

Smart Cities & Sustainability

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What is a City?

A City is human settlement of a substantial size. We're focusing on it as an urban area which allows for exchange of commerce, as well as ideas and labor force. Population tends to migrate to cities with better opportunities for personal development and improvement of the lives of individuals.

China has Over 10 Megacities (agglomerations where population is over 10Mln people) as well as 9 out of 20 biggest ports in the world.

Most important Cities in China were often created thanks to Special Economic Zones Established in the 80's, more specifically :

- Pudong District in Shanghai
- Xiamen in Fujian
- Shantou in Guangdong
- Shenzhen in Pearl River Delta
- Zhuhai in Pearl River Delta
- Whole Hainan Province

Apart from Special Economic Zones, special interest was also focused on 2 Special Administrative Regions

- Hong Kong
- Macau

Cities in Economy

Cities always used to be a place where people mingle, meet, trade, and most importantly to the economy - do business.

This trend has only accelerated since the 1606 when the Dutch has founded the first Stock exchange in Amsterdam. Since then businesses could have more funds too fund their expeditions, and more business was possible in a city with stock exchange.

Since late XVIII century Manchester was slowly becoming an industrial city, a pattern that was becoming more and more popular throughout Europe and the world. When industrialization started to spread, the cities started to attract more and more people, who were going there to find better chance in life by working in a factory. Those cities often were based around a single industry like textiles(Łódź), copper(Dongchuan) and especially coal(Dortmund), which became the most important commodity of the XIX century.

According to Saskia's Sassen's theory on contemporary cities, after industrial cities, now there is a new type of a city, referred to as global cities. Those cities are characterized by connecting a huge number of industries together, as well as being world financial centers. The 2 most important Global cities are London and New York, which Globalization and World Cities Research Network puts in the alpha ++ category for the cities most integrated with global economy. Examples of other cities that are also high on that list, include for example, Tokyo, Paris, Shanghai.

Global cities are currently the most important, but increasingly, innovation cities are becoming more and more important. The reason being is that innovation drives technology forward, which is beneficial to both economy, as well as cities social status. They are also often located in University cities. Examples of innovation cities include Eindhoven, Shanghai, San Francisco or Stockholm.

Chinese cities in Data

Aspect	Chongqing	Shanghai	Shenzhen
Population (2023)	~32 million	~25 million	~17 million
GDP (2022)	~USD 422 billion	~USD 664 billion	~USD 482 billion
GDP Per capita	~USD 10 720	~USD 27 001	~USD 25 300
Economic Role	Electronic equipment, cars, machinery	Financial and international trade hub	Tech and innovation center
Fun Fact	City is located in between mountains, forcing it to become very vertical oriented City	It's economy is slightly larger then the entire country of Thailand	Used to be a small fishing village, until it became the first special economic zone

What are Smart Cities?



According to European Commission a smart city is a place where traditional networks and services are made more efficient with the use of digital solutions for the benefit of its inhabitants and business.

A smart city goes beyond the use of digital technologies for better resource use and less emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population



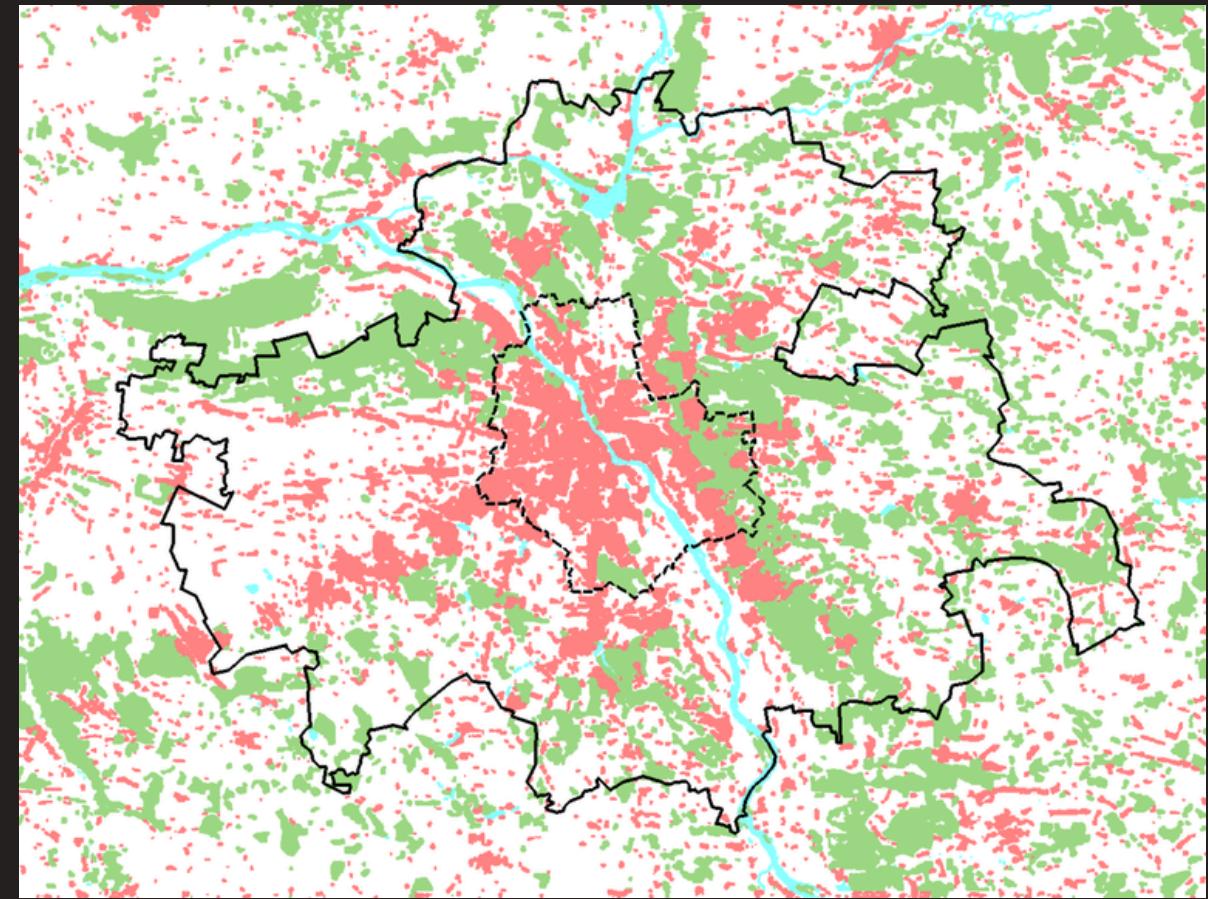
Wikipedia contributors. (2024, November 26). Smart city. Wikipedia.
https://en.wikipedia.org/wiki/Smart_city

Daily Urban Systems

Agglomeration can provide benefits several benefits to all cities that are within it.

