The rapid urbanisation of Shanghai has led to a lost connection to nature, seasons and trust between human beings, which has contributed to a lack of well-being. Even though the “Hutments”, informal settlements and former villages, are in poor conditions, these small pieces of villages spread out in the city provide qualities that are missing in the high-rise buildings of contemporary Shanghai: human scale streets, intimate public space and a self-sufficient everyday life of residents. Instead of demolishing these informal settlements, as proposed by the municipality, I suggest to reintroduce the qualities of nature and the village life in the city. I also wanted to explore the possibilities of how an architectural project can have an effect on the city.

In order to understand how the city works, my research takes a point of departure in the theory of urban metabolism. My main assumption is that self-organised systems always have higher resilience and adaptability. I have tried to understand the city as an organism that is continuously working out vectors that result in metabolism of built spaces. The cell of self-organised systems can be observed as an organic unit of all the systems. In order to have an effect on the city, the project must either affect the smallest unit directly or plug into the biggest self-organised unit. The smallest area I try to project is understood as one cell of this system. The area, defined by the boundary of 3 metro stations, is surrounded by gated communities and a university, hosts a lot of informal urban vending but is lacking public space.

A network of elevated roof platforms is proposed providing new infrastructure in which pipes, rainwater collectors and other facilities can be accommodated. The platforms are at the same time serving as structural stabilisation devices for the existing houses. Bamboo is used due to its quality (similar in strength to steel) and its abundance in this region of China. Pilot projects such as a teahouse, pub and community centre showcase how to build and inspire a future expansion.

“Just look at the country, and that would be love.”
William Cooper
1. Introduction

Three main topics:

1. The Hutment problem in Shanghai.
   The prime purpose is to explore the possibility of designing a public building in a heavily critiqued hutment area in Shanghai as an urban intervention. The building should revitalize the unstable local community as well as provide needed function in the hutment area. It should also be an attraction point to the people outside the area, which can recall the value of the forgotten value of there hutment communities.

2. Living in Shangahi (lifestyle and stressfulness)
   “God made the country, and man made the town.” William Cowper. The attention is to express the lost respect from nature of people and the over emphasized economic and technology value in the urban context. Children lost the connection of food to the soil as adults lost the idea of connection of money and life. In such capitalize society, the consumption becomes a deadly evil. The architecture and planning can play a greater role to express the balance of nature and human beings and the connection of food to life.

3. How one architecture can affect the whole urbanism?
   The third goal for this master thesis is to test and experiment the potential of the architecture design in the urban context. Not only does the design itself derive from the context, but also it will affect the urban situation as well. No matter how well we design our city, there are always unexpected elements happening, which we call “informal city”. Now, more than 50% of population in the world are living in the urban area. The whole human society can be projected completed to the city. Many different ways of mapping the city, including Tweets map, social networking, incomes and evening the Facebook location, indicate the complexity of the existing city, aka our society. The architecture project can be a trigger point that create social ripples in such a dynamic system. The architecture project can not only be catalyst in the surrounding, but also be a virus in the urban organism/human society.

The final conclusions aims to touch upon or understand these three questions better.

Research problem of contemporary cities: Designed City VS Zoning City

The study start from how can we understand and tackle the problems of city from historical reference. Regardless the huge difference in size between the historical town to the megacity now, it is rather difficult to grasp the whole image of contemporary of city. One can start mapping the city from so many different aspects ranging from population density, the land value, the infrastructure, the wifi-hotspots, twitter mapping, the metro station to many un-mappable statistics, such as the GINI index, the traffic time, the Big-mac index and other many index. Old Barcelona is made perfect designed to every public space under heavy control. People invented many different methods to evaluate and mapping the city. However, when we look at Tokyo, one of the most striking modern cities now, it seems more like a self-growing organism rather than a designed object. Although we have spatial planning and urban structure department to set the basic zoning plan, the expansion and growing speed are far beyond control. One evidence is the informal activities including slums, urban vendings and self-created events, are happening everywhere in cities everyday. They can never be documented or planned in the urban planning department. One can not find any trace of slum planning in the city planning office. How we call these informal cities? Should those be eliminated? How can we make conventional research and conclusions if the complexity and the uncontrollable performance are oversized the limited of human perception?

