WeSpace

Future Cities from the Lens of Space

Second edition Feb. 2021

清華大學建筑学院 School of Architecture, Tsinghua University

BCL Beijing City Lab

Tencent Research Institute

Tencent Cloud

WeSpace

Framework

1. *The Background and Connotation of WeSpace*
2. *The Technology Drive of WeSpace*
3. *The Development Prospects of WeSpace*
4. *The Creation Prospects of WeSpace*
5. *The Conclusions and Prospects of WeSpace*

Looking back upon history, each technological revolution has brought about the adaptation and transformation of urban space.

Each evolution of human civilization is closely related to the cyclical rise and fall in the history of city as a incubator and carrier of civilization.

In other words, for a generation of new civilization, there must be the city of its own.

Looking back upon the technological revolutions in the past, it can be found that the impact of disruptive technologies on urban life and production methods is also a challenge to traditional planning of physical space, and it will eventually be projected in space. As a container, city has strong flexibility and adaptability in its spatial form. Therefore, there is more hysreresis / adaptability compared to technological iteration. There are collage cities integrating new and old spaces at every moment in history.

Observing the present situation, technology supply and human demand are jointly promoting the changes in WeSpace.

The fourth industrial revolution, marked by the Internet industrialization and industrial intelligence and mainly characterized by technological integration, is profoundly affecting and changing our cities with a series of disruptive technologies.

Emerging technologies such as artificial intelligence, big data and cloud computing, mobile Internet, sensor network and Internet of Things, block chain, mixed reality, intelligent construction, and robotics and automation systems will have further impact on urban space at different levels.

Technology drive promotes the iteration of urban products at the level of service, and reconstructs the transformation of new urban space. The "information function" of city has been replaced by Internet information, and the behavior choice with spatial search as the core has been changed by individual customized algorithms.

The functional distribution and structure with land use as the core is developing in the direction of taking people as the core.

Looking ahead, the future is right at the moment.

Over the past ten years, emerging technologies have been integrated into all aspects of people's urban life, and have profoundly changed people's way of living, working, travelling and relaxing. And these trends will also play a more significant and important role in the near future. The future is right at the moment.

The boundaries are becoming fuzzy: The boundaries within and between cities, the boundaries between different functional spaces, and the boundaries between online and offline are dissolved.

Urban space is more flexible and free: The form is no longer required to follow function.

Distributed urban layout: People-oriented aggregation of functions and service.

The improvement of spatial experience: The change of physical functions of city and the improvement of scene experience.

Energy-efficient urban operation: Digital operation of space.

Future space integrating virtuality and reality: The integration of digital innovation into space design.

This is a creation with the participation of all people.

Future is not based on prediction, but creation.

In the future, there will be more entities participating in the process of creation and construction of city. In addition to design companies, developers and governments, space operators, retailers, and technology companies will also provide more power for organizational operations, space retail, and technology output. Public participation is also expected to be manifested in the form of creation by default because of the support of digital innovation.

The new trend of space creation integrating space intervention, place creation and digital innovation is also becoming increasingly significant and is a potential transformation mode of future space-related design. It is expected to facilitate the intellectualization of urban space and to realize the spatial projection of smart cities.

Target Readers of the Report

Government Regulators

- ✓ New urban lifestyle
- ✓ Development trend of urban space
- ✓ Urban operation and management opportunities

Urban Planners and Designers

- ✓ New urban lifestyle
- ✓ Development trend of urban space
- ✓ Opportunities and challenges of urban space planning and design

Real Estate Agent and Developers

- ✓ Development trend of urban space
- ✓ Trend of urban construction and management

Technology Companies and Operators

- ✓ Impact of science and technology on urban life and urban space
- ✓ Urban construction and management opportunities

Citizens

- ✓ New urban lifestyle
- ✓ Development trend of urban space
- ✓ Positive and negative impact of science and technology on urban life and urban space

1

The Background & Connotation of WeSpace

1 *The Background & Connotation of WeSpace / Background*

The transformation of the development trend of cities and people under the influence of emerging technologies

The transformation and development of cities

+

The transformation of the cognitive thinking of people

Digital cities	Smart cities	Future cities
Efficiency-driven Centered on the digitization and automation of working and business, the main purpose is to improve the working efficiency.	**Scenario connected** The Internet plus connects the whole urban scenarios and people so that services are restricted by physical space	**Physics-cyber integrated** The connection deepens and facilitates the integration of the systems continuously to emphasize essence rather than technology and method.
With system as the core (People adapt to the system)	**With scenario as the core** (System connects to the scenario)	**With people as the core** (Cities interact with people)

Way of thinking	Traditional mechanical thinking →	Big data thinking (comprehensive, fault-tolerant and relevant thinking)
+	+	+
Cognitive style	Spatial experience of physical entities →	Experience integrating virtuality and reality

Source: Tencent. WeCity Report (partly quoted)

1 The Background & Connotation of WeSpace / Background

- **The era of new type urbanization: Both the scale and efficiency are focused. The level and quality are improved. And the demand of refined urban management is urgent.**

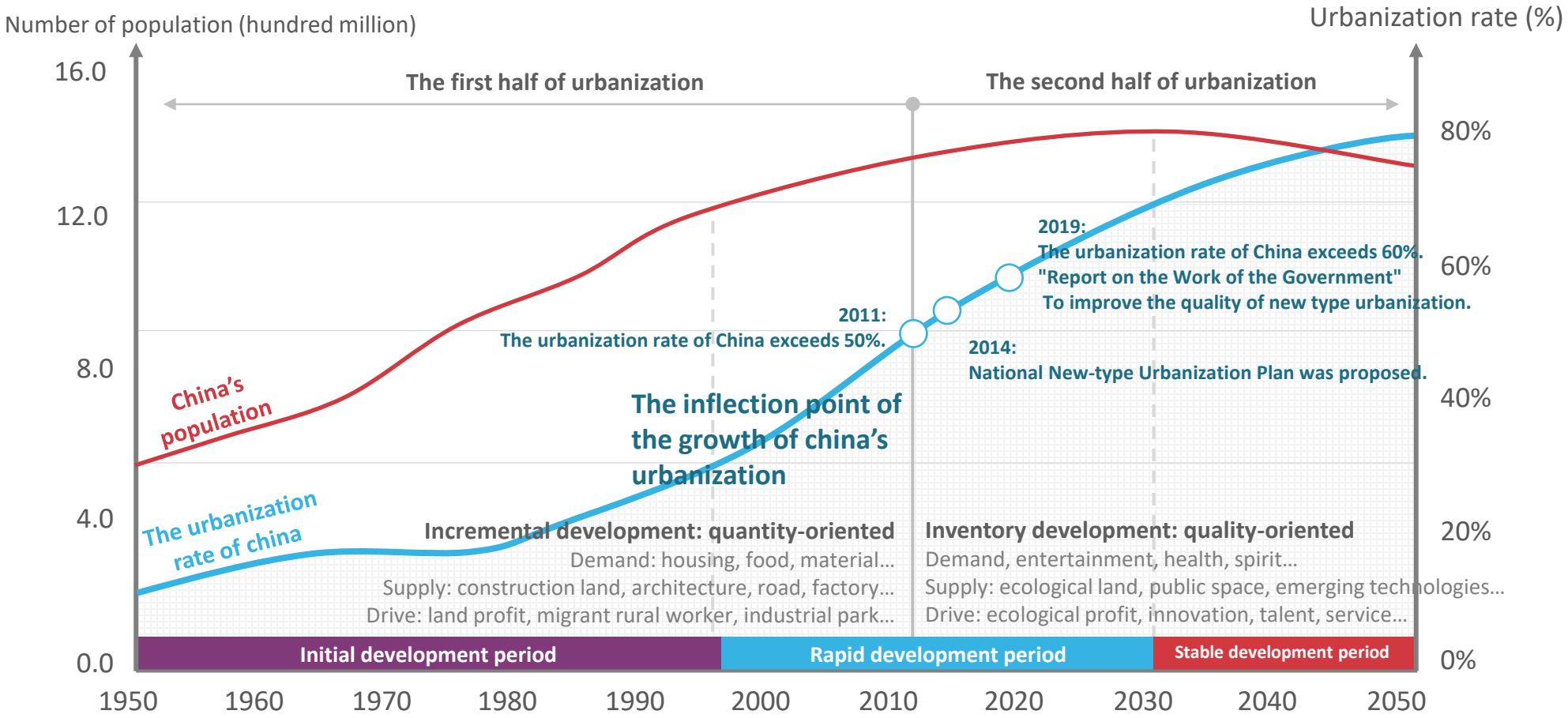


Diagram of development trend of China's population and urbanization level from 1950 to 2050

Data source: United Nations Population Division

1 *The Background & Connotation of WeSpace / Background*

■ **The main problems and challenges in China's urban development: The quality of urbanization needs to be improved**

Population

- ✓ The gradual disappearance of demographic dividend.
- ✓ The unbalanced population distribution.
- ✓ The upgrading and diversification of living needs.

…

Space

- ✓ The urban space spreads continuously.
- ✓ The spatial intensity needs to be improved.
- ✓ The space quality is limited and the vitality is not sufficient.

…

Infrastructure

- ✓ The infrastructure and population distribution do not match.
- ✓ The needs of Infrastructure upgrading are huge.
- ✓ The infrastructure construction is focused on while the infrastructure operation is not paid much attention.
- ✓ There is lack of core competitiveness for innovation and development.

…

Industry

- ✓ Lack of core competitiveness for innovation and development.
- ✓ Unreasonable supply structure.
- ✓ Not high element allocation efficiency and technological efficiency.
- ✓ Not high industrial development efficiency

…

Society

- ✓ The urban inequality increases and urban governance system needs to be improved.

…

Environment

- ✓ The human settlement problems caused by environmental pollution still cannot be ignored.
- ✓ Ecological destruction, damaged biodiversity,
- ✓ Resources are scarce and tend to be exhaustive.

…

Climate

- ✓ Globe: greenhouse effect, extreme weather, etc.
- ✓ City: heat island, acid rain, smog haze, etc.

…

Source: Dilixi. https://mp.weixin.qq.com/s/2TT8sV6o9kES4hpeoULM7Q (partly quoted). China Development Observation. https://mp.weixin.qq.com/s/LyqQ1_Qkd43o1pvpcKs-kA (partly quoted).

1 *The Background & Connotation of WeSpace / Background*

■ China's advantage in the near future:

A new type of national system, Strengthening scientific and technological innovation

It was pointed out at the meeting of the Standing Committee of the Political Bureau of the CPC Central Committee on May 14, 2020 that… **we will give full play to the super large scale of market advantage and domestic demand potential in our country, and we will construct a new development pattern of mutual promotion in domestic and international double-cycle… We will pay close attention to arrange the strategic emerging industries and future industries, and improve the upgrading level of industrial foundation and the modernization level of industrial chain. We will give play to the advantages of the new type of national system, enhance scientific and technological innovation and technology research, and strengthen the support capabilities of key links, key fields, and key products.**

The new type of national system focuses on strengthening scientific and technological innovation, gives play to the strategic supporting role of scientific and technological innovation to increase productivity and comprehensive national strength, gives play to the decisive role of the market in the resource allocation and the institutional advantages of socialism in concentrating on addressing major problems, and advocates the combination of government, industry, university, research, and practice so as to form the powerful joint force in promoting independent innovation.

- ## The 2020 Report on the Work of Government

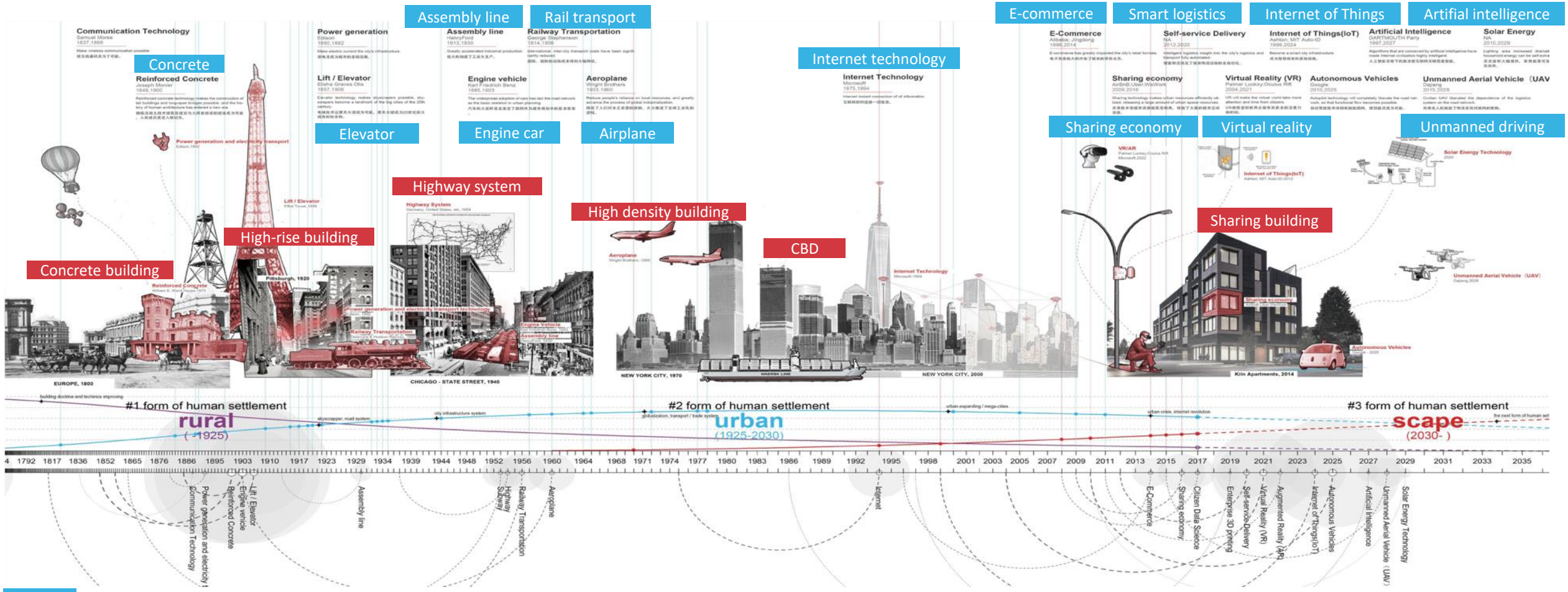
We will encourage the upgrading of manufacturing and the growth of emerging industries. We will markedly increase medium- and long-term loans to manufacturers. We will promote the industrial Internet and boost smart manufacturing. New forms of business such as e-commerce, online shopping, and online services have played an important role during the COVID-19 response and more policies will be introduced in support of such businesses. We will advance Internet Plus initiatives across the board and create new competitive strengths in the digital economy.

We will boost our capacity to support scientific and technological innovation. We will provide stable support for basic research and application-oriented basic research, and encourage enterprises to increase investment in research and development. We will accelerate the development of national laboratories, restructure the system of key national laboratories and develop private research and development institutions. We will intensify international cooperation on science and technology. Intellectual property protection will be strengthened. We will introduce an open competition mechanism to select the best candidates to lead key research projects.

Source: "The Standing Committee of the Political Bureau of the CPC Central Committee Held a Meeting." Xinhua News Agency. <http://www.xinhuanet.com/politics/leaders/2020-05/14/c_1125986000.htm>. "What is New-Type National System? It Is Enough to Understand These Three Points." Renmin Luntan. < https://mp.weixin.qq.com/s/sGhP6iZFBW1jUROwcJFagw>. The Chinese Government Website. < http://www.gov.cn/zhuanti/2020lhzfgzbg/index.htm>.

1 *The Background & Connotation* of WeSpace / Background

- **The relationship between scientific and technological development and the reform of human settlement form**



Main technologies

Spatial form

- **Under the influence and impact of scientific and technological development, human beings have experienced two typical forms of settlements: rural settlement and urban settlement.**
- **A series of emerging technologies that have a huge impact on urban form have matured rapidly and have accelerated our progress towards the next form of human settlement.**

1 The Background & Connotation of WeSpace / Background

■ The relationship between scientific and technological development and ideal city model

1760s | 1870s to the early 20th century | 1940s and 1950s | The late 20th century and the early 21st century

The first industrial revolution | The second industrial revolution | The third industrial revolution | The fourth industrial revolution

Gridiron city

European colonizers in North America

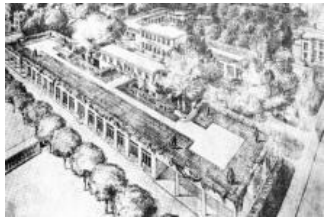
The method of capitalism cities coping with industrial and population concentration under the circumstance of undeveloped transportation in the horse and buggy era.

Linear city

Arturo Soria Y Mata

With the main roads as the skeletons of the layout. The living land and production land are arranged in parallel along the main roads.

Industrial city



Tony Ganier

It adapts to the industrial development of cities and divides the functions of the elements of "industrial cities" clearly.

Radiant city

Le Corbusier

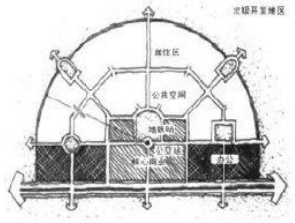
Continuous green space, high-rise buildings, continuous modern transportation network, and flexibly divided spaces.

Collage City

Colin Rowe

It unifies the past and the future in the present. Uses the collage method to reconnect the severed history.

TOD



Peter Calthorpe

A transit-oriented development model. There is high-intensity development of land around the stops.

1785 The emergence of factory **1811** | 1852 The invention of elevator **1882** | **1901** | **1933** | 1964 high speed rail **1978** | **1993** | 2020 unmanned driving

1804 The invention of train **1825** | 1886 The invention of car **1898** | **1929** | **1935** | **1992**

Village of new harmony

Robert Owen

There are production workshops with machines near the houses, and there are cultivated land and pastures outside the village. Necessities are produced within the village, and they are concentrated in public warehouses and distributed uniformly.

Garden city

Ebenezer Howard

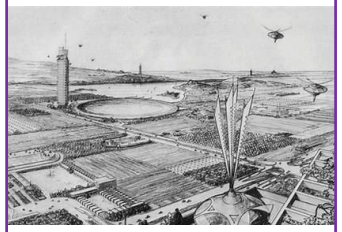
The geographical distribution presents the characteristics of planetary system. The cities are mutually connected with fast transport and instant and rapid communication.

Neighborhood Unit

Clarence Perry

In order to adapt to the development of modern cities owing to motorized transportation, it pays attention to the living community environment. It focuses on the community and is composed of six principles.

Broadacre City



Frank Lloyd Wright

With the development of the automobile and power industries, there is no need to concentrate all activities. Decentralization will be the principle of urban planning in the future.

Traditional Neighborhood Development

Andres Duany and Elizabeth Plater-Zyberk

It gives priority to public space and public buildings and advocates setting up a denser grid road system and emphasizes the compactness of communities.

- Technological development broadens people's imagination. The ideal cities fully embrace emerging technologies.
- The ideal model is limited by the overall social productivity and economic development level.
- The ideal city model pays attention to people's life quality and social operation efficiency, with solving urban problems at the moment as the starting point.
- The ideal models in the past still have practical significance even if there are emerging technologies at present.

1 The Background & Connotation of WeSpace / Background

■ The relationship between scientific and technological development and the reform of urban space

	1760s	1870s to the early 20th century	1940s and 1950s	The late 20th century and the early 21st century
	Agricultural revolution	The first industrial revolution	The second industrial revolution	The third industrial revolution	The fourth industrial revolution
	"The Age of Agriculture "	"The Age of Steam"	"The Age of Electricity"	"The Age of Information"	"The Age of Intelligence"
		✓ Steam is used as the new driving force to promote the mechanical revolution. ✓ It replaces mechanical production of handicraft industry. ✓ The invention of steam-powered transport.	✓ Electricity is used as the new driving force to promote the communication revolution. ✓ Household appliances and mass entertainment related to electricity. ✓ Internal combustion engines promote the new modes of transportation.	✓ Computers promote the information control technology revolution. ✓ New energy and new materials. ✓ Space technology and marine technology.	✓ Digital technology drives technology fusion revolution. ✓ Mobile Internet and Internet of Things. ✓ Intelligent manufacturing and artificial intelligence.
urban spatial characteristics (Adaptation and renewal)		• The emergence of factories and the rise of industrial cities. • The functional layout with employment as the core. • Increased urban density and the emergence of multi-story buildings.	• The emergence of large cities with high population density. • The emergence of mass entertainment industry and space. • The expansion of planar space by public transportation. • The emergence of tall buildings driven by elevators.	• The emergence of megacities and metropolitan areas. • The shrinkage of some industrial cities. • The increase of tertiary industry space. • The centralized urban functional zoning.	• The redefinition of inter-city connectivity. • The migration of traditional manufacturing industry space from cities. • The increase of knowledge production space. • The distributed spatial function organization. • The emergence of smart buildings and smart home.

The scientific and technological development is a necessary and insufficient condition for the transformation of urban space. Policies, culture and historical background, etc. play key roles in the transformation at different levels.

The progress of productivity tools has an impact on the ways of living and production and the way of social organization. → Affects the layout and structure of the city.

The unbalanced scientific and technological development in space has an impact on the hierarchy of the industrial chain of the city. → Affects the rank and size of the city.

The advancement of power technology promotes the development of transportation. → Affects the three-dimensional form of the city. (construction intensity or spread degree).

The advancement of construction technology brings architectural changes. → Affects the spatial form and function utilization form of urban architecture.

1 The Background & Connotation of WeSpace / Background

The periodic characteristics of urban development

- The efficiency improvement of energy generation and energy utilization facilitates social development and urban transformation. City is the scale of culture. Cities of each era have their distinct characteristics of the times.

The space projection of disruptive technologies	The impact of disruptive technologies on the ways of living and production in cities is projected in the space eventually.
The hysteretic effect of space	The form of urban space has strong flexibility and adaptability, and has hysteresis compared to technological iteration.
Integration and coexistence of new and old spaces	There is the replacement and the connotation infusion of new functions in the existing space, and the emergence of new space forms and design paradigms.
More efficient way of social organization	The way of social organization has been reformed and the cities become more complicated.
The "revival" of the old lifestyle	People’s nostalgia for the old lifestyle and their pursuit of new forms of activities
The emergence of new problems in cities	Urban technologies always appear in a way of solving problems, and they will also bring new problems to cities.

1 The Background & Connotation of WeSpace / Background

■ **All the countries promote the development of smart manufacturing and pay much attention to the impact of emerging technologies on urban development.**

2012 — **The U. S.: *Industrial Internet***

Global industrial system is integrated with advanced computing, analysis, sensing technology and Internet connection.

2013 — **Germany: *Industry 4.0***

The Internet of Things information system is used to digitalize and intelligentize the supply, manufacturing and sales information in production, and finally to achieve fast, effective and personalized product supply.

2015 — **China: *China Manufacturing 2025***

We adhere to the basic principles of "innovation-driven, quality priority, green development, structural optimization, and talent-oriented" to achieve the strategic goal of manufacturing power based on "three steps" development strategy.

2016 — **Japan: *Society 5.0***

The information and communications technology is used to the maximum and the cyberspace and physical space (real space) are integrated and shared to bring people a wealthy "super-smart society".

2017 — **China: *Smart Society***

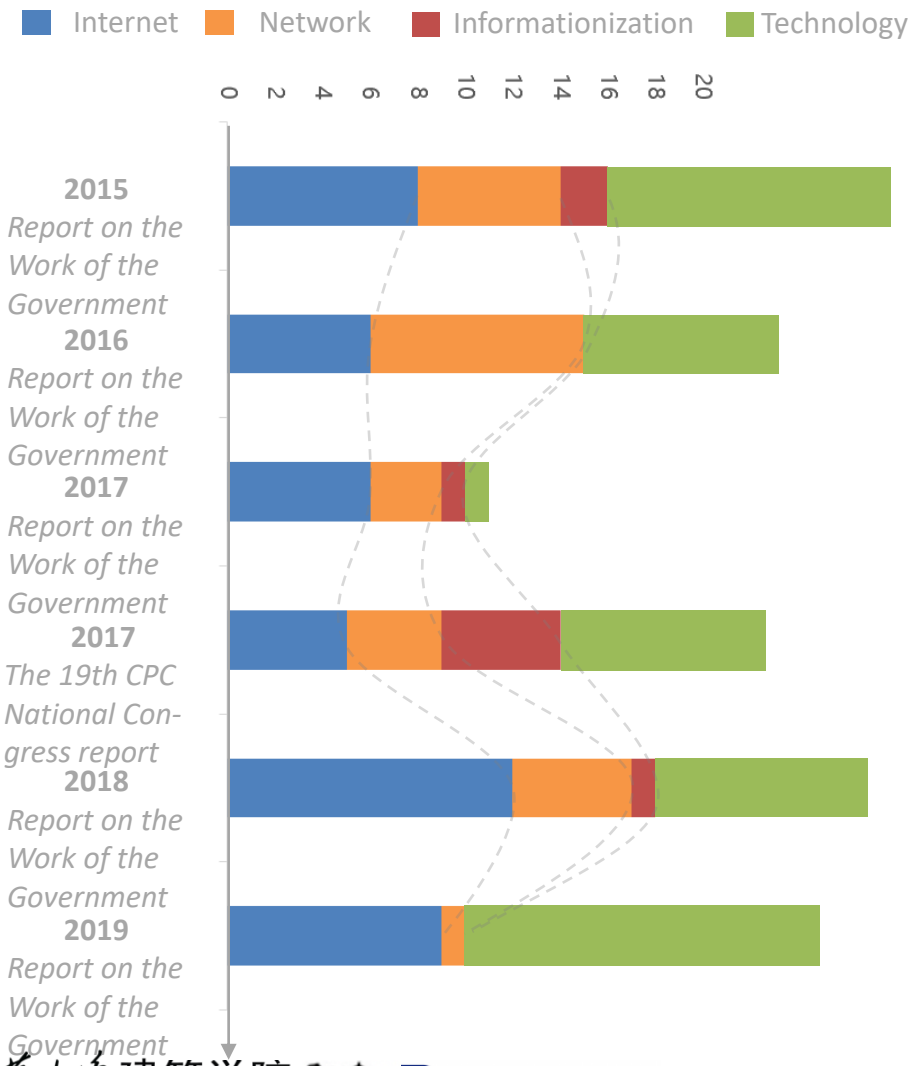
President Xi Jinping has proposed "smart society" in the report at 19th CPC National Congress and emphasized that the intelligentization transformation in the ways of living and production will be permeated into the various fields of society. In addition, we will build a network power and digital China and develop digital economy and sharing economy, and we will cultivate new growth points and form new momentum.

2020 — **China: *New Infrastructure***

We will speed up the construction progress of new-type infrastructures such as 5G network and data center, etc. Facing the needs of high-quality development, we will provide the infrastructure system of services such as digital transformation, intelligent upgrading, and integrated innovation.

.....

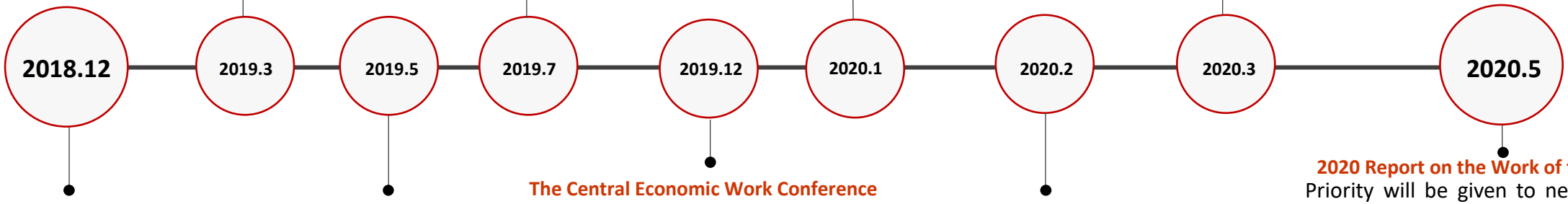
The frequency of relevant vocabulary in major reports of China



Source: Tencent. WeCity Report (partly quoted)

1 The Background & Connotation of WeSpace / Background

■ **China attaches great importance to the "new infrastructure strategy," and the construction of new-type infrastructure will open new spaces and inject new impetus into urban development.**



The Central Economic Work Conference

To speed up the pace of 5G commercialization and strengthen the construction of new-type infrastructure such as artificial intelligence, industrial Internet and Internet of Things

2019 Report on the Work of the Government

To strengthen the construction of information infrastructure of the new generation

The executive meeting of the State Council

To integrate the construction of new-type infrastructure such as industrial Internet with the technological progress of manufacturing industry

The meeting of Political Bureau of the Central Committee

To speed up the construction of new-type infrastructure such as information network, etc.

The Central Economic Work Conference

To strengthen the strategic and network-based infrastructure construction

The executive meeting of the State Council

To issue the investment support policies of new-type infrastructure such as information network, etc.

The twelfth meeting of the Central Committee for Comprehensive Deepening Reform

"Opinions on Promoting High-Quality Infrastructure Development" was examined and approved.

The meeting of the Standing Committee of Political Bureau of the Central Committee

To speed up the construction of new-type infrastructure such as 5G network and data center, etc.

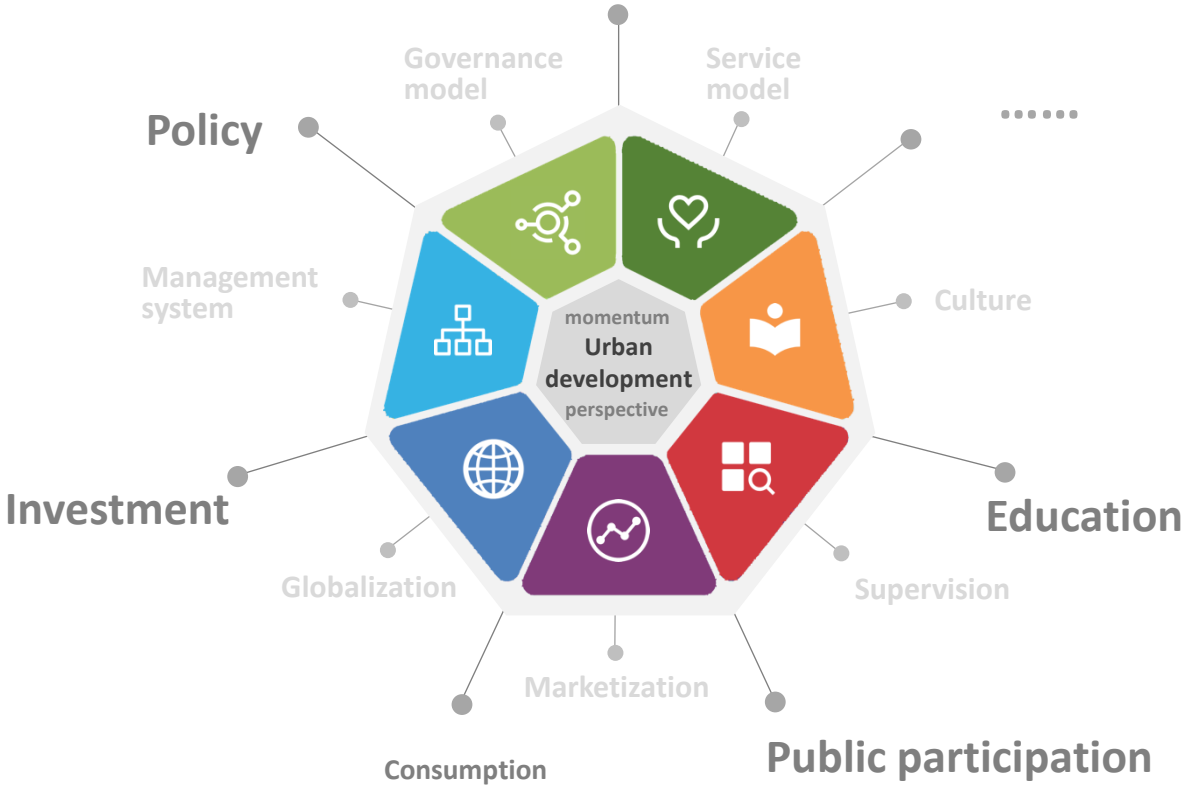
2020 Report on the Work of the Government

Priority will be given to new infrastructure and new urbanization initiatives and major projects. … set up the construction of new types of infrastructure. …develop next-generation information networks and expand 5G applications. …build more charging facilities and promote wider use of new-energy automobiles. …stimulate new consumer demand and promote industrial upgrading.

1 *The Background & Connotation of WeSpace / Background*

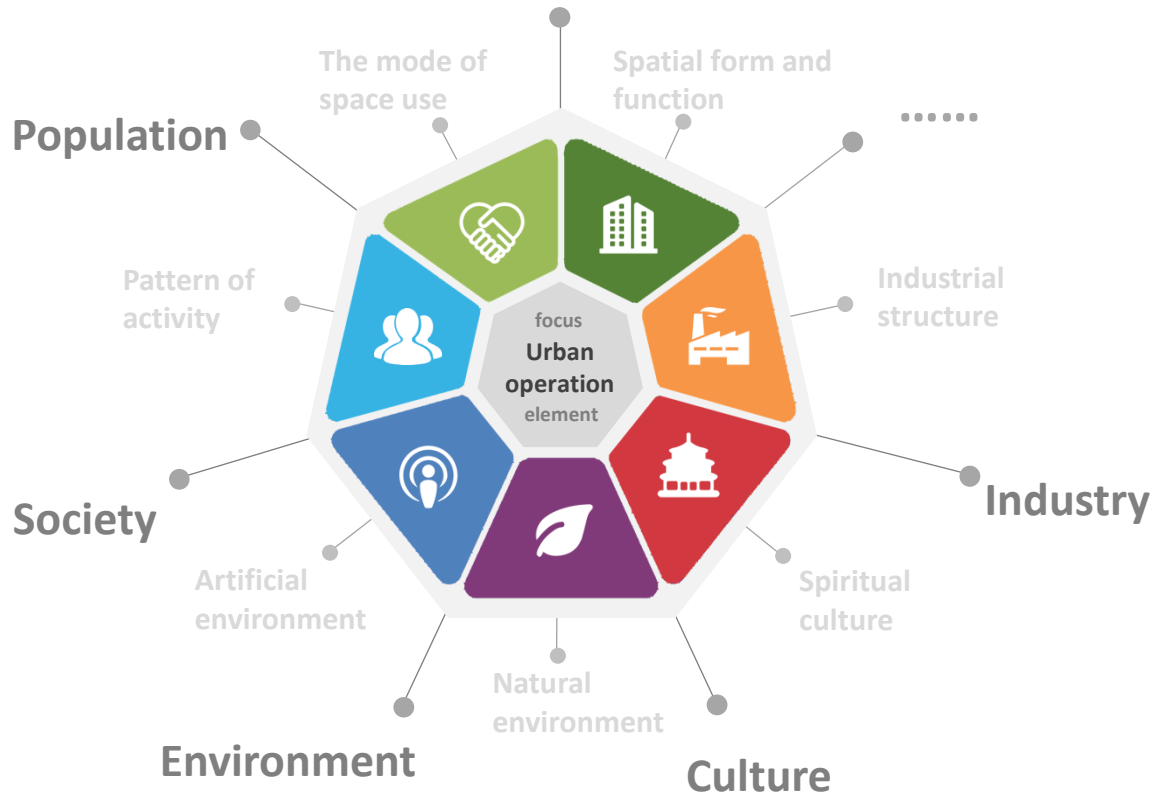
■ **Focusing on the perspective of emerging technologies + urban space to explore the development and creation of future cities**

Emerging Technologies



- **Different momentums and perspectives of urban development and operation**

Urban Space

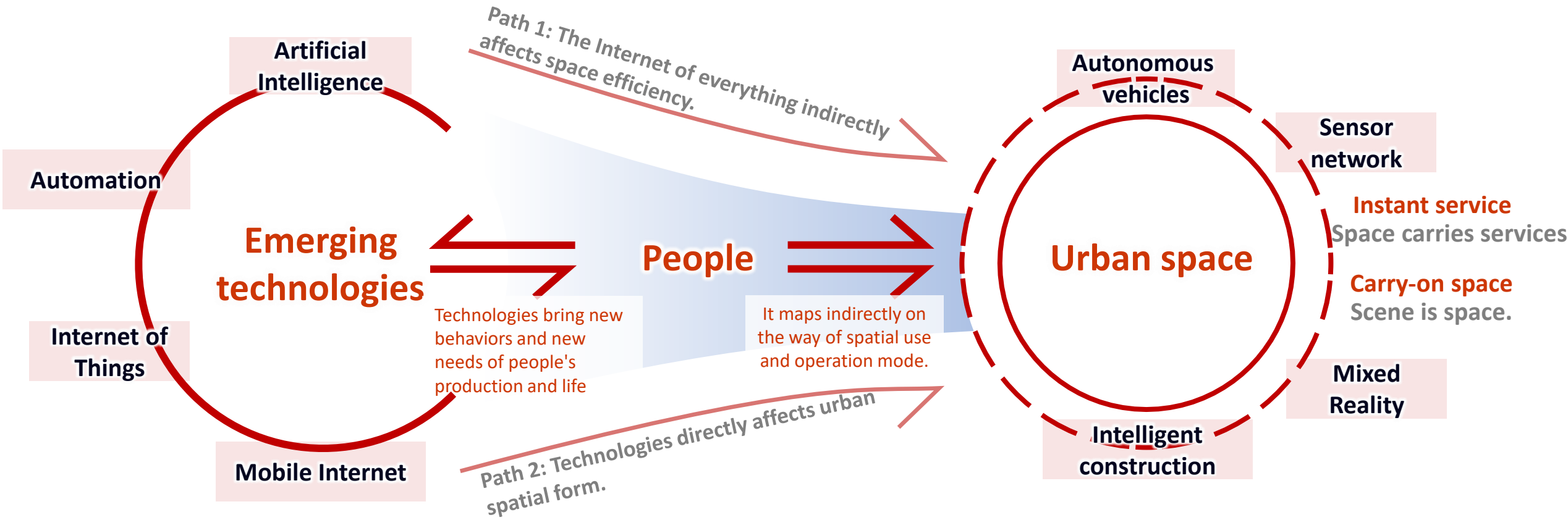


- **Different focuses and elements of urban operation**

School of Architecture, Tsinghua University
Tencent Research Institute
Tencent Cloud

1 *The Background & Connotation of WeSpace / Background*

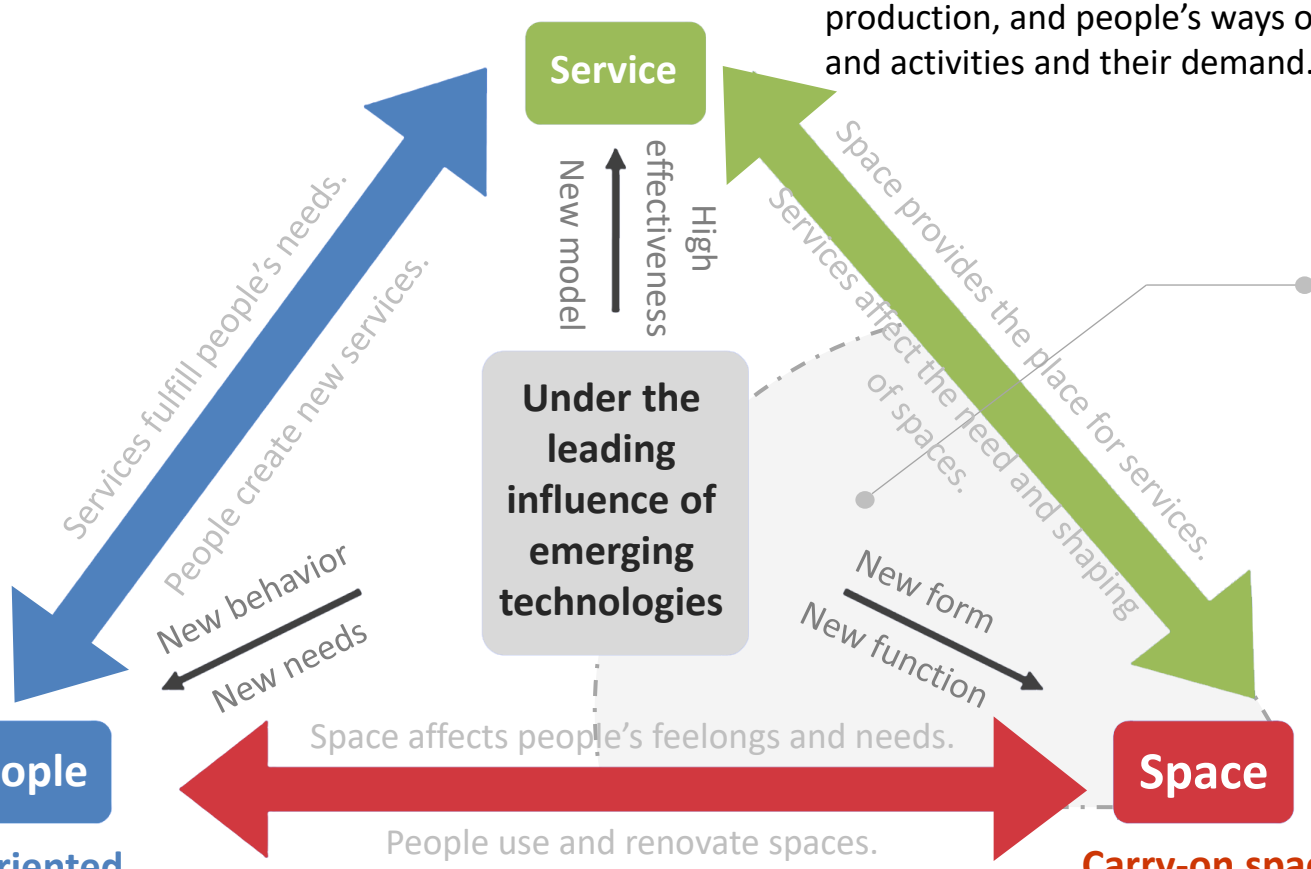
■ To explore the changes of WeSpace under the influence of emerging technologies



Source: Tencent. WeCity Report (partly quoted)

1 The Background & Connotation of WeSpace / Background

- **To explore the changes of WeSpace under the influence of emerging technologies**



There has first appeared a series of new service models and effects that match the changes in people's ways of living and production, and people's ways of behaviors and activities and their demand.