Increased Economical activity, more diverse pool of labor, more interlined infrastructure and additional investment opportunities are only the most basic benefits of agglomeration, which is acting as one functional unit. This is the functional size of the city, but there are 2 more, Administrative and Morphological

Lets take Warsaw for example. On the map, only the parts that are inside the dotted line are parts of actual city of Warsaw (Administrative borders), however the functionally speaking all of area inside the solid line are towns that are part of the Warsaw agglomeration (functional borders). Thanks to this people from nearby towns can work for better pay in Warsaw, and the city of Warsaw can use enterprises such as Modlin airport for the benefit of it's citizens. Lastly the urban footprint is marked with red on the map (morphological borders).

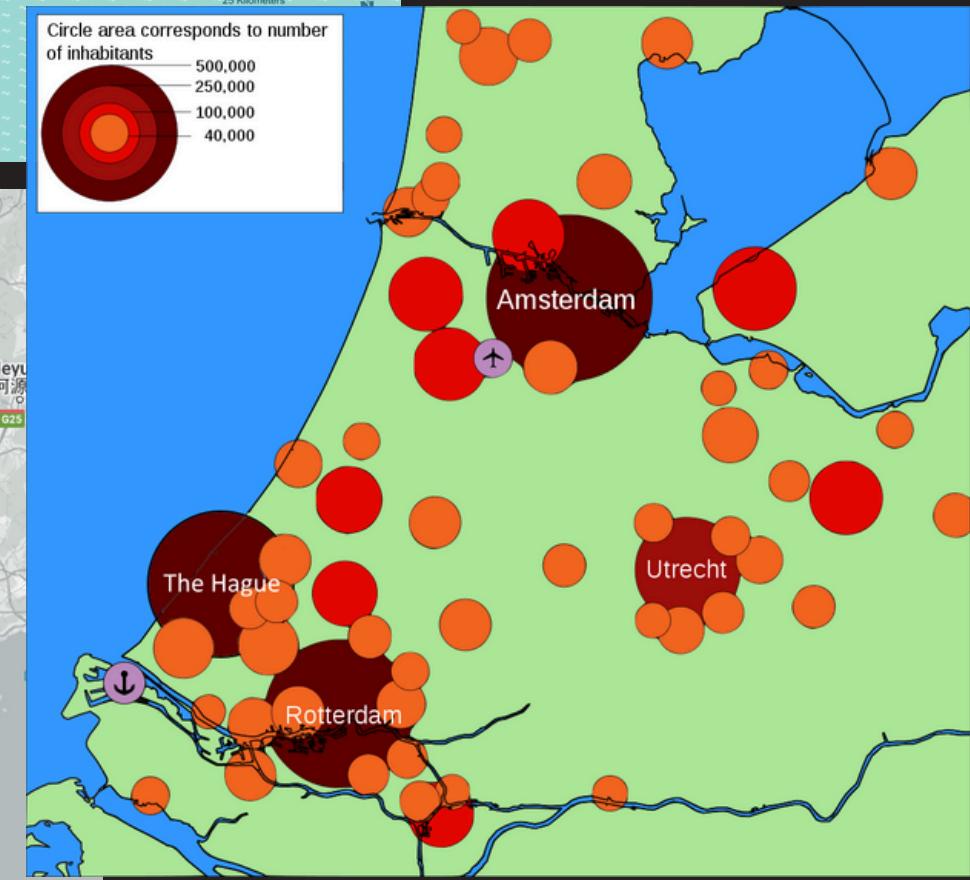
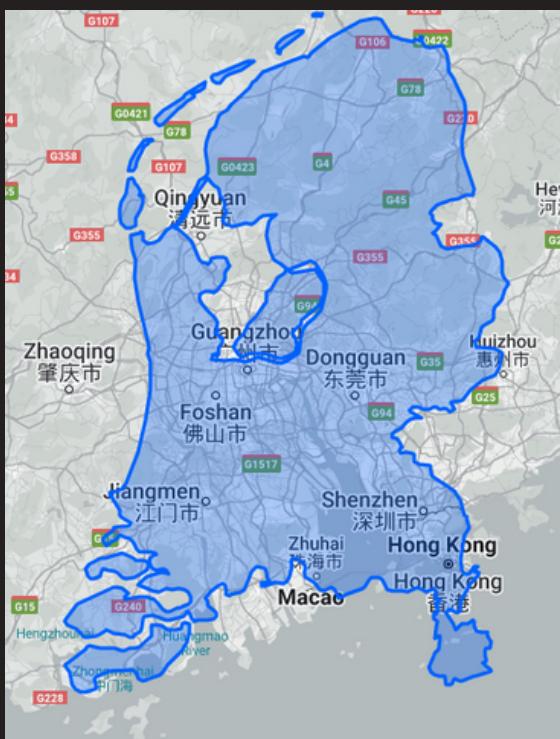
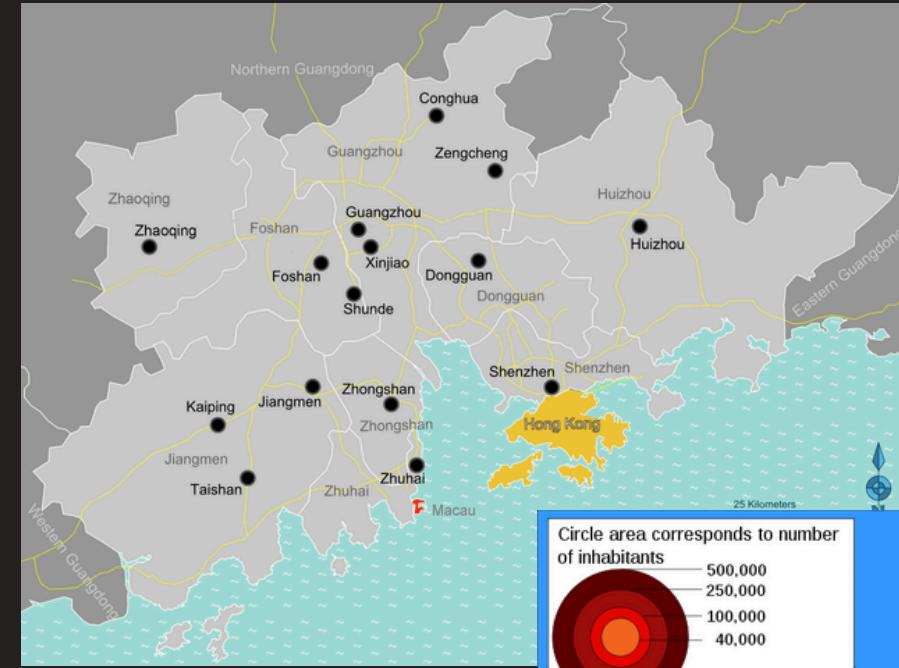