Is it still valid to use top-down strategy to create our world?

Example Illustrations of Tokyo ornamentary city or amorphous city

dig 1: The planning of Barcelona is simply defined by evenly distributed blocks spread across the whole city. The perception of reading the city as a whole coherent object is clear. Landmarks and public nodes are distributed strategically long time before Kevin Lynch.

dig 2: By abandoning the old capital, Japanese built Tokyo several times on the tabular rasa after earthquakes and the war. Influenced by the metabolism group, Tokyo is an achievement of the latest technology and concept of built environment study in 20th century. One can barely get a solid form of Tokyo.

2. Understanding the contemporary city

Theories of planning and design of the city

The perception of reading the city as a whole coherent object is clear. Landmarks and public nodes are distributed strategically.

Example Illustrations of Tokyo ornamentary city or amorphous city

dig 1: (fig 2.1) The ideology of Barcelona is simply defined by evenly distributed blocks spread across the whole city. The perception of reading the city as a whole coherent object is clear. Landmarks and public nodes are distributed strategically long time before Kevin Lynch.

dig 2: (fig 2.2) By abandoning the old capital, Japanese built Tokyo several times on the tabular rasa after earthquakes and the war. Influenced by the metabolism group, Tokyo is an achievement of the latest technology and concept of built environment study in 20th century. One can barely get a solid form of Tokyo.
Understanding Shanghai as a dynamic system

Shanghai, one of the fastest growing cities in the world, although under heavy designed spatial planning, is still out of control in terms of residential housing and the rest of urban development. As such, understanding the factors that determine the direction of these cities in the world is crucial.

The Endless City, by Bruce Katz, Andy Altman, and Julie Wagner, concludes that instead of considering cities solely in terms of planning and infrastructure, we should consider the social, economic, and cultural forces that drive urban development. This approach emphasizes the rapid change and complexity of urban systems, which cannot be captured by traditional planning models.

In the context of Shanghai, a city that has experienced explosive growth, traditional planning methods are increasingly inadequate. The city is characterized by rapid urbanization, economic development, and social transformation. As a result, traditional planning tools may be insufficient to address the challenges faced by urban areas.

Mapping Shanghai as a Dynamic System

The image presents a series of graphs and charts that illustrate the dynamic nature of Shanghai. These visualizations show the city's growth over time, highlighting key indicators such as population density, economic activity, and transportation patterns. The data suggests that Shanghai is undergoing rapid changes, with significant shifts in demographics and economic structures.

The charts indicate an increase in population density, particularly in central areas, with implications for urban planning and resource allocation. Economic data shows a growth in trade, hospitality, and transportation services, reflecting the city's role as a major global hub.

In summary, understanding Shanghai as a dynamic system involves recognizing the complexity of urban development, embracing the rapid changes occurring, and developing strategies that can adapt to these fluctuations. This approach necessitates a shift from static planning to more flexible and responsive urban management strategies.
Long time ago, before Shanghai expanding rapidly, all these hutments are built by migrants outside the city wall. These can be called natural village outside the city. They exists long time before those high rise apartments. They are the homelands of those migrants although the architectural quality is relatively low from the academic perspective. Under the city development, these areas were isolated from their context.

Hutment history

Relationship of housing price, population density and shopping centres

Interestingly, there is no direct connection between the density and housing price. But it is clear that all the shopping centers have close relationship with metro stations.

High Low

population density urban expansion hutments area water system infrastructure living and working green structure

fig 3.3 city layers

fig 3.4 Shanghai data mapping
History of hutments

Long time ago, before Shanghai expanding rapidly, all these hutments are built by migrants outside the city wall. These are the natural villages outside the city. They are the territories of the migrants although the architectural quality is relatively low from the academic perspective. Under the city development, these areas were isolated from their context.