Range of focus

The changes in service models and effects have further impact on the demand and shaping of space, and thus have interaction feedback with people.

There are a series of changes in people's ways of living and production, and people's ways of behaviors and activities and their demand.

- **The relationship between technology and urban space, people and service**

Source: Tencent. WeCity Report (partly quoted)

1 The Background & Connotation of WeSpace / Background

2019 **Tencent Research Institute ×Tencent Cloud** **WeCity**

The idea

It aims at building a technology system in which there is people-centered distributed intelligence, multi-middle platform coordination, and massive service that can be selected based on demand from the perspective of the urban sustainable development so as to support cities to be able to cooperate flexibly, coordinate and intelligentize comprehensively like living bodies. In the future, cities will not only need to emphasize the support of hard-core technology, but also attach importance to experience and be warm.

Three characteristics

- Multi-brain intelligence. There are brains, cerebellums, central brains, as well as limbic brains. It is distributed intelligence.
- Modular middle platform. Under the premise of sharing technology, data, interfaces and standards, there are not only AI middle platform, but also application middle platform and data middle platform exporting instant services for the society jointly and stimulating the blossoming of various applications or services.
- The participation of all people. There are both decision-making centers and various communities. The centers manage major affairs and the communities manage trivial matters so that an ecological city that is jointly built, governed and shared can be formed ultimately.

Core connotation

- The value transfer from "giant system" to "micro service".
- The interactive upgrading from "local intelligence" to "overall intelligence".
- The objective transfer of urban development from "present" to "future".

Source: Tencent. WeCity Report

1 *The Background & Connotation of WeSpace / Background*

2019 Tencent Research Institute ×Tencent Cloud **WeCity**

Technology
Intelligentization
People-oriented
Urban support system

+

School of Architecture, Tsinghua University | Beijing City Lab

=

2020 **WeSpace**

Technology + Space has been considered and discussed.
Ontology, methodology, practice theory

1 *The Background & Connotation of WeSpace / Connotation*

The definitions of the related concepts in this report

City : City is the distribution area of urban landscape with high-density human settlement and developed non-agricultural activities, and it is a collection of physical environment and various elements such as and society, economy and culture. The "city" in this report has not taken rural areas into consideration, that is to say, it is not the city border based on the administrative division.

Space : Space is an objective carrier that carries substances and activities. Specifically, it can be "form" or "physical environment" or administrative, entity and functional area. The "space" in this report is more about the concept of functional area.

The delimitation of time span	This report focuses on **the present and the next ten years** in the near future rather than the distant future. In this report, it is suggested that the future is right at the moment.
The delimitation of deduction method	The report focuses on the laws of urban development and **carries out scenario analysis under trend deduction** rather than specific prediction of the future
The delimitation of report purpose	The report summarizes the tendencies of urban development and analyzes the possible spatial scenes of cities in the near future so as to **trigger consideration and attention**, as well as in-depth research and discussion of this topic in the future.
The delimitation of application scope	The report emphasizes more on the **future cities in China**. However, part of the discussion can provide reference to other countries due to the versatility of technologies.

Source: Ma Shuang and Long Ying. The Identification of Urban Physical Area in China: Exploration on the Community Scale. [J]. Journal of Urban and Regional Planning.,2019,11(01):37-50.

1 The Background & Connotation of WeSpace / Connotation

■ Theoretical support: future-oriented cognition and creation

Theoretical and Technological Support

Theory

The New Science of Cities
the science of new cities and new urban science

Theoretical method

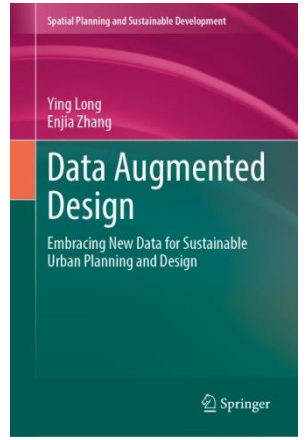
The new science of cities is not only new urban science, that is, to use new data, new methods and new technologies to study cities, but also science of new cities, that is, to study the cities that have been affected by disruptive technologies. On the basis of understanding the current cutting-edge technologies and methods in various professional fields, we should understand and comprehend the urban system and the laws of development objectively **so as to have a comprehensive grasp of the important theoretical and methodological support of urban studies, planning and management.**

Technology

Spatial Intervention, Place Making & Digital Innovation
SIPMDI

Creation approach

Spatial intervention, place making and digital innovation are not limited in the planning and design of traditional space. **Various intelligentized methods and intelligent facilities** are used to combine the digital innovation at the technical level, place making at the social level, and spatial intervention at the physical level to achieve the coexistence of virtualness and reality and empower urban space. It is the form of data augmented design methodology in the future.



1 The Background & Connotation of WeSpace / Connotation

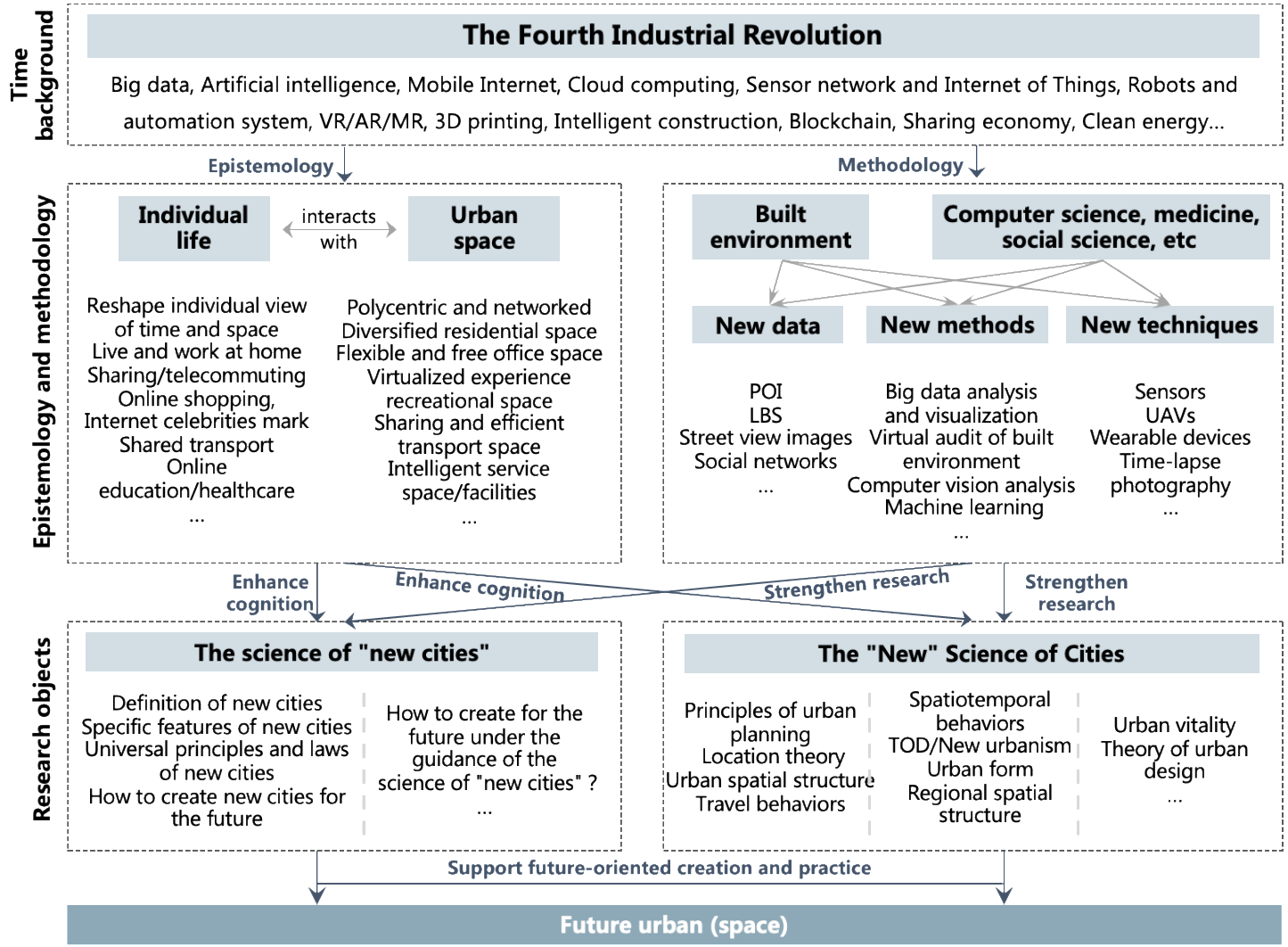
■ Theoretical support

Future-oriented cognition:
The New Science of Cities[1]

(Theoretical method)

New science of cities should study both "new" urban science and the science of "new cities". At present, the big data and artificial intelligence applications in the built environment field in China are mostly explored at the method level, while few studies have considered the changes in the research object, i.e. city. We prefer to encourage the study of the science of "new cities", that is to say, to fully perceive the fundamental changes of the research object from the epistemological and ontological level and to study new life, new space and new cities instead of being limited to innovation at the method level.

- The preliminary research framework of new science of cities



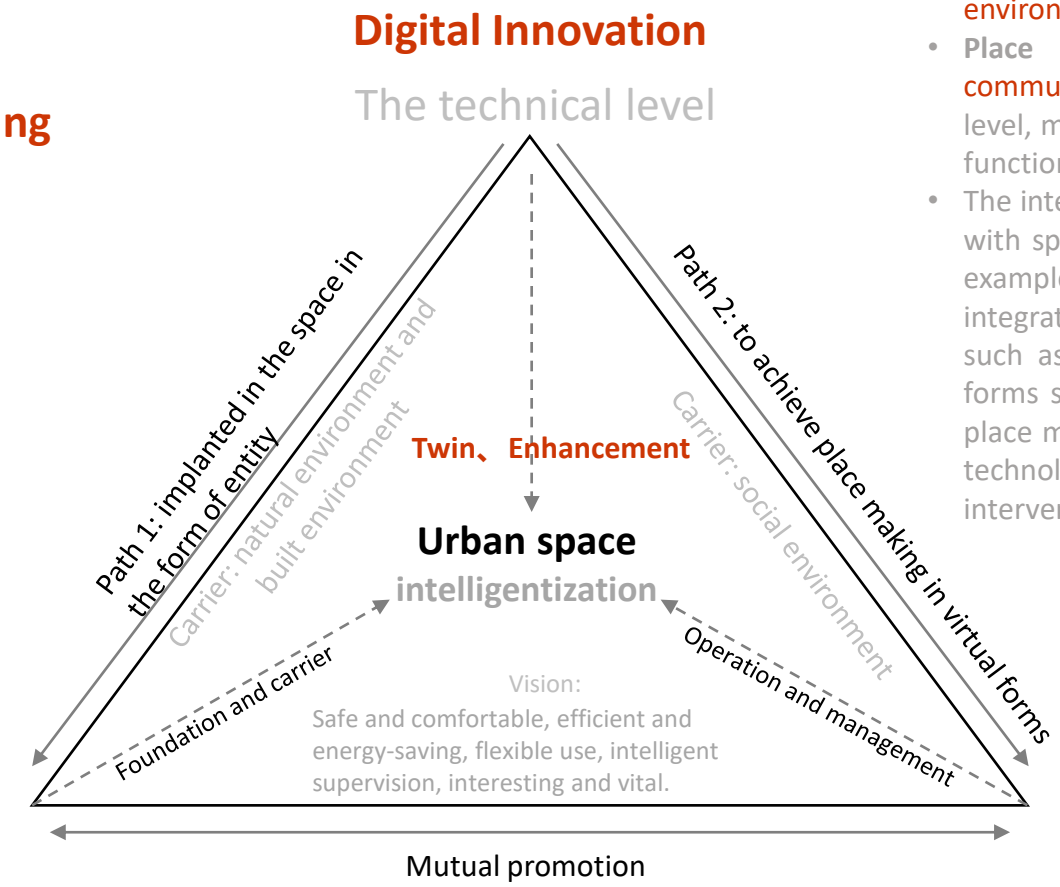
[1]The concept of "new science of cities" is derived from *The New Science of Cities* by Michael Batty. It originally meant to study new data, new methods, new technologies, etc. of city and is a concept compared to concept of "science of cities". On this basis, Mr. Long (Long Ying) of Tsinghua University has supplemented the focus on "new cities" and emphasized that study should focus on new urban phenomena and new urban issues. This report focuses on the derived perspective of "new cities" to study new cities and new spatial scenarios.

Source: Long Ying. "The Human Settlement in the Future Driven by the Disruptive Technologies: From the Perspectives of New Science of Cities and Future Cities, etc." *Architectural Journal*. Vol. 2020(03-04), pp. 34-40.

1 The Background & Connotation of WeSpace / Connotation

■ Theoretical support

Future-oriented creation:
Spatial Intervention, Place Making and Digital Innovation
(Creation approach)



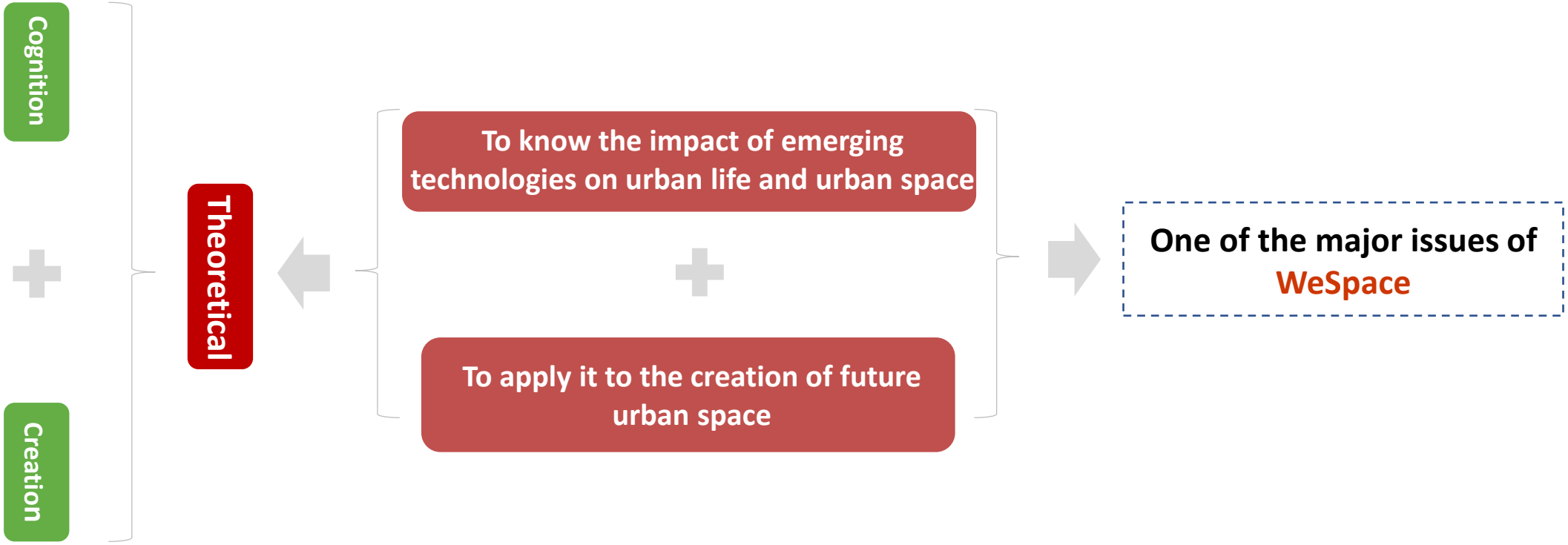
- **Spatial intervention** is committed to the creation and quality improvement of the built environment from the physical space level and it is the core of the built environment design.
- **Place making** is committed to promoting people's communication in the built environment from the social level, maintaining daily life, and enhancing the richness of functions in social life.
- The integration of **digital innovation** at the technical level with spatial intervention and place making is crucial. For example, digital innovation technologies can be integrated into physical spaces in some physical forms such as the Internet of Things, etc. or in some virtual forms such as APP or information platforms to promote place making. It is also expected to use digital innovative technology to enhance the interaction between spatial intervention and place making.

- **The concepts of spatial intervention, place making and digital innovation**

Source: Long Ying. "The Human Settlement in the Future Driven by the Disruptive Technologies: From the Perspectives of New Science of Cities and Future Cities, etc." *Architectural Journal*. Vol. 2020(03-04), pp. 34-40.

1 *The Background & Connotation of WeSpace / Connotation*

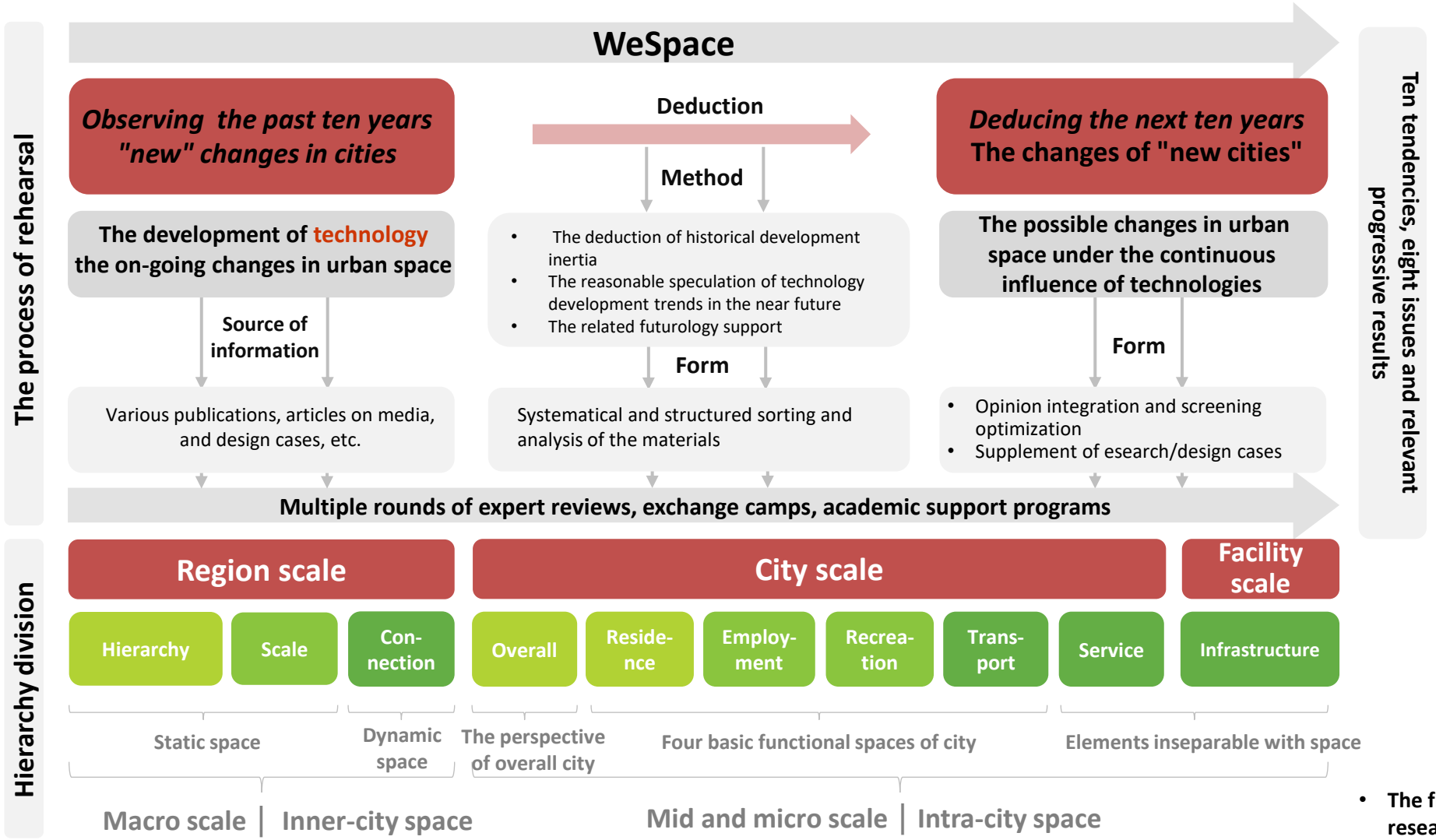
■ Theoretical support: future-oriented cognition and creation



- **The relationship between WeSpace and theoretical support**

1 *The Background & Connotation of WeSpace / Connotation*

■ **The core research method:** Tracing and deduction



- **The framework of research method**

1 *The Background & Connotation of WeSpace / Connotation*

Conclusion: The background and connotation of WeSpace

Research Background +	Development Background +	Concept Focus +	Theoretical Support +	Core Research Methods +
Technological revolution and urban transformation	**Digital facilities**	**Future urban space**	**Cognition + creation**	**Tracing and deduction modeling**
The impact of disruptive technologies on the historical tendencies of urban space	The emerging technologies develop iteratively and have become the infrastructure of cities.	The people-oriented intelligentized new urban space in the near future focuses on China and extends to the world	New science of cities + spatial intervention, place making and digital innovation	• Technology + space perspective • Region + city level • Business + field modeling • The focus is the tendency deduction to arouse reflection.

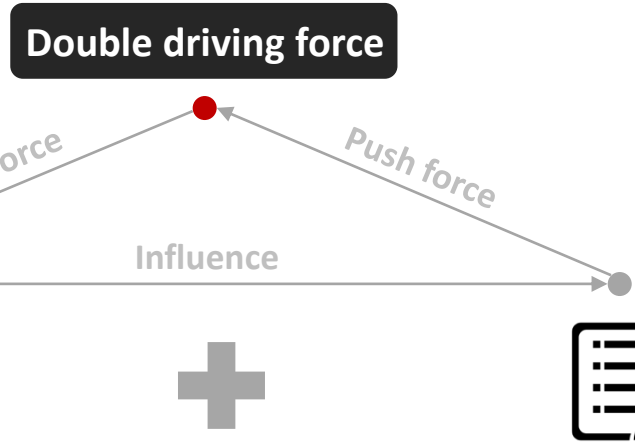
2

The Technology Drive of WeSpace

(Emerging technologies that have a profound impact on lifestyle and urban space)

2 *The Technology Drive of WeSpace*

■ The driving force of changes in future urban space from the perspective of technologies



Technological supply (Core)

Intelligentization

As the technology supply, AI is becoming a pioneer of the era with truly disruptive significance. With the continuous development of science and technology, the concept of "intelligentization" has been gradually expanded to all levels of urban life, and has greatly improved people's life and work efficiency, as well as the diversity and accessibility of leisure spaces. In this process, the reform of the labor market has been initiated.

Human demand

Personalization and diversity

Information and communication technology tends to direct everything to on-demand instant use. In addition, people's demand for online/virtual space is also increasing and it shows the characteristics of fragmented demand and emphasizing experience.
Personalized and diverse human demand will further facilitate more services and space paradigms.

Source: Kelly, K. The Inevitable: Understanding the 12 Technological Forces that will Shape Our Future. New York: Viking Press,2016 .
Batty, M. Artificial Intelligence and Smart Cities. Environment and Planning B: Urban Analytics and City Science,2018, 45(01),3-6.

2 *The Technology Drive of WeSpace*

■ **There have appeared a series of emerging technologies under the background of the fourth industrial revolution**

Artificial Intelligence

AI is a new intelligent machine that can react in a similar way to human intelligence, and it will bring disruptive innovation in all industries.

Big data and cloud computing

Big data is a revolution in the way of thinking. Cloud computing provides resource flexibility for big data analysis. They jointly support the analysis, operation and maintenance of urban space and resources.

Mobile Internet(4/5G)

It is the product based on the integration of Mobile and Internet, it inherits the advantages of Mobile such as the sharing, openness, and interaction with the Internet anywhere at any time. It is available for real-time sharing of remote data and remote resources.

Sensor network and Internet of Things

Wearable devices can use the wireless sensor network to form Internet of Things together with the Internet. It supports real-time monitoring and scheduling of urban space and resources.

.....
Smart City
Autonomous vehicles
Clean energy
3D printing
Human-computer interaction
Intelligent terminal
Sharing economy

Mixed Reality(VR/AR/MR)

VR is the computing and communication platform of the next generation. AR uses the virtual world to enhance the real world. MR integrates the advantages of VR and AR.

Intelligent construction

It is the transformation from Building Information Modeling (BIM) to City Intelligence Modeling (CIM). And it uses 3D printing, construction robotics, etc., to participate in intelligent construction.

Robots and automation system

It assists or replaces human beings in work and services, and assists in the intelligent, efficient and unmanned automated operation of the city.

Blockchain

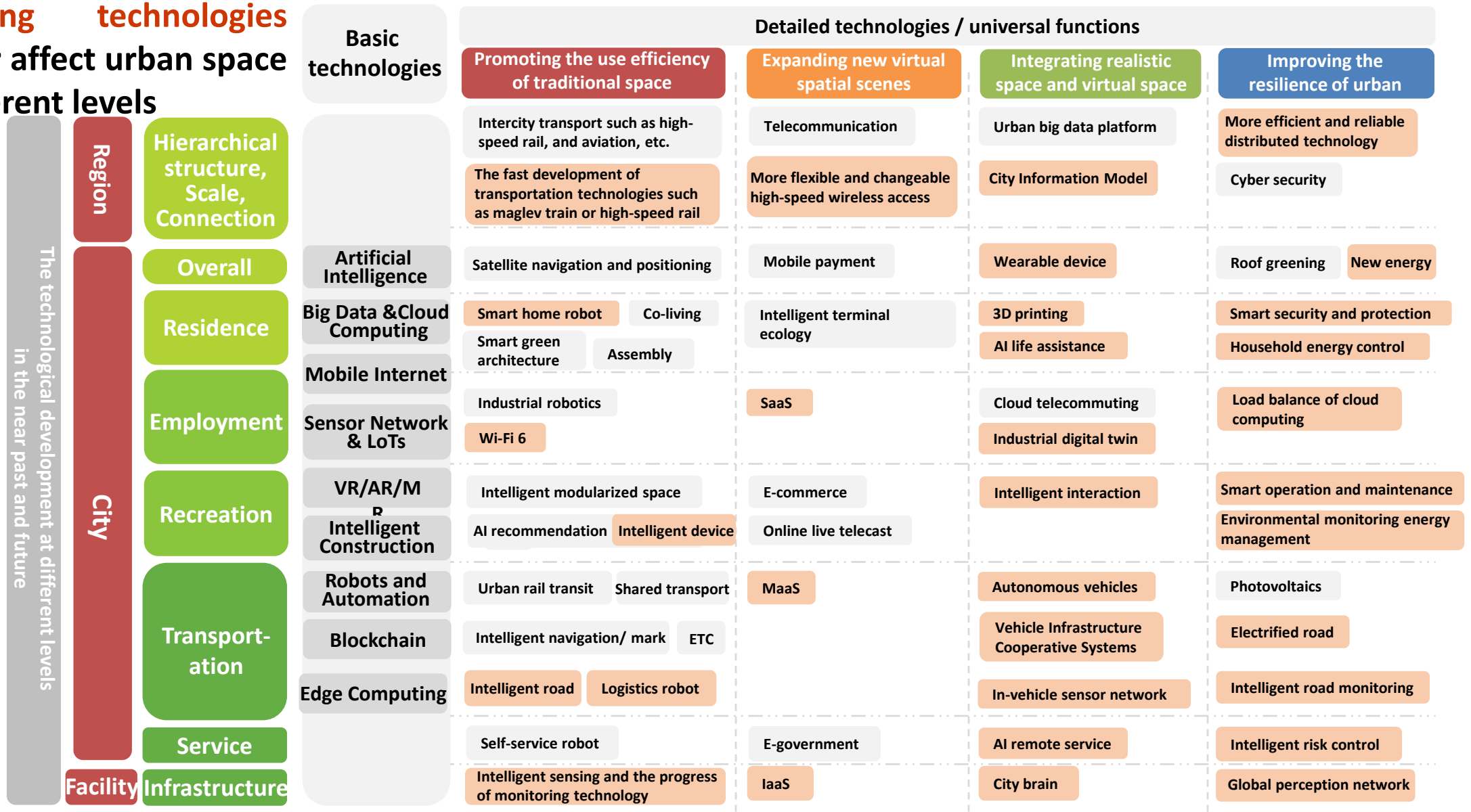
It traces data and is open and transparent. It assists in the efficient management and organization, laying the foundation for the trust of resource data.

Biotechnology
New material technology
Quantum computing
Edge computing
Data analysis
Cyber security
Voice assistance
Nanotechnology
.....

2 *The Technology Drive of WeSpace*

- The relationship between urban space and technologies at different levels
  - The existing/ relatively mature technologies in the past ten years
  - The developed and mature technologies in the next ten years

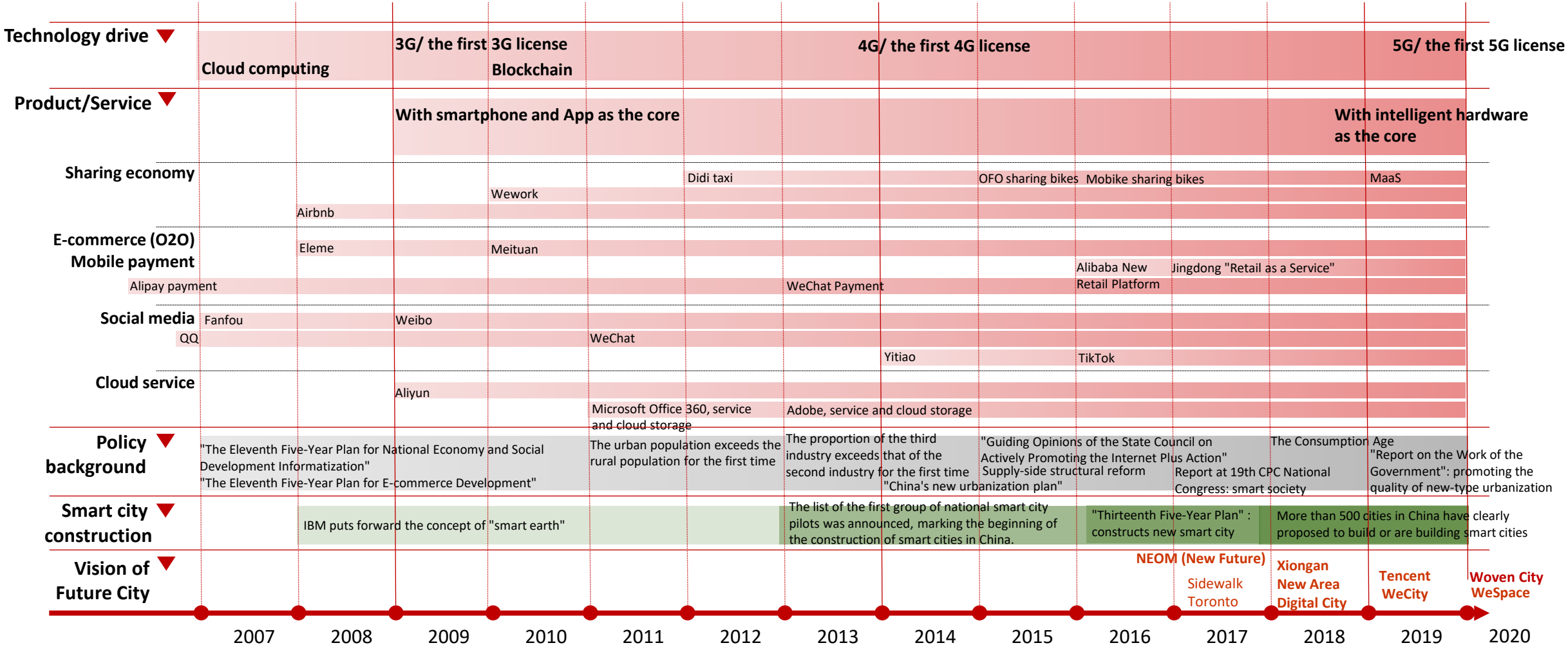
Emerging technologies further affect urban space at different levels



2 *The Technology Drive of WeSpace*

■ **The iterative mobile Internet technology is the main drive to facilitate the iteration at the urban product and service levels, and ultimately affects all aspects including urban construction**

- **The development and changes of cities at different levels in the past more than ten years**

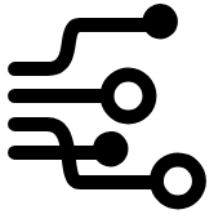


2 *The Technology Drive of WeSpace*

Technology drive: facilitates the iteration at the urban product and service levels

Information products

They are service products produced in the informationized society for the purpose of information dissemination. News products, media products, advertisements, software APP products, etc., are the main content of information products.



Mobilization

Information mobilization means that information can flow from one medium to another. Both the content and the form are no longer fixed but have been constantly changing and flowing. It has been a major trend in the past two or three decades and will continue to be the trend in the coming decades.

Crowd creation

The cost of the public creating information is getting lower and lower. The information of crowd creation and crowdsourcing has derived huge commercial value. Some art forms such as music, movies, books have gradually been democratizing.

Fragmentation

Information becomes increasingly fragmented as it flows. Although fragmented information adapts to the rapid pace of life of modern people, it may also result in insufficient learning depth, time fragmentation, short attention, and superficial thinking.

Algorithmization

In the era of high dependence on Internet information, people's behavior and choices largely depend on algorithms and bring about the elimination of random effects and the loss of personality so as to bring about large-scale transformation of urban physical space.

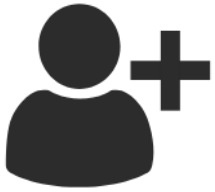
Source: Zhou Rong. How does Internet civilization change cities. https://m.igetget.com/share/course/pay/detail/22/11

2 *The Technology Drive of WeSpace*

Technology drive: facilitates the iteration at the urban product and service levels

Durable goods

They refer to products that can be used many times and can be used for a long time such as TVs, refrigerators, stereos, computers, and bicycles, etc. Consumers would be more cautious in making decision when purchasing such goods.



Sharing

In recent years, the concept of "sharing" has flourished in all areas of urban operation, and the sharing economy has redefined people's lifestyles. The sharing economy supports the breakdown of usage based on demand and emphasizes the right of use rather than ownership.

Service

The reason for the influx of a large amount of money into the service field is the development forms of one service are far more than those of one product. The service industry will soon replace the manufacturing industry and become the engine of employment in the future.

Personalization

In the Internet era at present, the trend of decentralization is increasingly apparent, and people's lifestyles are becoming more and more diverse. Suppliers have sufficient resources to respond to personalized users' demand. Therefore, a variety of customized products have emerged.

Experience

Future cities will not only provide people's basic living needs but also calculate and adjust according to different user groups. Using technological methods to achieve more efficient, flexible resource allocation, space optimization, and citizen service. And the niche demands with experience as the purpose are fulfilled.

2 *The Technology Drive of WeSpace*

Technology drive: facilitates the iteration at the urban product and service levels

Consumables / Services

Consumables refer to goods that are vulnerable such as batteries, papers, and inks, etc. Services generally refer to the type of activities that provide convenience between social members.

Home-based

In the past, it was mostly the case that "people looked for service", but at present, it has partly become the case that "service is looking for people" so that a large amount of urban physical space that was originally used for service has been released and the mixed-use model of living-commerce space has been formed indirectly.

Service

Selling products/services has been transformed to the home delivery of products / services.

Self-service

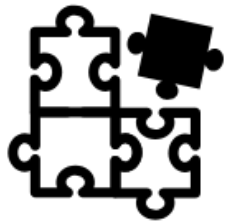
Some traditional products and services can be provided to the public every day on a self-service basis such as self-service car wash, unmanned convenience store/bookstore, etc., so that consumables/services can be used instantly on demand.

2 *The Technology Drive of WeSpace*

- **Technology drive: facilitates the iteration at the urban product and service levels, and restructures the new urban space**

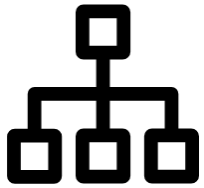
Reconstruction of urban spatial structure

The new location theory in the digital era means the location of physical space is being changed or even surpassed by the location of network space.



Fragmentation

Urban structure



Distribution

Urban resource layout

Mixture

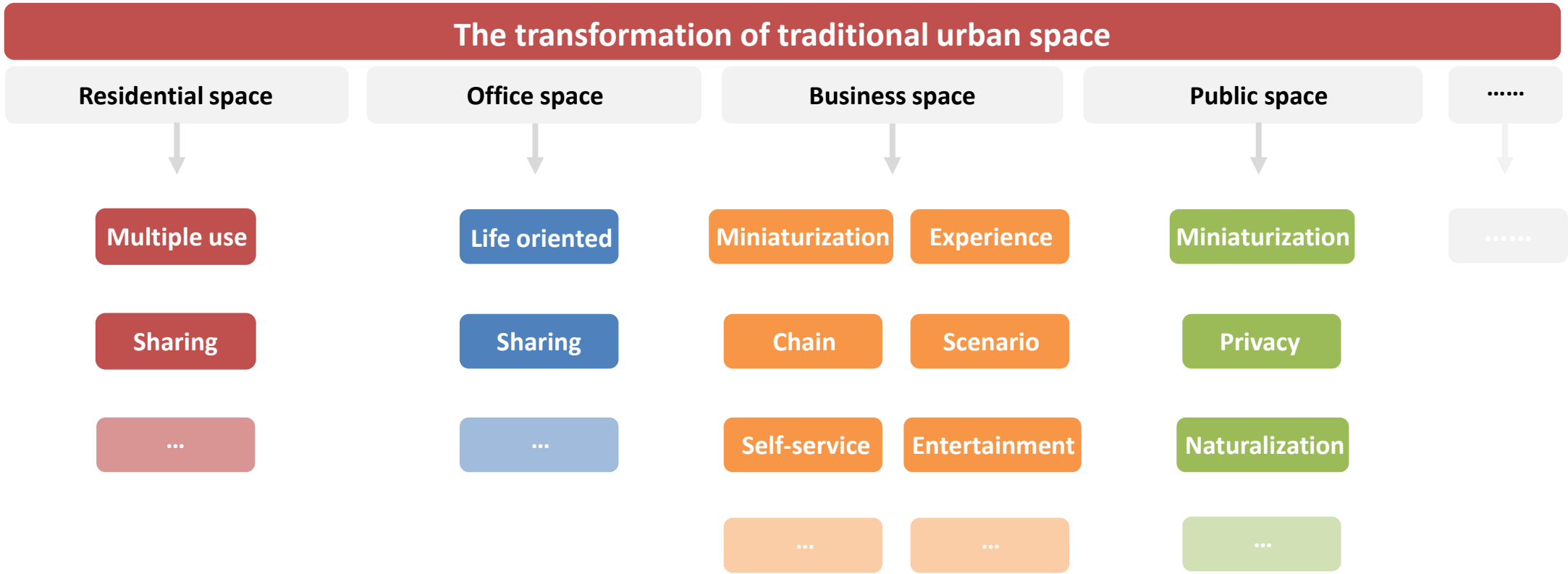
Urban function layout

In the restructured urban space, the information retrieval has transformed from the hierarchical model based on physical space to the hybrid model based on the cloud, edge and terminal. The restructuring is currently in its initial stage.