As you can see all of those borders and sizes are different, but all of them have their own place and purpose.

What Makes Metropolis ?

According to Oxford Dictionary, a Metropolis is “The capital or chief city of a country or region” or “A very large and busy city.”

In a context of comparing cities however, multiple cities or regions can often act as a megalopolis. Like **Canton metropolis** in China or **Randstad** (Rotterdam - Amsterdam - Utrecht area). However despite those Metropolitan agglomerations working similarly, there is a huge disproportion of scale. As you can see on the comparison, the Pearl River Delta is closer in size to the whole Netherlands than just the Randstad area. It also is housing almost 86 Milion people, over 10 times the amount of people that live in Randstad area. GDP is also disproportionate, standing at a bit less than 2 Trillion dollars for the Canton Metropolis, vs 500 bln that is coming from Randstad Area.



Traditional City Development (west)

European architecture way is based on Vitruvius principles from the ancient Rome

Those virtues are :

- **Firmitas** (stability) - Building should be structurally sound and able to stand the test of time, and using reliable materials
- **Utilitas** (utility) - Building must serve its intended purpose effectively, and attend to needs of it's users.
- **Venutas** (beauty) - Architecture of a building Should be aesthetically pleasing, typically using proportion, symmetry and harmony.



Cologne cathedral

Based on this principals, European architects in the middle ages started a trend to build religious buildings high, in order to “reach god”

They also drew inspiration from ancient Rome and Greece, by building pediments and columns.



Parthenon



White house

VS



Cape Town
houses of Parliament

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Traditional City Development (China)

Sinospheare has it's own set of virtues, based around feng shui

Those virtues are :

木 -Wood - Growth, vitality, expansion (associated with pillars and pagodas)



<- 火 - Fire

Energy, passion and transformation (Associated with pointed or triangular shapes, as seen in temple roofs or flame-like ornaments)

土 -Earth

->

Stability, grounding, and nourishment (Square or rectangular shapes, thick walls, and structures like earthen fortifications or brick buildings)



水 -Water

->

Flow, adaptability, and abundance (Curved lines, flowing shapes, and water features like ponds, streams, and fountains)



金 -Metal - /\

Precision, clarity, and strength. (Circular or arched forms and decorative metallic ornaments)

Traditional City Development (China)

Each of the most famous Chinese philosophers also had their own idea regarding architecture

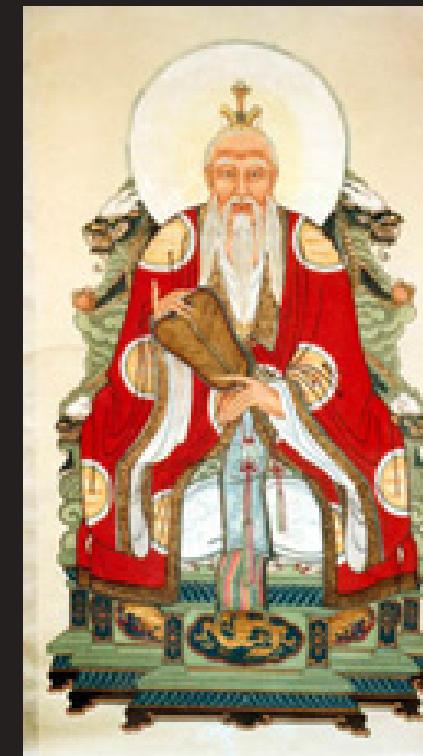
Da Yu

- Functionality and practicality
- Address natural challenges like floods and promote community
- Functional and utilitarian style, utility over aesthetics



Confucius

- Reflecting Social hierarchy
- Promote social values
- Grand, symmetrical and hierarchical style, reflecting social and cosmic balance



Laozi

- Integration with nature
- Foster simplicity, tranquility and natural harmony
- Simple, natural and flowing style, avoiding ornaments and excess