Fig. 3.5 hutment history
Fig. 3.6 Shanghai skyline with hutments
Fig. 3.7 hutment areas
4. Introducing the neural system theory

How to change the city?

The city is a miniature of human society, that is also one of the most complex system to understand. The difference of modern Tokyo and traditional Barcelona indicates the quality of unpredictable in term of approach towards city design.

Butterfly effects in the dynamic system? Reverse the traditional city planning!

Architecture keeps very low power leverage point in all human history. The grand palace from the past is the outcome of social, economic and technology combination instead of architecture visionary, although the built environment on the earth are aged designed by architect and its impact from architectural actions upon the balance of all human-social-environmental life. Architects are just a hand to realize the last step.

However, recent research shows that butterfly effect play critical role. Today the world seems as a complicated dynamic system. The butterfly effect in dynamic system theory suggests that the action of a butterfly in Brazil can affect the climate in Tokyo. These are miniaturized effects of the traditional city planning. The butterfly actions in architecture can induce center of other design. This new methodology can be used to design urban design to react to the architecture into something access aware within the other design in traditional planning.

Introducing the concept of plug-in to the urban neural system

The whole urban system can be seen as a human body, which consists of a mini ecological system. In order to make someone sick, virus should searching for a crack point in the human body. For instance, the cancer cells are not dangerous at all until they start to grow on the neural system of the human body. The AIDS is not dangerous at all until it affects the immune system of the human body. This is why it is critical for architects to understand the urban neural system in order to design a city which affect human body necessarily.

In order to influence the city body by a small project, one has to understand the neural system of the city. By plug-in to the urban neural system, certain butterfly effect can be achieved to influence the urban body. The Guggenheim museum in Bilbao is an example of this approach. The hype this project reached from different media ranging from fashion magazine, architecture books, tourism recommendation books, movies and TV show. By using those neural system, Bilbao even overcome its geographical weakness, and become a landmark city in the world.

Fig 4.1 Analog from the biog-neural system shows how virus can affect the human body by invading the immune system.
NO.1 The metro neural system

Shanghai, like any big city, depends heavily on its public metro system. Not only are the physical boundaries of the city changed, but the image of the city has also been transformed. Everyone can draw the shape of the city in middle age. But now the city is a complex network of metro lines. The metro system provides the fastest way to travel from one district to another. The metro system is not only a means of transportation, but also a way to understand the city. The metro lines are like the veins of the city, connecting all parts of the city. The metro system is also the most important neural system in the city. That is the reason why all big shopping malls, regarded as the church in our capitalist world, are located around metro stations. So I make the vertical shapes of the metro station indicating the clastic characteristic of Shanghai. The city can be read as a vertical tower using metro as the elevator. My project must work with this neural system to maximize the influence towards the city.

fig 4.2 The neural system of the metro stations

gfig 4.3 The city is deconstructed into a vertical tower by the metro neural system
Suzhou river used to be a heavily polluted river because of its industrial importance to the inland of China. But it is also an important tourism river that connects most of the cultural heritages in Shanghai. Started from 20 years ago, the municipality began to clean up the river and created natural parks along the river. Many innovative artistic studios were founded along the river, using the old industrial buildings. Nowadays, it is very attractive walking or biking routes for the citizens. The outside tourists also take it into consideration to sightseeing Shanghai by boat.
Combined neural system.
The selected area is called Cao Jia Cun, which is one of the most infamous hutment areas in Shanghai, where a movie about 72 families living in a very small hutment community was filmed in the 1950s. Nowadays, the huge contrast remains between the expensive housing community and those hutment areas. Surrounded the hutment area are many gated communities, which are the most common way of living in China nowadays.

There are very thin pedestrian routes surrounding the gated communities, providing very limited public space in-between.

The informal urban vending, which is heavily criticized by the government, is extremely popular in the area due to flexibility and low cost.

To the west of the hutment is a university, which can always become a welcome public space for people living around. However not many of them know the short cut through the hutment area. Most of them choose to go around the hutments to the waterfront.