Note: Cloud: cloud platform. Edge: edges for local computing to fulfill high response and emergency strategies. Terminal: edge gateway module for single hardware.

2 *The Technology Drive of WeSpace*

- **Technology drive: facilitates the iteration at the urban product and service levels, and restructures the new urban space**



People's lifestyle and the way that cities operate are all affected by disruptive technologies. It is of great significance to review the on-going changes in the development of new cities and the potential changes of new cities in the future from different scales and different functional spaces.

Source: Zhou Rong, Du Dikang. Towards or Away from Internet, the Upgrading or Degradation of City[J]. Design Community,2017(01):114-119

2 *The Technology Drive of WeSpace*

■ **The main tendency judgment of future urban space with the drive of technologies——from the division of service areas of use space to the functional service at any time and place (more embodiment)**

Blurred boundaries

1

Intra-city and inter-city/Different functional space/ Online and offline Boundaries dissolve

With the development of transportation, the differences within cities and between cities have shrunk, and the boundaries have dissolved. With the popularity of fragmented time and online working and life, the spatial boundaries of different activities are blurred. In addition, the boundaries between online and offline activities have also melted with the in-depth application of the Internet and the IoTs, and the online and offline activities have been further integrated.

Flexible and free

2

The form is no longer required to follow the function

With the influence of the Internet, urban life has had more freedom, and the connection between the form and function of urban space has begun to weaken. Activities carried by spaces in the same form have greater flexibility. Even if the space does not change, the functions that it carries can be changed at any time. The form no longer follows function.

Adjacent distribution

3

People-oriented function and service aggregation

With the continuous enrichment and maturity of online working, learning and entertainment, etc., even if the cost of travel has been reduced, people's willingness to travel has still declined. The importance of individual peripheral functions has been increased, and the phenomenon of the aggregation of people-centered functions and services will become more prominent.

Spatial experience

4

The Disintegration of spatial entity functions and improvement of scene experience

As the container of activities, urban physical space will no longer have the designated functions, and the mixed-type space use will increase dramatically. There is a surplus in the urban physical space, and the space-experienced form of space use will give a new connotation to the old space.

Energy-saving and efficient

5

The digital operation of space

Under the influence of mobile Internet, cities have shown the characteristics of operationalization. Space may not change, but the way that the space is used will be changed. Digitalized operation will further improve the usage efficiency of space such as sharing and customized recommendation, etc.

Virtuality and reality integration

6

Digital innovation augments space design

Space has hysteresis effect and use flexibility. Even if the form of space is not changed, it can still carry new activities. However, new forms of space design that conforms more to human demand will inevitably emerge. The design of digitalized space will manifest the characteristics of the integration of physical space and virtual space.

- The "**information function**" of city is replaced by **internet information**, and the behavioral choice with **spatial search** as the core has been changed by **individual customized algorithms**.
- The development of **"knowledge economy" industry** does not rely on physical space, as well as the maturity of the **logistics industry** from production to consumers promotes **more flexible way of living and production**.
- **The functional layout and structure with space as the core develops towards the direction with people as the core** (the functional embodiment).

2 *The Technology Drive of WeSpace*

Conclusion: The technological framework and its driving process

Technological framework +

Technological innovation

The emerging technologies and intensive innovation under the background of the fourth industrial revolution

Behavior demand +

Personalization and diversification

The immediacy, virtualization, fragmentation, and experience of on-demand use

Product service +

Intelligent and efficient

The transformation of product service model and improvement of performance

Urban space +

Restructuring and transformation

Fragmentation, distribution, mixture. and multiple transformations of different functional spaces

3 *The Development Prospects of WeSpace*

(The on-going and potential changes in the past and next ten years)

- *Region Hierarchical structure/ size/ connection*
  - *City Overall/ individual reform/ residence/ employment/ recreation/ transport/ service*
    - *Facility New infrastructure/ traditional infrastructure/ digital infrastructure*

3 The Development Prospects of WeSpace

Conclusion

The past ten years – The next ten years The on-going changes and potential changes in cities (space)

Region

Hierarchical structure

The development of transportation technology and communication technology has changed the two basic material orientations of time and space of human life, thereby changing the operating mode and spatial structure of cities.

- The eastern, central and western regions have presented polycentric-center and networked development to different degrees in terms of form and function
- Siphon effect of central cities
- Urban clusters and metropolitan areas are the main spatial forms
- Clear division of labor and characteristic development

City

Size

- Urban agglomerations and continuous urban areas are generated by clustering
- Developed cities spread and some cities shrink
- Uneven development within regions and urban agglomerations in the short term
- Digital divide
- New polarization center
- The uneven state between cities is more obvious in the short term

Connection

- The connectivity between cities is redefined
- The networked development of regional transportation
- The separation of employment and residence has spread to the regional scale
- Cross-city commuting and working in different cities are more popular
- Functional connectivity has surpassed the geographic proximity and become the important driving force of urban development

Overall

Reform begins with individual: The individuals are digitized. Behaviors have transformed from from offline to online and offline integration. The focus on online reduces the perception of offline physical space. Time fragmentation, diversified activities, and free selection of event locations.

- Transformation from the core-edge layering structure to the polycentric networked layout
- There are both agglomeration (regional center) and diffusion (suburbanization)
- Uneven development
- Urban sprawl
- Small cluster form and community form structure
- Flat design
- Transit-oriented development
- Location factors such as transportation are important
- The diversification, decentralization, mixture and fragmentation of spatial function
- Distribution
- Closer connections between entity space and cyberspace within cities
- Land use tends to be refined and flexible

Residential scene

New way of living: The pursuit of living has transformed from simple habitation to individualized lifestyle. The connection with family and community has been attached importance. The needs of online shopping, working, education, medical treatment, leisure, service, etc. have been fulfilled.

- Geographic location affects housing prices
- Suburbanization.
- Sharing
- Operationization and digitized management
- Unbalanced residence and employment
- Gentrification of city center
- Urban communities will self-manage and self-organize based on the community cluster in the future
- Functional mixture and compound
- Miniaturization / fragmentation
- Intelligentization of home facilities
- Personalization and independence
- Human need-oriented. Online and offline integrated community life circle
- Intensified social isolatin
- Traditional developers have become operators

Reduced changes: positive / negative
On-going changes: positive / negative
The changes in the way of living
New changes in the future: positive / negative

3 The Development Prospects of WeSpace

Conclusion

The past ten years – The next ten years The on-going changes and potential changes in cities (space)

City

Employment scene

New way of employment: New occupations are generated, and there are more free workers. Multiple working modes of shared working, collaborative working and remote commuting coexist. Collaboration with artificial intelligence. "Employment" relationship has been transformed into "cooperation" relationship.

- Online expansion and transformation of informal employment. flat office space distribution
- Industrial spatial differentiation
- The third space working
- Suburbanization
- SOHO working
- New working space such as in-car office, outdoor space office, etc.
- Clustering of innovation industry
- Functional mixture and sharing
- Intelligent interaction of working facilities
- Users participate in the operation and management of office space
- Traditional office space is facing decline and transformation
- The replacement of people by machine may disrupt regional balance

Recreational scene

New way of recreation: Online shopping, virtual shopping. Online entertainment, mobile games. Recreational planning, cloud travel, online celebrity check-in. From offline to online and offline integration, highlighting the characteristics of intelligence and interaction.

- Inward integration of commercial space
- The influenced of network location, "good wine needs no bush"
- The transformation of offline business space
- Takeaway and logistics have brought new space problems
- Reappearance of commercial street mode
- Five-sense virtual shopping affects physical stores
- The interaction of cyberspace and physical space
- Fragmentation
- Unmanned
- The interaction of entity and virtualness
- Public space loses vitality
- Cities return to sustainability and nature.
- GO travelling
- Offline public space urgently needs transformation

Transport scene

New transportation method: Unmanned driving has become a new choice for travel. Multiple modes of transportation such as sharing transportation, public transit, private car travel, and slow travel coexist. Travel algorithmization. Mobility as a service (MaaS).

- Superblock and sparse road network model-oriented
- TOD
- Congested traffic
- Three-dimensional and underground transportation
- The improvement of street quality and walkability
- Small block model-oriented and the mixture of big and small blocks
- The revival of street space
- Intelligentized operation of road and parking system
- Sharing transportation redefines city isochronous circle, service radius and subway house
- The parking of shared bikes
- Decentralization of transportation hubs and parking lots
- Driverless lanes, street classification

Service scene

New service method: Online consultation, remote consultation, wearable device health monitoring. Online education, mixed teaching, "ubiquitous learning", personalized education. Mobile payment, block chain-based payment. Government affairs intelligentization, online government service.

- Physical space transformation of medical, educational, financial, and government services
- Comprehensive service, home-based intelligentization and commercialization
- Classification of medical space
- Modular diagnosis and treatment space
- Flexible response to public health emergencies

Infrastructure

Infrastructure

- Digital facilities and urban middle platform
- New infrastructure
- Intelligentization of traditional infrastructure such as communication, power supply, gas, water supply and drainage, and waste management
- Perception of built environment elements
- Data hegemony and social equity
- Local perception
- Digital ethics and privacy security
- From local perception to urban global perception network
- Digital twin
- Digital infrastructure
- Standardized and normalized operation
- The emergence of urban operators

Reduced changes: positive / negative — The changes in the way of living

On-going changes: positive / negative — New changes in the future: positive / negative

3 The Development Prospects of WeSpace / Region Scale

The introduction of region: Hierarchical structure, size and connection

Region

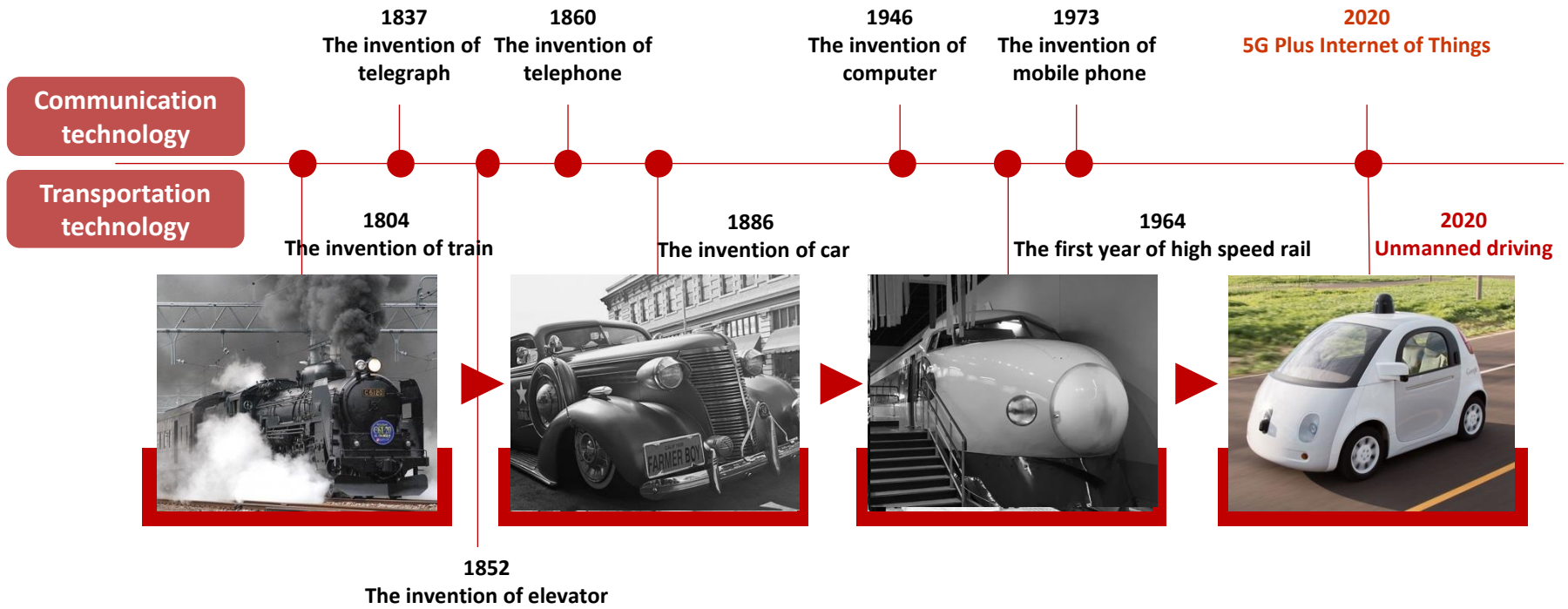
Hierarchical structure	• **Poly-centric and networked urban system:** The eastern, central and western regions have presented polycentric-center and networked development in terms of form and function. The urban agglomerations have formed and strengthened continuously. The level of the central cities is high and there shows functional division between cities. • **The network is related to physical space:** The development of urban system of network space is related to the hierarchy of physical space. • **The tendency that urban clusters and metropolitan areas are the main spatial organization models is obvious:** In the future, the central cities will be regarded as the core of aggregations to promote the development of the neighboring cities and towns. Between large, medium and small cities and towns, there will be division of labor and cooperation based on function as well as coordination in a balanced manner. Cities that are not included will be faced with unpromising prospect.
Size	• **Population and resources are concentrated in urban agglomerations and metropolitan areas:** The central cities are continuously concentrated while are dispersed to the surrounding cities. The node cities and micro centers develop cooperatively. • **The new polarized centers have emerged and the hierarchical differences have increased:** On the one hand, developed megacities (clusters) have been increasingly powerful and enriched. In addition to the continuous development of municipalities, the era of strong provincial capitals is about to come. On the other hand, the rest of the cities seek for "characteristic" development or some of them have shown shrinkage. The gap between cities may be faced with an increasing tendency. • **The long-term disequilibrium is evolving to equilibrium:** Under the combined effect of technology diffusion laws and historical inertia, the disequilibrium between regions and within urban agglomerations may become more obvious in the short term in the future, and there will be transition from disequilibrium to equilibrium in the long term.
Connection	• **The urban connectivity is more intense:** The concepts of intra-city and inter-city are blurred. The physical and virtual connectivity between cities is more efficient. Functional connectivity has surpassed the geographic proximity and become the important driving force of urban development. • **The flow of elements is more frequent:** The cross-city commuting cost has been reduced. The inter-city collaborative working has been popularized. The separation of employment and residence has spread to the regional scale and it may become a norm.

3 The Development Prospects of WeSpace / Region Scale

Transportation and communication technologies have changed the operation between and within cities

- **The transformation of transportation technology and information and communication technology: In the future, the popularity of technologies such as unmanned driving, and 5G mobile Internet results in the further iteration of the transportation technology represented by private cars and the communication technology represented by smartphones, and redefines people's lifestyles and urban spatial structure.**

  The transportation technology (including vertical transportation technology) represented by automobiles and the communication technology represented by smartphones have played an important technical foundation role in the development of modern urban space and have changed the basic physical orientations of time and space in human life. The technological development since the industrial society has promoted the formation and development of modernism urban planning, brought about changes in the ways of living and production, and gradually formed the zoning of the four functions of residence, work, entertainment and transportation in the modern urban planning.



The two technologies that have the greatest impact on urban space are transportation technology and information technology. This is because these two technologies are the main technologies related to the spatial and temporal relationship, and time and space are the two fundamental physical dimensions of human life.

With the rise of network society, "flow space" is becoming more and more important compared with the traditional "place space".

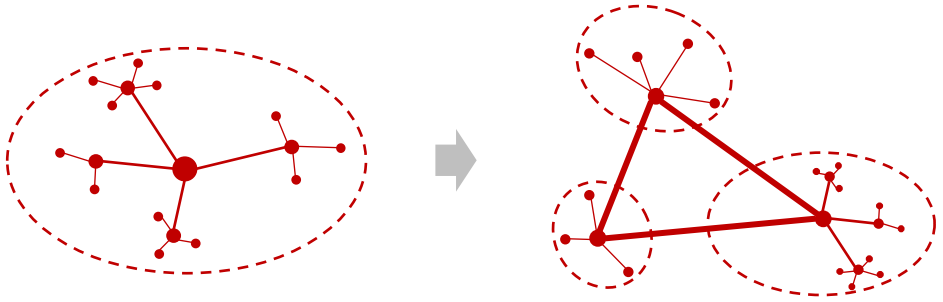
——Manuel Castells

Source: Castells M. The informational city: Information technology, economic restructuring, and the urban-regional process[M]. Oxford: Blackwell, 1989.Castells M. The rise of the network society[M]. John wiley & sons, 2011.Liu Quan. Singularity Approaching and the Challenge of Smart City to Modernism Planning. [J]. *Urban Planning Forum*.2019(05):42-50.Visualhunt. com. Visualhunt. com.Visualhunt. com(Steven Vance).Visualhunt. com(Marc van der Chijs)

3 The Development Prospects of WeSpace / Region Scale

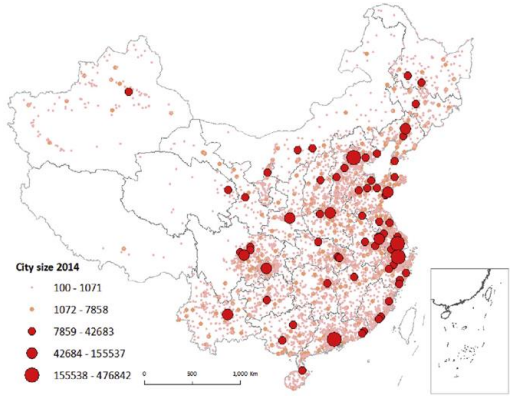
Hierarchical structure

- **Poly-centric and networked urban system: The eastern, central and western regions have presented polycentric-center and networked development in terms of form and function. The urban agglomerations have formed and strengthened continuously. The level of the central cities is high and there shows functional division between cities.**
  Firstly, urban agglomerations have been formed and strengthened continuously, and different cities within the urban agglomeration have different divisions of labor and functions. Secondly, high-level cities such as Beijing and Shanghai are in an absolute dominant position in the urban network and radiation and siphon effects are generated.
- **The network is related to physical space: The development of urban system of network space is related to the hierarchy of physical space.**
  The hierarchical nature of both network and physical space is significant. Different from the United States and other countries, the city hierarchy in the cyberspace of China follows the physical city hierarchy to some extent, and the difference between them is not significant.



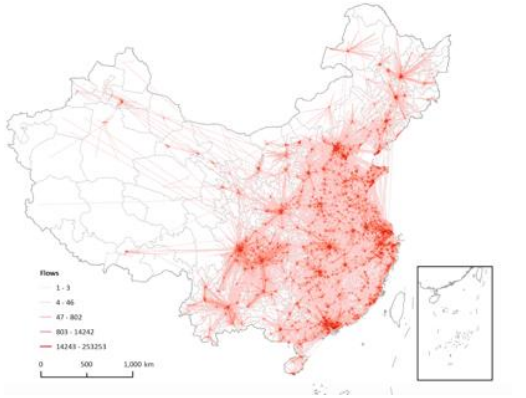
- Monocentric city
- Network city

Polycentric hierarchical system

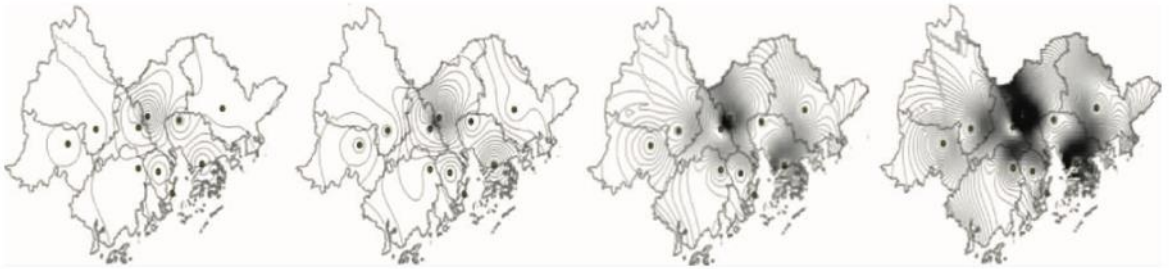


- Based on the study of urban spatial changes in 2009-2014, it has been found that the urban system presents different levels of development, and some prefecture-level cities in the urban agglomeration are constantly forming as new centers.

Networked development structure



- Based on the study of the data of Didi Chuxing in 2016, there is frequent inter-city commuting in Chinese cities, presenting a networked structure dominated by urban agglomerations.



- Monocenter- polycenter- network: The regional spatial structure of the Pearl River Delta metropolitan area is changing from "point" agglomeration to "planar area" agglomeration. Its networked aggregation is mainly based on planar area aggregation, that is, the polycentric networked development.

Source: Ma S, Long Y. Functional urban area delineations of cities on the Chinese mainland using massive Didi ride-hailing records[J]. Cities,2020,97:102532. doi:10.1016/j.cities.2019.102532. Long Y. Redefining Chinese city system with emerging new data[J]. Applied geography,2016,75:36-48.Batten D F. Network cities: creative urban agglomerations for the 21st century[J]. Urban Studies,1995,32(02): 313-327

3 The Development Prospects of WeSpace / Region Scale

Hierarchical structure

- **The tendency that urban clusters and metropolitan areas are the main spatial organization models is obvious: In the future, the central cities will be used as the core of aggregations to promote the development of the neighboring cities and towns. Between large, medium and small cities and small towns, there will be division of labor and cooperation based on function as well as coordination in a balanced manner. Cities that are not included will be faced with unpromising prospect.**

It has been pointed out at the Nineteenth National Congress of the CPC that we will take urban agglomerations as the main body, and construct the urban pattern showing the coordinated development of large, medium, small cities and small towns. The high-quality urbanization in China will form the overall strategic pattern and full-scale spatial combination chain of the integrated development of "**urban agglomeration-metropolitan area-central city-coordinated development of large, medium and small cities-characteristic towns-rural revitalization**". We will accelerate the formation of a population-industrial agglomeration pattern with urban agglomerations as the main form, and take the metropolitan area as the main mode of spatial organization of regional development...

——"2018 China Metropolitan Area Development Report"

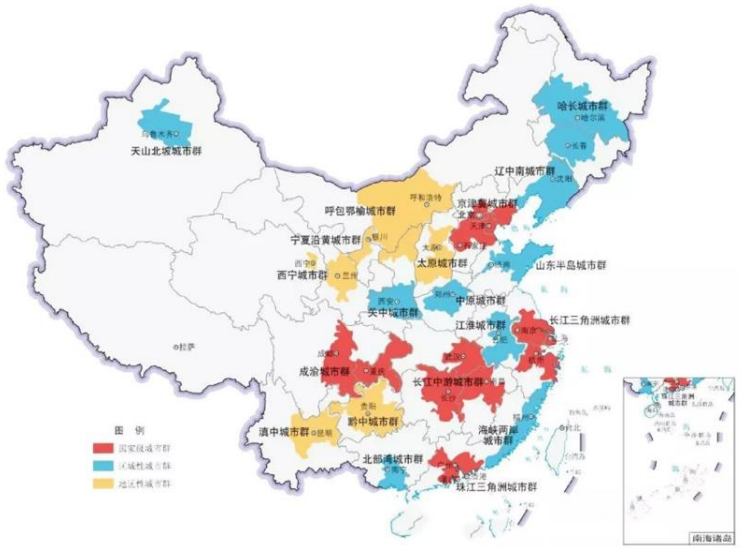
Central cities

Knowledge-intensive and high-end producing service functions such as R & D, marketing, management and finance, etc.

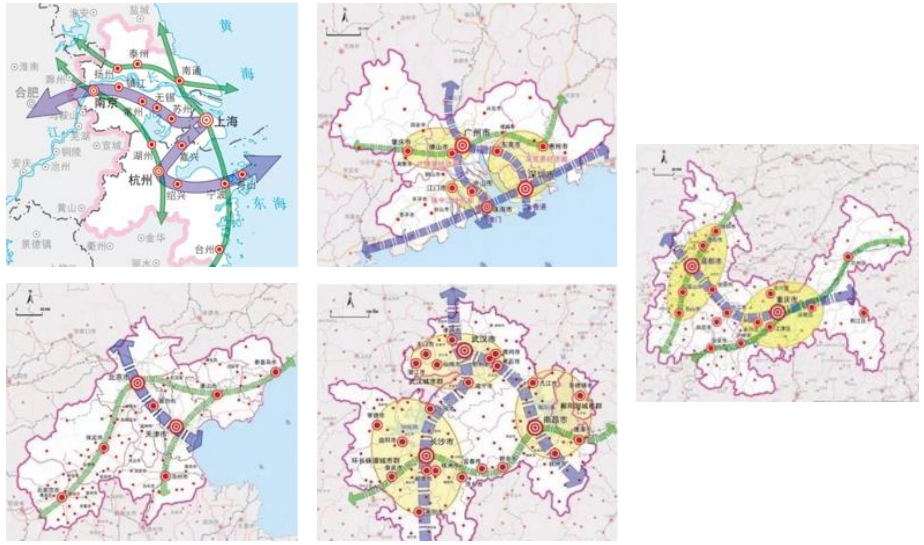
Medium and small sized cities

Professional production functions such as intelligentized and automated manufacturing

- The transformation from industrial specialization to functional specialization has become the basic development trend and global phenomenon of inter-city division of labor. The level of functional specialization has become an important criterion for measuring the development degree of urban agglomerations.



- The new system of "5+9+6" urban agglomeration spatial structure to be constructed in China in the future



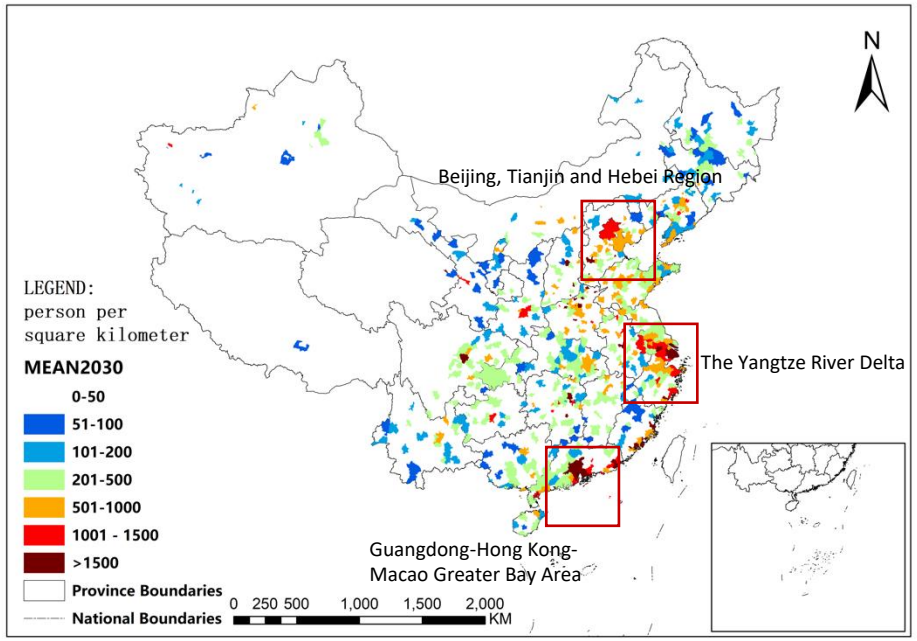
- Key construction of five major nation-level urban agglomerations

Source:Wang Peng. From Urban Data to Smart City Report. Institute for China Sustainable Urbanization, Tsinghua University. China Metropolitan Area Development Report 2018. http://tucsu.tsinghua.edu.cn/upload_files/atta/1551401345990_2C.pdf . The Choice of China's Future Urban Agglomeration. https://mp.weixin.qq.com/s/qF3lmVS6fNO0ezCwh0rePg

3 The Development Prospects of WeSpace / Region Scale

Size

- **Population and resources are concentrated in urban agglomerations and metropolitan areas: The central cities are continuously concentrated while are dispersed to the surrounding cities. The node cities and micro centers develop cooperatively.**
  In the future, under the combined effect of hierarchization and network, regional cities will once again experience the change of "aggregation-dispersion", and the space will develop more compactly and intensively.



- It is estimated that by 2030, China's urbanization rate will continue to increase, and the tendency of population aggregating towards the east, southeast, and core urban agglomerations will continue, and the middle class will grow rapidly.

- Night light of the Yangtze River Delta

- Night light of Beijing, Tianjin and Hebei Region

- Night light of Guangdong-Hong Kong-Macao Greater Bay Area

- The change tendency of night light in Beijing, Tianjin and Hebei Region in the future (preliminary diagram)

Source: Beijing City Lab. "Scenario Analysis Project of China's Population (internal mid-term report)". Beijing, Tianjin and Xiong'an Urban Agglomeration. https://mp.weixin.qq.com/s/HfbNaUleuO7OdJD6akTQ-Q

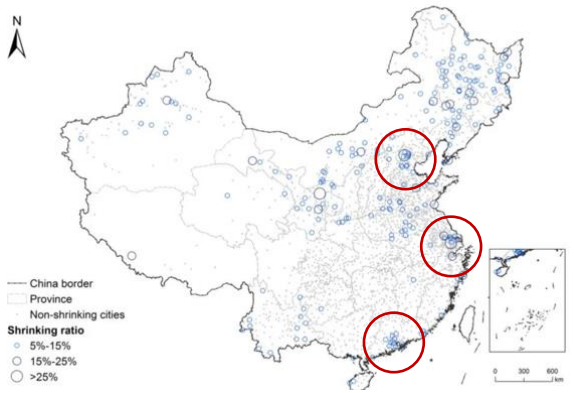
3 The Development Prospects of WeSpace / Region Scale

Size

- **New polarized centers have emerged and there are intensified herarchical differences: On the one hand, developed mega-cities (agglomerations) are becoming more and more powerful and enriched. In addition to the continuous development of municipalities, the era of strong provincial capitals may be coming. On the other hand, other cities seek to "characteristic" development or partly contracted. The gap between cities may be faced with an expanded trend.**

  In recent years, talents and resources have been excessively concentrated in some developed cities while some underdeveloped cities are faced with contraction and decline. Under the combined influence of disruptive technological development and political and economic factors, new polarization centers will be created in the future, and the status of the provincial capitals will increase in the era of "strong provincial capitals", and each city will perform its own duties.

- **The evolution from long-term disequilibrium to equilibrium: Under the combined influence of technology diffusion laws and historical inertia, the disequilibrium between regions and within the urban agglomerations may become more obvious in the short term in the future, and the disequilibrium will transit into equilibrium in the long term.**



- It has been studied that from 2016 to 2018, there were 217 shrinking cities in China, which account for 7.2% of all spatial cities and are mainly distributed in the north part of the Yangtze River.

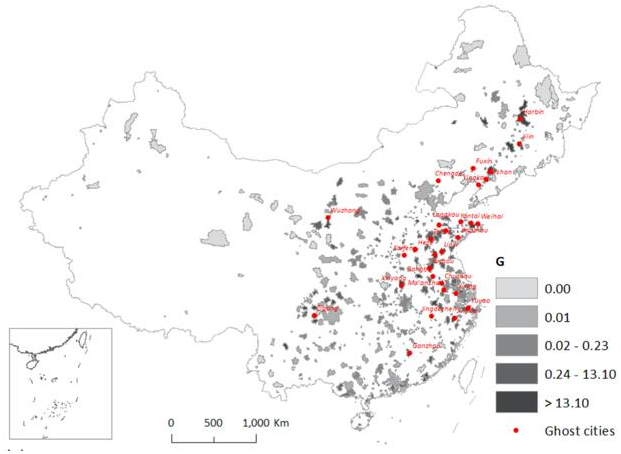
Local shrinking phenomenon in the Yangtze River Delta, the Pearl River Delta, and Beijing, Tianjin and Hebei Region

Xinbei District of Changzhou City
Zhangjiagang Subcity
Taicang Subcity .....

Dongguan Main City
Foshan, Guangdong
Kaiping Subcity ...

Sanhe Subsidiary City
Gaobeidian Subcity
Weixian Main City...

- Based on the continuous research from 2000 to 2010 and from 2016 to 2018, it has been found that the Yangtze River Delta, the Pearl River Delta, and the Beijing-Tianjin-Hebei urban agglomeration are developing quickly and there is also local shrinkage. The current shrinkage rate is mainly between 5% and 15%.



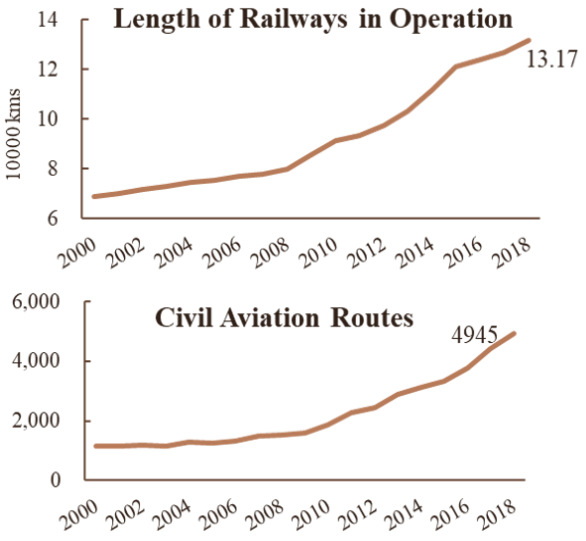
- There were 30 ghost cities identified in China in a 2015 study.

Source: Wu Kang, Long Ying and Yang Yu. "Urban Shrinkage in the Beijing-Tianjin-Hebei Region and Yangtze River Delta: Pattern, Trajectory and Factors. [J] *Modern Urban Research*. 2015(09):26-35.Jin X, Long Y, Sun W, et al. Evaluating cities' vitality and identifying ghost cities in China with emerging geographical data[J]. Cities, 2017,63: 98-109.
Beijing City Lab. https://mp.weixin.qq.com/s/Je0f9d7heSlpGpkXJ4HMTA.IFENG WEEKLY. https://mp.weixin.qq.com/s/KuLsuYqInXuLSFYrCFoZXg

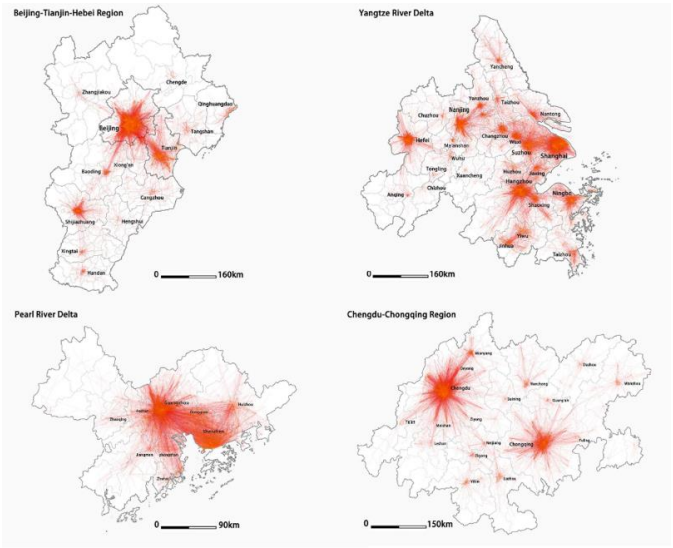
3 The Development Prospects of WeSpace / Region Scale

Connection

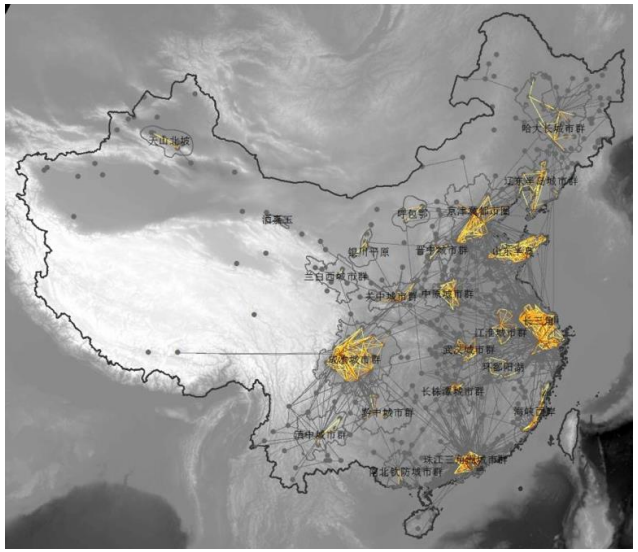
- **The urban connectivity is more intense: The concepts of intra-city and inter-city are blurred. The physical and virtual connectivity between cities is more efficient. Functional connectivity has surpassed the geographic proximity and become the important driving force of urban development.**
  The high-speed rail and rail transit have shortened the actual commuting time cost between cities. Digital facilities have enabled people to communicate across time and space. Sometimes it takes less time to go to cities outside the province faster than cities within the province
  The flow of elements is more frequent: The cross-city commuting cost has been reduced. The inter-city collaborative working has been popularized. The separation of employment and residence has spread to the regional scale and it may become a norm.
  With the excessively high cost of living in central cities and the decline in commuting time and commuting cost between cities, the phenomenon of "cross-city commuting" has appeared in central cities representing by Shanghai, and the blurred boundary of geographic space has also emerged, and "sleeping cities" and "ghost cities" have also increased.



- From 2000 to 2018, the number of transportation infrastructure in China continued to grow.



- It has been found in the study on the car commuting in four major urban agglomerations in China that the inter-city connection within the urban agglomerations of the Yangtze River Delta, the Pearl River Delta, as well as between Beijing and Tianjin.



- The scale of cross-city travel between inner cities in 23 urban agglomerations in China (yellow) and between inner cities and outer cities (gray)in 2014.

Source: Wu K, Tang J, Long Y. Delineating the Regional Economic Geography of China by the Approach of Community Detection[J]. Sustainability,2019,11(21): 6053.Beijing City Lab. Scenario Analysis Project of China's Population (internal mid-term report). Beijing City Lab. "To Perceive the Development of Chinese Urban Space with the Data of Didi Chuxing." https://www.beijingcitylab.com/projects-1/25-urban-china-using-didi-records/

3 The Development Prospects of WeSpace / City Scale

The overview of city: spatial structure on the city scale, functional organization and land use

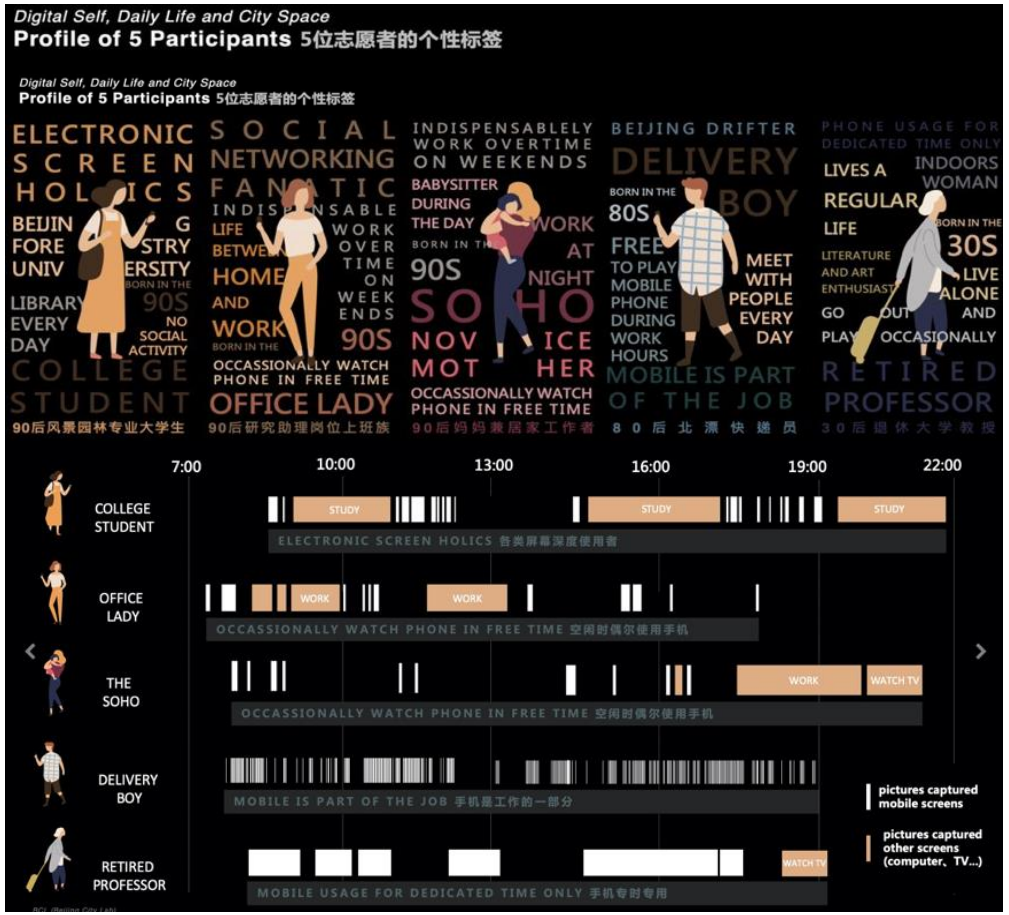
City Scale	Spatial structure	Hierarchical structure	• **Polycentric networked development:** The spatial organization within cities may be the community formal structure, and forms more dispersed networked and polycentric small clustering form. The central areas and marginal areas of cities show different functions.
		Size	• **Agglomeration and diffusion:** In the future, urban agglomeration will be the form of clusters with small centers. The urban agglomerations may be liberated from traditional location and transportation pattern, and they will be more flatly, evenly and flexibly arranged, and even scattered to the suburbs. • **Polarized and flat:** On the one hand, with the rapid development of technologies and the transformation of urban economy, there will be new growth centers such as innovative industrial clusters represented by digital economy, artificial intelligence, and biotechnology. On the other hand, the spatial organization will be more flexible and tends to be distributed , flat and scattered within the city. • **Even and uneven development:** Due to the differences in the popularity of technologies in different regions of the city, the digital divide will be further deepened. In the short term, cities may show certain uneven development, and then change to even development.
		Connection	• **Connectivity:** The urban transportation network has been increasingly improved, and the spatial and temporal distance has been reduced, and the range and radius of people's activities have been expanded. The various functional areas of cities are mutually connected through perfect public rail transit system and flexible point-to-point unmanned driving method. At the same time, visual enhancement and cloud service have made virtual connections more intensified.
	Functional organization and land use	Functional transformation	• **Functional transfer:** The function of urban space has undergone major changes. In particular, with the breakthrough of transportation technology, transportation space has been transformed into green space, public open space, and public service facilities, etc. • **New function:** The changes in technological development and human needs have enriched the functions of the space and have resulted in the update and changes of the spatial functions. The space tends to be shared, compound, service, online and offline integration, operationalized.
		Functional restructuring	• **Functional centralization and decentralization:** The central impact of transportation centers, schools, shopping centers will be reduced in the future. The spatial distribution of residence and employment will be more flexible and flat. The problem of Home-Work Separation and traffic congestion will be alleviated to a certain extent. • **Functional mixture and fragmentation:** Cities have transformed from clear functional zoning to mixed reconstruction. They tend to take the living space as the center, and spaces for employment, working, and recreation are mixed, coordinated and organized. And there will be more fragmented spaces generated.
		Development mode	• **Mixed development:** From "large-scale land use" to "refined land use". At the same time, the proportion of urban land use has changed. For example, public spaces such as green space, and street, etc. have increased while the area of traffic space has decreased.