Vitruvius and Chinese architecture comparison

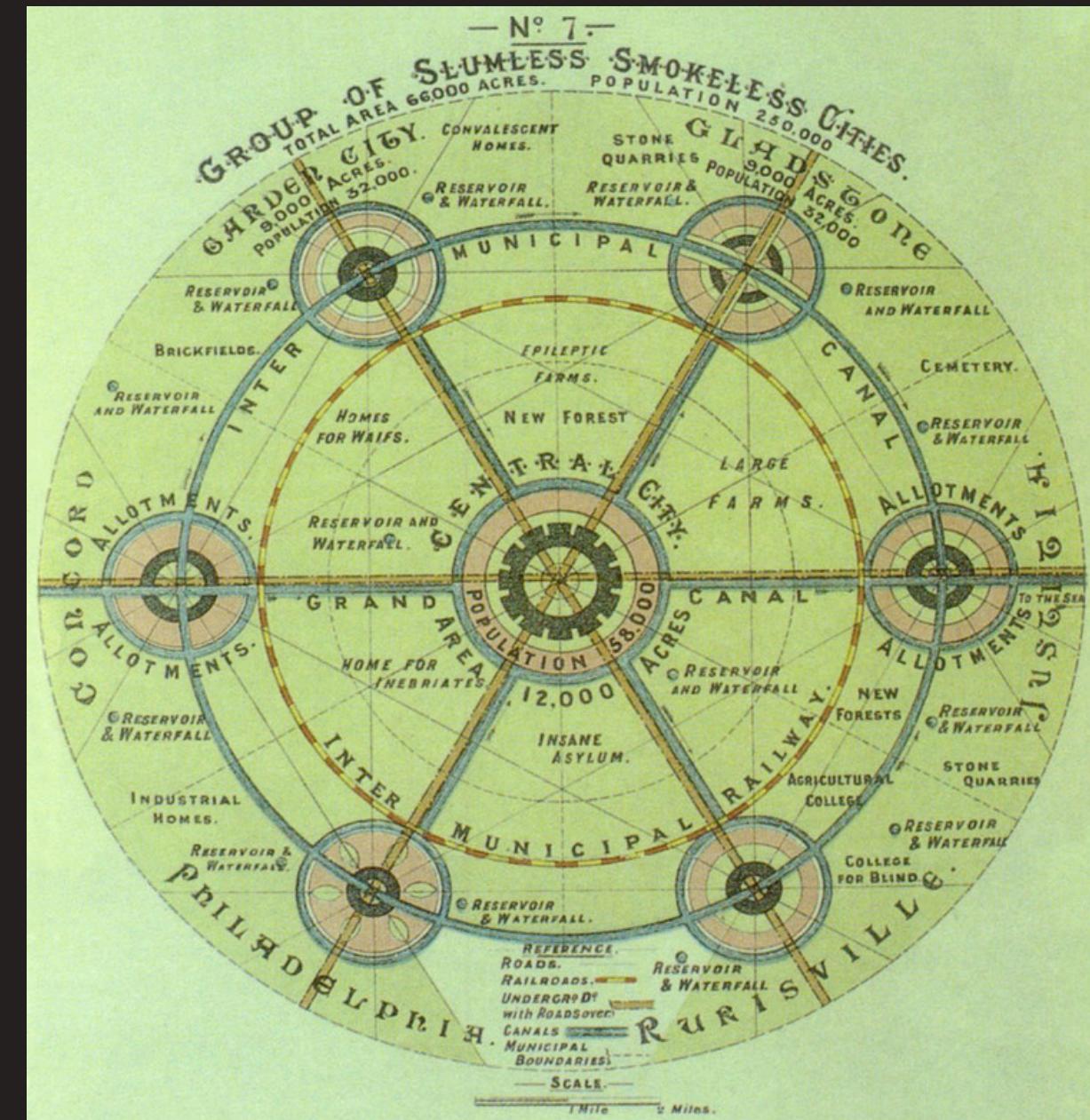
Aspect	Vitruvius	Da Yu	Confucius	Lao Zi
Focus on principles	Concerned with architecture and the physical structures that define human environments	Focused on practical governance and controlling natural forces for societal benefit	Centered on moral behavior, social harmony, and ethical governance	Advocated a philosophical way of living in harmony with nature and the universe
Approach to nature	Views nature as a source of inspiration and resource for constructing enduring, functional, and beautiful buildings.	Engaged with nature through active intervention (flood control) while respecting its power.	Nature is less central; his focus is on human relationships and societal structures.	Advocates for deep integration with and minimal interference in the natural world
Human Role in a World	Humans are creators who shape their environment to meet practical and aesthetic needs	Humans are stewards of the environment, working to harmonize natural forces for communal benefit.	Humans are ethical beings who create order through virtue and proper behavior.	Humans should align with the flow of nature, acting with humility and restraint.
Outcome orientation	successful outcome is a physical structure embodying strength, utility, and beauty.	Success is measured by societal stability and the prevention of disasters.	Success lies in the cultivation of virtuous individuals and harmonious communities.	Success is living in accordance with the Dao, fostering peace and balance.

Industrial City Development

Industrial revolution, completely changed how we understand cities. Before cities were mainly a place for merchants and artisans to sell goods, offer their services, and do joined bussines. Industrial revolution made the cities a place for work for masses by opening factories in which thousands of people were working. This made the city a good option for people that wanted to improve they life by moving to the city and finding a job there.

This however has lead to overcrowding of cities, air and water pollution, sanitation and health problems etc. The amount of smoke from the factories, has created a new word in English language - smog, which was a new thing in industrial England.