The height difference of the high rise apartment and the low hutment is huge. Those high rise creates a feeling of juxtaposition to the people inside the hutments. On the other hand, the hutment area provides an intimate spatial quality that is absence in those gated communities.

The neural system described in the previous research indicates the research boundary and the affected region. So the land between 3 main metro stations becomes the research target.

Fig 5.1 The conclusion was made inside the research boundary defined by the neural system including the metro system and the water system.
5. Urban analysis: inside the hutment area

The existing MPK's interior walking

Breaking the MPK in Shanghai, owing real estate market in the hutment area became the most feasible idea. The MPK building is a non-freedom building, the entrance is only connected from the street to the community. This makes the whole public more unwelcome to the outsiders.

Sunlight/Sanitation

Fig 5.2 The conclusion was made inside the hutment area

Structure weakness is one of biggest factors that one has to deal with. The structural weaknesses or the green vegetation in the roof of the MPK can be applied to the other communities.

In this context, we have to choose the entrance of the university to connect from the street to the MPK. This makes the whole public more unwelcome to the outsiders.

The idea is to choose the existing commercial zones from the street to connect from the community to the outside area of the street where it is more representative in Shanghai. The design of these commercial zones could be applied in the whole city of Shanghai.

Fig 5.3 The concept was made inside the hutment area

The surrounding characteristics are two stories. The area of roof are the green vegetation with sunken, but most of area are the empty section. Technically, along the axis is mainly potential commercial that need the light, requirement for the initial idea. But they are carrying the character for the whole public space more unwelcome to the outsiders.

The conclusion was made inside the hutment area.

In this context, we have to choose the entrance of the university to connect from the street to the MPK. This makes the whole public more unwelcome to the outsiders.
6. Urban strategy

Phase 1: The pilot project showcase

Phase 3: Big growing mega-structure potential for future bigger scale urban farming and other activities

Phase 2: Start self-occupying the small/practical roof top

RAINWATER SOLUTION

The rainwater collecting device can create water source for the urban farming. Meanwhile the flood problem can be solved. More importantly, it can be sponsored and promoted by the municipality due to the pollution challenge in Shanghai.

CONSTRUCTION

The idea of modular system using small pieces of bamboo is made due to the economic and environmental friendly factor.

PLA FORM

By moving many elements to the platform, the generic solution is created to open the village street to the public in order to make a better public image.

INFRASTRUCTURE

It provides new possibility to customize the platform, meanwhile acting as a stabilizer the buildings underneath.

MATERIAL_BAMBOO

As one of the most adopted material in the South of China, the resource of bamboo is almost infinite in Shanghai. It has good strength as steel. The only problem is to deal with the deflection by filling concrete inside.

ECONOMIC VALUE

Informal urban vending is regarded as an opportunity factor in the area to generate economic value and improve the public image.

LA UNDRY ROPE

Being a main element for laundry, the new way of thinking and creating space is explored by using those ropes. It also become a new landmark over the existing structure.

HYDROPONIC FARMING

It provides a light weight way of making urban farming on the roof the apartment. A new life pattern can be generated and admired by the public.

COMPOSTS

This solution aims on creating better sanitation situation in the area. The compost can be recycled for urban farming, in which way it can be an economic generator.
Garbage sorting is very irritating even for many well-educated people. The existing problem is that people lost the connection to where they are using it happily. The bottom line is that designing architecture is not only about physical material, technology, and space, but also about the shopping street or introducing artists to occupy the plots. The most important thing of architecture is to allow original users to keep using it.

What will make the public space really public? Instead of choosing some conventional solutions including transforming it into the most popular temporary buildings admired and kept forever, the architecture must be useful for all different people. The architecture design is not only about making dazzling space for those privilege people, but also about becoming a useful device for those grassroots people living inside those buildings. In the Dynamic system, the small butterfly can cause a huge impact to the whole city.

Temporary buildings are admired and kept forever. On the other hand, people have demolished many monuments. The essence of architecture as a profession with very limited power on the leverage point, what can architects do with the activities afterwards. Many examples of the lifestyle in the busy city and the hutment daily life.