3 *The Development Prospects of WeSpace / City Scale*

Reform begins with each individual in cities

- **Reshaping the concept of time and space: The individuals have been digitized, and the behaviors have transferred from offline to online, and the characteristics of online and instant are presented. The individual time use has been fragmented, and daily activities are becoming more increasingly abundant and have got rid of simple linear relationship with specific places.**
  People's daily activities are no longer constrained by traditional space-time distance, and the way of flexibly arranging activity time has been used to exchange for the flexibility and high timeliness in the activity space.
- **Reconstruction of spatial experience: Science and technology have brought convenience to life and have also affected people's perception of the surrounding environment at the same time, which has brought about people's reflections on personal health issues.**
  Electronic products have brought huge convenience to life. At the same time, there are an increasing number of online groups such as "phubber" and "homebodies" in cities, and they have gradually lost face-to-face communication with people.

In the report of Aier released in 2018, it shows that Chinese people use screen for 6 hours per day on average and use mobile phones 108 times on average. A study cooperatively conducted by Beijing Lab and TikTok shows that an video of offline marking on TikTok platform has received an average of more than 8,000 times of views, likes, comments and forwards.



- Through the experiments of wearable devices, the length of time and the degree of fragmentation of people facing the screen have been studied from the individual level and people's face-to-face social activities and the use of indoor and outdoor space has been explored.

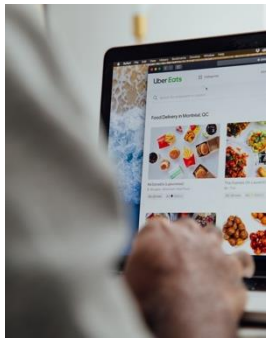
Source: Beijing City Lab. Digital Self. https://www.beijingcitylab.com/projects-1/42-digital-self/. Digital Twin of Beijing : https://www.beijingcitylab.com/projects-1/45-digital-twin-of-beijing/

3 *The Development Prospects of WeSpace / City Scale*

■ Residence: Individual reform

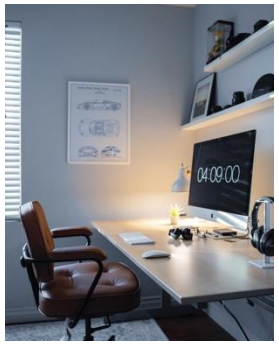
- **Online home service: People can enjoy the "online" and "instant" door-to-door services at home and a variety of needs such as shopping, working, learning, medical care can be fulfilled at home.**
  Commercial services such as e-commerce, online retail, takeaway catering, fresh O2O, online car-hailing, and shared bicycles have developed continuously, and the prospects for online public services such as self-service books, telemedicine, online carers, online education, and elderly care services in the future are promising.
  Changes in the meaning of living: The concept of living has transformed from simple habitation to personalized lifestyle, and the pursuit of the connection between family and community has been focused on.

Shopping at home



- Freshippo
- Missfresh
- Dingdong Maicai
- Meituan Maicai
- ELEME

Working at home



- Tencent Meeting
- WeChat Work
- Tencent File
- Tencent Sharing
- TGit

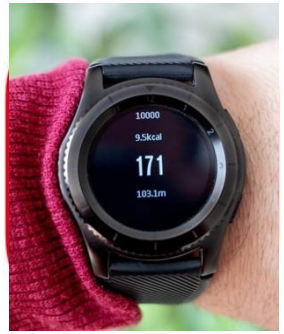
Education at home

- Tencent Class
- Tencent Sharing
- Tencent Classroom in the Air
- Tencent Eglish
- Tencent Penguin Supervision

Recreation at home

- Tencent Video
- Tencent WeSee
- TikTok
- Kuaishou
- Bilibili

Medical care at home



- Dingdang Kuaiyao
- Tencent Health
- WeDoctor
- Haodaifu Zaixian
- Tencent Medpedia

Service at home

- 58 Daojia
- Haoshifu Lianmeng
- Tuan Jiazheng
- Aihuishou
- Helijia

Source: Unsplash.com(Charles Deluvio).Unsplash.com(Michael Soledad).Unsplash.com(Annie Spratt). Unsplash.com(Kon Karampelas).Unsplash.com(Artur Łuczka). Unsplash.com(The Honest Company)

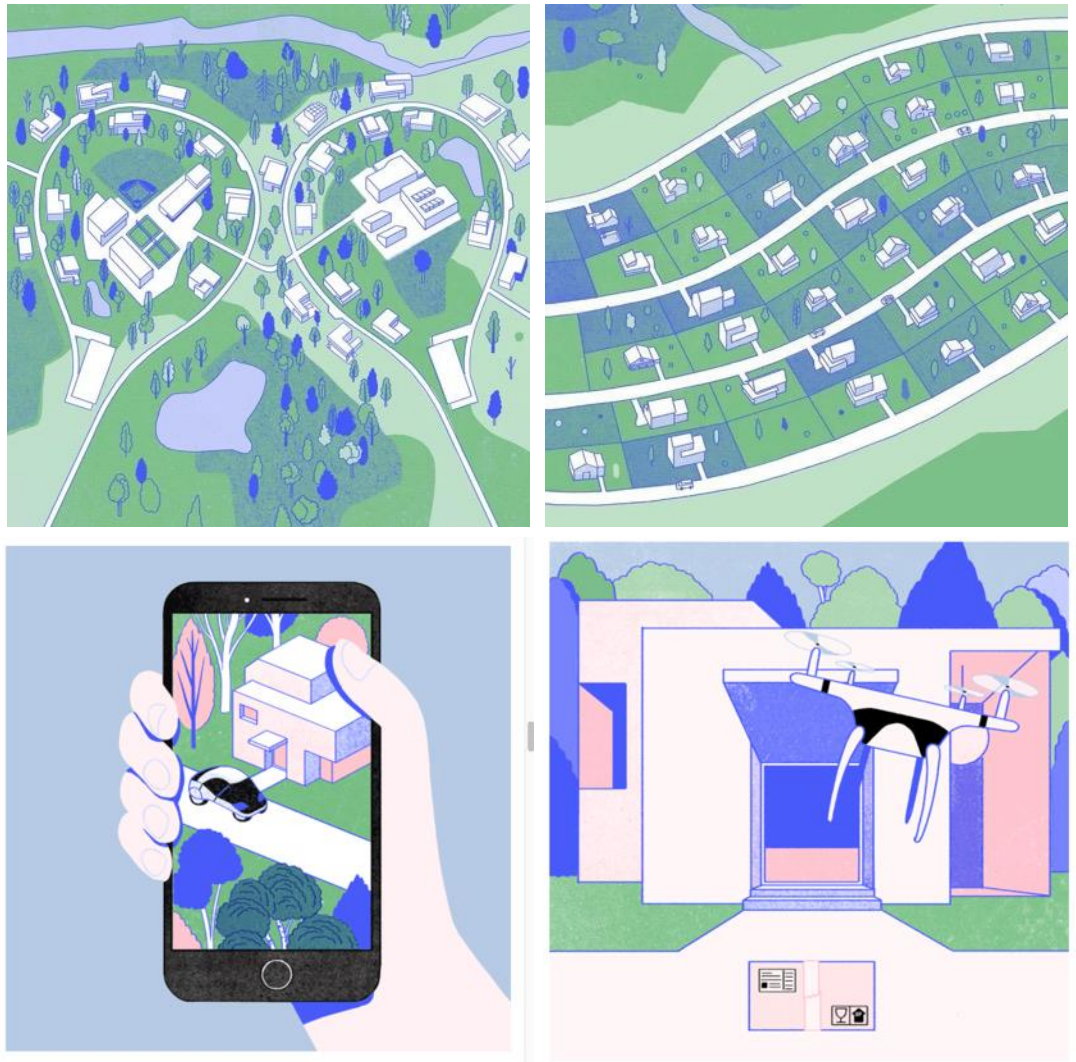
3 The Development Prospects of WeSpace / City Scale

■ Residence: Location change and structure

- **Flat distribution: Smarter and more efficient suburban residence. The combined development of technological development and spatial functions are used to achieve the relative balance of work-residence commuting.**
  In the future, with the further development of transportation technology, remote communication, vision enhancement, unmanned vehicles, and new logistics, transportation technology will be more convenient, and blurred boundary between work and life and the mixed and diversified space functions may result in more diffusion of living space to the outer suburbs

- **The reduction of location impact: With the development of transportation, logistics, and communication technologies, the impact of location and geographic distance on living space may be reduced.**
  In the future, with the development of driverless technology, distance education, and online life services, the impact of location and geographic distance on house prices may be greatly reduced.

- **Residential segregation: The differentiation in the living quality in different areas of cities may aggravate the problem of residential segregation between different groups in the future.**
  Due to the differences in digitization, convenience of transportation and economic level, different people have different spatial barriers to housing and occupation, and different groups may be faced with more polarized spatial alienation issues.



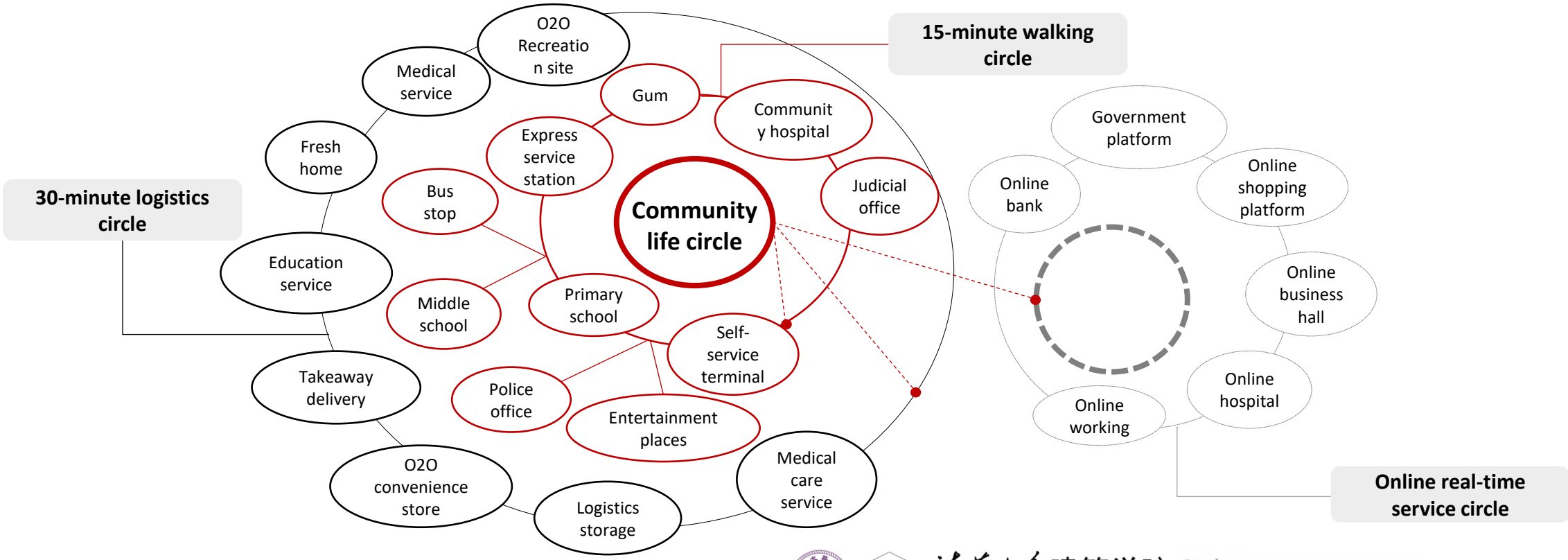
- Credit Jun Cen

Source: Yu Xiaoping. Synergetic Development of Urban Rail Transit System and Polycentric Metropolitan. [D].Beijing Jiaotong University. 2016(partly quoted).All mountains in a single glance– Sustainable city and transportation. https://mp.weixin.qq.com/s/GhKzUgBU4quWpS3yYUEh-g

3 The Development Prospects of WeSpace / City Scale

■ Residence: Location change and structure

- **Living place as the center with online and offline integration: Human activities have transcended the spatial scale constraints to a greater extent under the support of information technology. The resources center on people's needs and organization and the community life circle has been redefined, forming a community life circle that integrates offline walking distance and online service for convenient home delivery.**
  Online space continues to penetrate into offline space, and the way of community service supply has undergone a subversive change. The community life circle is no longer limited to physical spatial organization and facility configuration, but has transformed to the mode of online and offline integration.



Source: Niu Qiang, and Yi Shuai et al. New Concept and Approaches to the Reconfiguration of Service Facilities of Online and Offline Community Life Circle: A Case Study of Wuhan. [J] Urban Planning Forum. 2019(06):81-86.(partly referred)

3 *The Development Prospects of WeSpace / City Scale*

■ Residence: Functional transformation and reconstruction

- **The mixture of spatial functions: The living space has transformed from single functional space to mixed functional space, from the state of people seeking for service to the state of service seeking for person, presenting a personalized and independent development.**
  As for Meituan, JD.com, Huolala, and MOOC, etc., they have transformed from the state of people seeking for service to home delivery service. People can fulfill a variety of needs at home such as living, working, shopping, education, medical care, finance, and recreation, etc. In the future, the compatibility of living space will be further expanded.

- The concept of digital open platform based on function. Data and services are flexibly combined to serve applications and scenarios.

Source: Shi Fang. https://mp.weixin.qq.com/s/M6UWGD8EjOYPyaBte5VpxA.Planning China. https://mp.weixin.qq.com/s/rdxI3HqTFI-kljxMi_wWCQ

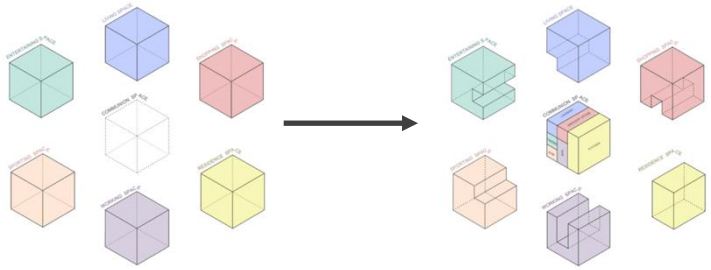
3 *The Development Prospects of WeSpace / City Scale*

■ Residence: Functional transformation and reconstruction

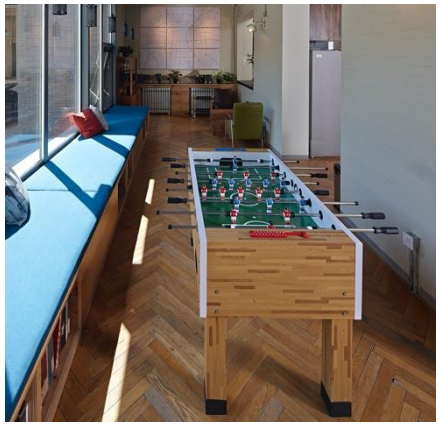
- **Multi-functional community: More space for working, entertainment and shopping, etc. will be integrated into communities. And the communities can continuously adapt to the demand changes through modular facilities.**
  The living space has new functions for work, leisure and entertainment such as shared studio, jointly shared office, room escape, and live action role playing.

- **Shared living community: In the future, Co-housing may become a universal model, and individual housing will become a shared product of "housing + service + lifestyle".**
  The shared thinking has been extensively spread on the Internet and has gradually become the consensus of the whole society. Shared accommodation and shared living rooms such as WeLive and Airbnb are constantly evolving.

- **The necessity of relying on spatial digitization for new digital asset management increases.**



- The transformation from single function to mixed functions in communities



- Yanjing Lane: small community with the functions of living, working, culture and entertainment.

- Beijing Xingpai Shared Building: One-stop co-living community integrating working, apartment, commerce and other industrial forms.

Source: SureDesign. https://www.zcool.com.cn/work/ZMjIzNzM5MDA=/1.html.
Landscape China. http://www.landscape.cn/architecture/10580.html

3 *The Development Prospects of WeSpace / City Scale*

■ Residence: Functional transformation and reconstruction

- **Spatial fragmentation: The living space shows fragmentation development and more small living spaces meeting the instant needs have appeared.**
  In the workplaces and hotels, a large number of assembled, modular, and self-service small-scale living spaces such as capsule apartments have appeared to meet the housing needs of high-density cities.

- Prefabricated container residence

- Capsule Hotel

3 The Development Prospects of WeSpace / City Scale

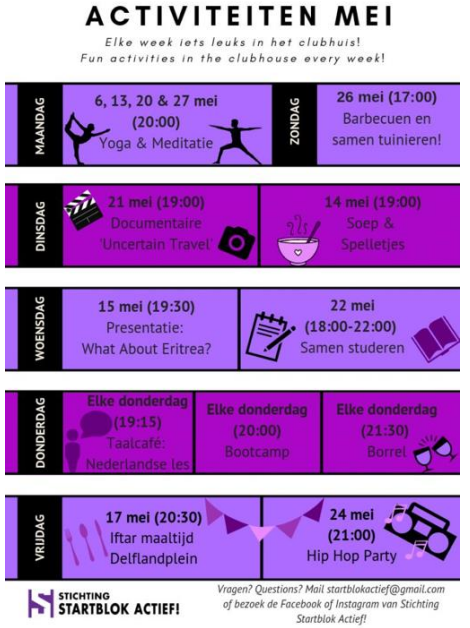
■ Residence: Operation and management

- **Community self-management: Communities carries out self-management and self-organization based on space and platform. Everyone participates in the management and operation of communities, and traditional developers have become operators.**
  Under the influence of Internet thinking, traditional real estate have turned to operators and takes "human needs", "lifestyle", and "value creation" as the development goal rather than focusing on single space. For example, interest-based cultural and tourism community "real estate + Internet + lifestyle" of Aranya, urban supporting service providers of Vanke, "space as a service" of Longfor and the "lightly capitalized, compound, and multi-format" real estate plus model of China Fortune Land Development.
- **People are able to choose neighbors to live in and create free and personalized communities, while they may also accelerate the differentiation of living space and intensify social isolation.**

Aranya Community: Seaside community

It relies on perfect vacation supporting facilities to provide a communication-sharing platform and create a space-based community. There are nearly one hundred communities in Aranya, of which eight large owner groups are mainly used to discuss community affairs. There are also some other interest groups of drama, running, equestrian, family history, reading, music, photography, dance, poetry, kite and surfing, etc.

Startblok Riekerhaven Young People and Refugees Autonomous Community (Holland)



Starblok Riekerhaven Project is an innovative residential and social experiment in Europe. Some young people under the age of 28 and refugees live together in the community. The community encourages self-management, and organizes residents together through movie nights, football games and other community activities. The residents learn the culture of each other and maintain living space together.

Source: Ayana: https://www.sohu.com/a/314555741_235398.Wang Peng. "From City Data to Smart Cities."
Startblok Riekerhaven. https://startblokriekerhaven.nl/en/about-the-project/self-management/

3 The Development Prospects of WeSpace / City Scale

■ Residence: Functional transformation and reconstruction

- **Intelligent operation and management: The operation and management of the living space in the future will turn to be intelligent, and intelligent home facilities may become universal home assistants.**
  It has been widely used to assist the operation and management of communities with big data, cloud computing, and artificial intelligence. Property service robots, environmental cleaning robots, intelligent security access control management, home environment regulation, home energy control, smart furniture, and AI life assistants in the community have emerged and have become the norm.

Intelligent operation and management

- Tencent Haina Smart Community Platform

Intelligent home facilities

Hall, living room	Balcony	Kitchen	Bedroom
			
Smart door lock. Door and window magnetism. Smart terminal. Smart panel ...	Smart gateway. Smart speaker. Background music. Smart appliances.....	Weather sensor. Smart camera. Door and window magnetism. Audible alarm ...	Gas, water immersion, smoke alarm ...	Smart panel. Night light. Smart appliances. Electric curtain. Emergency button ...

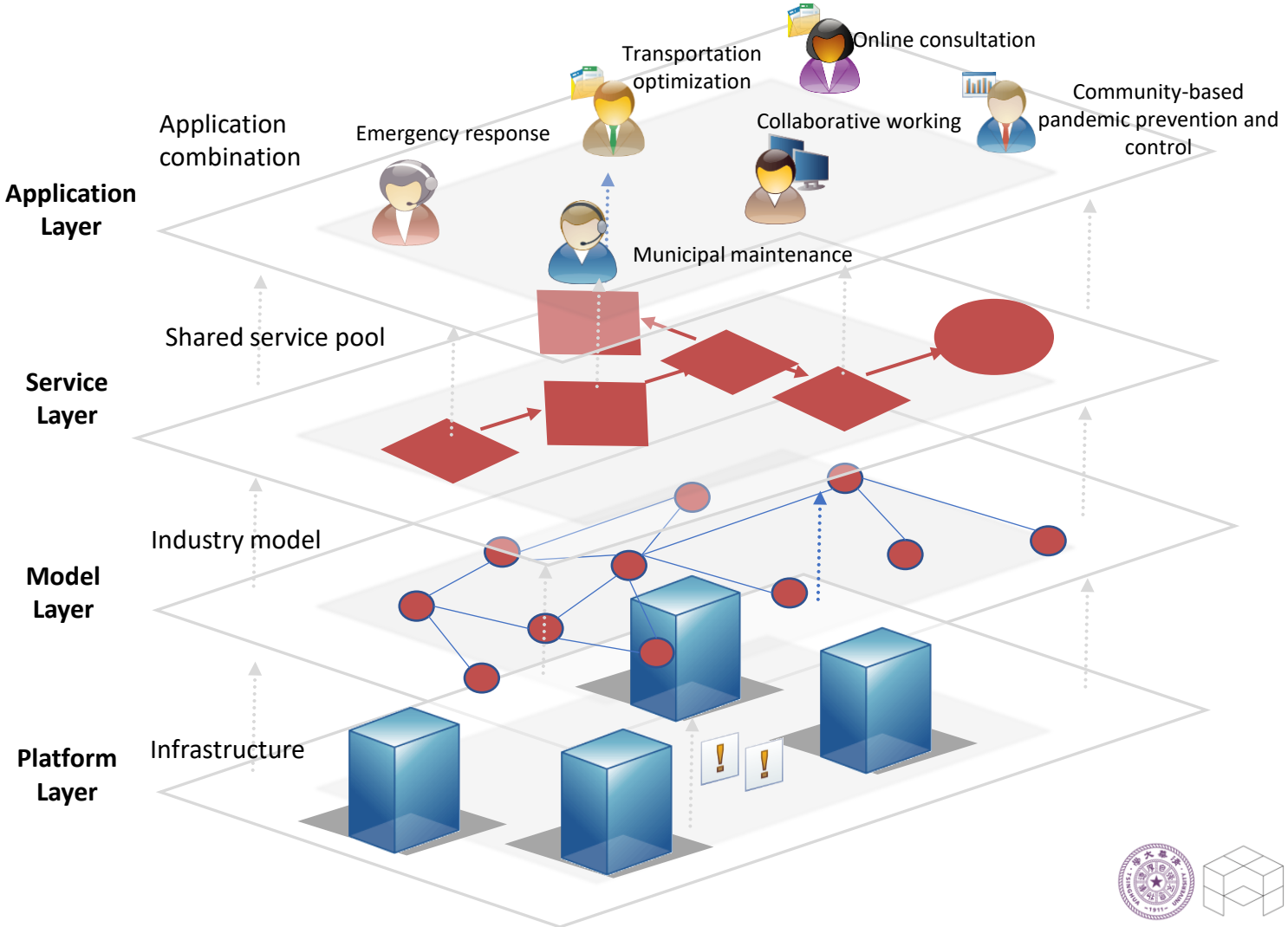
- Haier smart home system

Source: Tencent. WeCity Report. Haier U-home. https://mp.weixin.qq.com/s/fbkL4iKDMCC08Ak4WuOAkw

3 The Development Prospects of WeSpace / City Scale

■ Residence: Functional transformation and reconstruction

- **Intelligent operation and management:** customized need-based micro service infrastructure and model drive. Taking Tencent WeLing as an example.



- **Application layer:** The government-enterprise linkage can be realized through the combination of shared services to provide shared interfaces for governments, enterprises and individuals. The managers, operators, builders, and large, medium, and small enterprises of cities can arbitrarily combine data according to their business characteristics to serve more citizens.

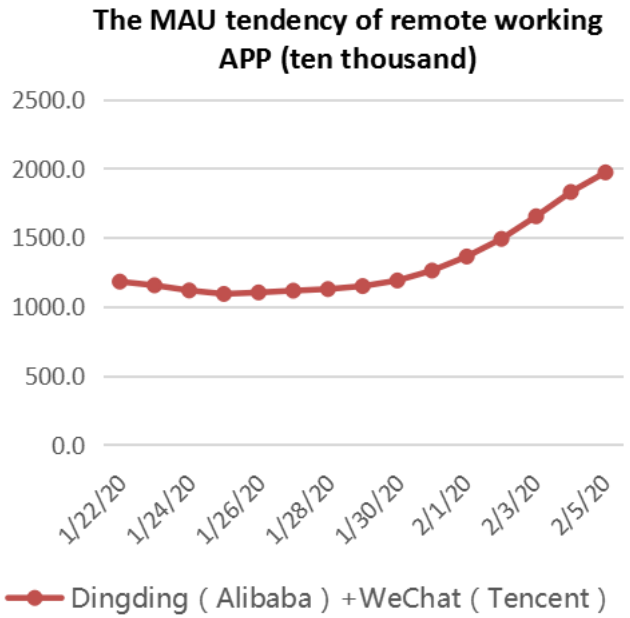
- **Model layer:** Based on the summarization and extraction, expert knowledge precipitation, business logic, data algorithms, equipment mechanism models, etc. of the topics in different fields, model foundations that can analyze, understand, and support all the data flows are formed.

- **Platform layer:** It can provide basic resources such as cloud computing, IoT access, space service, big data analysis, and AI computing power, etc.

3 The Development Prospects of WeSpace / City Scale

Employment: Individual reform

- **Online and mobile working: Various working modes such as traditional working, shared working, collaborative/ cooperative working, remote working coexist. And in the future, intelligent working collaborating with artificial intelligence will be more relied on.**
  The centralized working model has been broken through. The production tools with workplace as the main body have changed from "fixed" to "mobile", and have changed from traditional "face-to-face" communication to the mode of simultaneous online remote working and offline fixed working. These new working modes will inevitably lead to the evolution of work space design or the design of alternative work space.



- During the Spring Festival in 2020, remote working has become the main working method. The usage of Dingding and WeChat Work has greatly increased.

Tencent Meeting, WeChat Work

- WeChat Work is available for audio and video conferences and is equipped with functions including audio and video conferences, shared screens, document presentations, and phone call-back access, etc. and it supports the access of mobile terminal and PC terminal.

Dingding

- It is multi-end platform for free communication and collaboration. There are multiple versions and it is available for the file transfer between mobile phones and computers.

ZOOM

- It provides users with free cloud video call service combining the functions of HD video conferencing and mobile Internet conferencing.

Source: Dingding. https://www.dingtalk.com/oasite/register_new.htm?source=1001&lwfrom=20171202020913670000000111#/.Mob Research Institute. Observation on Mobile Internet Data in the pandemic Period. .ZOOM. https://www.zoom.cn Tencent. https://mp.weixin.qq.com/s/qAnYQRO4mfuNOpGAB1LgwA. Tencent Research Institute. https://mp.weixin.qq.com/s/vk1D9efAho397k1XEJKh2A

3 The Development Prospects of WeSpace / City Scale

■ Employment: Individual reform

- **The emergence of new occupations and new classes: New occupations and new classes such as "digital nomads", freelancers, and creative classes are created. The working hours and locations are redefined.**
  More and more people are engaged in full-time or part-time online working, and knowledge workers will become nomads from one place to another, connected only by wireless data and smart devices. New occupation types and creative workers will continue to emerge in the future.

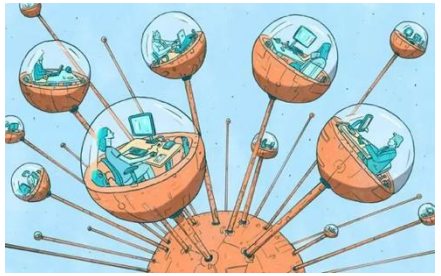
- **The distributed organization form in enterprises: The productivity of employment units has been improved, and the organization form has been increasingly flexible. The "employment" relationship is transformed into a "cooperation" relationship. The enterprises will become a mixture of full-time employees and free workers.**
  The intelligent production organization will facilitate the change of manufacturing from man-machine separation to the integration of industrial robots, labor, information system and services, greatly liberating human resources. At the same time, the development of 3D printing technology will greatly increase labor productivity.

In the process of any historical transformation, **one of the most direct manifestations of systemic changes is the transformation of employment and occupational structure**. The change of occupational structure is the strongest empirical evidence for the advent of new social structure.

——Manuel Castells

From mainly relying on internal full-time staff to solve problems, to seeking outsourcing cooperation and subcontracting to freelance workers, and then to forming a more flexible business cooperation model with online platform, the enterprises will become the mixture of full-time employees and (non-full-time from the platform) freelance workers.

——Boudreau et al., 2016



- Digital facilities such as 5G and VR will create a good platform for "digital nomads". More and more technology companies have decentralized work teams such as Wordpress, Basecamp and Genuitec, as well as GitHub.

- In 2019, Archmixing has entered Mobile Office 2.0 and adopted the mode of simultaneous online mobile office and offline fixed office. Light office tools are used in the office to allow users of space to move.

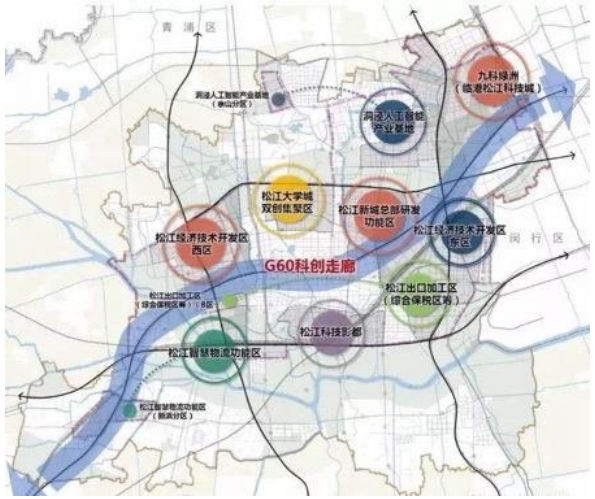
Tencent: Tencent Technology. https://mp.weixin.qq.com/s/6bjdsBFBwba2JmZBWgJ7wg.
gooood. https://mp.weixin.qq.com/s/PMKcPJMM2iRC21mZGDyUwg

3 The Development Prospects of WeSpace / City Scale

■ Employment: Location change and structure

- **Flat space distribution: Office space has been moved from the central areas to the suburbs of cities. The distribution tends to be flat in the city and the office space is more distributed around the place of residence.**
  The development of transportation technology and communication technology has shortened the temporal and spatial distance. The decentralized and flexible enterprise organization form has liberated the shackles that constrained the location of enterprises. The office activities have shown the development of suburbanization, forming a regional employment center. In the future, the distribution of office space in the city may be further flattened, and the location and demand of office buildings will change, and it will be closer to people's living space.
- **Spatial alienation: Innovative technologies are concentrated in the central areas of cities, and office space is alienated in the central areas and marginal areas of cities.**
  Due to the rise of factor prices and living costs, some sectors of production service industries and emerging manufacturing whose transportation costs and the output per unit of land are high are located at the urban core area, enjoying urban external benefits while traditional manufacturing is located at the marginal areas of cities where the land cost is relatively low.

- Wangjing SOHO: one of the CBDs constituting the polycentric spatial structure in Beijing.



- Songjiang G60 Kechuang Corridor: Transformed Suburban Industrial Park

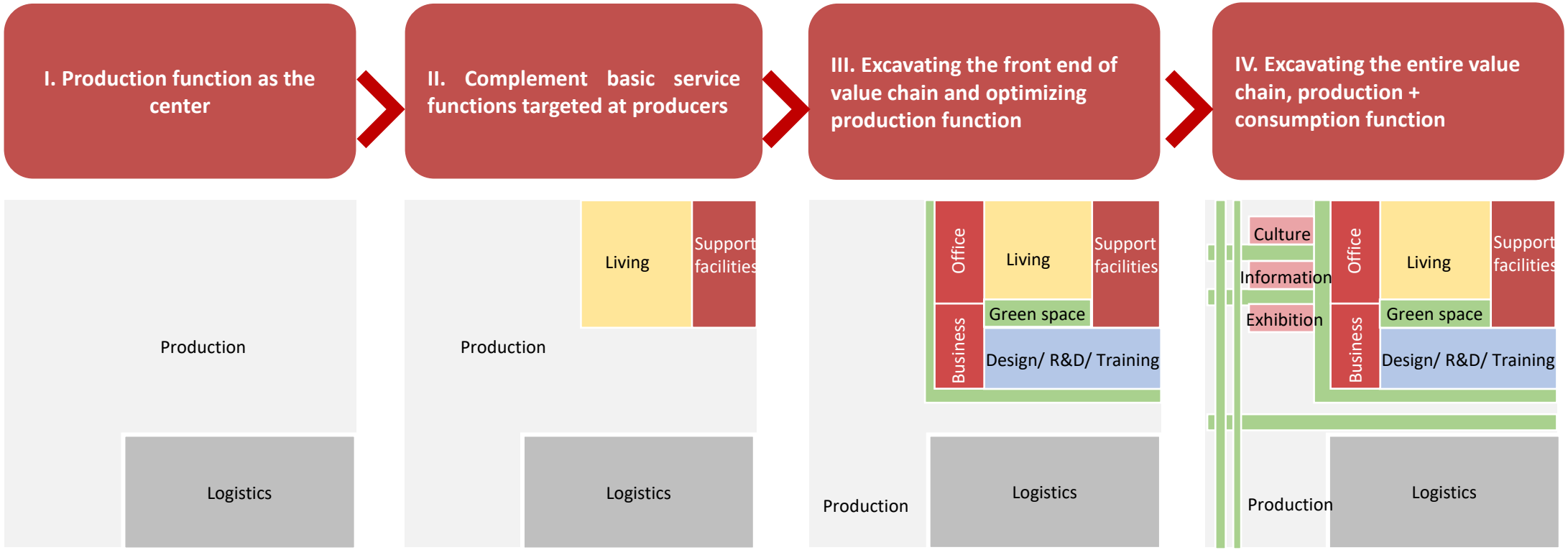
- From fishing village to Shenzhen Dachan Bay Technology Island

Source: Yang Dejin. Development of Metropolitan New Industrial Space and the Corresponding City Space Structure. [D].Tianjin University,2012. www.sh-italent.com. sz.focus.cn. bbs.szhome.com

3 The Development Prospects of WeSpace / City Scale

■ Employment: Location change and structure

- **The agglomeration of new innovation spaces: The innovation elements will reshape and optimize the spatial structure of districts. The innovation industry space tends to agglomerate and is distributed in combination with scientific research institutions and universities.**
  In the process of transformation and upgrading of traditional industries and the development of new industries, the interconnected production organization system has facilitated the agglomeration of new innovation elements in space. In the future, cities will take innovation industries such as digital economy, artificial intelligence, and biotechnology, etc. as the new leading factors, and they will become the core driving force facilitating economic growth.



- The Evolution of Innovation Industry Space
- Production + Logistics——+ Dormitory + Support Facilities ——+Living + Business + Green Space + Office + Design / Research and Development / Training——+ Leisure + Culture + Information + Exhibition

Source: A Study on the Future-oriented Innovative Space. https://mp.weixin.qq.com/s/XZz4rnMs0M1Tacp4BT-bzw .
Urbanization Study. https://mp.weixin.qq.com/s/PegacA9zYLza4t6E3qvlqQ

3 *The Development Prospects of WeSpace / City Scale*

■ Employment: Functional transformation and reconstruction

- **Shared office space: There may be more shared office space. On the one hand, the shared work space will become the standard of communities. On the other hand, the traditional office space will be faced with decline and it will partly convert into shared/short-term rental or even other functions.**

  WeWork, crowd-making space and shared studios have sprung up to save cost and inspire creativity for workers. In the future, remote working and virtual working may become a norm. The working mode will have fundamental changes and it may generally change to the compound working mode of face-to-face plus remote working. It will greatly facilitate the development of shared office space.


HubHub shared office: A 21st century digital community where various types of telephone rooms, video conference rooms, meeting rooms and lecture rooms are carefully laid out in this space of more than 2000 square meters and are provided to users in a shared manner.

Source: gooood design website. https://mp.weixin.qq.com/s/PMKcPJMM2iRC21mZGDyUwg

3 *The Development Prospects of WeSpace / City Scale*

■ Employment: Functional transformation and reconstruction

- **New space forms: Third-space such as coffee shops and libraries, and home offices have become very common and have created new office spaces for in-car office and outdoor space office.**

  The boundaries between time and space and the boundaries between work and living are blurred. Office activities are expanded to other spaces. The living space and the third space have become office spaces, and more and more professionals are working in coffee shops, libraries, SOHO and other places. In the future, the technological development will give birth to new office spaces such as in-car office and outdoor space office. The work efficiency will be improved, and the new ways of living and working will bring new space requirements.

Third space working

- Starbucks is the typical representative of the third space.