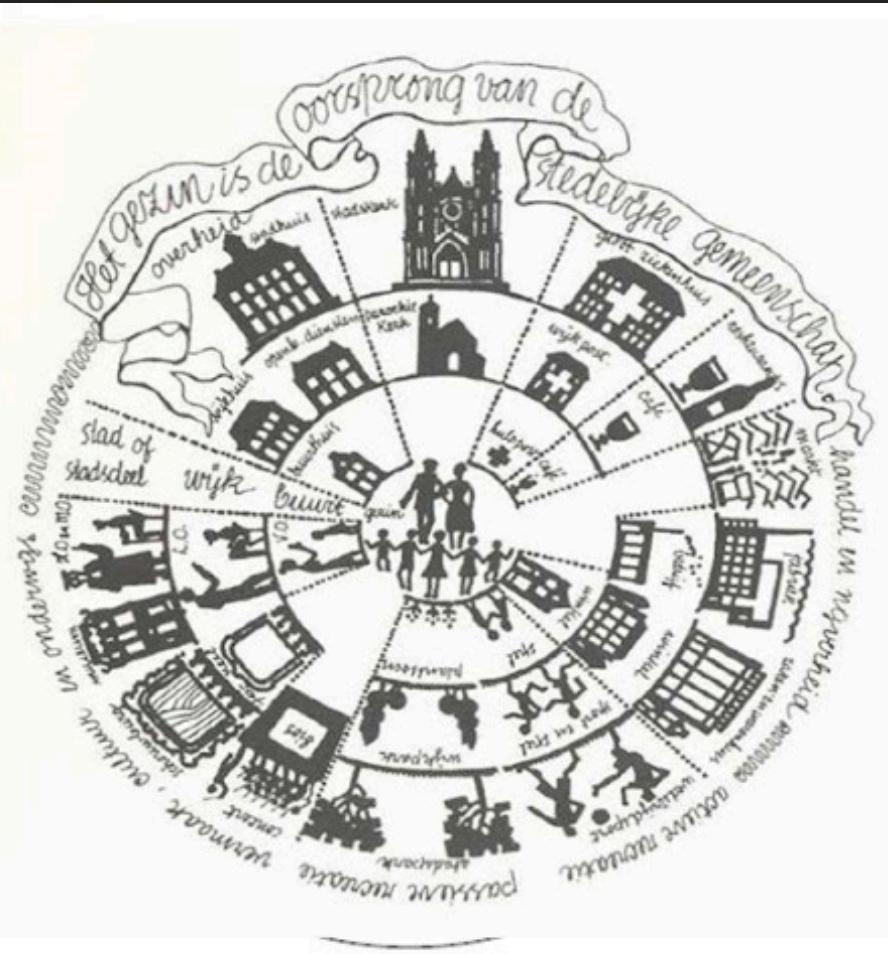
To counteract all of those issues, the idea of “Garden city” was proposed first by Ebenezer Howard in 1898. The idea was to make a protoecological communities that are on one site interconnected with each other, on the other are not overcrowded. This would hypothetically allow a city to grow in a sort of hexagonal pattern, allowing citizens to both have access to grander agglomeration around them, and have all of the necessities in their own city.



Modernism in urban design

After WW2 the Dutch had an idea that can be considered a prototype of a concept of 15 minutes cities, called wijkgedachte.

Similar to 15 minutes city, is the idea to create a cities based around neighborhoods, reaching around 20 000 people, in which everything that each of the inhabitants need is located, I.E. Store, community enter, pharmacy etc.



The idea is to divide the city, into a series of neighborhoods. For the neighbourhood idea, it is important to keep clear what the spatial units are in the city. The urban development of the neighbourhood often clearly shows where the different sections are located.

Another Modernistic idea regarding urban design were apartment buildings made from Large panel systems. Extremely popular all over communist block in Europe, were a quick way for building a low-cost housing for millions of people.



Large panel system apartment building in Halle

Modernism in neighborhoods in China

Modern Chinese apartment buildings often look like those on the picture. They usually are over 20 stories high and are only one apartment thick, allowing inhabitants to experience both sides of the building.

Those apartment buildings are usually part of a gated community. Within this community located are convenient store, pharmacy, some smaller businesses. Communities themselves are surrounded by a fence or a wall, for which the only entrance are monitored by security guards, often only allowing inhabitants based on facial recognition technology.

This practice seems to be liked by the Chinese, providing them with sense of exclusiveness, however also limiting shared space, making barriers between neighbors and encouraging sort of sense of entitlement, correlated with a place where a person lives.

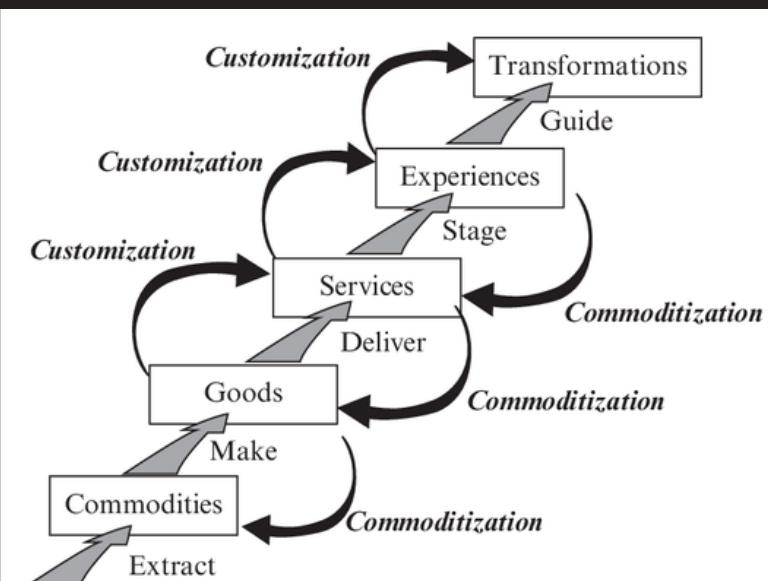


Contemporary City Development

Contemporary city development is a modern approach to urban planning and growth, emphasizing sustainability, technology, and inclusivity.

It focuses on creating livable spaces by implementing a repeating cycle of commoditization and customization of services and industry that is available in a city.

This cycle allows for constant improvement of the city based on its inhabitants needs



Thanks to industrial revolution experience became a very needed commodity. When work started to be possible to perform while using machines, instead of by hand, experience in operating machines and doing performing job sufficiently, became a very valuable commodity.

Because of this transition, not only industry but also service sector became much more prominent in a society, especially in regions that went thru industrialization the earliest.

Best examples of this kind of cities are London and New York. Both of them used to be industrial powerhouses, however nowadays they're operating predominantly in services, especially finance.

Because of their success, developers, architects and investors had a lot of money and incentive to invest in a new type of buildings called "signature buildings", examples of which are on the next slides.