Feedback loop can be created within these elements. This system connects to the bigger system in the city, for example the lifestyle in the busy city and the hutment daily life. The urban strategy is under the systematic approach thinking. All the elements are designed to both solve certain problems and support each other. Connectivity generators.

Systematic Thinking Approach

The pilot project showcase the importance of garbage sorting in social protection and the revenue from each other. Compost can be used directly, and sanitation will be improved. Compost can be used for urban farming rather than throwing away. People can realize the importance of compost by using them directly. The sanitation situation will be improved dramatically because of garbage sorting. The human waste can be used as fertilizer for urban farming as well.

- From the water neural system, both tourists and students in the university can approach the temporary vending areas in the street of the hutment. The structure of the platform also acts as a structure generator. The public image of the hutment area can be improved better. The existing poor living condition is kept to keep the price low. By adding an new layer of cheap infrastructure, the self-occupying the roof top where one can have laundry and other activities.

Q&A

How will poor people dealing in garbage selling?

Garbage selling is only helping for the money and sometimes. The existing architecture must link the connections between of the space. From space occupation, they can own their space. But also they need to find the connections between the economic sources for the urban farming, due to the garbage selling and more responsibility.
7. Architectural design

fig 7.1 the architecture solution
The new platform creates a new layer of infrastructure on the top of the existing context, avoiding the heavy and impractical digging work underground. The bamboo made spatial truss system open up big opportunity both for different pipes and more ambitious activities happening on the platform in the future.

By playing with ropes and sticks, which can be transformed from regular bamboo sticks to hydroponic pipes, a kind of unique and undefined space is formed.

Bamboo and ropes are chosen from many early experiments due to their abundant in the Shanghai region. Bamboo has been a practical scaffold material in China long time ago. The rope can not only be a functional elements for laundry, but also be a spatial creator.

Although all the architectural elements are customizable, certain parameters are controlled including the urban farming need for sunshine (the height of the sticks), the density of the rope and the curvature of the ropes. The undefined interesting space is formed by those parameters.
The same design philosophy is implemented everywhere in the project. The customizable quality and economic feasibility (with small pieces of bamboo) can be achieved in the trash bin design as well. Repeat the same design elements about bamboo sticks. By changing the height of the bamboo sticks, combing with the rope, different urban furniture can be designed and made in the community. Although it is not a mandatory solution, it provides new scope towards these 2 kinds of cheap material elements.
fig 7.3 Different space is formed simply by farming structure, strings for laundry and simple furniture.

fig 7.4 New program can be made by changing the configuration of the strings, for example the playground for children.
fig 7.5 exterior rendering for the tea house/community centre
Fig 7.6 Cross section

Fig 7.7 Explosion isometric view showing the 4 elements of the building, namely:
- the foundation
- the frame
- the enclosures
- the support
A TEA HOUSE

A tea house, a knowledge hub and a refuge from the urban chaotic must be a place for the peaceful soul. To get rid of the competition stress from the external world, one can talk to yourself under the shelter of a tree, behind a bamboo filter that stops the noise from outside. Except the facilities, thin bamboo columns define the space usage. People read, relax, talk and sleep in this soul place hanging over the village.
fig 7.11 exterior rendering of the public stair
fig 7.12 open stair configuration depending on activities
A Public Stair

The biggest idea is created a connection space not only for connecting but also made up of different and unanticipated activities. Encouraged on this big stair, there are different and unanticipated activities. Changing chairs depending different activities. A fluent transition from the ground to the platform at 5.5 m should be created.

Bamboo wall & Polycarbonate Insulation

The bamboo walls are made with bamboo elements to bear the weight of the building. The insulating panels are sandwiched in between the bamboo components. The semi-transparent polycarbonate panel creates closure feeling inside for the public. The exterior space is open and direct.

Platform on Water

On top of the building in the view point towards the water and the activity is open to the end point in the ground around the buildings.

Skylights under the Stair

Under the stair, the only parts by glass create a dynamic light condition without any discomfort.