In-car working and outdoor working

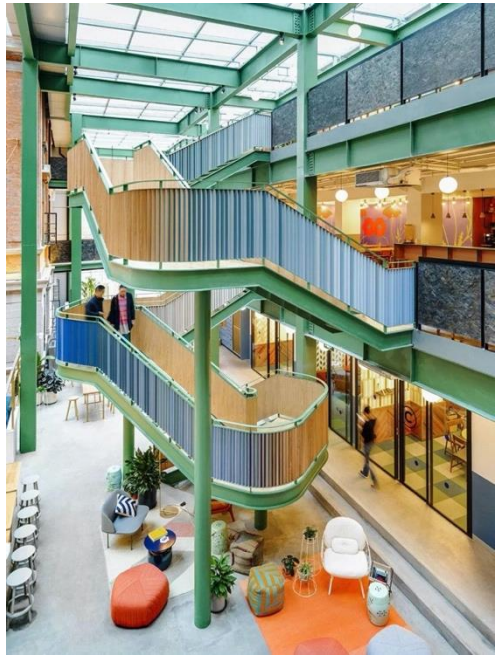
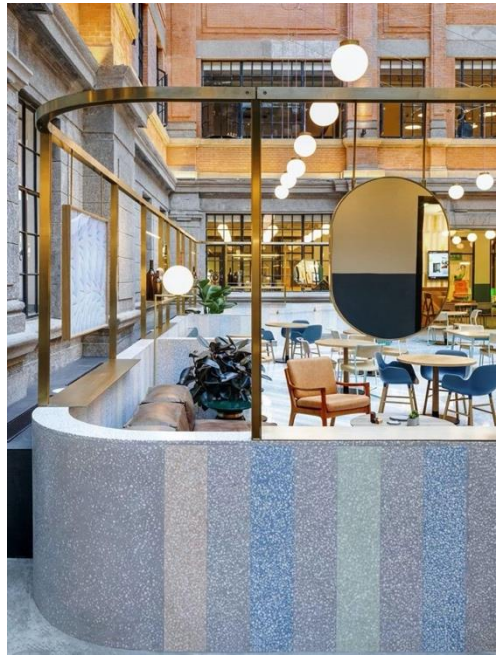
- Various types of third space offices such as in-car office have emerged.

Source: Unsplash.com(Aral Tasher). Linggan Daily: http://www.ideamsg.com/2015/09/dojowheels/

3 The Development Prospects of WeSpace / City Scale

■ Employment: Functional transformation and reconstruction

- **The mixed spatial functions: Office space has developed from a single dimension to multiple dimensions. And there have been more spatial units developed with the mixed functions of employment and life / service / recreation, presenting diverse and flexible combinations.**
  Employment parks are constantly emerging, and they are equipped with multi-functional facilities and spaces such as supermarkets, leisure cinemas, and fitness equipment, etc. to meet the work needs of people in the "996" era, and are "unit courtyards" in the new digital era. In the future, more innovative space units with the mixed functions of life / employment / service / recreation will emerge, presenting diverse spatial combinations and generating more flexible office spaces. In the future, the work spaces of digital twin can be used independently and can be freely combined and shared.

- WeWork Co-working office space on Weihai Road, Shanghai. Various types of work support areas for games, sports and food, etc. are increased, creating social, professional, and creative spaces.

Source: gooood design website. https://mp.weixin.qq.com/s/PMKcPJMM2iRC21mZGDyUwg

3 The Development Prospects of WeSpace / City Scale

■ Employment: Functional transformation and reconstruction

- **Space fragmentation: The further fragmented office space can make up the shortcomings of traditional single-function/scale land development model.**
  In the public space, Telecube, Station Booths and other assembled, modular, and self-service shared small office rental spaces have emerged. The traditional office space has been equipped with remote office phone booths and soundproof booths and has been an independent venue for people's diversifies work at any time and any place.
- **The commercialization and specialization of the third space: The forms designed for office workers such as office coffee shops, study rooms, libraries, shared office spaces, etc. are more abundant.**

- A shared small office cabin charged by minute. People can quickly find an office space on a business trip/journey and carry out temporary work quietly and comfortably.

- The soundproof booths in the office can meet the needs of remote working and conference discussion, etc.

- SMART LOUNGE is divided into different forms of working areas

Source:yankodesign.com.loopphonebooths.com.hunterscontracts.co.uk.mooredesign.fr.https://mp.weixin.qq.com/s/7w37DCil0e0JprpnIfa3zg

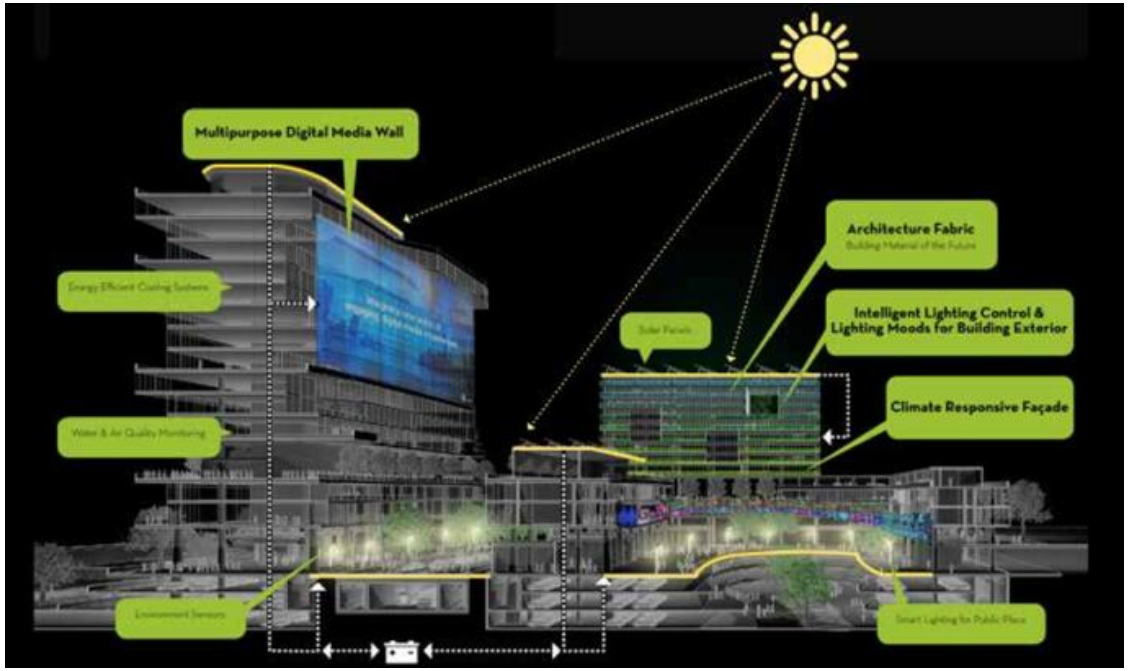
3 The Development Prospects of WeSpace / City Scale

■ Employment: Operation and management

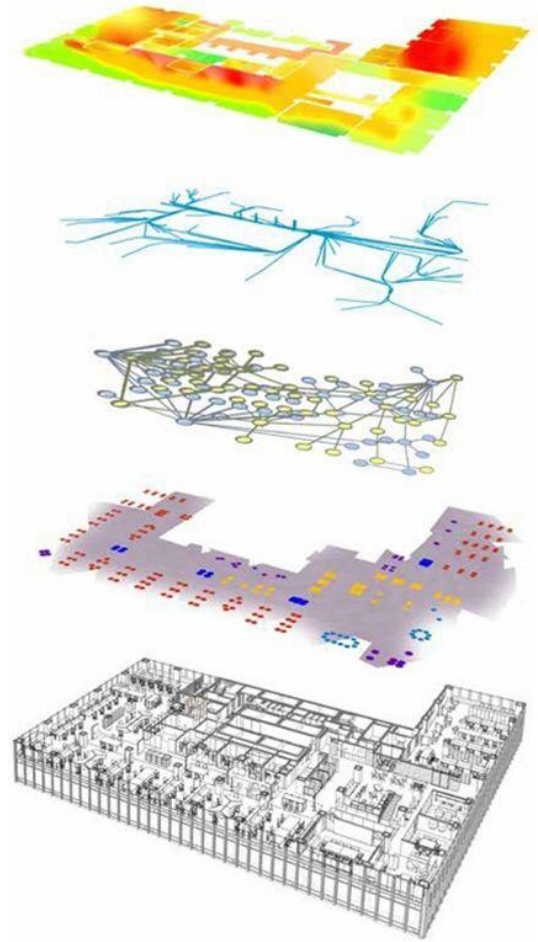
- **Intelligent operation and management: Office facilities are intelligent and interactive. And users participate in the operation and management.**
  In the future, offices will become the main place to realize the Internet of Things. More VR/MR virtual and human-machine interactive work applications will be more configured in places for work, education and entertainment, etc. The service of SAAS will be improved. In the future, the office space may be rented directly by users and exempted from the intermediary, and even users participate in the operation of the office space. The office space is also a social place.

- Interactive Working Platform/ Gensler

- Interactive façade experience / Gensler



- Cisco Guangzhou Smart city office building / Gensler



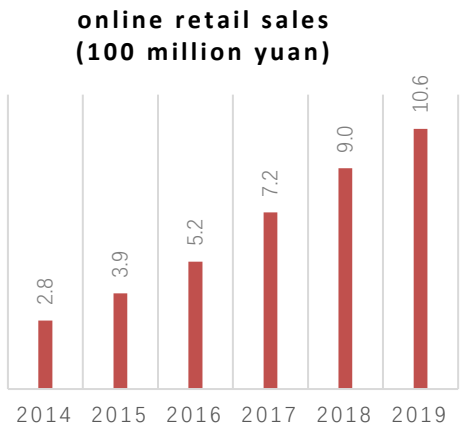
- The New York Office of Gensler is envisioned as a living laboratory. It uses the IoT sensors specified by the New York office to learn how to provide information for evidence-based design. The network with more than 1500 sensors follows the daylight level, occupancy, temperature and energy consumption relative to space conditions.

Source: Gensler. "Shaping the Future of Cities."

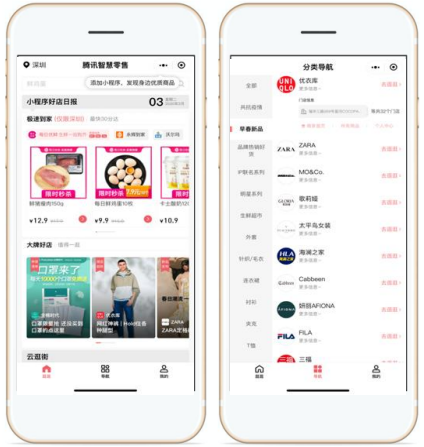
3 The Development Prospects of WeSpace / City Scale

Recreation-shopping: Individual reform

- **Online and virtual shopping: Online shopping has penetrated people's clothing, food, housing and transportation. And it has transformed from online shopping to online-offline combined shopping. In the future, the way of shopping will be upgraded, and self-service shopping and virtual shopping will be popularized. People will enjoy the five-sense experience in physical stores at home.**
  People can switch between offline physical stores and digital channels more frequently and skillfully to get more product information, and compare products and prices so as to finally make purchase decisions and share information. In the future, with the development of unmanned sales technology, artificial intelligence, AR/VR/MR, and the Internet of Things, virtual shopping will be popularized, and people can simulate shopping in physical stores at home.
- **Algorithm-recommended shopping choices: People's shopping choices will be more influenced by the algorithm recommendation and online evaluation, and are faced with social synchronization and lack of personality.**
- **Live streaming: It is the new-type service with the live stream technology for the lose-range product display, consultation reply, and shopping guides to attract thousands of online consumers. And its influence is far more than offline promotional activities.**



- The online retail sales in China has maintained the trend of rapid growth and has increased to 10.6424 trillion yuan in 2019, an increase of 2.8 times compared to 2014 (Data source: National Bureau of Statistics).



- Small programs and APPs such as Tencent Smart Retail, Meituan Takeaway, JD.com provide diverse and rich online shopping services.

By 2020, there will be 100 million people using augmented reality (AR) for shopping in physical stores and shopping online so that people can visualize products in different environments. At that time, there will be 46% of retailers planning to use AR or VR to fulfill the needs of customer service experience.

—— "2018 Survey Report of Unified Retail Method" of Gartner, an authoritative IT consulting company

VR can be used by retailers to improve work efficiency and reduce the cost of product design. And it can also be used to restore goods and simulate shopping. For example, the VR shopping experience Buy + promoted by Alibaba, VR in-store experience promoted by Tesco, VR video for outdoor clothing promotion of Adidas, and the store's personalized VR application launched by eBay and Maier department store in Australia...

- AR/VR/MR assisted shopping will continue to enrich shopping methods.

Source: Tencent Research Institute. Kearney. "Building a Complete Picture of Smart Retail--- 2018 Smart Retail White Paper." .Pixabay.com(FunkyFocus)

3 The Development Prospects of WeSpace / City Scale

Recreation-shopping: Location change and structure

- **Spatial location choice change: The tendency that the commercial space constantly changes from commercial streets to inward complexes will be reduced and the street-front business model will revive.**
  The commercial formats have shown the tendency of branding and chaining, which will converge the space to a certain extent. In the future, unmanned driving technology will change the urban street space environment. AR/MR technology combines and interacts with small chain stores along the street, re-stimulating people's desire to explore urban street space and promote the reproduction of the commercial street model.
- **The impact of network location: Algorithms and evaluations have changed the location and demand of commercial spaces. It has turned from "Golden horn, silver edge and grass belly" to "Good wine needs no bush".**
  With the sinking of technology and the popularization of management knowledge, people's shopping choices are more affected by algorithm recommendations and online evaluations. At the same time, stores can accept free location consultation and the technology is more equal. For example, small shops can rely on Meituan for site selection.

Traditional site selection of stores

Research company → Methodology design → On-site observation → Data sampling → Site selection report

Big data site selection

	Data modeling	Brand / Store	Tencent	Partner	Result output
step1	Select the business circle	The sales data of the existing stores	The number of population and population profile of the district	Macro data of the district business formats of the district	Region scoring
step2	Select the location	Rent, facade and property service, etc.	The number of population and population profile of the region	Commercial conditions of the region	The scoring of the store, predicted number of consumers, Predicted sales amount

- Providing decision-making for new store site selection through machine learning and modeling

- AR (Augmented Reality) facilitates people's explorations of business streets

Source: Tencent Research Institute. Kearney. "Building a Complete Picture of Smart Retail--- 2018 Smart Retail White Paper." .Keiichi Matsuda. Hyper-Reality. https://mp.weixin.qq.com/s/qHfsY3mwtGqkE-PrtFz4Vw

3 The Development Prospects of WeSpace / City Scale

■ Recreation-shopping: Functional transformation and reconstruction

- **OMO (Online-Merge-Offline): Provides convenient living services based on location, and is equipped with personalized logistics, delivery and warehouses centering on communities.**

  Takeaway services have been fully popularized, and delivery boys have become a new group in the city, redefining the space location of traditional commercial stores. Takeaway delivery, waiting, commuting and other related space optimization are less considered, and there have emerged some new problems such as urban transportation and space occupation, etc. The new retail concepts including "Three-Kilometer Ideal Life Circle" of Tmall and "Retail as a Service" of JD.com have emerged and they will reshape the three elements of "people, goods, and places" driven by the digital facilities such as artificial intelligence, big data, AR, and the Internet of Things in the future.

Fresh food service for Supermarket + Takeaway		Fresh food service for prewarehouse of communities
Takeaway APP Self-built platform VR virtual shopping	online	Takeaway APP Self-built platform VR virtual shopping
Physical supermarket experience Multiple functions such as catering Logistics and warehouse Community logistics cabinet	offline	The main warehouse. Front storehouse of community/community service station. Community logistics cabinet
Logistics vehicle Delivery man UAV and robotics	logistics	Logistics vehicle Delivery man UAV and robotics

Source: Tencent Research Institute. Kearney. "Building a Complete Picture of Smart Retail--- 2018 Smart Retail White Paper." .BusinessAnalysis. https://mp.weixin.qq.com/s/sxZ6gUOAc4FeLYHfO_zgOgfayifa.com . www.chinaks.net.big5.cri.cn.baike.baidu.com.www.ctoutiao.com.dy.163.com.mini.eastday.com

3 The Development Prospects of WeSpace / City Scale

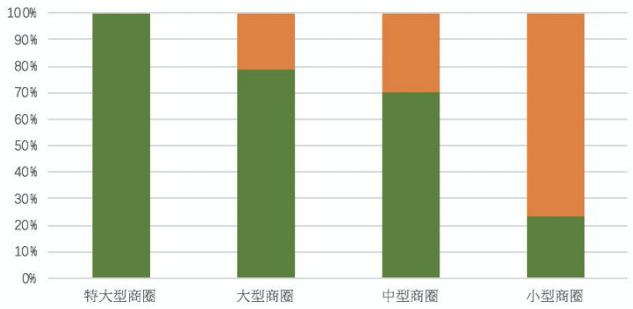
■ Recreation-shopping: Functional transformation and reconstruction

- **Offline business transformation: The transformation of different scales of offline business spaces. Large-scale business spaces prefer "large and comprehensive" overall development, while small-scale business spaces provide convenient living services.**

  As for supermarkets, bookstores and commercial complexes, etc., different scales of them show different tendencies. Large-scale business spaces focus on comprehensiveness, experience, and environment, and the experience function of offline physical stores have been enhanced and turn to focus on scene, entertainment, and socialization. Small business spaces focus on convenience, quality and life.

"Big and comprehensive" is the development tendency of business circles.

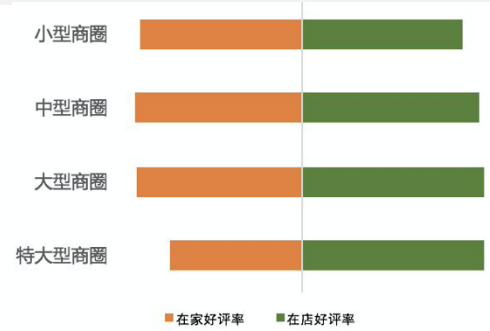
Large-scale commercial circles can provide richer experience.



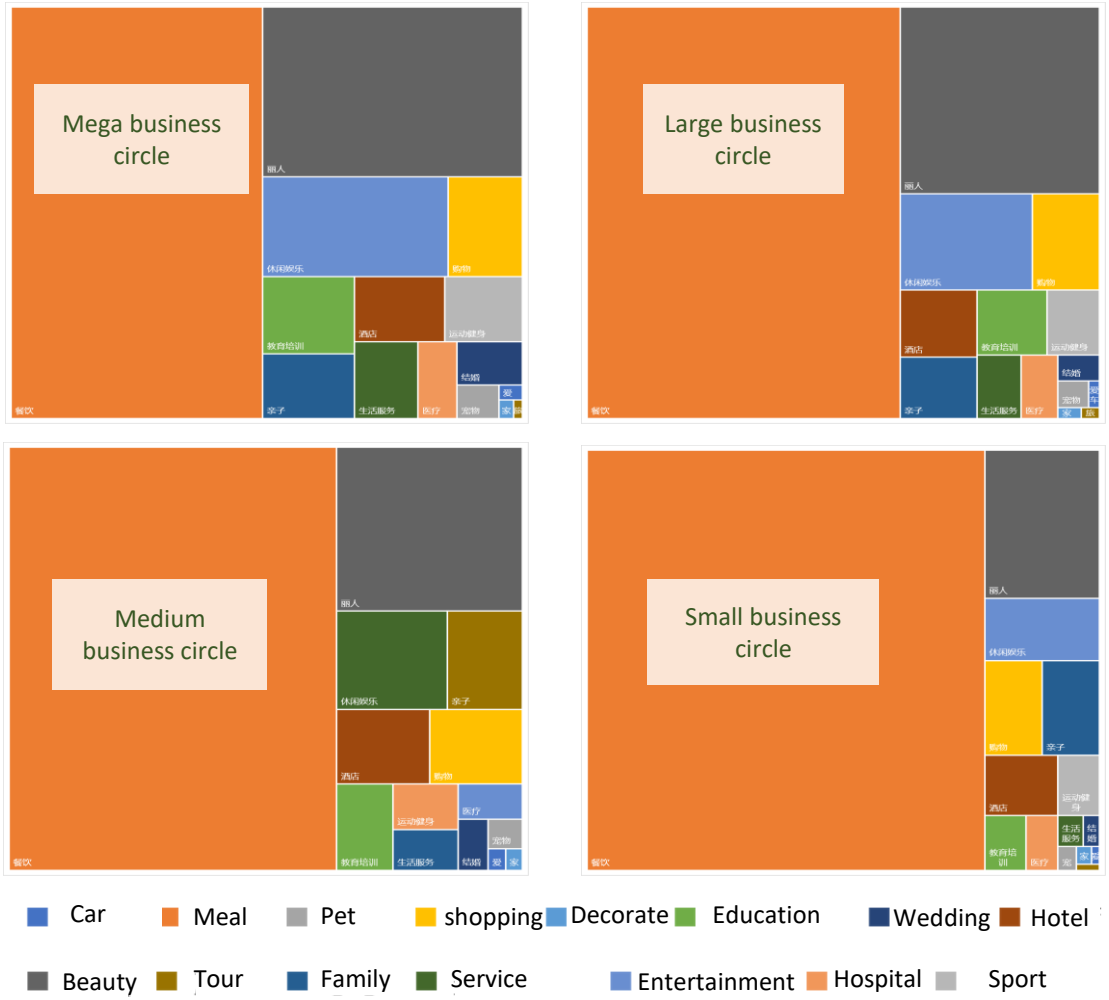
- It has been studied that, in terms of consumers' choices, they tend to go to large business circles for their pursuit of experience while they tend to go to small business circles to fulfill their functions.

Small and medium business circles are more convenient.

Small and medium business circles center on the layout of residential areas and business areas



- Large business circles have a high rate of in-store comments, while small and medium business circles cater to the functional needs of consumers for takeout and delivery.



- Composition of the categories in different sizes of business districts

Source: Beijing City Lab. Urban Business Reconstruction and Governance in the Era of Digital Economy. https://www.beijingcitylab.com/projects-1/47-understanding-commercial-districts-with-meituan/

3 The Development Prospects of WeSpace / City Scale

■ Recreation-shopping: Functional transformation and reconstruction

- **Offline business transformation: The enhancement of virtual shopping in the future may have stronger impact on offline physical stores, prompting the accelerated transformation of business spaces.**
  With the maturity of AR/VR and other virtual reality technologies and the improvement of logistics efficiency, people will enjoy the experience of shopping in physical stores at home in the future. For example, people can try lipsticks with different numbers on the WeChat AR. It will promote the transformation of offline physical stores.

Zone I Technology Fever Museum

simulation animal display, working robot tour, O2O retail robot provide convenient shopping trip.

Zone II Foodie Street

Self-service food conveyor, O2O online-merge-offline premium supermarket

Zone III E-Sports Amusement Park

9D cinema, VR games, passionate e-sports exhibition games, professional game commentary.

Zone IV Hot Blood Playground

VR climbing, basketball bullfighting challenge, hip-hop 1V1 battle challenge.

Zone V Artistic Park

Group exhibitions of famous sculptors, BLUE BOX installation art and various art forms interweave and collide.

- By creating a ubiquitous and virtuality-reality integrated digital omnichannel.
- It relies on an intelligent supply chain system that covers the consumption service ecosystem to fulfill consumers' personalized and scene-oriented shopping needs at any time and any place.

Source: IDEAT. https://mp.weixin.qq.com/s/dAJOwo1ncKCuwfw724t-Og

3 The Development Prospects of WeSpace / City Scale

■ Recreation-shopping: Functional transformation and reconstruction

- **Unmanned offline commerce: The intelligentization of commercial spaces such as unmanned convenience stores and unmanned supermarkets are further popularized.**
  It relies on artificial intelligence and algorithms to provide good service for buyers so as to improve revenue and resource utilization.

- In WeChat unmanned pop-up shop, people can open the store door and purchase items with the scan code of small programs of WeChat, and they can identify the goods through the electronic label and scan the code to pay before leaving the store.

- Unmanned vending machine of Tmall Car. When the test drive has been appointed successfully, users can identify the face information and take the test drive model.

- JD.com unmanned supermarket accelerates the retail layout and tests unmanned supermarkets and intelligent distribution robots.

- In the Amazon Go Grocery, an unmanned supermarket of Amazon, people can take the order of "commodities-recognition actions-recognize the commodities that carry actions-commodities relate to user list/user" before leaving the store without scanning.

3 *The Development Prospects of WeSpace / City Scale*

■ Recreation-shopping: Functional transformation and reconstruction

- **Space fragmentation: Business spaces are inclined to fragmented development. More types of small commercial facilities such as unmanned vending machines will appear.**
  In the past, street indoor vending machines that relied on coin/paper money payment have further developed in the mobile payment era. They are not limited to the consumption form of physical currency, prompting the layout of more types of small commercial facilities and accelerating the fragmentation of space.

- A variety of unmanned vending machines appear in every corner of the city. And the commodities are no longer limited to food and drinks.

- Full self-service coffee shop in the future

Source: alibaba.com.inhabitat.com.architecturaldigest.com

3 The Development Prospects of WeSpace / City Scale

■ Recreation-entertainment: Individual reform

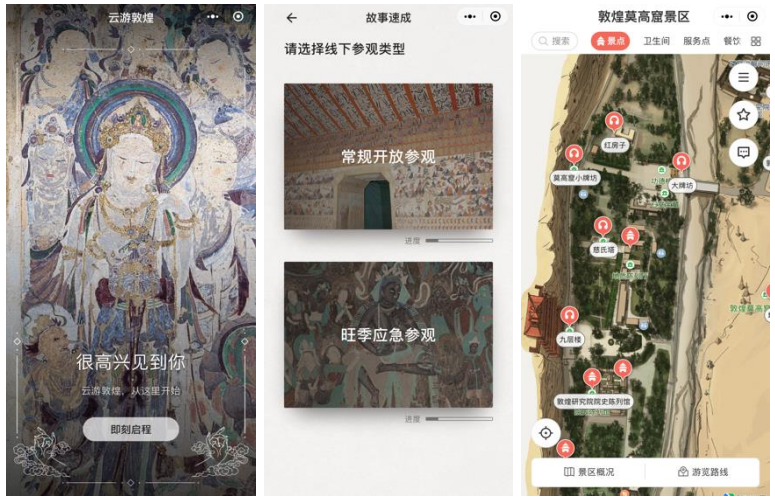
- **Online leisure and entertainment: Online leisure and entertainment methods such as cloud tourism, cloud exhibition, and cloud disco dancing, etc. have enriched individual leisure and entertainment methods. People focus on pursuing travel quality and novel sensory experience.**
  With the emergence of platforms such as Expedia, Ctrip, TikTok, Kuaishou, and video software, etc., people have had more online leisure and entertainment, information search, and online transactions. Short video platforms and video software can be used for online entertainment.
- **Offline perception reconstruction: Yearning for nature and health is the constant core of humanization, but the focus on online has an impact on the individual's perception of offline environment.**
  With the development of technologies, on the one hand, residents choose to escape from the city centers, and their demand for natural spaces such as lakes, greenways, large parks, and rural scenery has begun to increase, on the other hand, people are also addicted to the use of electronic devices even in natural environments and the urban public space has lost its vitality.

In the future, online browsing, consumption, and the experience level of public spaces may exceed offline physical spaces.

The tourism industry lies at the forefront of the evolution of digitization. Advanced technology and data analysis are conducive to the tourism industry in discovering competitive advantages.

---Bain's Survey of Global Marketing Leaders and Backwards

Cloud Tourism, Cloud Exhibition



- With "Yun You Dunhuang" mini-program at WeChat, tickets for Dunhuang Cave online experience + tourist guide is provided. The "Dunhuang Shijin" module guides users to participate in interactive art creation.

Cloud Disco Dancing

- The offline bar OT and "TAXX SHANGHAI" have started the "Online Cloud Disco Dancing" live broadcast through the live stream platform.

Cloud Concert

- Personal concert has been moved from offline venues to indoor and online live stream rooms.

Source: Tencent Mobile Game Official Website. https://mp.weixin.qq.com/s/hF8mEDs6ksQ8bjLhRBE91g .Today Net Celebrity. https://mp.weixin.qq.com/s/0GidHifvgwUy7xgwTs2ADg.Kuaishou. https://mp.weixin.qq.com/s/2pPQPt1aBtG2GhBev_5i-w

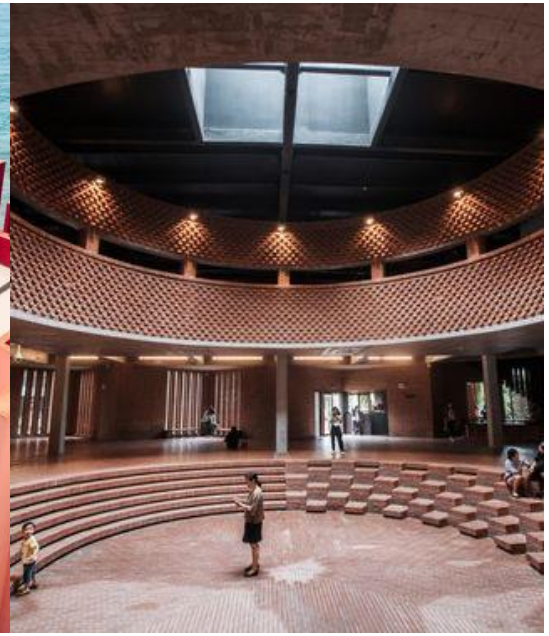
3 The Development Prospects of WeSpace / City Scale

■ Recreation-entertainment: Location change and structure

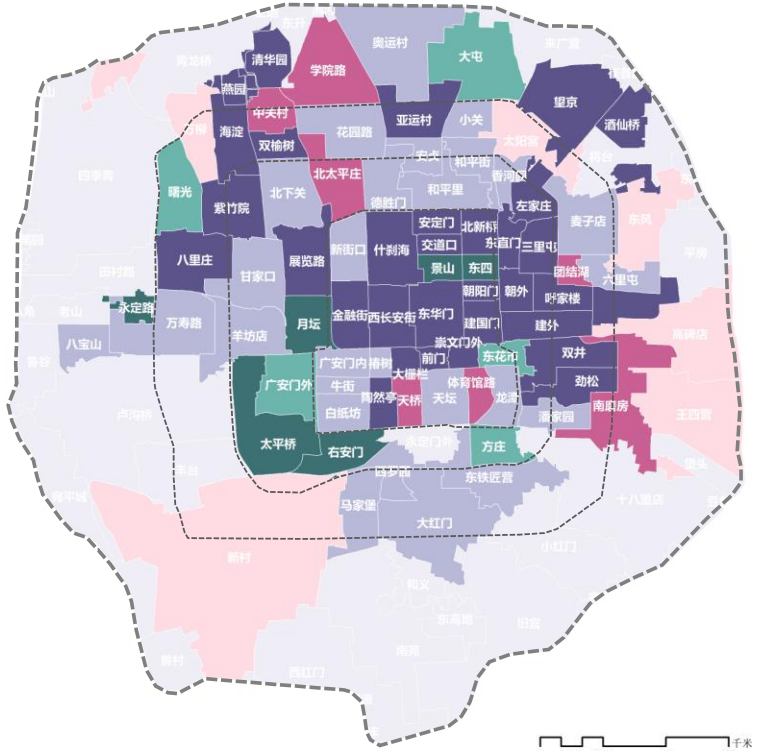
- **The impact of network location: Internet famous space and Internet famous places have emerged. The physical space and virtual space are constantly interacting. The network space location is becoming more and more important, further activating the scene and vitality of new urban public space.**

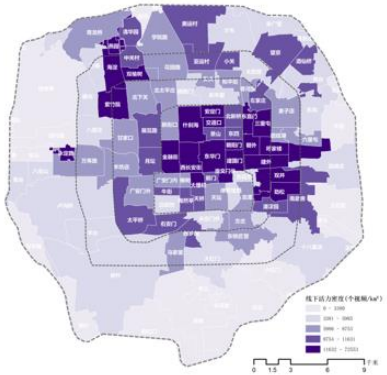
  The phenomenon of Internet famous space and Internet famous places reflects the constant mutual influence between physical space and virtual space.

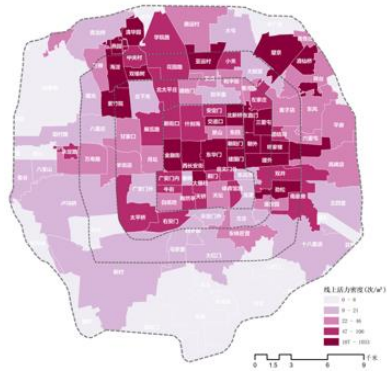
- Internet famous La Muralla Roja



- Internet-famous place: Red Brick Art Museum







- Based on the study on the matching degree of online and offline space development within the Fifth Ring Road of Beijing, it has been found that the features such as functions and landmarks of offline space have a certain impact on online likes and marking behaviors. One marking video of offline space can have an average of more than 8,000 interactions (highlighting the disparity between online and offline).

Source: Beijing City Lab. A Study on the Urban Spatial Vitality in Beijing based on TikTok Data.
https://www.beijingcitylab.com/projects-1/45-digital-twin-of-beijing/.decouvrirensemble.com.archdaily.com

3 The Development Prospects of WeSpace / City Scale

■ Recreation-entertainment: Functional transformation and reconstruction

- **Compound space function: Digital methods such as smart furniture and energy devices can improve the utilization rate of public space and transform offline public space from single function to compound functions.**

Outdoor intelligent facilities

- Energy meter
- In the future, there will be energy meters that allow universal output, USB, wireless charging, and built-in power supply monitoring, parking spaces with charging functions, and ashtrays with temperature sensors.

Outdoor intelligent shared space

- Shared multi-functional meeting room / DreamDeck
- The public space is equipped with shared activity space that can be used for work, conference, party and education. The glass wall with adjustable transparency allows indoor and outdoor to switch at any time to fulfill different usage requirements.

Micro climate regulation

- Smart Sunny Umbrella / Google Sidewalks
- It provides people with a more comfortable outdoor environment, improve the comfort of public spaces, and extend the usable time.

Source: Beijing City Lab. The collation of TOP 100 digitalized transformation cases in architecture firms(Reference materials are attached at the end of the text.).

3 The Development Prospects of WeSpace / City Scale

■ Recreation-entertainment: Functional transformation and reconstruction

- **Space experience: The superposition of digital facilities enables public space to provide people with personalized interactive experience and enhance the attractiveness of public space. In the future, offline space + interactive facilities, "offline space + live stream", "offline space + AR/VR" models will become the development tendencies of public space.**

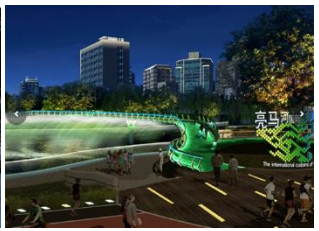
  With the help of online media, websites, and smart devices, it has already been common for the selection of recreational destinations and the planning of travel routes. In the 5G era in the future, short videos may evolve into short VR/AR sharing and it will make VR cloud tourism at home possible with a set of devices. City parks will not longer only a physical entity, but also superimposed online and digital attributes.

Offline space + digitalized interactive facilities

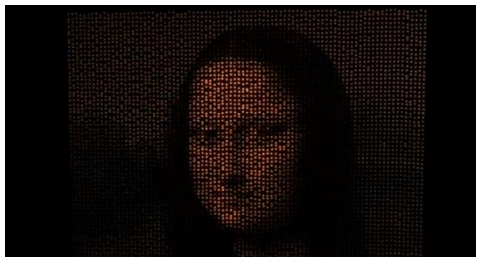
Digital waterside pavilion /Carlo Ratti Associati

Interactive bubbles/UNSENSE

Interactive facilities/ DreamDeck

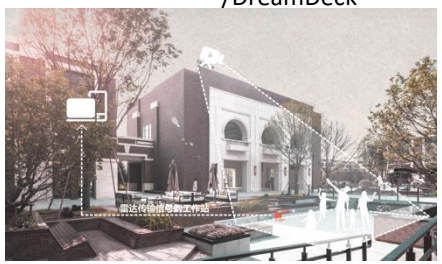


The interaction od light-water interaction /DreamDeck



- Immersive, interactive display facility / MIT SENSEable City Lab

Gravity fountain design / DreamDeck



Interactive projection facilities/ DreamDeck

Offline space +AR/VR/live stream

- Columbia "AR“ Virtuality and Reality integrated public recreation space

- TOP100 designs of public space of architecture firms are integrated more interactive experience facilities.

Source: Beijing City Lab. The collation of TOP 100 digitalized transformation cases in architecture firms(Reference materials are attached at the end of the text.).Shenzhen Augmented Reality Technology Application Association..
https://mp.weixin.qq.com/s/qHfsY3mwtGqkE-PrtFz4Vw

3 The Development Prospects of WeSpace / City Scale

■ Recreation-entertainment: Functional transformation and reconstruction

- **The naturalization of space: Technologies have brought the implementation of the concept of ecological city. The management capabilities have been strengthened with intelligent means so the cities return to sustainability, and people return to nature.**

Environment monitoring

- Energy saving system / DreamDeck
- In Haidian Smart Energy Park, intelligent brain has been used for the management of public spaces. It realizes self-awareness and automatic control in areas such as clean energy, interactive landscape, shared facilities, automation of nutrition, and environmental awareness.

Energy management

- S Park Bicycle Power Generation System/NSENS
- S Park is the first system that allows bicycles to generate electricity in the world. This technology provides a more sustainable dimension for this model selection.

- Footprint Energy/Umbrellium
- Pavegen is a project in London and it has created a patent of floor technology, converting kinetic energy generated by pedestrian footsteps into electricity and data.

Source: Beijing City Lab. The collation of TOP 100 digitalized transformation cases in architecture firms(Reference materials are attached at the end of the text.).

3 *The Development Prospects of WeSpace / City Scale*

■ Recreation-entertainment: Functional transformation and reconstruction

- **Space fragmentation: There are more places for entertainment activities such as watching movies, dramas, and exhibitions. The fragmented development of entertainment space has fulfilled people's instant needs. Parking lots and the two sides of roads have transformed into urban green spaces so that a large number of linear and fragmented public spaces appear.**
  In the future, with the development of unmanned driving technology, some parking lots and road space will be transformed into urban green space and public space, making the number of linear spaces such as green roads and fragmented space increase.

- The public space has increased, providing residents with a green, comfortable and friendly living environment.

- Pocket parks appear in large numbers in the city

Source: Modern Gardening. http://www.sohu.com/a/337189115_806910.https://www.sidewalktoronto.ca. mooool.com. https://www.sohu.com/a/337625732_301606

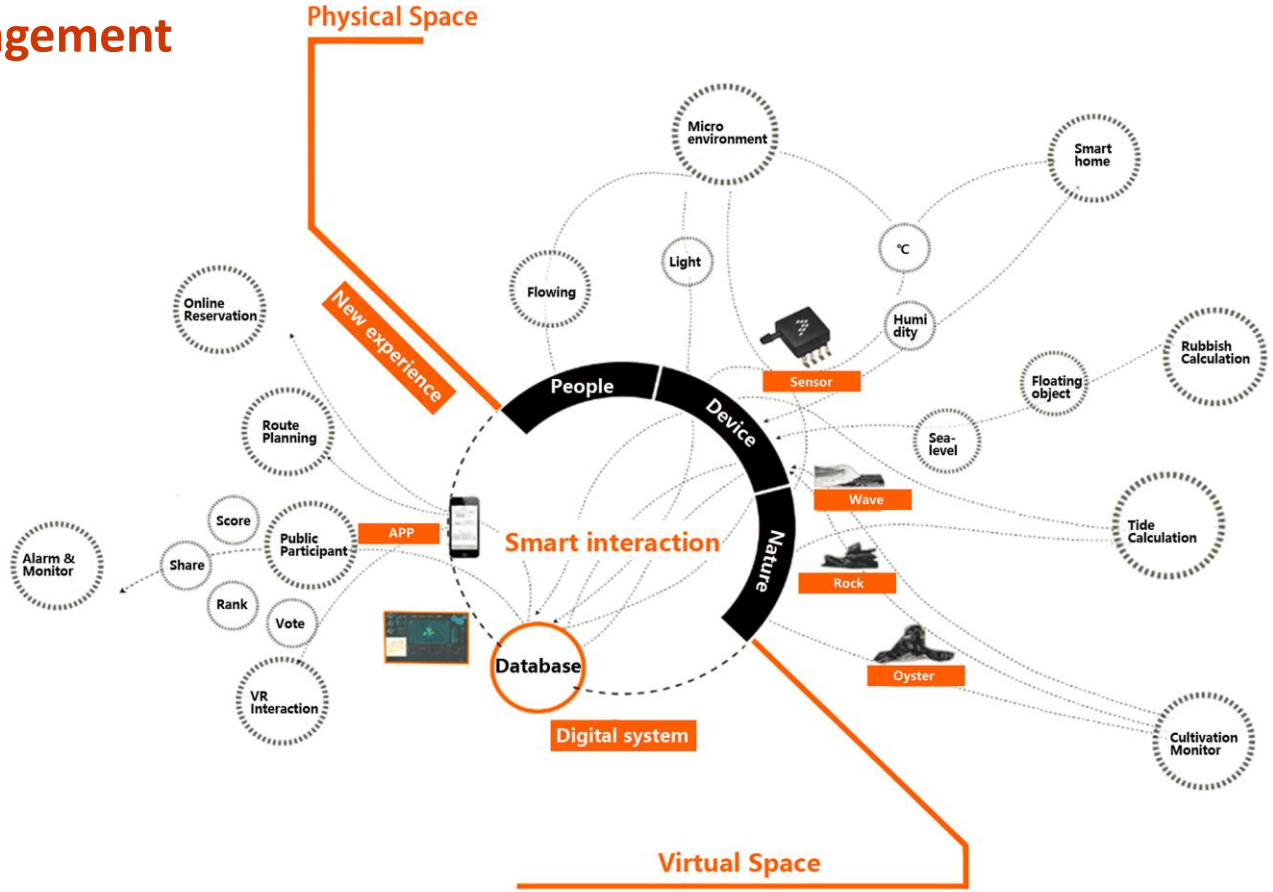
3 The Development Prospects of WeSpace / City Scale

Recreation-entertainment: Operation and management

- **Intelligent operation and management: With the implantation of the Internet of Things + sensors, the operation and management of public space will be further intelligent, and the public participation will increase.**

  Through the subsystems such as environmental monitoring, traffic monitoring, energy consumption monitoring, security, maintenance, lighting, irrigation, waterscape and other subsystems, it supports the efficient operation of various parks and effectively reducing the cost of management and operation. Everyone can participate in the activity organization, operation and management of the park. For example, people can reserve public events through APPs and WeChat mini programs.