Since Shanghai also became one of Asia's most important Financial centers, it became a breeding ground for new buildings. Thanks to that it became a big markets for international, mainly western architectural companies, who were more then happy to take huge paychecks for their work. Most of the most iconic Pudong buildings are made by american architects, making them feel more related to New York. Then Shanghai, however i suppose that is to be expected when a city becomes a world financial center, they take inspiration from the biggest



“Cool” and “uncool” signature buildings

Signature buildings are typically overengineered buildings, that are made more as a show of wealth and prosperity than actual functionality.

Palm Jumeirah, Dubai <- Uncool



Palm Jumeraih in Dubai is an archipelago of artificial islands in Dubai.

In my opinion it should be in “Uncool” category for several reasons:

- Completely misplaced resources, making artificial land on a see, is costly and difficult endeavor, which in my opinion should be done out of necessity (like Singapur) to house more people, not for making luxurious villas in a middle of an ocean.
- It was an ecological disaster for local marine wildlife
- It was expensive to build, and even more expensive to operate, just like Burj Khalifa is a never-ending money eating well

Great City in Chengdu is a project for making an extremely well designed city, near the capital of Sichuan, Chengdu. Its goal is to make a city that will :

- consume 48% less energy, 58% less water, 89% less landfill waster and 60% less CO₂ then similar size cities
- It doesn't mean to destroy everything around it in order to make this city came true, but build around existing farmlands.
- Be self sufficient but in the same time have good connection with regional capitals

Project looks very impressive, however only time will tell how this development will actually turn out.



Great City, Chengdu <- Cool

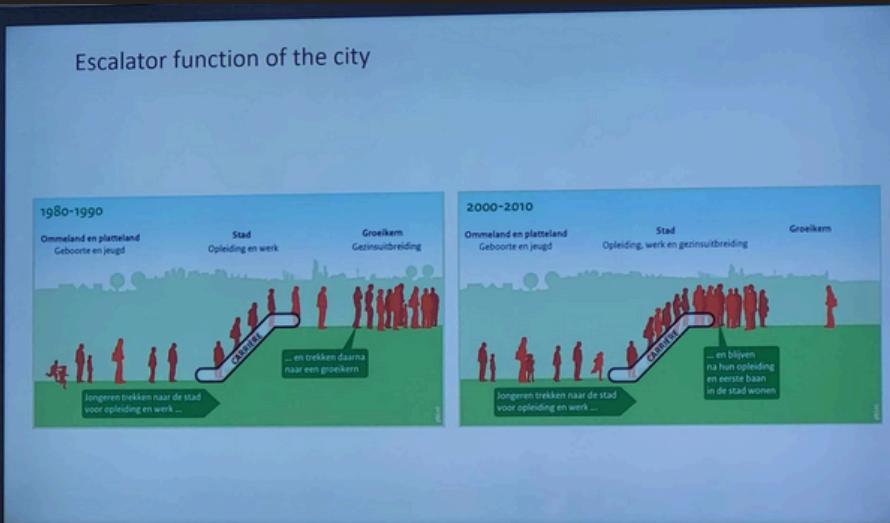
The Line, Saudi Arabia <- Uncool

The Line in Saudi Arabia is another yet unrealized project, however its principal ideas are ridiculous in my opinion, here are my reasons.

- this city is meant to 500 meters tall, and 170 km long city, meaning every part of it would be 12 tallest building in the world.
- Current biggest building in the world is a Boeing factory in the US which has 13.3 mln m³ of volume, the line would have 17 bln, well over 1000 times the current record holder.
- Burj Khalifa was much smaller project, and it bankrupted oil rich city of Dubai, this is thousand time bigger endeavor



Creative City Development



Into the creative parts of the cities we can also include so called freezones. Lets take a look at Christiania. It is an ex-military base in Copenhagen, that has been squatted since 1971. It used to be a drug zone, which was tolerated by Danish government, because they know that people will take drugs regardless of governments opinion, so at least the “problem” was contained in one place. Nowadays only weed is officially allowed by their self elected Anarchist commune, and you can get it on almost every corner.

Creative cities also tend to attract different type of inhabitants then other cities. Those inhabitants are not only going to the city to work, and then come back to the suburbs, but also tend to live, entertain, and party in the city itself

Development of a creative city is different then development of other types of cities

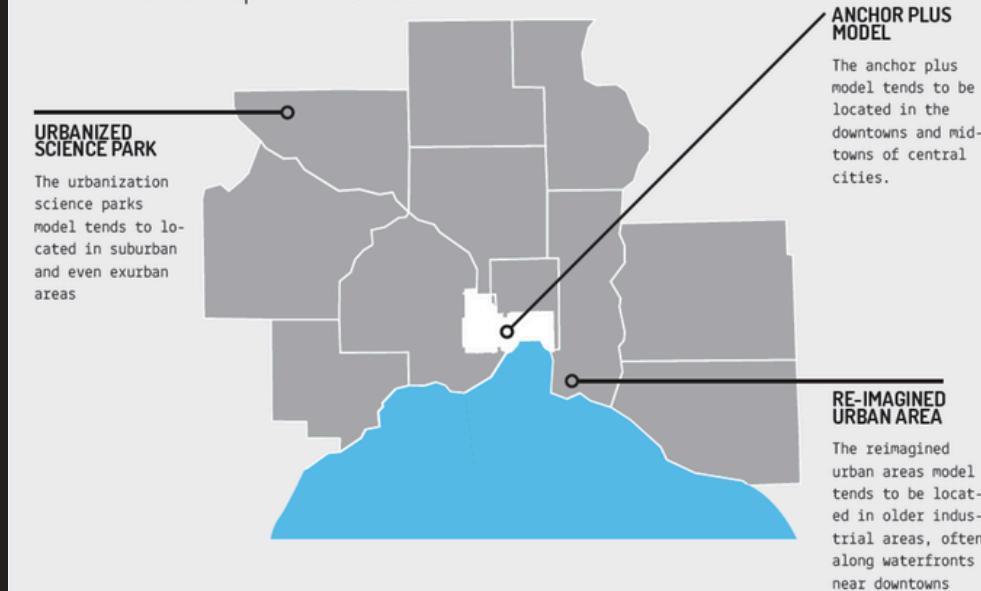
Creative cities often sprout out of poor districts of major cities, like Medellin which was a capital Escobar drug empire.

