middle-class people. As the suburb develops fast these years, a lot of high quality, residential areas built. Some rich people moved to suburb.

The living levels in the suburb are complicated, and they have different requirements for the HOPSCA model. It may be a little hard for the HOPSCA model to choose the main service client. HOPSCA built in suburb may have different effects to those people who living there.
Some suggestion of urban complex construction in China

Since the reform and opening up, China’s economy is growing very fast and the level of urbanization is also corresponding increase dramatically. The acceleration of urbanization will definitely bring the development of urban complex into a new improving period. Most city governments will choose to create a new city center in suburb areas to maintain the growth of economy and GDP. Hence, the government and the city planners need to research and experience more on those successful urban complexes in other cities even in other countries to avoid the waste of land resources and improve the life quality of citizens.

Here are some suggestions when creating a HOPSCA model urban complex in the suburb.

1) Adjust measures to local conditions when choosing the site and orientation
The specificity of HOPSCA determines its developing characteristics that it will always be built in the central area or new town center. So choosing a most suitable area to create HOPSCA model urban complex has a significant meaning. (Sun, 2011) Every city will have its own character and own culture, simply copy the style of HOPSCA in other cities or other countries are absurd. Furthermore, the construction cost of HOPSCA is high and the investment recovery period is long. Any accidentally fault can make the whole game lose. Therefore, the construction of HOPSCA should be respect for science and the opinions of experts to adjust measures to local conditions; do analyze of the surroundings and then finally create a successful HOPSCA instead of copying from other cities.

2) Seeking for cooperation and government support
Obviously, exploitation and construction of a huge scale HOPSCA cannot be done without the support of government. The huge scale; the request of the municipal facilities and the social activity facilities; and the high cost in investment, all of these characteristics needs the support of government. Meanwhile, it also needs the support and cooperation of citizens and different communities in order to express the concept of live and culture of the city, especially in China, which adopted government led development style when developing a city.

3) Develop the cultural strategies and accurately represent the regional spirit
The unique urban complex social significance makes the cultural significance which is contained by the building become very important. Different city will have different culture traits, so that the development of HOPSCA in different city should be different also. Culture is the heritage of a city. HOPSCA development must take cultural factors into account, especially the distinctive local culture. Without the local culture, urban complex becomes a complex which is lack of foundation. (Zhu, 2010)
4) Focus on the following modernizations: three dimensional, intelligent

Three-dimensional development means based on high-rise buildings to make full use of the upper space, build a three dimension traffic network which has overhead road, road and underground traffic; and make full use of the underground space. Three-dimensional development is the most effective way to use the urban land resources.

Intelligent development has significant effect on living, transportation, education and many other aspects of human live. Intelligent development means the development and construction of HOPSCA should make good use of high technique to make full use of resources and achieve win-win situation for social and economic efficiency.

**Expectations of the application of HOPSCA in China**

China, one of the world’s fastest growing countries, grows every day, every hour even every second. The urbanism and suburbanization situation has been taking their way in China. The city center is suffering high pressure on traffic, population and so on. Most of the cities trying to build a sub-city center in suburb area to reduce the pressure on city center. Based on this background, how to make full use of the land resources in the suburb area and built a really attractive and active new-center become a problem which is eager to be solved as soon as possible.

HOPSCA model is useful in making full use of the limited land resources, and can help improve the charm and livingness of the surrounding area. HOPSCA model has a lot of advantages. The mixed-use idea can make full use of the land resources; make the surrounding area more attractive and active. High density can provide more spaces for landscapes, and roof garden is also a sustainable choice. The development of suburb areas where HOPSCA is used can increase the economy of the surrounding areas and so on. HOPSCA model is suitable for the reconstruction of the old city center and the construction of a new sub city center.

HOPSCA is still at infancy stage in China, especially in medium and small cities such as Yiwu. The research and approach of HOPSCA are on its way. China, one of the world’s fastest growing countries in the process of urbanization and suburbanization, has a lot of limitations such as population density, land resource constraints, pollution, ecological and environmental pressures. According to those issues, the application of HOPSCA has a broad prospect in China.
Summary

Firstly, this paper introduced the status quo of the suburb development situation in China. According to those problems which are eager to be solved, urban complex was proposed. In chapter two, I give a brief introduction of the related theories and common models of urban complex. The full paper mainly introduces the HOPSCA model, one special model of urban complex. Relying on the analysis of characteristics, advantage and disadvantages of HOPSCA, the analysis and study of the successful HOPSCA application case — Roppongi Hills in Tokyo and China Central Place in Beijing; focusing on the new city center construction project in Jiangdong district, Yiwu, to describe the application of HOPSCA in suburb area in detail and give out a more intuitive introduction to HOPSCA. Followed by the considerable difficulties of constructing a successful HOPSCA in the suburb area and some suggestions when construct a HOPSCA in suburb in those medium and small cities. In the last part of the paper, the author also analyzes the expectations of the application of HOPSCA in suburb area.
Conclusion

The aim of this thesis is to clarify and deeper understand the HOPSCA model and find out if the HOPSCA model can be a choice when developing the suburb areas in Yiwu or other similar medium-to-small cities in China. After the research and design study, I found out that the HOPSCA model is suitable for the development of the suburb area in Yiwu and it may become a successful case in the future. The HOPSCA in Jiangdong district can become a new sub city center in Yiwu and can partly reduce the pressure on city road traffic, sharing the population pressure for the city central area and improve the life qualities of the residents nearby.