- Tencent provides big data center for the planning of Chengdu Greenway to achieve intelligent management.



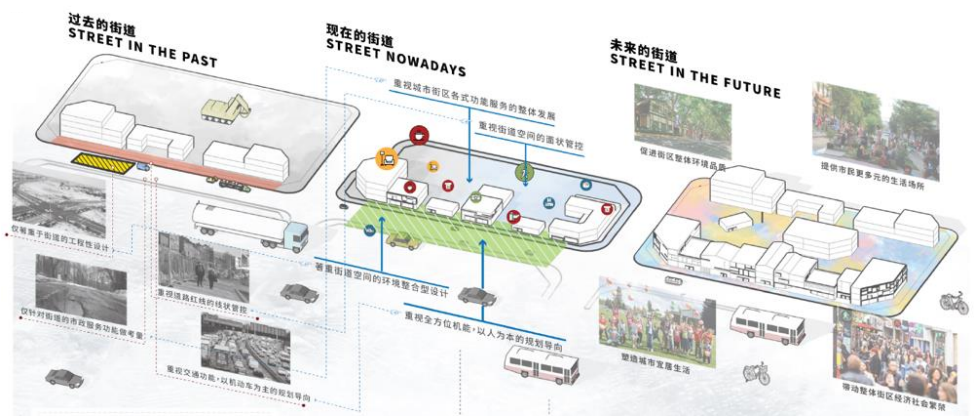
- Smart "O" -- In the design of Island Nature & Technology Experience Zone, sensing facilities and databases are used to establish "virtual and realistic" and "offline and offline" intelligent information systems, and the combination of nature and technology can be used to enrich the experience. For example, people can use the APP to control VR technology, and experience the seabed when the tide is low. At the same time, the temperature and wind simulator can be used to feel the wave height and the water temperature to obtain the experience that cannot be obtained under natural constraints.

Source: Tencent. "Smart Green Road Construction Plan in Chengdu.". Beijing City Lab. Competition Work."Smart"O"——Deisign of sland Nature & Scientific and Technological Experience Zone". https://www.beijingcitylab.com/projects-1/17-data-augmented-design/applications/

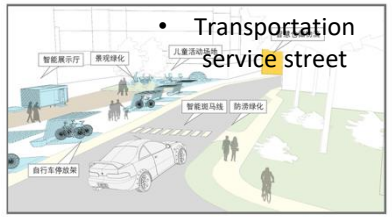
3 The Development Prospects of WeSpace / City Scale

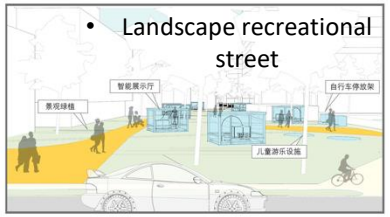
■ Recreation-entertainment

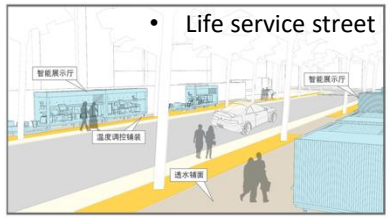
- **Future street space: intelligent+ interactive+ healthy+ operation**



The intelligentization of different types of streets







Online platform

+

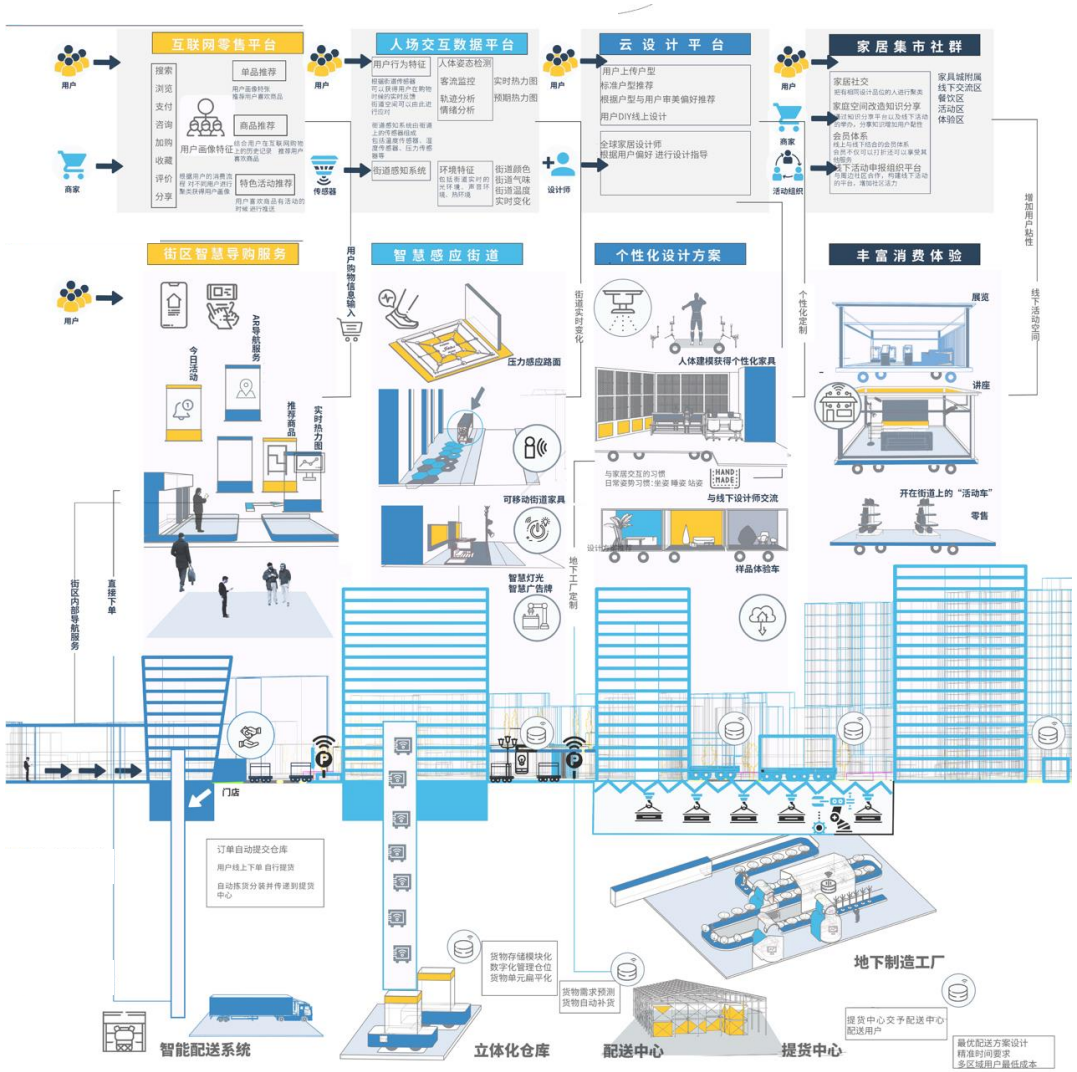
Offline smart street and space service

+

Manufacturing factories

+

Smart logistics



- In the future, street space will change from offline to online-merge- offline, and it can provide personalized services more intelligently to fulfill the immediate needs of human beings.

Source: Beijing City Lab. 2019. Competition work at Shanghai Urban Design Challenge."Wending Plaza Home Experience Workshop."(internal report)

3 The Development Prospects of WeSpace / City Scale

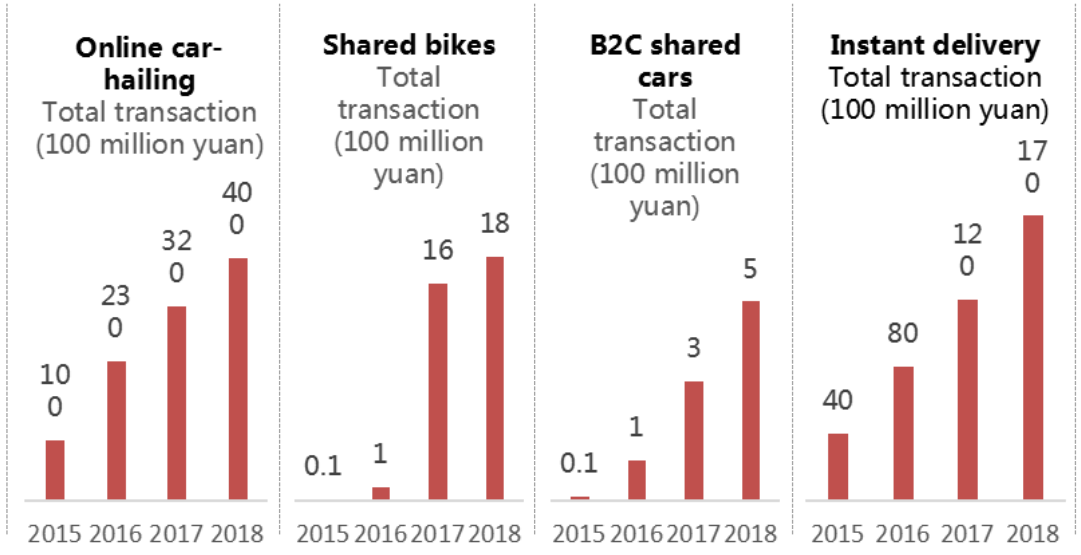
■ Transportation: Individual reform

- **Travelling with driverless cars and shared transportation: The travel methods of Individuals have changed, and the boundaries between private and public transportation have been blurred. Unmanned driving has changed the way of travelling led by private cars, and the status of travelling with public transportation and shared transportation has been improved.**

  Various travel methods such as shared transportation, public transportation and slow travel have been combined, and it has greatly improved people's travel conditions and reduced travel cost. In the future, unmanned driving will be widely used and it will greatly reduce the number of private cars and reconstruct the urban spatial structure and form.

- **The algorithmization of travel: The Internet of Things, big data, artificial intelligence can be used for overall route planning and traffic regulation and guidance, which may alleviate traffic congestion.**

  People have increasingly relied on algorithms for route planning and destination navigation and they tend to use mobile phones and bracelets to quickly enter the station. In the future, MAAS, intelligent navigation, and intelligent bus scheduling will become a normal state. And intelligent driverless cars will be combined with 5G and Internet of Vehicles for intelligent scheduling and it will greatly reduce road congestion and can collect high-efficiency and high-density perception data so as to greatly ensure the safety of pedestrians.



- The constant development of shared transportation and logistics from 2015 to 2018

In the United States, cars are idle 95 percent of the time. Car sharing has led to the decline in demand for parking lots. It is estimated that each shared car can replace nearly10-30 operating vehicles, and driverless cars will also exacerbate this tendency. This will have a major impact on urban life, as it will blur the boundaries between private and public transportation..."

——Carlo Ratti

- Automatic Driving

- **L0:no automation**
- **L1:driving assistance**
- **L2:part automation**
- **L3:conditional automatic driving**
- **L4:highly automatic driving**
- **L5:fully automatic driving**

Parking lot Automatic parking

SAE International Automated Driving Classification Standard

Source: Regal Lloyds. https://mp.weixin.qq.com/s/y5oD7fo211eLpFdNptw1gg (partly quoted).
Bain Consultation. "2019 Asia-Pacific Travel Market Research"(partly quoted).Visualhunt.com(Marc van der Chijs)

3 The Development Prospects of WeSpace / City Scale

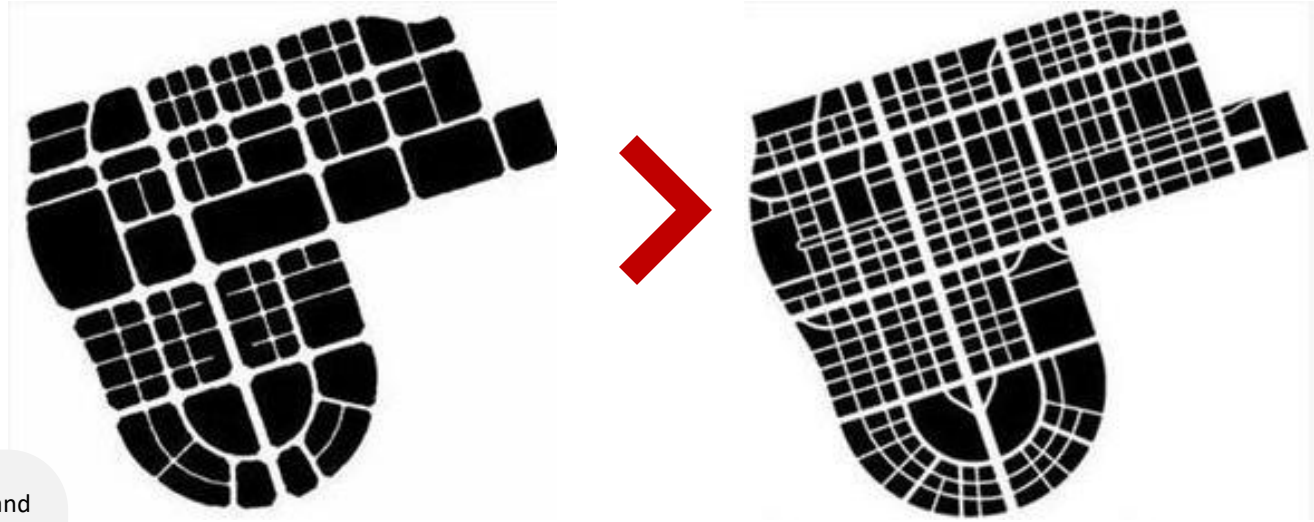
■ Transportation: Location change and structure

- **The transformation from large block into small block: The leading factor has been transformed from large block and sparse road network model to small block model, or the coexistence of large and small blocks.**
  The hierarchical and centralized road systems of large block model have a clear hierarchy. And the cars are playing an absolutely dominant role, resulting in low walking and cycling accessibility and long travel distance. The flexibility of driverless technology and the reduction of private cars will further promote the development of small block model.

- The blocks in New York

- The blocks in Portland

- The blocks in Beijing
- **The Chinese characteristic of "large block and sparse road network**



- Comparison of the traditional "Large block area" and the planned "small block area" road network of Chenggong New Town in Kunming

We will optimize the road network structure of blocks. We will strengthen the planning and construction of neighborhoods, clarify the area of newly-built neighborhoods by cascades, and promote the development of open, convenient, and harmonious neighborhood neighborhoods with a suitable scale and complete support facilities. We will establish the urban road layout concept of ‘narrow road and dense road network’ and construct a road network system with reasonable gradation of expressways, primary and secondary trunk roads and branch roads.

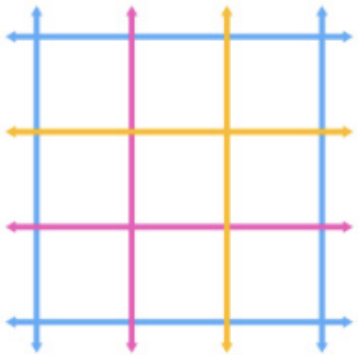
——"Several Opinions on Further Strengthening the Management of Urban Planning and Construction" CPC Central Committee and State Council

Source: Municipal Administration Department. https://www.thepaper.cn/newsDetail_forward_1434659(partly quoted.)

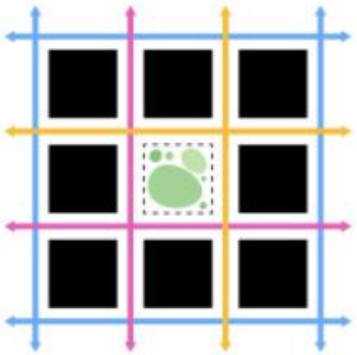
3 The Development Prospects of WeSpace / City Scale

Transportation: Location change and structure

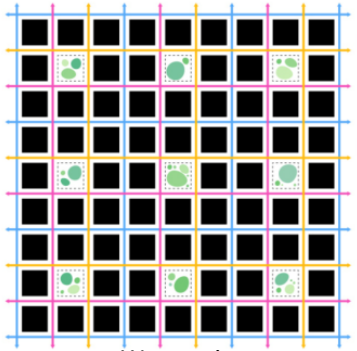
- **Hierarchical street system: Unmanned driving lanes/areas have appeared. People and vehicles are diverted and the distribution of parking lots is more flexible.**
  Street grading design has been carried out for different modes of transportation such as rail transit, unmanned driving, and slow traffic. It has broken the P + R parking lot mode and parking lots no longer need to be set up at the destination or departure place, but should be set up in a remote and convenient place in order to free up more traffic space for green space or residents' public leisure.
- **Flexible block organization: The centrality of rapid rail transit and bus stations has been reduced, and the role of TOD development model may be reduced, showing a more convenient and humanized organization method.**
  In the future, people can get on the car at any time and any place, and driverless cars can send people directly to their destinations or even each floor of the building, thus bringing a more decentralized and flexible block organization form.



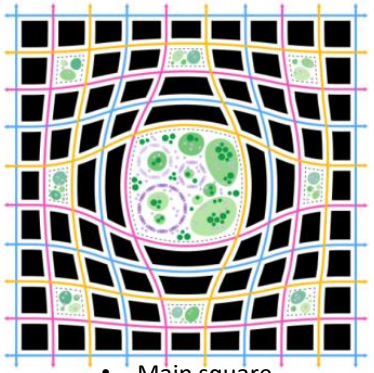
• Woven grid



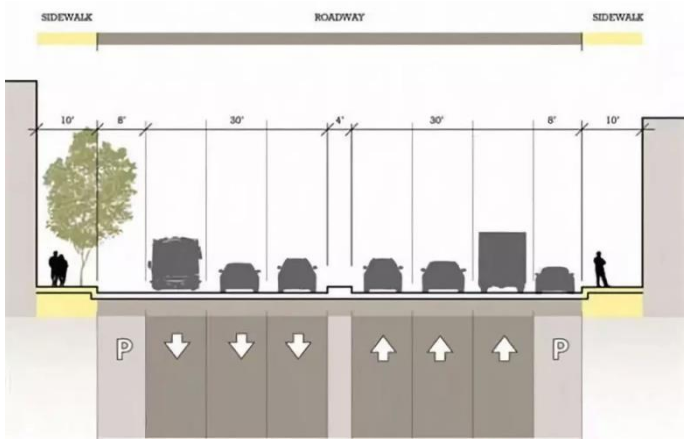
• Woven block



• Woven city



• Main square



• At present, on both sides of the road, parking lanes are set up for vehicles that need to be parked nearby.

• In the future, parking lanes on both sides of the road are no longer needed, providing more space for walking and greening in cities.

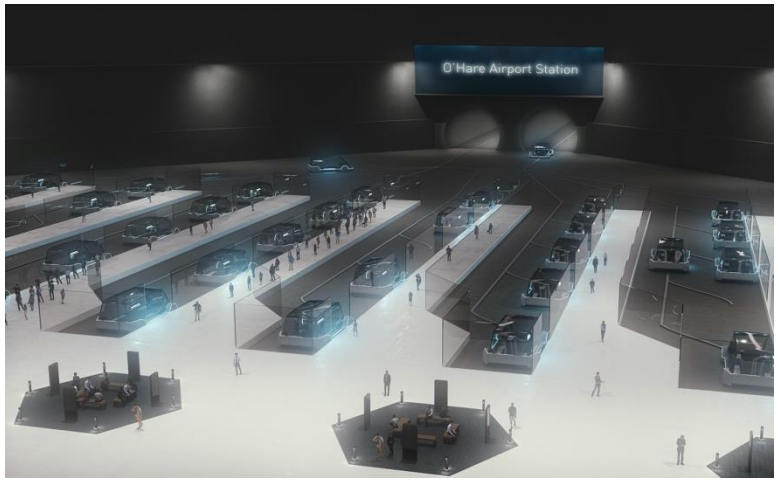
Source: Toyota Woven City. https://big.dk/#projects-twc .12365auto.com

3 The Development Prospects of WeSpace / City Scale

■ Transportation: Location change and structure

- **Three-dimensional and underground transportation: The logistics and fast lanes have been moved to underground, further using the underground space and urban gray space.**
  Super complexes of business entertainment and transportation integrating the underground and above ground at core subway stations have emerged. In the future, the vast urban gray space such as the space under the viaduct will be actively reused for the arrangement of charging piles of shared vehicles and automatic parking, etc.

Underground unmanned driving transportation and parking



- Boring underground driverless tunnel and public transportation system

Underground logistics

- Underground logistics system in Xiong'an

Underground garbage transportation

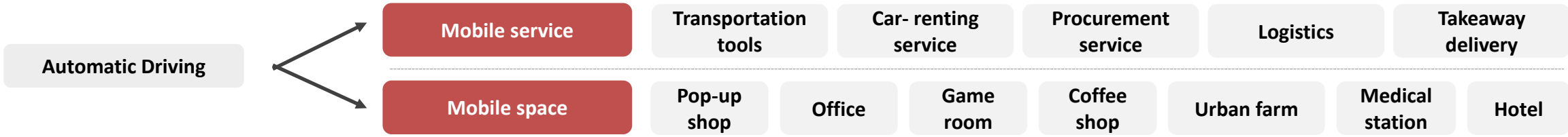
- The vacuum garbage collection system is constructed in Jiangbei New District, Nanjing.

Source: The Boring Company. https://www.boringcompany.com/chicago/ .
The Research Center of the Construction and Development of Xiong'an New District. https://mp.weixin.qq.com/s/fVPqX0zZL6EU9kEVgq1Fmg.
Smart Sanitation Alliance. http://www.zghwkj.cn/a/gongzuodongtai/20181031/4182.html

3 The Development Prospects of WeSpace / City Scale

■ Transportation: Functional transformation and restructuring

- **Shared transportation and shared service: Shared transportation has greatly solved the problem of the last mile in commuting and daily life. In the future, a large number of shared driverless cars will appear, or more O2O services will be extended to provide more home life services.**
  With the popularization of travel methods such as shared bicycles, shared rental cars, and private car sharing, etc. the concepts of urban isochronous circle, service radius, subway houses, etc. have been redefined. At the same time, there have appeared corresponding parking areas and some unreasonable occupation of public space. In the future, car-hailing application will also develop other life services such as procurement services, takeaway delivery, and express delivery service in addition to car rental services.
- **Compound space functions: Driverless vehicles have become an extension of space. The single-dimensional transportation space has been expanded into multi-functional intelligent mobile spaces for office, leisure, medical, and retail, etc.**



- IKEA pop-up shop /Shop on Wheels

- Mobile office/Office On Wheels

- Mobile coffee shop /Cafe on Wheels

- AR game car/Play on Wheels

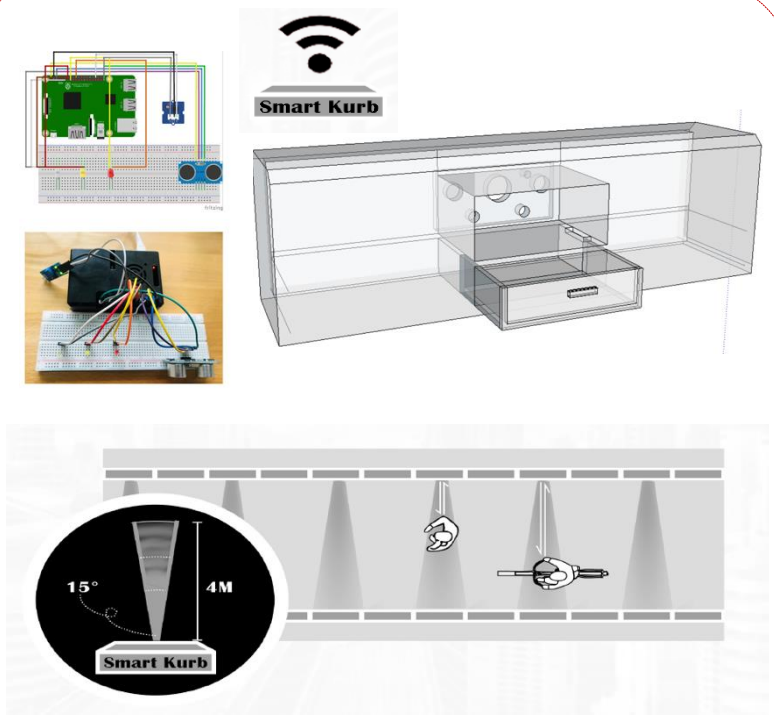
- **IKEA Space 10 Laboratory designs the automatically driving vehicle Space on Wheels**

Source: Sohu. https://www.sohu.com/a/342405999_188910

3 The Development Prospects of WeSpace / City Scale

Transportation: Operation and management

- **Intelligent operation and management:** **The traffic identification system has been intelligentized. Digital facilities such as smart curb, parking guidance system, intelligent parking, intelligent navigation, intelligent ground lock, etc. have emerged. The global awareness, real-time monitoring, timely warning and intelligent management have been realized in traffic management.**



- Smart Curb: Perception and Guiding Device/Beijing City Lab

Intelligently guiding people flow, vehicle flow and parking, and adapting to the tide changes

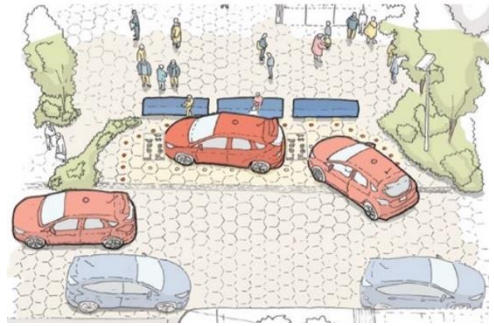
- Intelligent guidance / Gensler

- Green wave signal coordination system/SWARCO

- Smart racetrack / DreamDeck

- Smart ground traffic lights / Büro North

Creating dynamic and safe curb space



- Dynamic curb: passengers get on and off smartly and charge smartly / Google Sidewalks

Source: Beijing City Lab. The collation of TOP 100 digitalized transformation cases in architecture firms(Reference materials are attached at the end of the text.). Beijing City Lab.. Smart Curb Design (internal report)

3 The Development Prospects of WeSpace / City Scale

■ Service-medical treatment: Individual reform

- **Online consultation and medical treatment: Online consultation, remote consultation and online shopping for drugs, etc. are used to achieve home consultation and medical treatment of common diseases and chronic diseases.**
  People can get remote AI diagnosis, treatment and guidance directly on mobile medical treatment APPs such as Dingdang Kuaiyao, Tencent Health, Baidu "Consult Doctor Online", and 5G remote consultation platform of Wuhan Union Hospital, etc. It is even possible to detect physical indicators such as blood test at home through medical products such as wearable devices.
- **Mobile digital health management: Medical and health products such as wearable devices are used to establish personal health cloud files.**
  Wearable medical devices and smart home medical devices such as smart thermometers, smart bracelets, smart watches, and smart rings, etc. are used to enter the health data and establish personal electronic medical record and health files.
- **Medical algorithmization: Daily medical care relies more on algorithms and AI assistants to help balance the medical resources between regions.**
  In the future, 5G + VR remote observation and guidance consultation system, surgical robots, robot nurses and other artificial intelligence doctors, and AI + deep learning can shorten the knowledge gap between doctors.

- Reservation for masks during the pandemic

Detection
Breath
Blood glucose
Temperature
Pressure
Water

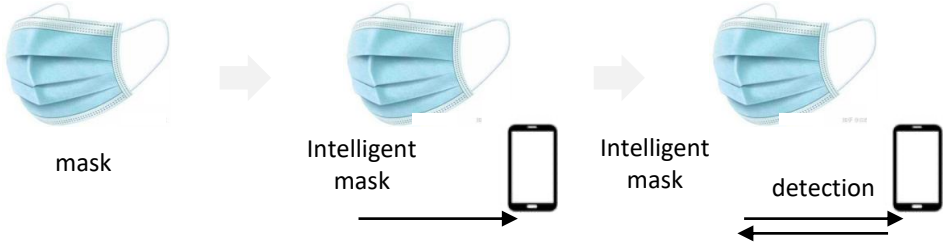
- Wearable medical devices such as smart thermometers, smart bracelets, smart watches, and smart rings, etc. for daily test

Patient terminal: camera video, medical impact, transmission of haptic feedback information, etc.

Doctor terminal: camera video, operation of rocker to control signal

- **Remote Robotic Ultrasound Service**

Breath coverage | **Breath information** | **Breath treatment**



Intelligent mask in the future

Detection: virus detection such as flu. PM 2.5 content. respiratory rate

Treatment medicine algorithm

Source: NOKIA BELL. https://mp.weixin.qq.com/s/1Wi1EtjKI1-Rjjy854nefw.m.sohu.com

3 The Development Prospects of WeSpace / City Scale

■ Service-medical treatment: Structure and function

- **Hierarchical diagnosis and treatment system and process optimization: A hierarchical diagnosis and treatment space system of "comprehensive and specialized hospital medical care--community medical care--home medical care--mobile medical care" has been formed, and community-level medical service has increased.**
  The technological development has intelligentized medical space and enhanced the functions of community medical centers. At the same time, remote consultation and other methods can fulfill some medical needs of people and make up for the lack of medical resource allocation and space mismatch so as to make the medical system more convenient and perfect and provide medical conditions for the needs of home-based care under the tendency of aging population.
- **Online and offline integration and awareness education: Traditional offline pharmacies, hospitals and clinics have transformed to online and offline integration, providing home service and remote service for patients and the elderly.**

The medical service supply in China is still in a state of imbalance between supply and demand. The gap is large, and the medical resource allocation is unbalanced.

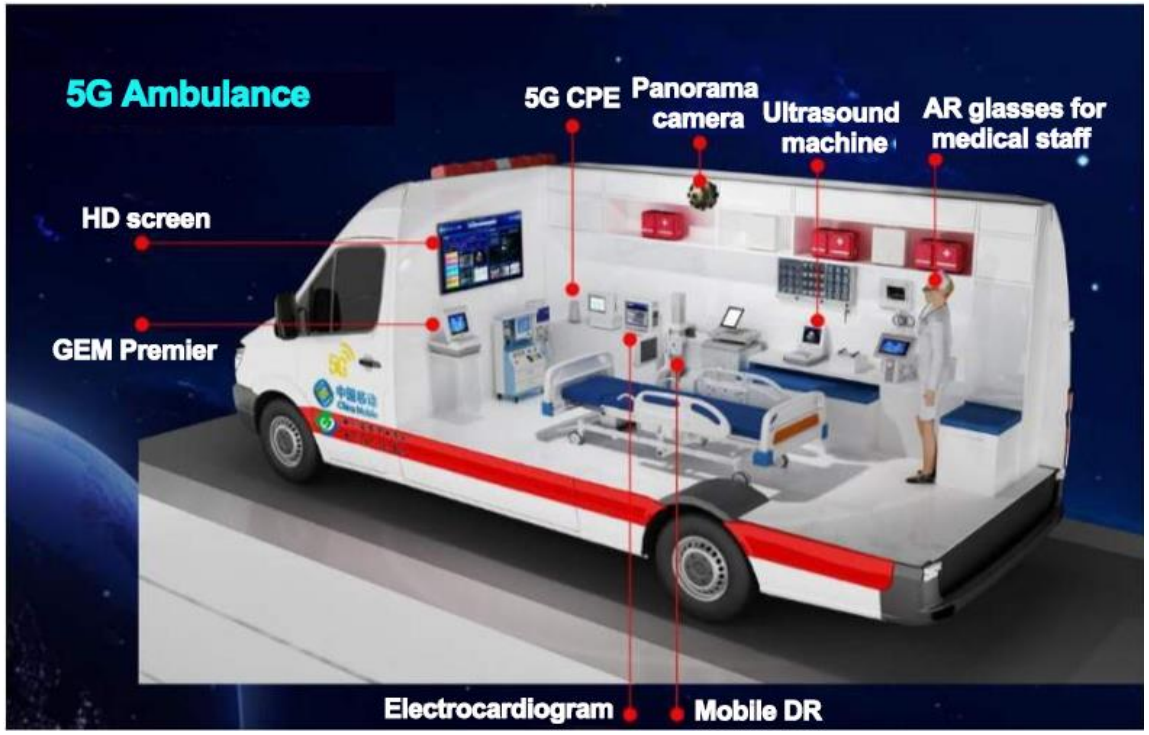
- City layer: The medical resource allocation of large-scale hospitals and primary level small-scale hospitals such as community hospitals is seriously unbalanced. The 80% of medical resources all over the country are concentrated in large cities, and 30% of them are concentrated in large hospitals.
- Hospital layer: The medical resources are mismatched and there is lack of fairness and efficiency in the provision of medical and health services.

Comprehensive and specialized hospital medical care (Serious diseases, drug development, high-precision test)	Community level medical care (General diseases, minor surgery, general detection)	Family medical care (General diseases, chronic diseases, health management)	Mobile medical care (First aid, elderly service)
Patient behavior perception system. AI algorithm drug development. 3D printed organs. VR remote consultation. Medical and surgical intelligent robots. Self-service registration and reservation system ...	Patient behavior perception system. DNA Test. VR remote consultation. Automatic drug system. Medical service robot. Self-service registration and reservation system ...	Home emergency monitoring and perception system. VR Remote consultation. Personal electronic health record. Wearable device. health management products. testing products for blood, and blood glucose ...	Driverless ambulance. Detection vehicles for CT and other detections. Intelligent mobile robots. Drug distribution system ...

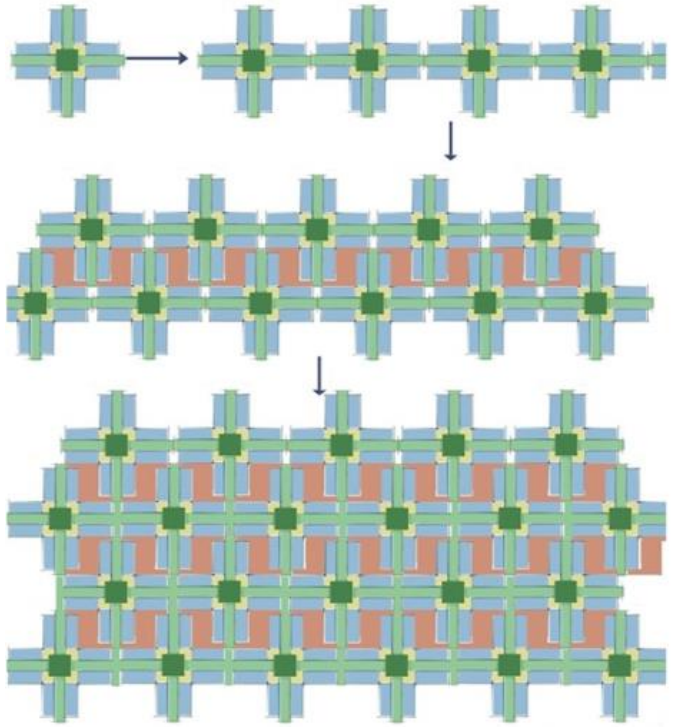
3 The Development Prospects of WeSpace / City Scale

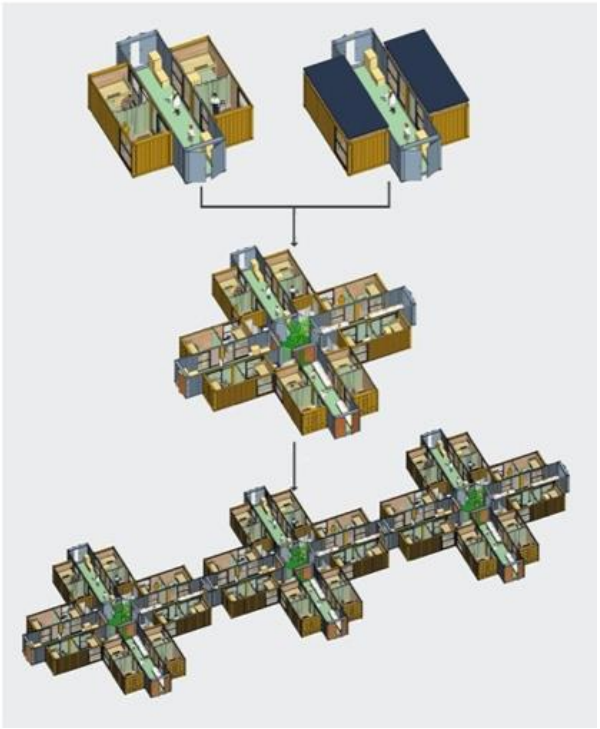
■ Service-medical treatment: Structure and function

- **Flexible diagnosis and treatment space: The flexible medical space with real-time data collection and flexible movement has emerged to response to public health emergencies in time and effectively.**
  The development of modular intelligent construction technology makes the spatial changes more flexible. The space configuration of driverless medical ambulances makes it possible to have treatment inside the ambulances so as to respond to emergency public health events more flexibly.



- 5G + Medical first aid = First aid "high speed" passage





- Modular prefabricated square cabin hospital design

Source: Chinese Hospital Architecture and Equipment. https://mp.weixin.qq.com/s/m6VgcsmIy6NOpff-wOcuVg.
Zhao Kui. https://m.weibo.cn/1254344660/4471596348036295

3 The Development Prospects of WeSpace / City Scale

■ Service-education: Individual reform

- **Online and intelligent education: There have been teaching model innovation such as MOOC, multimedia teaching and blending teaching, etc. Learning methods have also turned to online and offline integration. In the future, education and technology will be further integrated, and will gradually change from online and commercial direction to intelligent direction.**
  With online educational websites such as MOOC, rid kid, Tencent Classroom, Baidu Yunzhi Academy, etc., teachers can have online live stream courses or have online and offline blending teaching. People can learn and communicate at home, which has greatly improved learning efficiency and reduced space cost. In the future, information technologies such as VR/AR, cognitive computing, advanced robotics and brain science, etc. will be further integrated with education and become powerful driving force for educational innovation in the future.
- **"Ubiquitous learning" and lifelong learning: The education method with knowledge as the center has transformed into personalized education with people as the center, and it has developed from a fixed time and place to a breakthrough in time and space restrictions.**
  The self-adaptive learning technology based on artificial intelligence can break through the existing linear learning model used in online learning and it can automatically detect the learning level and state of students and help students continuously adjust the learning plan and progress so as to provide students with personalized and differentiated teaching. In the future, each person will be able to have a lesson schedule and adjust the content at any time.

Smart teaching	Constructing a teacher-centered teaching platform with diverse tools, personalized teaching, and diversified content including teaching equipment, smart evaluation, smart teaching assistant and smart scientific research, etc.
Smart learning	Constructing student-centered lifelong learning platform with process evaluation, personalized program, and autonomous learning including online classrooms, AI-assisted learning, immersive learning and technological quality education, etc.
Smart management	Constructing a manager-centered digital governance platform with ubiquitous resources, convenient operation, and personalized matching including smart school affairs, smart education affairs, smart office and smart decision-making, etc.
Smart space	Constructing a people-oriented education space with situational awareness, intelligent recognition, and autonomous adaptation to break down isolated data island including smart security, energy-saving management and control and environmental monitoring, etc.
Smart service	Constructing a user-centered service platform with standardized system, open ecology, and personalized supply, including one-code access, open community, one-stop platform and personalized assistant, etc.