But are also often spotted in a cities that are innovation hubs, especially where universities are located. Examples of those cities are Berlin and San Francisco



Cristiana Copenhagen

The location of innovation districts within a metropolis varies



Chinese cities have no such thing as hip gay districts

I think that I should argue against this statement. Despite not having Gay districts per se, there are quite a few gay areas in many cities in China. The city that is considered a Chinese gay capital is Chengdu, which is supposedly one of the most tolerant cities in terms of acceptance of LGBTQ+ community. It has dozens gay bars and clubs and public showing off affection by homosexual couples is generally tolerated.

Interestingly Gay community in Chengdu has it's roots in teahouses, in which gay people have been meeting in the past.

During our trip in Shanghai, if you went to the right place you could also find gay bars, clubs and environments, however they weren't as open as they are in Chengdu.

Despite Chinese government not being exactly accepting towards LGBTQ+ community, in general they let people live their lives how they want, Homosexual connections were banned, and since 2000 they aren't so hopefully someday chinese gay couples are not going to have to conform to heteronormative norms



Public Space - Jan Gehl's Theory

At the beginning of the 20th century, public spaces in cities were primarily utilized for functional and work-related purposes. Gehl's studies reveal that these areas served as essential meeting places and marketplaces throughout history. The streets and squares were bustling with a mix of people, animals, and few motorized vehicles, creating a vibrant urban environment.

A significant change occurred after the invention of a car. Gehl refers to this as the “car invasion”, which dramatically transformed public spaces:

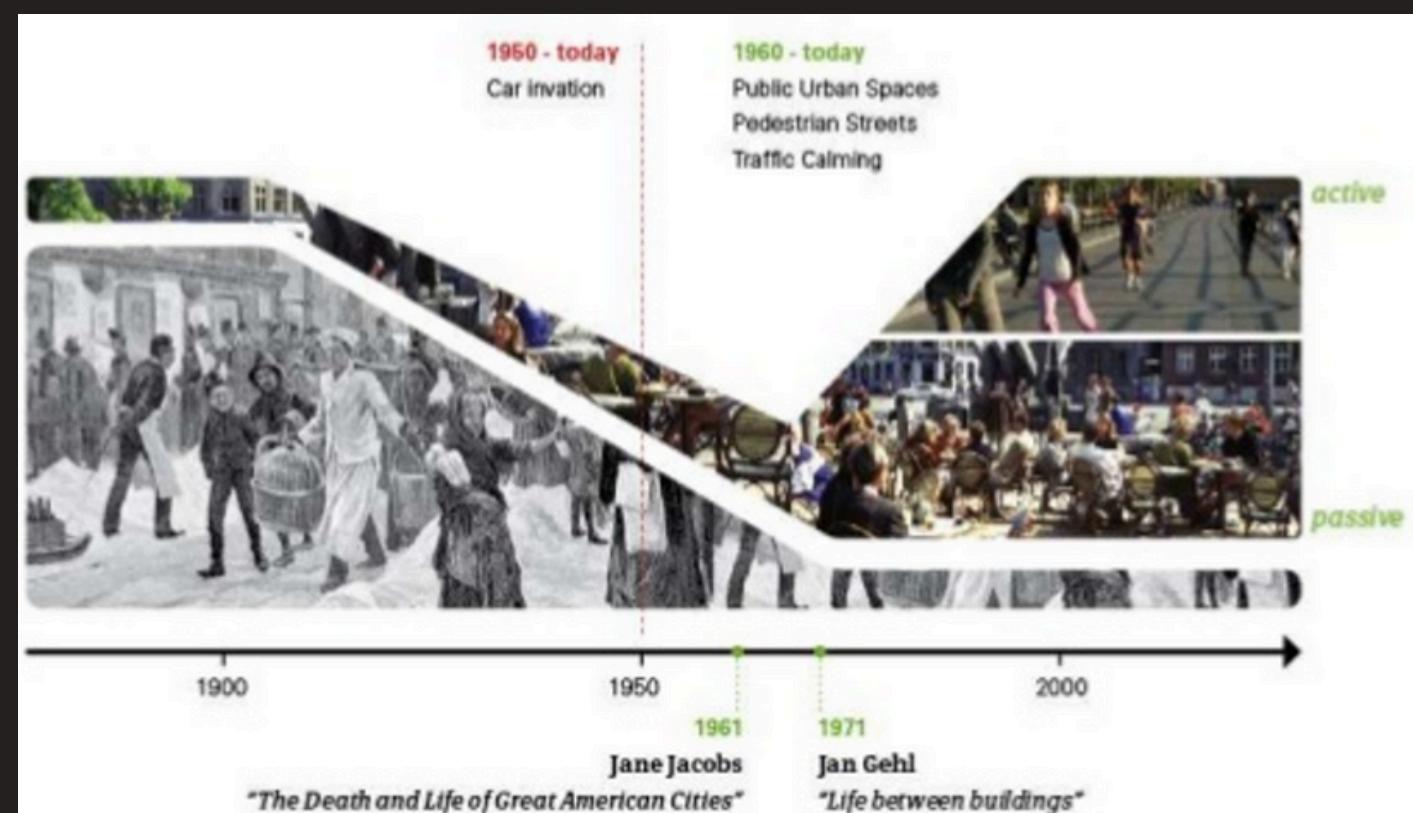
- Streets were widened to accommodate traffic
- Pedestrians were marginalized
- Social exchange in public areas diminished

This transformation was most profound between 1960 to the early 2000s, particularly in US and England.

In the last couple of decades the trend seems to be reversing, with more and more cities focusing more on public spaces, public transport and walkability of cities.

This pattern is especially noticeable in couple of sectors.

- Active Uses: There's an increased demand for spaces that accommodate activities like jogging and cycling.
- Passive Uses: People are seeking more opportunities for leisure activities such as sitting at bars and terraces
- Renaissance of Public Spaces: Gehl notes a resurgence in the use of public spaces as meeting places, exemplified by the worldwide increase in sidewalk-café culture.