The advantages of this thesis are the detailed analysis of the HOPSCA model: I finally found the connection and the differences between HOPSCA and an urban complex, clearly explained the concepts and differences of varying kinds of urban complexes, illustrated the advantages and disadvantages of HOPSCA by studying a successful case in Tokyo, Japan. Finally, I made an application design in Yiwu, China.

The limitation of this thesis is that I have not successfully found out all the necessary conditions for constructing HOPSCA in a suburb area: such as the relationships between the density of population and the successful outcome of an urban complex like HOPSCA. If the density of population is too low, the area is not suitable for HOPSCA, because HOPSCA needs a big amount of population to live in the apartment, working in the office and to sustain business like shopping in those malls. On the other hand, too high density might be unattractive in relation to the surrounding built environment, and fail to attract tenants and customers. The appropriate density of an urban complex in various neighborhoods can be a topic for further research.
References


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Image Source

Image 1-1 The location of the design site
Source: By author

Image 1-2 The frame work of the thesis
Source: By author

Image 2-1 mixed use development

Image 2-2 Mixed-use district
Source: http://planning.city.cleveland.oh.us/cwp/glossary/glossary.php

Image 2-3 Mixed-use building
Source: Wei Gao, 2011, pp123

Image 2-4 urban complex in Shanghai

Image 2-5 building complex Y3+1 center
Source: Wei Gao, HOPSCA, pp219

Image 2-6 urban complex in Shanghai

Image 2-7 master plan of Dongzhimen urban complex

Image 2-8 section of Dongzhimen urban complex

Image 2-9 bird view of Cloud Nine urban complex

Image 2-10 Cloud Nine urban complex

Image 2-11 Office Complex Moscow, Kromova Street

Image 2-12 China expo exhibition complex
Source: http://act.youth.cn/zdgz/201201/t20120109_1913560.htm
<table>
<thead>
<tr>
<th>Image 3-1 Composition of HOPSCA model</th>
<th>Source: By author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image 3-2 the relationship between HOPSCA and general urban complex</td>
<td>Source: By author</td>
</tr>
<tr>
<td>Image 3-3 internal transportation of HOPSCA</td>
<td>Source: <a href="http://xiaozu.renren.com/xiaozu/176065/334657905">http://xiaozu.renren.com/xiaozu/176065/334657905</a></td>
</tr>
<tr>
<td>Image 3-4 The space organization of HOPSCA</td>
<td>Source: By author</td>
</tr>
<tr>
<td>Image 3-5 Vertical from</td>
<td>Source: By author</td>
</tr>
<tr>
<td>Image 3-6 The horizontal form</td>
<td>Source: By author</td>
</tr>
<tr>
<td>Image 3-7 Three dimension form</td>
<td>Source: By author</td>
</tr>
<tr>
<td>Image 4-1 bird view of Roppongi Hills</td>
<td>Source: <a href="http://www.keguan.jst.go.jp/kgip_lifestyle/kgip_lifestyle_other/7801/">http://www.keguan.jst.go.jp/kgip_lifestyle/kgip_lifestyle_other/7801/</a></td>
</tr>
<tr>
<td>Image 4-3 Master plan Roppongi Hills</td>
<td>Source: <a href="http://www.roppongihills.com">http://www.roppongihills.com</a></td>
</tr>
<tr>
<td>Image 4-4, 4-5, 4-6 Internal pass way of Roppongi Hills</td>
<td>Source: <a href="http://wuhe100.blog.163.com/blog/static/334550820103231651165/">http://wuhe100.blog.163.com/blog/static/334550820103231651165/</a></td>
</tr>
<tr>
<td>Image 4-7 Metro line map of Roppongi Hills</td>
<td>Source: <a href="http://mice.academyhills.com/?page_id=720">http://mice.academyhills.com/?page_id=720</a></td>
</tr>
</tbody>
</table>
Image 4-12 Roof garden of residence building in Roppongi Hills (right)

Image 4-13 The bird view of China Central Place

Image 4-14 The location of China Central Place

Image 4-15 The perspective of China Central Place
Source: http://www.officecx.com/huamao/index.htm

Image 4-16 Master plan of China Central Place
Source: http://www.huamao.cc/web/ShowArticle.asp?ArticleID=78

Image 4-17, 4-18 Internal pass way of China Central Place
Source: http://www.kpf.com/project.asp?R=2&ID=123

Image 4-19 Metro station and bus stations around China Central Place

Image 4-20 Floor counting of China Central Place

Image 4-21 Satellite view of China Central Place (Left)
Source: http://map.baidu.com

Image 4-22 Green space on the roof of Hotel (Right upper)
Source: http://www.ky-cgs.com/_d272085605.htm

Image 4-23 Roof Garden of China Central Place (Right down)
Source: http://www.ky-cgs.com/_c_sOpOdji25iH7R6NzduGq0hrXU9_rmXV25yirdox41FU=.jpg