- Tencent WeLearning Intelligent Education: Education-oriented Governance System in the Future

Source: Tencent Smart Education. https://mp.weixin.qq.com/s/K_Da2cirSfJX_h4TO2QLAg(partly quoted).
China Future School Lab. China Future School 2.0 Innovation Plan. https://mp.weixin.qq.com/s/RtdVs2_BBcAbzLq-1THRzg (partly quoted). Kunpeng Research and Study Association. https://mp.weixin.qq.com/s/5ntxm5XaMRXR9F7ME7AI6w

3 The Development Prospects of WeSpace / City Scale

■ Service-education: Structure and function

- **Spatial scale and site selection:** Centralized large-scale education space has been reduced. Fragmented learning centers have appeared, and the site selection of education space is closer to the place of residence.
- **Spatial function mixture:** Single space has been transformed into the mixed space of teaching area + non-learning area + public space and is equipped with virtual simulation laboratory and 3D printing room.
- **Intelligent spatial function:** The intelligent education space promotes the improvement of school teaching and management level including intelligent teaching assistant, intelligent security, energy-saving management and control and environmental monitoring, etc.

- Wilmeth Active Learning Center, Purdue University
- There are 27 classrooms in the active learning center. Each classroom is designed centering on active learning. Students can move freely in the classroom instead of simply listening to the lecturer to impart knowledge. Throughout the building, classrooms, libraries, conventional learning spaces, collaborative spaces, and informal learning spaces are interwoven and integrated.

- VR Virtual Laboratory of Active Learning Center, Suzhou Bay Foreign Language School
- The layout of active learning classrooms varies according to different subjects such as a history classroom with single desks and chairs, a physics classroom with group experiment tables, a geography classroom with a round-table desk and chair layout, and a future classroom with full-course electronic teaching equipment.

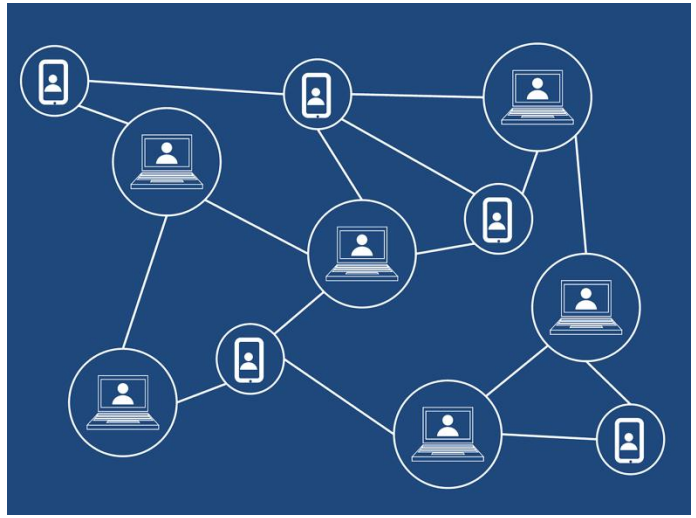
Source: China Future School Lab. https://mp.weixin.qq.com/s/RtdVs2_BBcAbzLq-1THRzg(partly quoted).
Tendency Culture Design. https://mp.weixin.qq.com/s/0oVwfvJI3BMoRTxQ-Eevig(partly quoted).
Purdue University. https://www.purdue.edu

3 The Development Prospects of WeSpace / City Scale

■ Service-finance: Individual reform

- **Mobile and decentralized payment: Mobile payment methods such as facial recognition payment and fingerprint payment, etc. have been popularized. For example, block chain-based payment methods such as Bitcoin no longer rely on third-center parties.**
  China has almost entered a "cashless society". People usually use third-party payments relying on e-commerce and social media sites such as WeChat Pay and Alipay, etc., or they use independent third-party payments representing by Kuaiqian, Yibao Pay, and Lakala. The number of times that cash is used has been greatly reduced. In the future, as for the block chain-based payment methods, automated and distributed algorithms do not rely on third-center parties, and it will reduce cost and shorten the time for payment.
- **The decrease of financial spatial and temporal cost: Consumer finance models such as installment payment, consumer loan, Mayi Huabei, Jingdong Baitiao, and Tmall installment, etc. make the capital flow more free. The physical cost and learning cost of people participating in investment and financial management have been reduced, and investment and financial management can be carried out anytime and anywhere.**

- Mobile payment creates a"cashless" society



- Bitcoin takes block chain as the underlying technology and is based on decentralization. It uses a distributed database composed of many nodes, and can realize financial transactions without going through banks and third-party payment platforms, etc.

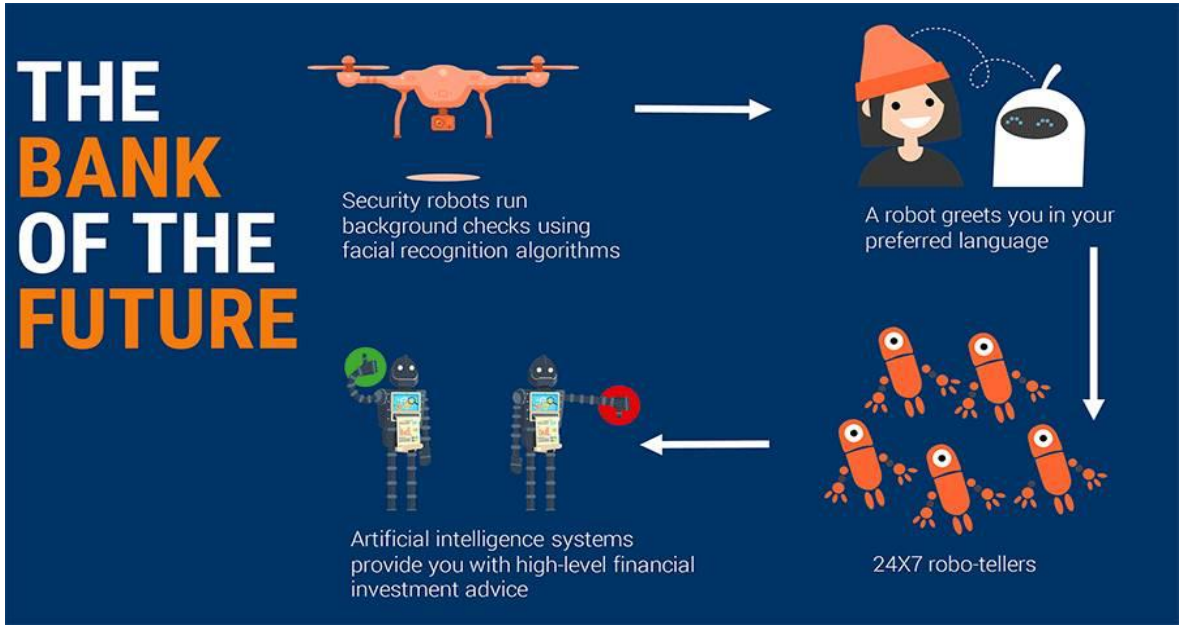
Source: Unsplash.com(Clay Banks).Pixabay.com(Tumisu).Pixabay.com(rebcenter-moscow)

3 The Development Prospects of WeSpace / City Scale

Service-finance: Structure and function

- **Spatial scale and site selection: The number of physical bank outlets has been reduced, and the site selection is more centered on the community.**
  The demand for physical bank outlets has decreased. At present, due to the increase in urban population, the number of outlets has not decreased so much. It is still increasing macroscopically, but it may be faced with a substantial decrease in the future.
- **Online and intelligent spatial functions: Functions have been transformed into services, and also from transformed online to intelligent. And more unmanned banks have appeared.**
  The physical banks have transformed to the direction of self-service and the private bank of the wealth center and it has increased the investment of ATM machines and the facade construction of self-service centers. The third-party payment platforms promoting mobile banking, online banking without physical outlets, wealth companies, and WeBank have emerged.

- The number of self-service spaces such as ATM has greatly increased.



- The transformation of intelligently operated bank outlets

Source: CB Insights." Top Ten Fintech Trends Subverting the Financial Industry in the Future."
Unsplash.com(Kolar.io).Unsplash.com(Nick Pampoukidis)

3 The Development Prospects of WeSpace / City Scale

■ Service-government: Individual reform

- **Intelligent government affairs: Assist in government decision support, emergency management and collaborative working, etc.**
  Government affairs have changed from digitization and informatization to intelligentization. e-government cloud platform, leadership cockpit, government service network, government portal website, and government affairs app, etc. can be used to assist in government work and improve city management level.
- **Online government affairs service: Government affairs service has transformed from offline to online. The methods of self-service handling and online service can be used to achieve 24-hour "no closing" and "only one run".**
  With online apps for government affairs service represented by Yueshengshi, people can carry out "real person + real name" identity verification and handle daily services such as provident fund, social security and Hong Kong and Macao passports, etc. in the APP or mini program.

- Face swiping registration
- E- document processing
- Daily services processing
- Featured service area
- One key to move cars
- ...

- "Yueshengshi" app provides palm-top livelihood services for urban individuals

- More than 200 services can be handled anywhere in the country.
- Special services such as cultural tourism, marriage and childbirth, disability assistance, and justice, etc.
- Small and micro enterprises / self-employed service area
- ...

"Guoshengshi" app create a government affairs service hall exclusively for individuals

- Pandemic situation report
- Convenience service
- Health code
- Pandemic situation
- Fever clinic
- ...

- Screening of residents in the jurisdiction
- Timely notification of pandemic information
- ...

- Tencent liaison robots for government affairs assists community work.

Source: Tencent. "WeCity". Tencent Cloud Security.. https://mp.weixin.qq.com/s/WadxInXA9qwf1u9fBoXiFA.
Tencent Cloud AI. https://mp.weixin.qq.com/s/19iVXru3YW6PC-KpjH8KAw.
Zhejiang Governmetn Service Website. https://mp.weixin.qq.com/s/7OMXUZiWVgR1Mcs2tU_eXg

3 The Development Prospects of WeSpace / City Scale

■ Service- government: Structure and function

- **Space scale and site selection:** **The site selection of government service space has been further sunk to community. More convenient community government affairs centers and 24-hour self-service government affairs service stations have emerged. The community-level government affairs service capabilities have been enhanced under technological development.**
- **Online and intelligent space functions:** **The government office hall has changed from offline physical space to online and intelligent space and it is no longer completely dependent on physical space.**

- The first government self-service hall in Guiyang

- Jisheng Vanke Smart Government Affairs Service Station is the first 24-hour non-closed smart government affairs service station with the function of "three in one" built in Panyu District, Guangzhou

Source: Panyu Public Service. https://www.sohu.com/a/312454861_711690.app.qguiyang.com.www.sohu.com

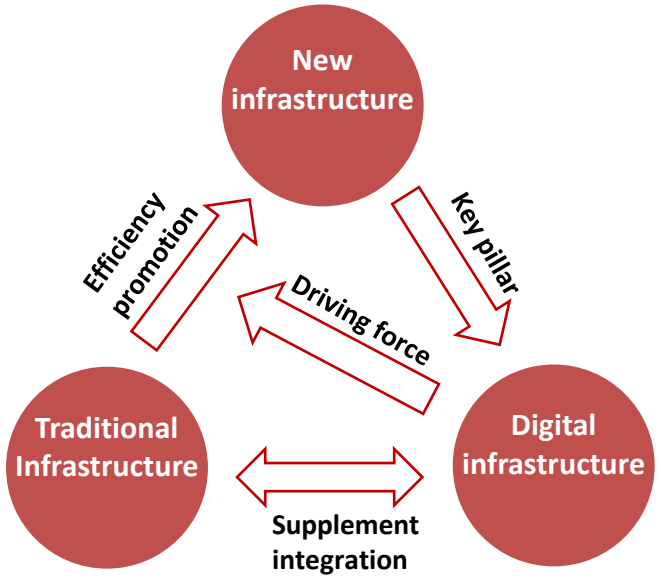
3 The Development Prospects of WeSpace / Infrastructure Scale

■ Urban infrastructure

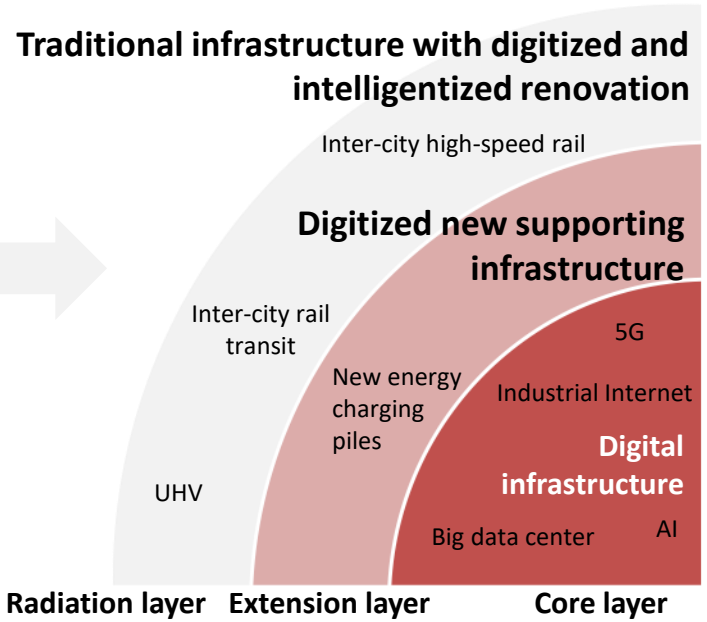
- **New infrastructure: The new infrastructure centers on the production factor of data and shows the complementary integration of digital infrastructure (core) and traditional infrastructure (radiation).**

  It has been proposed at the Central Economy Work Conference in 2018 that we will accelerate the pace of 5G commercialization and strengthen the construction of new-type infrastructure such as artificial intelligence, industrial Internet and Internet of Things, etc. By March 2020, the meeting of the standing committee of the Political Bureau of the CPC Central Committee has further emphasized to accelerate the construction of new infrastructure such as 5G network and data center, etc.

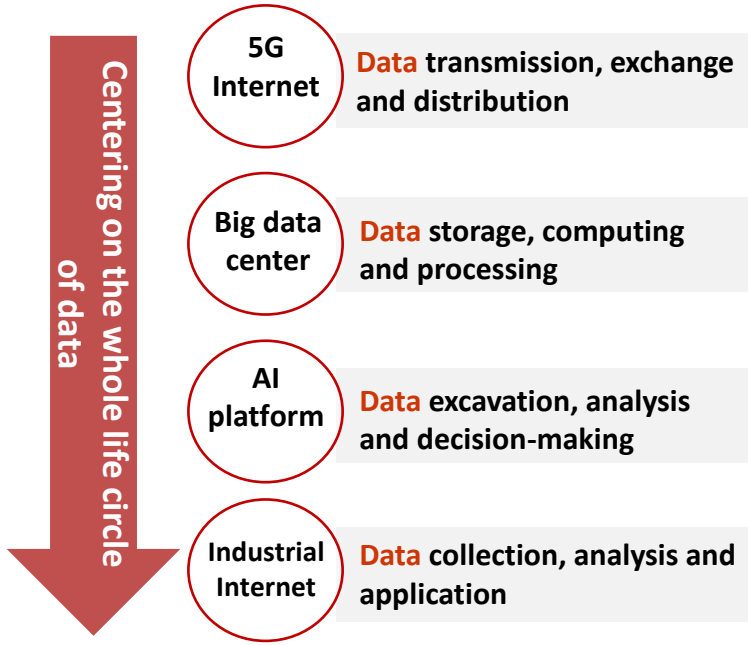
  The new infrastructure centers on the production factor of data ad it can be divided into seven major areas including 5G infrastructure, artificial intelligence, industrial Internet, big data center, UHV, new energy charging, and intercity high-speed and rail transportation.



- The relationship between new infrastructure, digital infrastructure and traditional infrastructure



- Three levels of new infrastructure



- Digital infrastructure with new production factors as the core

Source: Tencent. "Interpreting the Internet Opportunities of New infrastructure Strategies" (partly quoted).China Industrial Control Systems Cyber Emergency Response Team. https://mp.weixin.qq.com/s/P5jnHK1msQFd-_J8HWl2kg(partly quoted)

3 The Development Prospects of WeSpace / Infrastructure Scale

■ Urban infrastructure

- **Intelligentization of traditional infrastructure and perception of built environment elements: Ecological environment and built environment have changed from local perception to global perception network of the city.**

  The global perception network serves emerging industries and intelligent decision-making services, including the equipment and capabilities of collecting and processing geographic information and spatial and temporal data, as well as open data mechanism. On the one hand, in the future, in the transportation facilities including railway, highway and subway, etc. and the traditional infrastructure areas including water supply, drainage, power supply, communication and other urban municipal projects will be superimposed with digitalized layers such as sensors and monitoring and scheduling platforms to achieve the intelligentization of urban components. For example, autonomous perception, monitoring, feedback, early warning and management.

Intelligentization of traditional infrastructure

Traditional infrastructure system + Sensor and monitoring and scheduling platforms → Real-time data feedback | Abnormal monitoring and early warning | Intelligent management and implementation

- Railway, highway and rail transit
- Gas Engineering
- Communication Engineering
- Power supply and heating supply engineering
- Sanitation Engineering
- Water supply and drainage engineering
- Disaster prevention engineering

- Power supply: smart meters and energy monitoring and scheduling platforms, etc..
- Water supply and drainage: green energy irrigation system, intelligent water network system, intelligent electric meter, and water quality detection system, etc..
- Sanitation: unmanned garbage sanitation vehicles, intelligent trashcans, intelligent transportation route scheduling, etc..
- Communications: mobile broadband facilities and fiber optic network, etc..

……

- Amsterdam Emergency Management System

- Concept of Sidewalk Toronto Garbage Disposal System

- The world's first unmanned cleaning fleet in Shanghai

The intelligentization of traditional infrastructure is conducive to real-time perception and emergency event handling of the processes of water supply, drainage, power supply, communication, gas, heating and sanitation, etc.

Source: Long Ying and Zhang Enjia. Smart Urban Planning Under the Framework of Data Augmented Design. [J]. *Urban Planning.*,2019,43(08):34-40+52.Wepon Intelligent Cities and Urban Intelligence. https://mp.weixin.qq.com/s/Iykc54beNosSUuRRhavCtA
SidewalkToronto. https://www.sidewalktoronto.ca .Zhike. https://www.sohu.com/a/228289633_355133

3 The Development Prospects of WeSpace / Infrastructure Scale

■ Urban infrastructure

- **Intelligentization of traditional infrastructure and perception of built environment elements: Ecological environment and built environment have changed from local perception to global perception network of the city.**

  In terms of the built environment, it includes the monitoring and management of the humid and hot environment, space quality, acoustic environment and light environment of the three types of elements including buildings and structures (point), transportation facilities (line) as well as green spaces and open spaces (plane). In terms of crowd activities, it is mainly based on the flow monitoring of space and the trajectory characterization of people such as the types of crowd activities including work, residence, leisure and travel, etc. and the spatial distribution of activities.

Elements of traditional urban space + New-type infrastructure → Real-time data feedback → Abnormal monitoring and early warning → Intelligent management and implementation

Perception of built environment elements and crowd behaviors

The elements of built environment

- Buildings and structures (point)
- Transportation facilities (line)
- As green spaces and open spaces (plane)

Crowd activities

- Flow, trajectory and activity type

Monitoring and management

Smart building system and integrated pipe corridors, etc..
Intelligent signal light, roadside sensing unit, intelligent LED pavement, and variable curbstone, etc..
Smart urban furniture: smart streetlights, smart trashcans, smart information announcements, smart chairs and smart interactive facilities, etc..
.....

Monitoring and feedback

Smart security system, human flow monitoring system, smart terminal and mobile smart government affairs/community system, etc.

Edge computing

Distributed micro data center

- Intelligent infrastructure of xiong'an new district **X-HUB**

It is one of the key carriers of the smart city management system in Xiong'an New District and undertakes the equipment management, data aggregation, and edge computing functions of the urban perception system. It will be mainly used as an important part of urban furniture and public buildings such as streetlights and charging piles, etc. It can be connected to a variety of sensors to provide new access methods for smart transportation, smart environmental protection, smart fire protection, smart urban management and other application scenarios.

Source: Long Ying and Zhang Enjia. Smart Urban Planning Under the Framework of Data Augmented Design. [J]. *Urban Planning*.2019,43(08):34-40+52.
Datang Semiconductor Technology Co., Ltd. https://mp.weixin.qq.com/s/CAZCitnCGm8FfnW3hKUkZQ

3 The Development Prospects of WeSpace / Infrastructure Scale

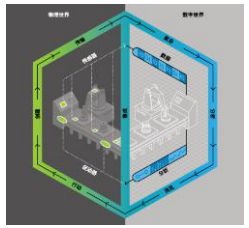
■ Urban infrastructure

- **Digital facilities become infrastructures: There has been the standardization and normalization in the operation of urban infrastructure and new species of urban operators have emerged.**

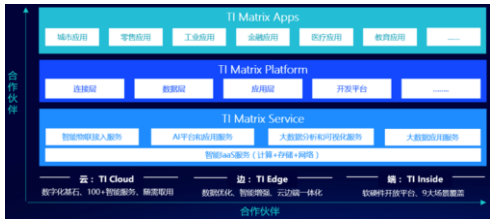
  The digital infrastructure with 5G, big data center, artificial intelligence platform, and industrial Internet, etc. as the core provides the foundation and support of the whole life cycle for data collection, information processing, data storage, and implementation feedback, etc. in the virtual space to realize the standardization and normalization in the operation processes of urban infrastructures so that it will become a new form of infrastructure to promote the efficiency of urban operation and improve operational capabilities and effectiveness of the city. At the same time, urban infrastructure will present a marketed tendency. In the future, it may be jointly constructed and operated by city operators, real estate developers, Internet companies, ICT companies and governments, etc. but it may bring digital ethics and privacy, data hegemony and hidden dangers of social equity.

Urban middle platform, digital twin

Digital twin serves all aspects of urban planning, urban construction, urban operation, and urban management, etc.



- **Tencent Cloud Urban Digital Middle Platform**



City operators

Internet company | ICT company | Developer | Property service company | ...

Government

Various departments

Urban application service system

Logistics management system	Transportation management system	Sanitation service system	Community service system
Government affairs service system	Environmental protection management system	Retail management system	...

JD.com Emergency Material Supply Chain Management Platform in Hubei Province

Informationized and intelligentized supply chain platform:
Digitized and systematic collection of emergency materials -- The information flow is perfect, visible, open and transparent.

Big data management for front-end procurement, inventory management, and cargo flow:
Integration of procedures and processes such as instock, outstock, signing, acceptance, and verification – It is convenient for the deployment and management of materials to improve the processing efficiency of materials.

Source: Long Ying and Zhang Enjia. Smart Urban Planning Under the Framework of Data Augmented Design. [J]. Urban Planning.2019,43(08):34-40+52.Deloitte. "Industry 4.0 and the Digital Twin Make the Manufacturing Industry Become More Powerful". Tencent. "Urban Super Brain in Pingshan District". JD.com. http://www.xinhuanet.com/gongyi/2020-02/13/c_1210472927.htm

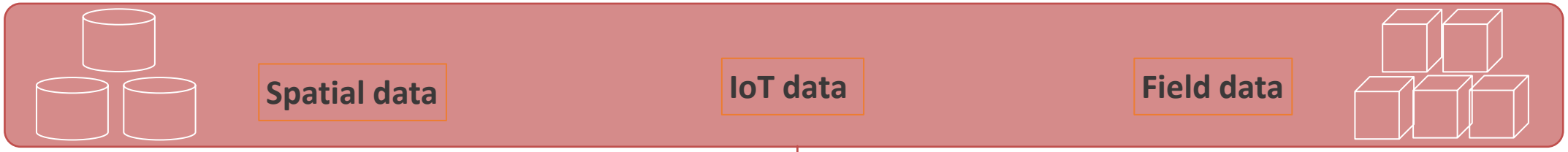
3 The Development Prospects of WeSpace / Infrastructure Scale

■ Urban infrastructure

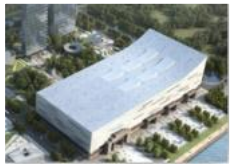
- **Digital Infrastructure --- Smart City Driven by Data: CIM= Space + IOT + Data Fusion and Application**

Smart City Driven by Data =digital twin =CIM=City Information Modeling
City Information Modeling (CIM) system can build CityBase to realize the goals of integration and sharing of urban resources, overall monitoring and management of smart cities, intelligent collaboration, and management decision support, etc.

Model Layer



BIM data



3DGIS data

IOT data

Municipal planning data

Transportation data

Engineering operation and maintenance data

Government affairs data

3 *The Development Prospects of WeSpace*

The positive externalities of technological development to WeSpace

Improving the utilization efficiency of traditional space

- Information technology and Internet platform are used to give full play to the optimization and integration roles of the Internet in the allocation of production factors so as to improve the utilization efficiency of traditional space.

Expanding new scenarios of virtual space

- The enormous enrichment of digital life has enabled the digitization of existing activities, and it will breed new types, forms and scenarios of activities at the same time.

Integrating realistic space and virtual space

- Platform operation, human-machine interaction, digital twin and other technologies integrate physical space and virtual space, and the forms of online and offline interaction are more abundant.

Improving the resilience of urban development and operation

- The resilience of inflexible space has been greatly improved under the influence of flexible and free digital space. And its ability to face various disasters and crises has been improved.

Reducing energy consumption and carbon emission

- Online activities can reduce unnecessary travel, and energy-saving automatic vehicles can reduce energy consumption and carbon emission to exchange information for energy savings.

The negative externalities of technological development to WeSpace

Intensifying social isolation and residential isolation

- The Internet promotes community building, and the isolation between different groups is more serious, thus the residential isolation is further exacerbated.

Increasing spatial inequality

- In the process of global digitization, the digital divide generated by the development of the digital economy will increase spatial inequality.

Generating algorithm-driven space crisis

- The resource allocation, resource flow and space operation driven by algorithm will also be restricted by algorithm. There is the possibility of over-reliance or even being bound by the algorithm and the data privacy crisis.

Accelerating the surplus of physical space and the shrinkage of city

- Artificial intelligence and intelligent manufacturing have accelerated the transformation of industrial production. The function of physical space has collapsed, and there has been a surplus in space. The local shrinkage and overall shrinkage of cities have been accelerated.

Leading to the elimination of people's personality and loss of people's preferences in the activities and choices in space

- Space use and personal activities that rely on the algorithm recommendation will also be limited by the algorithm, and personalized choices and preferences gradually disappear.

3 The Development Prospects of WeSpace

Conclusion

The past ten years – The next ten years The on-going changes and potential changes in cities (space)

Region

Hierarchical structure

The development of transportation technology and communication technology has changed the two basic material orientations of time and space of human life, thereby changing the operating mode and spatial structure of cities.

- The eastern, central and western regions have presented polycentric-center and networked development to different degrees in terms of form and function
- Siphon effect of central cities
- Urban clusters and metropolitan areas are the main spatial forms
- Clear division of labor and characteristic development

City

Size

- Urban agglomerations and continuous urban areas are generated by clustering
- Developed cities spread and some cities shrink
- Uneven development within regions and urban agglomerations in the short term
- Digital divide
- New polarization center
- The uneven state between cities is more obvious in the short term

Connection

- The connectivity between cities is redefined
- The networked development of regional transportation
- The separation of employment and residence has spread to the regional scale
- Cross-city commuting and working in different cities are more popular
- Functional connectivity has surpassed the geographic proximity and become the important driving force of urban development

Overall

Reform begins with individual: The individuals are digitized. Behaviors have transformed from from offline to online and offline integration. The focus on online reduces the perception of offline physical space. Time fragmentation, diversified activities, and free selection of event locations.

- Transformation from the core-edge layering structure to the polycentric networked layout
- There are both agglomeration (regional center) and diffusion (suburbanization)
- Uneven development
- Urban sprawl
- Small cluster form and community form structure
- Flat design
- Transit-oriented development
- Location factors such as transportation are important
- The diversification, decentralization, mixture and fragmentation of spatial function
- Distribution
- Closer connections between entity space and cyberspace within cities
- Land use tends to be refined and flexible

Residential scene

New way of living: The pursuit of living has transformed from simple habitation to individualized lifestyle. The connection with family and community has been attached importance. The needs of online shopping, working, education, medical treatment, leisure, service, etc. have been fulfilled.

- Geographic location affects housing prices
- Suburbanization.
- Sharing
- Operational and digitized management
- Unbalanced residence and employment
- Gentrification of city center
- Urban communities will self-manage and self-organize based on the community cluster in the future
- Functional mixture and compound
- Miniaturization / fragmentation
- Intelligentization of home facilities
- Personalization and independence
- Human need-oriented. Online and offline integrated community life circle
- Intensified social isolation
- Traditional developers have become operators

Reduced changes: positive / negative
On-going changes: positive / negative
The changes in the way of living
New changes in the future: positive / negative

3 The Development Prospects of WeSpace

Conclusion

The past ten years – The next ten years The on-going changes and potential changes in cities (space)

City

Employment scene

New way of employment: New occupations are generated, and there are more free workers. Multiple working modes of shared working, collaborative working and remote commuting coexist. Collaboration with artificial intelligence. "Employment" relationship has been transformed into "cooperation" relationship.

- Online expansion and transformation of informal employment. flat office space distribution
- Industrial spatial differentiation
- The third space working
- Suburbanization
- SOHO working
- New working space such as in-car office, outdoor space office, etc.
- Clustering of innovation industry
- Functional mixture and sharing
- Intelligent interaction of working facilities
- Users participate in the operation and management of office space
- Traditional office space is facing decline and transformation
- The replacement of people by machine may disrupt regional balance

Recreational scene

New way of recreation: Online shopping, virtual shopping. Online entertainment, mobile games. Recreational planning, cloud travel, online celebrity check-in. From offline to online and offline integration, highlighting the characteristics of intelligence and interaction.

- Inward integration of commercial space
- The influenced of network location, "good wine needs no bush"
- The transformation of offline business space
- Takeaway and logistics have brought new space problems
- Reappearance of commercial street mode
- Five-sense virtual shopping affects physical stores
- The interaction of cyberspace and physical space
- Fragmentation
- Unmanned
- The interaction of entity and virtuality
- Public space loses vitality
- Cities return to sustainability and nature.
- GO travelling
- Offline public space urgently needs transformation

Transport scene

New transportation method: Unmanned driving has become a new choice for travel. Multiple modes of transportation such as sharing transportation, public transit, private car travel, and slow travel coexist. Travel algorithmization. Mobility as a service (MaaS).

- Superblock and sparse road network model-oriented
- TOD
- Congested traffic
- Three-dimensional and underground transportation
- The improvement of street quality and walkability
- Small block model-oriented and the mixture of big and small blocks
- The revival of street space
- Intelligentized operation of road and parking system
- Sharing transportation redefines city isochronous circle, service radius and subway house
- The parking of shared bikes
- Decentralization of transportation hubs and parking lots
- Driverless lanes, street classification

Service scene

New service method: Online consultation, remote consultation, wearable device health monitoring. Online education, mixed teaching, "ubiquitous learning", personalized education. Mobile payment, block chain-based payment. Government affairs intelligentization, online government service.

- Physical space transformation of medical, educational, financial, and government services
- Comprehensive service, home-based intelligentization and commercialization
- Classification of medical space
- Modular diagnosis and treatment space
- Flexible response to public health emergencies

Infrastructure

Infrastructure

- Digital facilities and urban middle platform
- New infrastructure
- Intelligentization of traditional infrastructure such as communication, power supply, gas, water supply and drainage, and waste management
- Perception of built environment elements
- Data hegemony and social equity
- Local perception
- Digital ethics and privacy security
- From local perception to urban global perception network
- Digital twin
- Digital infrastructure
- Standardized and normalized operation
- The emergence of urban operators

Reduced changes: positive / negative The changes in the way of living

On-going changes: positive / negative New changes in the future: positive / negative

4

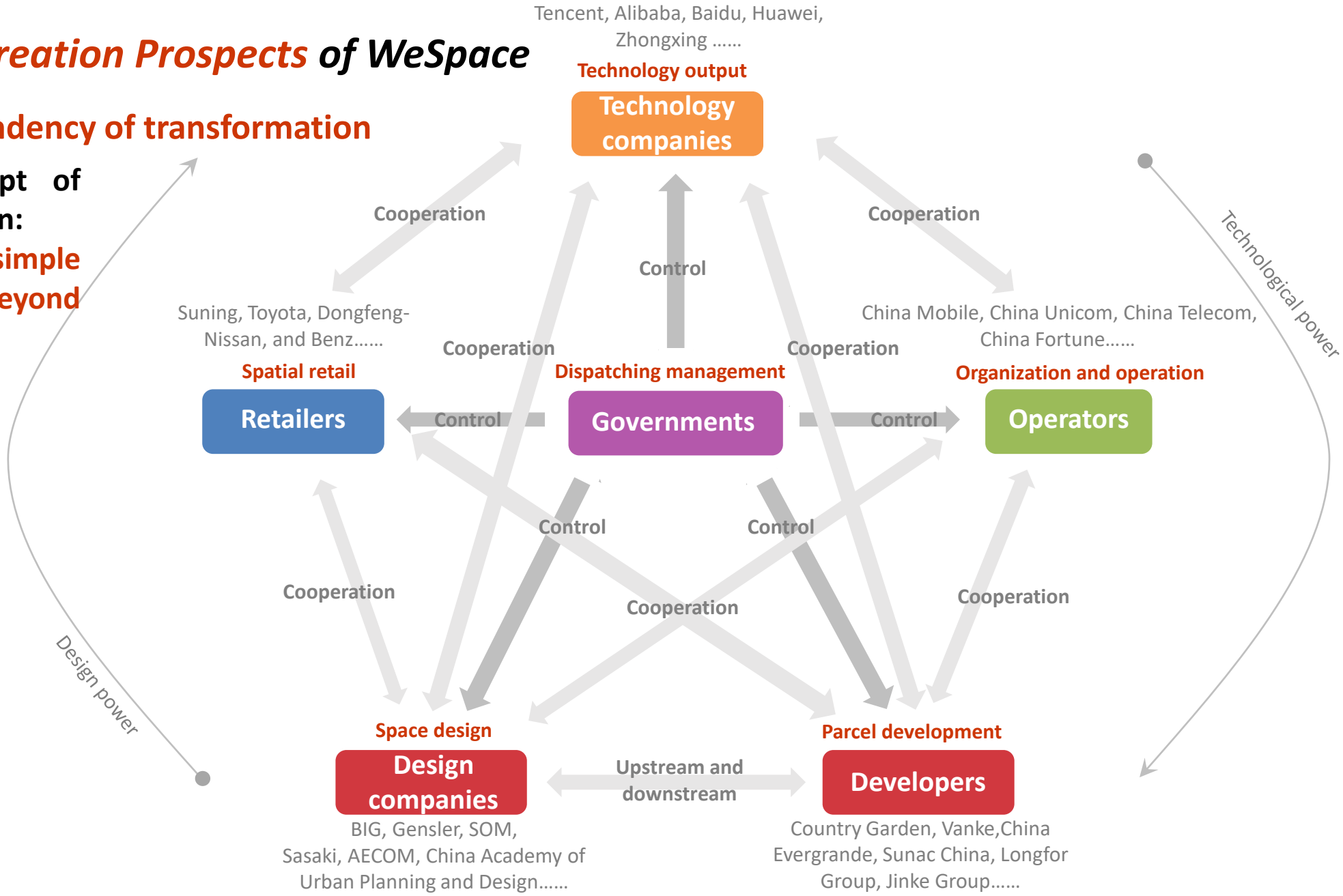
The Creation Prospects of WeSpace

(Future city-oriented design and creation practice transformation)

4 The Creation Prospects of WeSpace

The tendency of transformation

The concept of construction: From the simple design to beyond design

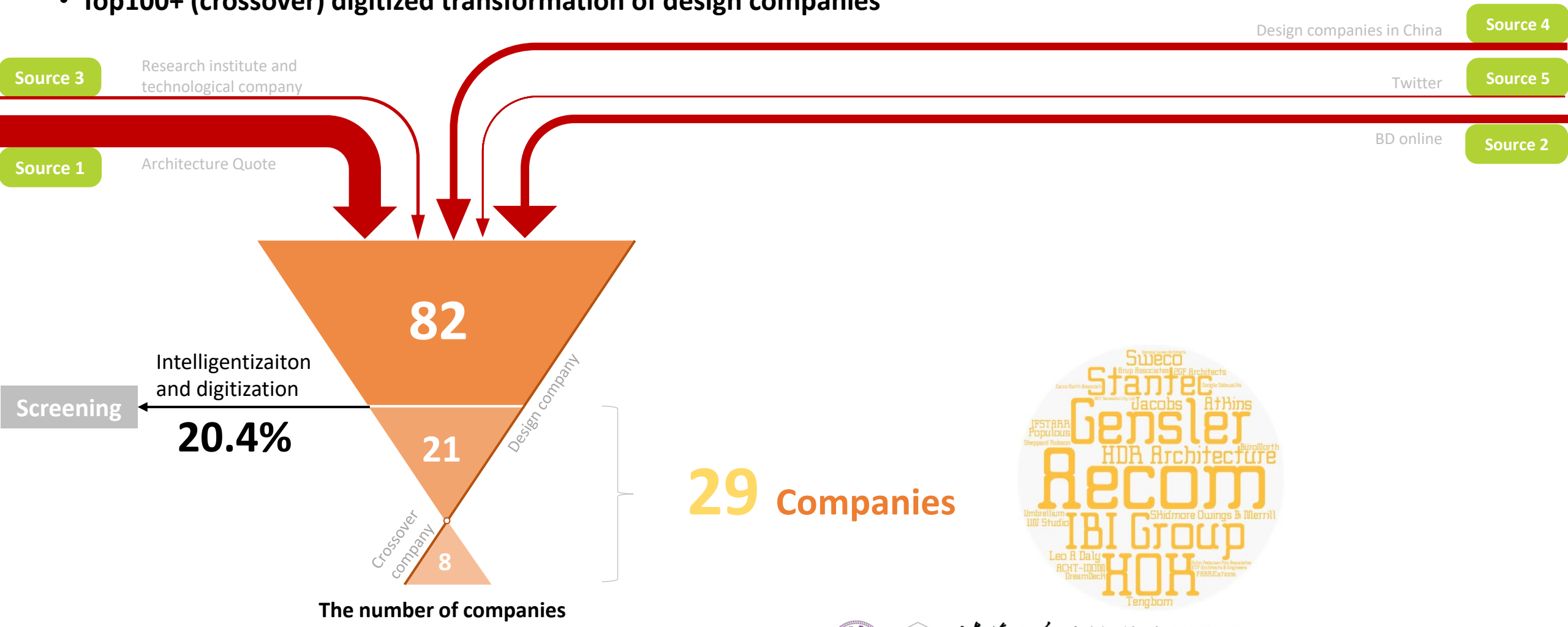


- **Several major forces involved in the construction/design of future cities**

4 The Creation Prospects of WeSpace

Design companies

- **Top100+ (crossover) digitized transformation of design companies**



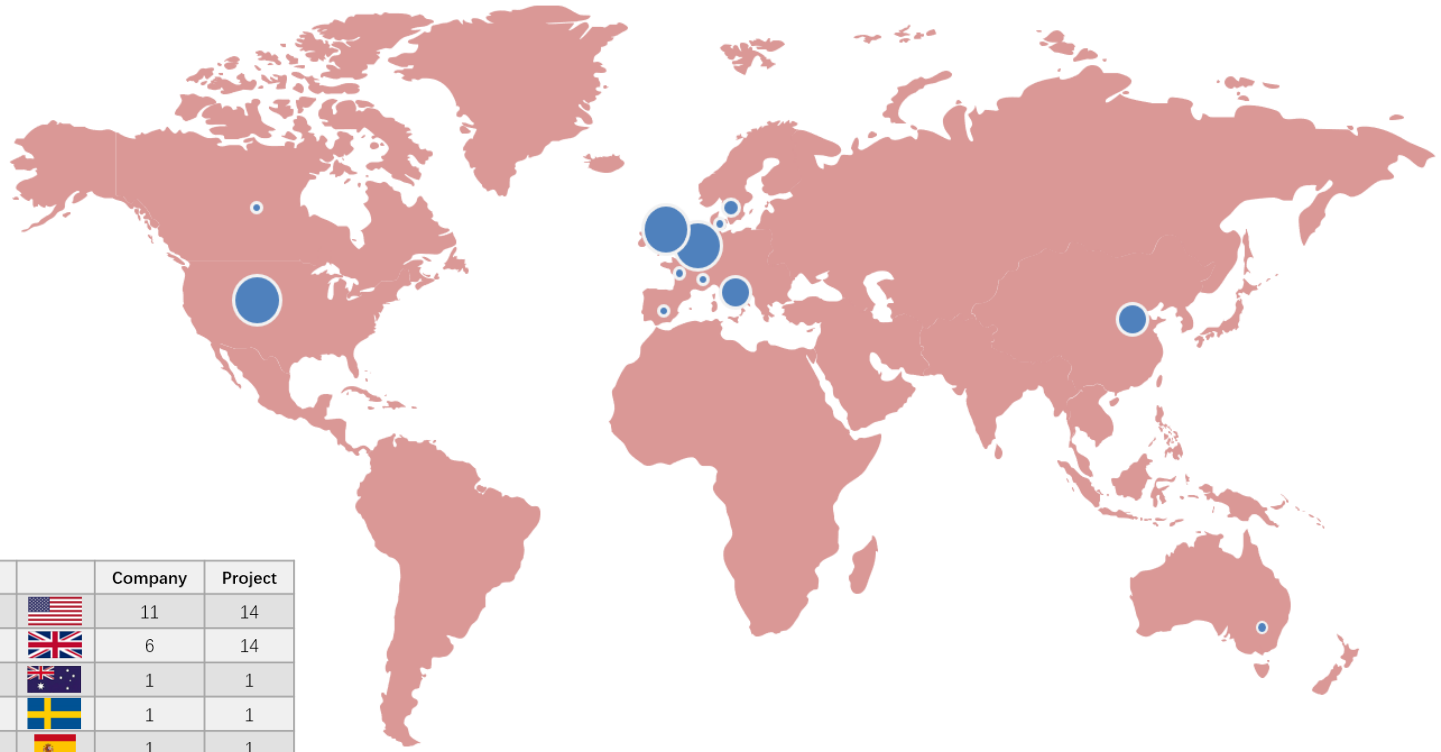
29 Companies

- **Top100+ (crossover) digitized transformation of design companies**

4 The Creation Prospects of WeSpace

Design companies

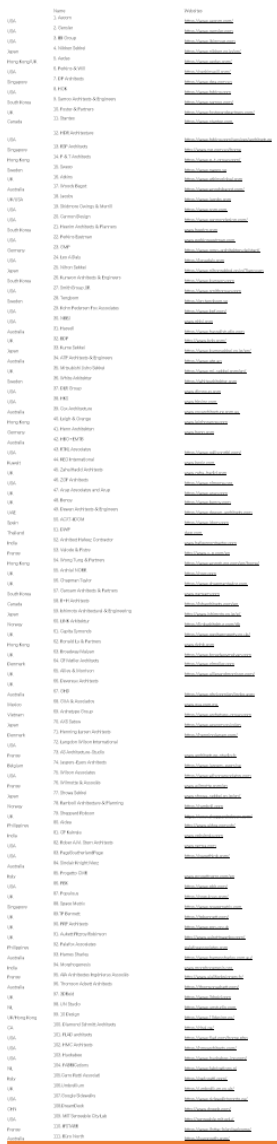
- Top100+ (crossover) digitized transformation of design companies



- The distribution of top100+ (crossover) digitized transformation of design companies

Country		Company	Project
USA		11	14
GBR		6	14
AUS		1	1
SWE		1	1
ESP		1	1
NED		2	13
DEN		1	1
CAN		1	1
AUT		1	1
ITA		1	10
CHN		1	9
FRA		1	1

12 countries **97** projects



103+8

USA	1. AECOM
USA	2. Gensler
USA	3. IBI Group
USA	8. HOK
Canada	11. Stantec
USA	12. HDR Architecture
Sweden	15. Sweco
UK	16. Atkins
UK/USA	18. Jacobs
USA	19.SOM
USA	24. Leo A Daly
Sweden	28. Tengbom
USA	29. KPF
Austria	34. ATP Architects & Engineers
USA	46. ZGF Architects
UK	47. Arup Associates and Arup
Spain	50. ACXT-IDOM
Denmark	71. Henning Larsen Architects
UK	79. Sheppard Robson
UK	87. Populous
NL	98. UN Studio
NL	104. FABRICations
Italy	105.Carro Ratti Associati
UK	106.Umbrellium
USA	107.Google Sidewalks
CHN	108.DreamDeck
USA	109. MIT Senseable City Lab
France	110. IFSTARR
Australia	111. Büro North

21+8

4 *The Creation Prospects of WeSpace*

Design companies

Transformation

- The intelligentized and digitized transformation within design companies
- The active empowerment and cooperation of design companies with cutting-edge forces such as technology companies

Tendency

Design companies participate in the design, creation and response of WeSpace directly. With the development of emerging technologies and the changes in people's needs for space use under its influence, design companies have also started to focus on using emerging technologies to combine digital innovation with traditional spatial intervention and place making to better fulfill people's activity needs, achieve self-adaptive and energy-saving functions, promote space use and management efficiency, and improve space vitality.