Chinese park culture

There are a lot of beautiful parks all over China, and during our trip to Shanghai we had an opportunity to visit a couple of them. Parks in China are fulfilling many more functions than usually park do in the west. It is not only space for experiencing nature in a middle of a city and a place for exercise, but predominantly it's a space for local community to talk, enjoy tea in a teahouse and meeting neighbors. Additionally we have seen ourselves, how common it is to just find people dancing, doing Tai Chi or playing cards or mahjong on some benches in a park.



There are also more unorthodox things in Chinese Parks. In Peoples park in Shanghai, it is quite common to find a marriage market. Parents of people that are past "marriable" age are trying to find their child a suitable spouse, by providing their child's basic information. The text on the card on the right reads : "Shanghai female, born march 1989 Undergraduate 1.6m Good appearance, considerate Shanghai Municipal Hospital Lab Technician Looking for healthy, unmarried man of similar age in Shanghai, who owns a house, has no bad habits, has a stable job and is responsible"

Planning in Practice

the 8th Lecture was a Guest lecture with Willem Wolters, and architect who worked at Walters Architects. He talked about his work, and on the changing in Chinese housing market, on which I want to focus on.



Pre-Reform Era (1949-1982)

State-Owned Housing: After the establishment of the People's Republic of China in 1949, all land was nationalized, and urban housing was controlled by the state.

Housing Allocation: Housing was considered a welfare benefit, provided through workplaces (danwei) at low or no cost, with little emphasis on market dynamics.

Low Urbanization Rates: In 1978, only about 18% of China's population lived in urban areas, limiting the demand for large-scale residential development.

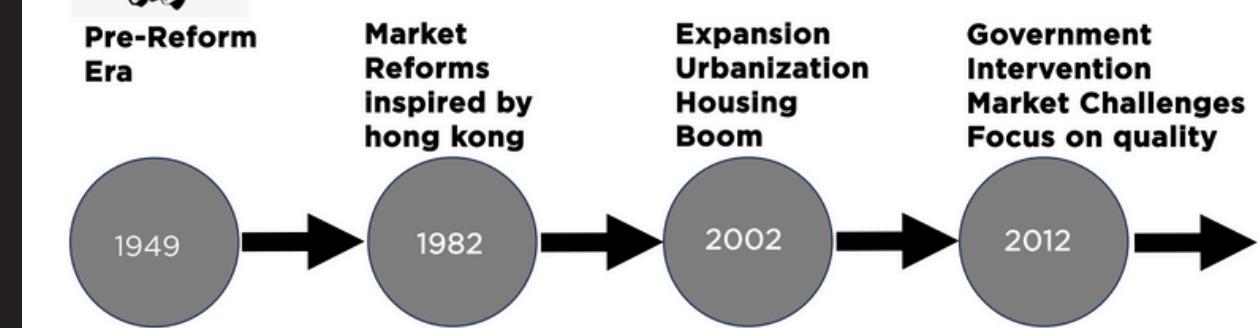


Market Reforms and Housing Boom (1982-2002)

Economic Reforms: In 1982, Deng Xiaoping initiated economic reforms, including land-use reforms that allowed for the commercialization of real estate.

Introduction of Private Property: In the 1980s and 1990s, the government allowed private ownership of homes, which stimulated the growth of the real estate market.

Housing Privatization: By the mid-1990s, China had largely privatized its urban housing stock, leading to a surge in residential construction and homeownership.



Timeline



Real Estate Expansion and Urbanization (2002-2012)

Rapid Urbanization: China's entry into the WTO in 2001 fueled economic growth, leading to massive migration to cities and a corresponding rise in housing demand.

Boom in Construction: The early 2000s saw a boom in construction, with cities like Shanghai and Beijing undergoing massive urban transformations.

Speculation and Rising Prices: Property became a key investment vehicle for Chinese households, leading to significant price increases, especially in Tier-1 cities.



Government Intervention and Market Challenges (2012-2024)

Cooling Measures: To control skyrocketing property prices, the government implemented measures like restricting purchases, raising down payments, and tightening lending.

Debt-Driven Growth: Developers expanded rapidly using high leverage, leading to the emergence of large players like Evergrande. This debt-fueled growth eventually created systemic risks.

Ghost Cities: Overbuilding in smaller cities led to the phenomenon of "ghost cities"—urban areas with significant infrastructure but low occupancy rates.

Reflection after Shanghai Trip

Even before our trip to Shanghai I had an overall idea of what constitutes a “smart city”. My interpretation of it focuses on practical uses of technology where their implementation can help with efficient use of resources. Importantly in my opinion a smart city is not a one that uses technological/digital solutions absolutely everywhere where it's possible, but is utilizing them where they bring either a practical or hypothetical improvement in efficiency, compared to non “smart” solution, or can bring data that can later be used to improve the handling of accruing processes.

During our presentation we have presented our class with 5 statements, with the overall topic being “Perspective on Architecture and Buildings in Shanghai”. During our presentation we were trying to encourage our classmates to come up with arguments for and against each statements with various levels of success. We discussed the statements that we've presented as well as characteristics of Shanghai architecture.

In my opinion discussion went well, however looking back I think our statements could have been more provocative in order to encourage more opinions between our peers, but it might be taught to achieve when the topic was focusing on architecture.

The discussion didn't change much in my opinions, furthermore i think it even reinforced them, since I've agreed with most of the arguments that have been said during the discussion. In the same time I've enjoyed listening to the discussion, especially with Eddy's and Nick's arguments regarding sustainability.

For my part I've tried to add arguments for more green spaces in Shanghai, and how they're necessary for livability of a city from a perspective of a day to day citizen. I also had prepared arguments for and against for each of the statements if the discussion wasn't lively enough, however they weren't necessary during the discussion, since my peers and classmates also had arguments on their own.

I've truly enjoyed both mine and the other group discussion, however I wouldn't say it changed much in my view in terms of Shanghai and sustainability, especially since I've agreed with an overall trend of arguments that was being said.