- **Relevant representative concepts and cases**

Source: Beijing City Lab. The collation of top100 digital transformation cases of architectural firms (Reference materials attached at the end.)

4 *The Creation Prospects of WeSpace*

Design companies

- **The construction of future cities**
- **Big: Woven City**

- This project is located in the factory of Toyota, which is about to be closed down under Mount Fuji in Japan, with an area of about 708,000 square meters. The construction is planned to start in early 2021.

- When the construction is completed, the area can accommodate more than 2,000 residents. Toyota employees and their families will be the first group of residents to stay in the cities, and here it is also the best place to develop new technologies.
- The buildings and site planning of the city is designed by BIG and completed in cooperation with Toyota.

Source: Toyota China. http://www.toyota.com.cn/brand/mobility_company/two.php.
Design Together. https://mp.weixin.qq.com/s/OUn0qHJ_MoD7Rz0qbTTpOA

4 *The Creation Prospects of WeSpace*

Design companies

- **The construction of future cities**
- **Big: Woven City**

- The three kinds of lanes including motor vehicle lanes, non-motor vehicle lanes and sidewalks are interspersed in the city and it makes the entire city look like a mesh braided structure.
- These intertwined roads have fulfilled the conditions of the pilot site for driverless cars, and it also helps Toyota with the test of smart cities.

- In addition to fulfilling people's daily traffic needs, vehicles can also provide services such as mobile office, retail space, medical clinics, and hotel rooms, etc.
- Vehicles will gather at the squares in the central area of cities to sell commodities or provide commercial services to people.

Source: Toyota China. http://www.toyota.com.cn/brand/mobility_company/two.php.Design Together. https://mp.weixin.qq.com/s/OUn0qHJ_MoD7Rz0qbTTpOA

4 *The Creation Prospects of WeSpace*

Technology companies

Transformation

- Technology companies strengthen their cooperation with the government and actively participate in the construction of future cities.
- Technology companies strengthen their cooperation with design companies and actively participate in the intelligent operation of urban space.

Tendency

Technology companies provide continuous technological empowerment for the creation of WeSpace. On the one hand, they always participate in the top-level design of future smart cities, deepen and expand the organizational structure and application scenarios of emerging technologies. On the other hand, they actively cooperate to expand the platform and serve the ecology. They are people-oriented and have good technologies to better fulfill the real needs of urban residents.

- **Relevant representative concepts and cases**

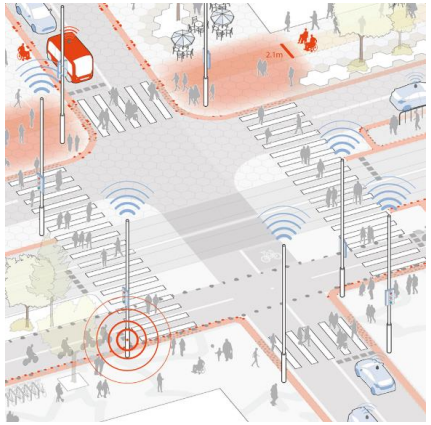
Source. Nanyue Business Information of International Business Daily. https://mp.weixin.qq.com/s/6o6wm3NLiLChmfGKswhU0Q.Planning China. https://mp.weixin.qq.com/s/QUTDKpv_qqobeAgfhBFdiQ. Baidu AI. https://mp.weixin.qq.com/s/GWCnlNoRMUTJgT7pTjKwSQ. Beijing City Lab. The collation of top100 digital transformation cases of architectural firms (Reference materials attached at the end.)

4 *The Creation Prospects of WeSpace*

Technology companies

- **The construction of future cities**
- **Google: The Sidewalk Toronto Project in Canada**

- The Toronto Waterfront in the east provides a good platform for shaping the future cities. Sidewalk Labs has proposed a "Master Innovative Development Plan" (MIDP) to try to explore a blueprint for the development of future cities. The plan integrates a series of innovative solutions in transportation, society, housing, digital tool technology, sustainable infrastructure, building, construction and public space, and it aims to improve the quality of life of Toronto residents. In this process, the emerging technologies have been fully used to guide the intelligent and efficient operation of urban material spaces.



- With the advent of driverless technology, about 7% of the travel needs in this block have been met by carpooling, making it easier for families to travel without having to own a car. Intelligentized signal lights can give priority to pedestrians and cyclists who need more time to safely cross the intersection or vehicles that are late for emergency situations.
- Shared infrastructure: For example, the connection of screen projections, lighting brackets or public facilities can have the community easily converted into rich and diverse public space.

Source: Sidewalk Labs. https://www.sidewalktoronto.ca

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **Tencent: Jiangmen Talent Island Smart City**

- The Tencent "WeCity" is Tencent Cloud's comprehensive upgrade of solutions for the government industry. It will be based on the technological advantages of Tencent Cloud and start from government affairs of people's livelihood and digital government affairs, and expand to urban governance, urban decision-making, industrial interconnection, and assist in the fields of cultural tourism, medical care, transportation, and education, etc. so that residents in the "WeCity" can truly enjoy the convenience brought by technology to life.

- Jiangmen Talent Island will take advantage of Tencent "WeCity" in the fields of digital government affairs, urban governance, urban decision-making and industrial interconnection to jointly promote the industrial innovation development of Jiangmen Talent Island.

Source: Jiangmen Business. https://cloud.tencent.com/developer/news/435958

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **Tencent: Jiangmen Talent Island Smart City**

- In the field of digital government affairs, the two parties will focus on the overall planning of digital government construction, and rely on the core technical advantages of Tencent in cloud computing, big data, and AI, etc. as well as the construction experience of digital Guangdong to create new government service experience for Jiangmen Talent Island so as to improve the level of government affairs service and accelerate the digital transformation of the real economy.

- In terms of urban governance and urban decision-making, Tencent will implement WeCity Urban Operation and Management Center in Jiangmen Talent Island. By accessing information such as transportation, public safety, ecological environment, and people's livelihood, Tencent has established a unified urban comprehensive operation monitoring platform, urban operation business linkage platform, emergency command platform, and comprehensive presentation platform for Jiangmen Talent Island, which has greatly improved the level of local urban governance.

Source: Jiangmen Business. https://cloud.tencent.com/developer/news/435958

4 The Creation Prospects of WeSpace

Developers

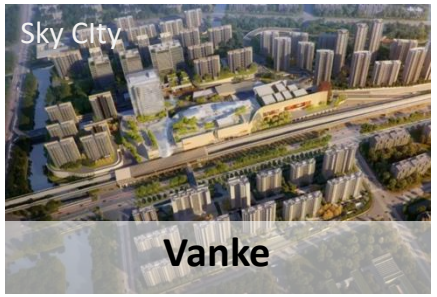
Transformation

- The developers transform from developing simply space to developing supporting service models.
- The location of developers transforms from houses to (urban) operators.

Tendency

The developers participate in the market development and utilization of future urban space. However, as housing demand further slows, developers begin to pay attention to the considerations on future urban space and further improve the quality of supporting services of products, and innovate service models to match the more comprehensive and operational living space requirements of future cities.

- **Relevant representative concepts and cases**



Source: Real Estate Review. https://mp.weixin.qq.com/s/cPMe2RL5VpwNPncIgAZihA.Biguiyuan. https://www.bgy.com.cn/news_details.aspx?id=9976811.Sunac. https://mp.weixin.qq.com/s/tBKTRefvVjAnIv4w-fIeMQ.Longfor Tsingdao. https://mp.weixin.qq.com/s/KI61rEti5DsYHjaU9oZOBQ

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **Vanke: The Sky City**

- The complex project on the subway station jointly built by Vanke and Shentong Metro (Shanghai Metro) is the first TOD project in Shanghai and it is of great significance. It may be the residential sample of Shanghai in the future. For all the land around the subway, Vanke has participated in the construction and has truly formed the integration of station and city. It is a super miniature city containing parks, residence, business and office.

- "Sky City" refers to the design concept of "High Line Park". From the subway station to the residential groups, the base height difference of the project is used to create an "air walkway". By designing a rich three-dimensional transportation system, a multi-level moving line of going back home is formed. A variety of roads including vehicle lanes, sidewalks and jogging tracks, and bicycle lanes are planned. These roads lead to shopping malls, residential groups, subway stations and parking lots, etc., forming a vertical spatial hierarchy.

Source: Real Estate Review. https://mp.weixin.qq.com/s/cPMe2RL5VpwNPncIgAZihA.Real Estate Kengqiangshuo. https://mp.weixin.qq.com/s/Tjisq-TvMNV6WDotbUSF6g

Developers

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **Vanke: The Sky City**

- In the research of Vanke on walking scale and space, it shows that within 500 meters is a relatively comfortable walking distance, and 800 meters is the limit of "comfortable distance". Therefore, in the planning of "Sky City" there is a principle, that is, even the residential building farthest from the subway station cannot be more than 800 meters away from the station.

- In order to reach the limit of "comfortable distance" of 800 meters, the road from each residential group to the subway station should be as straight as much as possible. The trails will be filled with green plants and some public facilities will be arranged. When the owners walk along the trails to the subway station every day they will pass coffee shops, small squares, and commercial streets, etc., and they will meet different scenes along the way so that the walking distance of hundreds of meters may become more interesting and the psychological distance is also shortened.
- This "air walkway" will be connected to the shopping mall in the later stage and attracting consumers to the shopping mall. Non-owners can also take a walk and rest here, but they cannot enter the residential group. Open community space that can reserve privacy is the tendency in the future.

Source: Real Estate Review. https://mp.weixin.qq.com/s/cPMe2RL5VpwNPncIgAZihA.Real Estate Kengqiangshuo. https://mp.weixin.qq.com/s/Tjisq-TvMNV6WDotbUSF6g

4 The Creation Prospects of WeSpace

(Space) Retailers

Transformation

- Retailers are gradually faced with the opportunities and challenges of service scenarios and models brought by emerging technologies.
- Retailers have begun to think about the new service scenarios and models of future urban space from the industry itself.

Tendency

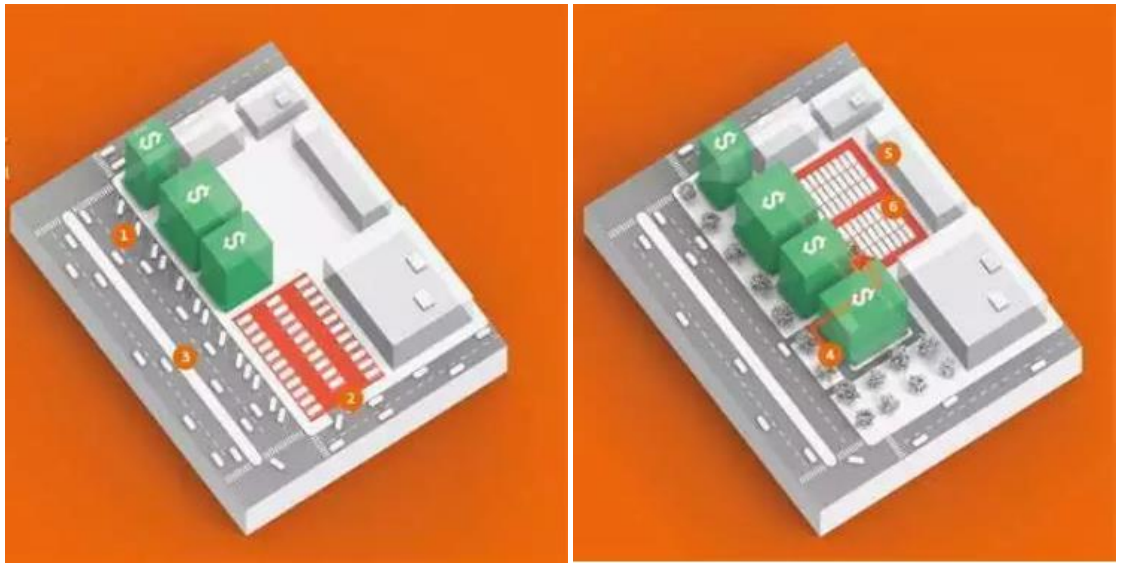
Retailers participate in the specific construction of various ecological application scenarios in the future urban space. Traditional retailers are faced with severe market impact brought by emerging technologies, so they often use their deep understanding of specific service scenarios and models and combine with the application empowerment brought by emerging technologies to explore the scenarios and models of innovative service application, improve service efficiency and experience, and respond flexibly to changes in market demand brought about by technology.

- **Relevant representative concepts and cases**

Source: Future-Horizon. https://mp.weixin.qq.com/s/j3x3v8JKQE5orAM-b1DwgQ.Toyota China. http://www.toyota.com.cn/brand/mobility_company/two.php. Bejing Suning. https://mp.weixin.qq.com/s/WkXgt4TMzEQ-rOu3zW5QMQ. Eastern Nissan. https://mp.weixin.qq.com/s/q6ixykrEyWmbuEAY6qCjFQ

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **Audi: The smart city project in the U.S.**



- Audi has cooperated with Somerville, a coastal city in the eastern United States to launch a smart city project to solve local problem of parking and traffic jams and develop automatic parking technology. The project focuses on automatic parking of smart cars and the reduction of the area occupied by parking in order to save up to 60% of the parking space. In this kind of parking lots, the area of each parking space can be reduced by more than two square meters, and the lanes have become narrower. In addition, there is no need to install stairs and elevators, and the cars can be parked one by one and end to end in a row.

- The project can not only reduce cost in essence, but the most important thing is that the space saved can be used to build residential buildings, shops or leisure facilities, as well as everything that can improve the quality of life of the residents. Residents can use the parking lot in the early morning and night, and corporate users can use it during working hours. The parking lot can also be built in less prosperous areas. When the user gets off the car in the central area, the car will go to the parking lot in the non-busy area according to the designed route.

Source: Future- Horizon https://mp.weixin.qq.com/s/j3x3v8JKQE5orAM-b1DwgQ

4 The Creation Prospects of WeSpace

Operators

Transformation

- Traditional operators actively participate in digitized transformation and iteration.
- The majority of developers and other social forces transform into operators in the broad sense.

Tendency

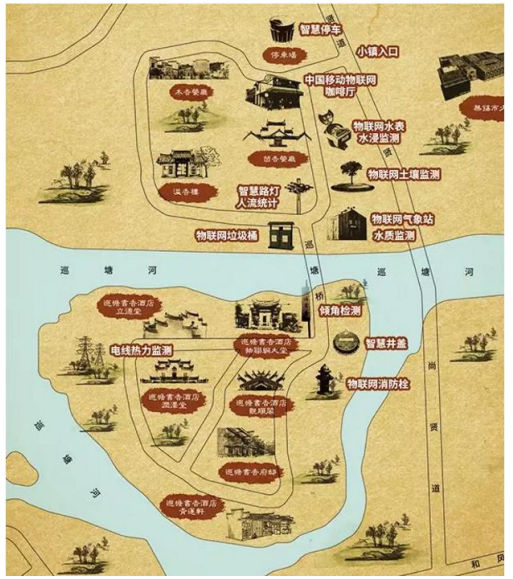
Operators participate in the planning, organization, management and operation of future urban space. With the further development of emerging technologies and the further digitized development iteration of future urban space and resource elements, everything can be operated, and city (space) becomes the largest operating product. Different social forces are involved in the management and management of future urban space in competition and collaboration.

- **Relevant representative concepts and cases**

Source: WoBaoBao. https://mp.weixin.qq.com/s/BoRH9RG9wQe0P2OBIGRB_g.Mobile Labs. https://mp.weixin.qq.com/s/P3DpeUD3fEmGtS6bKTcuIA.
China Academy of Information and Communications Technology. CAICT. https://www.sohu.com/a/257950523_297710.China Fortune Land Development . https://mp.weixin.qq.com/s/QyenffM0rvblRxS1ZyLu2A

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **China Mobile: Smart Xuntang**



- In 2018, the first phase of "Smart Xuntang", the Internet of things application demonstration area jointly created by Wuxi Mobile Company and China Mobile Internet of Things Co., Ltd. has been completed. Based on the extraction and analysis of big data and cloud management platform, and relying on the new generation of information technology such as intelligent perception, cloud computing and Internet of Things, etc., it focused on the featured positioning of "Internet of Things + Tourist Town" in Xuntang Ancient Town and built six smart application modules including smart fire control, smart security protection, smart municipality, smart consumption, smart home office, and smart environment. And it has provide integrated and perfect solutions for environmental monitoring and protection, municipal management and construction, security requirements, residential experience, and tourism consumption upgrade.
- In 2019, the second phase of "Smart Xuntang" has been completed as scheduled. It takes the creation of the application scenarios of Internet of Things as the key content. The construction of the project has been accomplished from point to plane and from the installation of single smart device and the scenario-based solutions such as smart hotel and smart retail, forming the epitome of the development of smart city and providing a reproducible model of future city for smart towns.

Source: China Mobile. http://iot.10086.cn/news/read/id/1132.
China Mobile Intelligent Manufacturing. https://mp.weixin.qq.com/s/YzlQg4BpokIEuWEnZiJnNg

Operators

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **China Mobile: Smart Xuntang**

- As the brain of the town, "Smart Xuntang" cloud management platform is able to centrally display and control the data of each device platform. Various application equipment platforms acting as the nervous system will upload all real-time data, images, videos and other information of the town to the brain of the town. Based on data analysis and comparison, the platform can provide visual and dynamic theoretical basis for the management of the town. In addition, on the cloud management platform, the smart devices of the town are presented in the form of maps. People can click on the device icon on the "Smart Xuntang" cloud management platform to clearly understand the data of smart manhole covers and fire smoke, etc. without leaving the house without leaving the house so as to truly achieve the smart management of digital towns.

- Walking out of the town coffee shop and walking along blue stone path all the way, people will experience the high integration of humanities and Internet of Things technology in the ancient town. Beside the quaint stone road, the manhole cover of the Internet of Things cleaves to the safety of groundwater and pipelines. On the banks of the Xuntang River with blue waves and clear water, the water quality monitoring and air monitoring are silently guarded. By the mottled ancient wall stands the intelligent fire hydrant proudly. There are also smart street lamps and smart cameras here and there. The new Internet of Things devices complement each other with the ancient town that has been baptized over the years.

Source: China Mobile Intelligent Manufacturing. https://mp.weixin.qq.com/s/YzlQg4BpokIEuWEnZiJnNg

4 *The Creation Prospects of WeSpace*

■ Government (Multi-party participation)

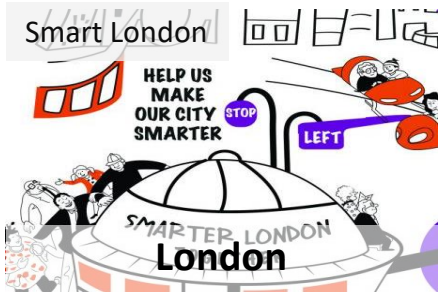
Transformation

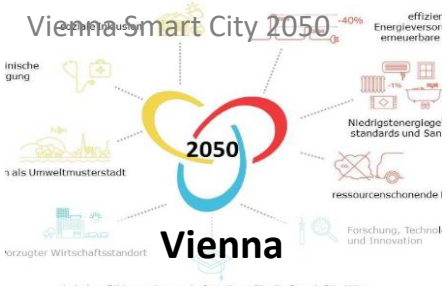
- Government transforms into digital government.
- The WeSpace collaborate with multiple social forces for governance and creation under the leadership of the government.

Tendency

The government participates in the macro control of future urban space and coordinates different social forces to actively participate in urban co-construction. The traditional high-efficiency model in which the government dominates the urban space construction independently has been increasingly affected by emerging technologies, and it has transformed to the model in which multi parties perform construction collaboratively. Social forces such as technology companies are actively involved in the process of collaborative governance with the government from their own professional perspectives.

- **Relevant representative concepts and cases**



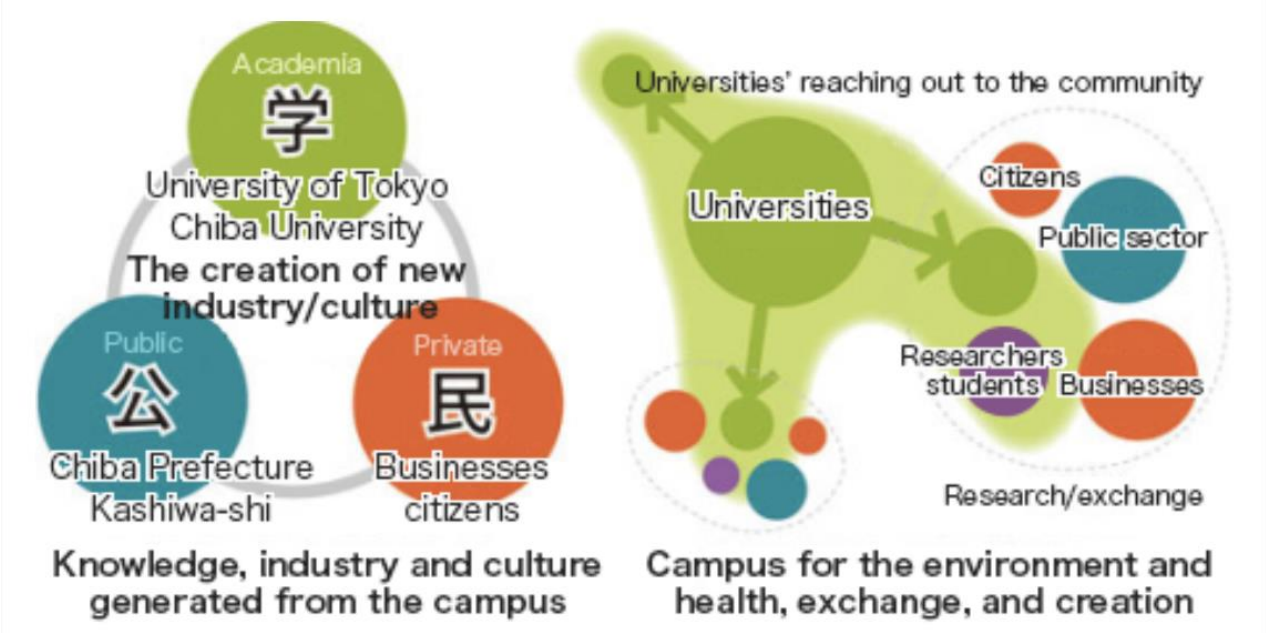


Source Kashiwanoha Smart City. https://kashiwanoha-smartcity.com/cn/concept/whatssmartcity.html.Smart London. https://www.london.gov.uk/what-we-do/business-and-economy/supporting-londons-sectors/smart-london/smarter-london-together.Smart Soul. http://digital.seoul.go.kr/eng/smart-seoul/strategy.
Vienna Smart City. https://smartcity.wien.gv.at/site/en/citizens/

Governments

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **Kashiwanoha Smart City: For the environment of the future, for healthy living of the future, for key industry of the future.**



- Kashiwanoha Smart City is constructed collaboratively by the "public, private, and academic" parties including administrative agencies, universities, research institutes, Mitsui Real Estate and Hitachi and some other private enterprises from three perspectives of "for the environment of the future", "for healthy living of the future", and "for key industry of the future", and it aims at constructing a safe, secure and sustainable smart city.

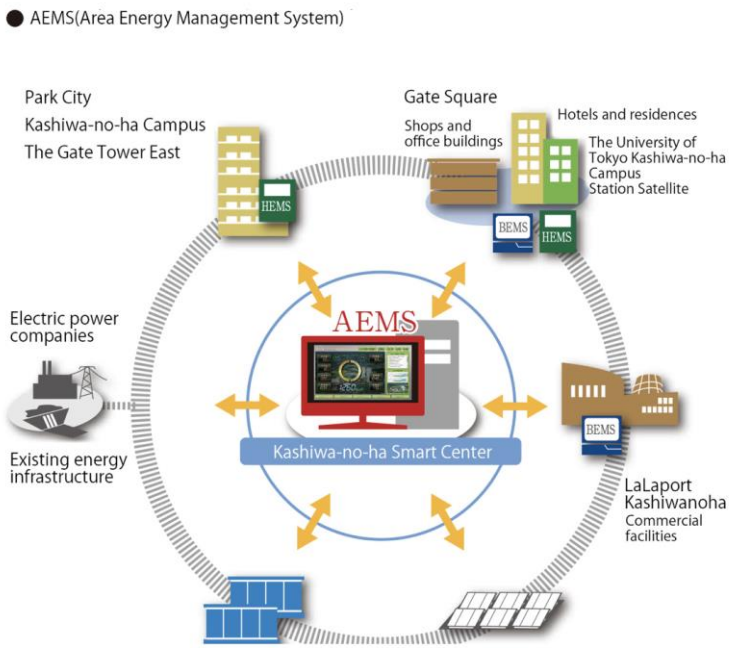
- In 2005, the Tsukuba Express Railroad was opened, and Kashiwanoha gakuen station was established. The convenience of transportation had been improved, and the development of the Kashiwanoha area entered a new era. The first stage of Kashiwanoha Smart City is to build a compound city composed of four main blocks with the surrounding area of Kashiwanoha gakuen station as the center.

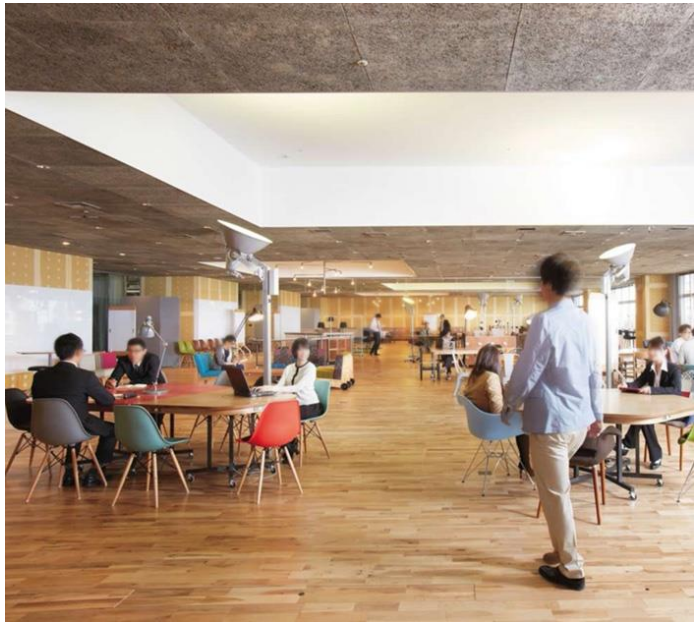
Source: Kashiwanoha Smart City. https://kashiwanoha-smartcity.com/cn/concept/whatssmartcity.html

Governments

4 *The Creation Prospects of WeSpace*

- **The construction of future cities**
- **Kashiwanoha Smart City: For the environment of the future, for healthy living of the future, for key industry of the future.**





- AEMS Area energy management system: It constantly optimizes the overall energy utilization of the city. It aims at creating self-operated power supply network, and expanding the scale of the area and achieving functional expansion. In addition, it strives to develop into "smart grid" as the core power that improves residents' quality of life and supports urban innovation.

- It is composed by health facilities in the block (medical facilities focusing on preventive medicine), visual health status (wearable life recorders and data analysis systems), health promotion projects, well-equipped health research projects, and various community level communication activities with health as the topic.

- KOIL (Kashiwanoha Open Innovation Institute): It is composed of innovation floors aimed to stimulate creativity and office floors aimed to improve business efficiency.
- Co-working areas, coffee shops, 3D printers and laser cutting machines, shared factories and apartment-style suites of activity centers provide support for users from every aspect of business activities.

Source: Kashiwanoha Smart City. https://kashiwanoha-smartcity.com/cn/concept/whatssmartcity.html

4 *The Creation Prospects of WeSpace*

- **Conclusion: The attributes of future urban space are diverse. Different social forces are also competing for services and usage scenarios in the space in collaboration.**

Major forces +	Construction mode +	Transformation tendency +	Management method +
1+5 forces	**Collaborative construction**	**Smart creation**	**Space operation**
Government + design companies, developers, technology companies, retailers, operators	All social forces compete and collaborate to participate in the co-construction of urban space under the leadership of the government.	The main body presents the tendency of combining spatial intervention, place making and digital innovation.	Urban renewal under inventory planning focuses on designing the long-term tracking, feedback and operation of projects.

5 *The Conclusions and Prospects* for WeSpace

(The deep thinking from the perspective of technology and space)

5 The Conclusions for WeSpace

The top 10 tendencies of future urban space

Epistemology

Tendency I — The increasing screen use behavior affects people's perception of space

- The fragmentation of screen use of individuals reduces their attention and perception of physical space
- Individuals highly rely on electronic products, which has triggered the consideration on health issues

Tendency II — Individuals' spatial and temporal freedom of work and life has improved

- Work has been redefined and it is no longer limited to a fixed time and place. In the future, work may become a choice of freedom and interest
- The Internet of Everything brings diversification and personalization of lifestyle

Tendency III — The transformation of organization and development model of free and mixed future urban space

- The spatial form no longer follows the function, and services with people as the core are more concentrated
- Urban development tends to have refined development and mixed functions, and the space shows fragmented development
- The places of residence are the organization center, and other functional spaces are scattered around the community, or become the supporting facilities of the community

Tendency IV — The unity of opposites between spatial polarization and flattening

- At the region level, new polarized centers are generated. The central cities are increasingly enriched and other cities seek "characteristic" development or are faced with shrinkage. The imbalanced state may be more obvious in the short term
- At the city level, on the one hand, new innovative industrial clusters will become the new growth poles of the city. On the other hand, the employment space is flattened. The transportation center and shopping malls may be weakened, and the service space will sink to communities

Epistemology

Tendency V — The deep integration of virtual space and physical space

- The Internet-based virtual space with the algorithm as the core has taken over the information search function of the urban physical space, and the urban gap/fragmentation space has gained new opportunities and values
- The urban space surpasses the physical function due to the enhanced ability of digital attributes. In addition, the symbolization role of some spaces such as CBD is weakening, and traditional offline spaces are faced with remodeling

Tendency VI — The solution of old problems and the emergence of new problems in urban space

- The combination of technology and space is expected to solve the problems of traffic congestion, environmental pollution, energy waste and other environmental problems in the city for a long term to make the return to be sustainable.
- Under the background of a new round of "digital divide", the social issues such as gentrification, social segregation, the gap between rich and poor, and privacy and security in the process of urban development should be discussed more

Methodology

Tendency VII — The data-driven tracking research on future urban space

- Super big data based on the Internet of Things in future urban space will provide more refined and larger-scale data support for urban studies.

Practice

Tendency VIII — The coexistence of old and new urban space and urban collage of different eras

- Urban space as a container has relatively stronger flexibility in use. The space remains the same but people's use of the space has changed. In addition, new spatial forms will also emerge and new and old spaces will coexist.

Tendency IX — Operation of the use and management of urban space

- The comprehensive intelligentization of urban space elements makes everything operational. It gives full play to the optimization and integration roles of mobile Internet in the element configuration. Cities may become operational products.

Tendency X — The superposition of urban spatial technology layer with digital innovation as the core

- The design of some urban spaces in the future will need the superposition of technological layer. Spatial Intervention, Place Making and Digital Innovation will be more feasible and practical ways to create better built environment in the future.

5 The Conclusions for WeSpace

The top 8 issues of future urban space

Epistemology

Issue I

Research on the overall evolution tendency and characteristics of future urban space

- Can future urban space be predicted? / how to predict better?
- How are the changes in future urban space reflected nowadays? To what extent can they be reflected?
- How many cities will the development prospects of WeSpace apply to finally?

Issue II

Research on the scale and model of human settlement in future cities

- What is hierarchy, scale, structural form and development model of future cities?
- Will the future urban space be more differentiated or more uniform ?

Issue III

Research on the impact and challenges of emerging technologies on future urban space

- The role of emerging technologies in future urban space
- The impact of emerging technologies on future urban space : efficiency, quality and vitality
- New urban spaces and new spatial organizational relationships generated by emerging technologies
- Challenges that the future urban space is faced with under the application of technologies

Methodology

Issue IV

Research on the cross-regional collaborative path and mechanism of future urban space under the background of the application of emerging technologies

- Do metropolitan areas, strong provincial capitals, and existing administrative boundaries affect the development of urban space?
- How to use emerging technologies to achieve the cross-regional coordination of urban development more efficiently?

Issue V

Research on the matching and fusion mechanism of urban physical space and digital space

- The development of online space has had many influences on offline space. How will physical space in the future deal with the opportunities and challenges brought by emerging technologies?
- Where is the balance point between physical space and virtual space in the future?
- Facing the continuous iteration of technology, how can the relatively lagging urban space adapt quickly and elastically?

Issue VI

Research on Data Ecology Construction of the future urban space (Collection, use, sharing, protection, governance)

- The challenge of data/technology hegemony to urban spatial justice and social equity
- How to build a better urban data ecosystem in the future?

Practice

Issue VII

Research on the creation method of future-oriented urban space design

- How can emerging technologies make urban space development more humane?
- In the future, how to combine emerging technologies to revive the withering urban space or the declining cities?

Issue VIII

Research on the digital space construction and operation mode of future cities

- Who pays for the future urban space, and how do governments and enterprises cooperate?
- Is it necessary to/how to form a unified standard paradigm for the creation (construction) of future cities?

5 *The Conclusions for WeSpace*

Major contributions of this report

Contribution I

It reviews the impact of technological development on urban space in order to look forward to the development prospects of urban space in the near future

- This report sorts out the macro, medium, and micro effects of various technological developments on urban space since the Industrial Revolution, as well as the guiding role of ideal city model, and then derives the cyclical characteristics of urban development. For example, "The influence of disruptive technology on the ways of living and production in cities is finally projected in the space", "The urban spatial form has strong flexibility and adaptability, and it has hysteresis compared to technological iteration", "The replacement of new functions and the infusion of connotation in the existing space, and the generation of new spatial form and the design paradigm", "social organization methods have changed, and cities are becoming more complex". These characteristics provide the basis for this report to focus on the cutting-edge trends of current technological development and look forward to the urban space scenarios in the near future.

Contribution II

It sorts out the emerging technologies that are having /may have a profound impact on urban space in contemporary society and summarizes the main tendencies of future urban space driven by technology

- This report explores the driving forces of changes in future urban space from the perspectives of technology supply and human needs. It sorts out the impact of emerging technologies on space at different levels. And with the chain of technology drive -product service-spatial transformation, it discusses the reconstruction and transformation of urban space by emerging technologies, and finally condenses into ten main tendency judgments.

Contribution III

It prospects the possible development scenarios of regions, cities and facilities in the future, and triggers more in-depth discussions and research

- This report summarizes the development tendency of hierarchical structures, scales, and connections at the region level and explores possible scenarios for future residence, employment, recreation, transportation, and services. And it discusses the upgrade of traditional technological facilities and the integration of digital infrastructure under the context of new infrastructure. The report summarizes a variety of possible future space scenarios more comprehensively, and it aims to trigger more considerations and discussions on future space, as well as more in-depth research and exploration.

Contribution IV

It sorts out a wealth of design, construction, and operation cases to show future space scenarios with a variety of possibilities

- Based on a wealth of case accumulation and systematic sorting, this report fully demonstrates the imagination and practice of different participants in the future urban space scenarios, and provides a good platform for understanding the latest progress of multi-disciplinary research on future urban space in order to stimulate more diversified and in-depth research and thinking.

5 The Conclusions for WeSpace

Several limitations of this report

Limitation I

The consideration of the spatial impact of technological development on the secondary industry is limited

- Based on the current development tendency, this report suggests that the internal industrial space of the city in the future is expected to be dominated by the tertiary industry space, and the secondary industry space will be moved out of the core area of cities. Therefore, this report does not focus much on the specific impact (such as machines will replace men) of technological development on the secondary industry (manufacturing industry) as well as the impact of the development of large-scale intelligent manufacturing industry, traditional industrial transformation, and industrial migration in different regions on people's ways of living and production, and employment opportunities, etc.

Limitation II

The consideration of other factors affecting the development of future urban space is limited

- This report is mainly based on the partial development trends and path dependence of the current urban space scenarios under the influence of technologies to derive possible future scenarios. However, technology is only one of the driving factors for the development and evolution of future urban space. The economy, policies, and cultural values and ecological development of human society will also have many effects on urban space. This report focuses on the perspective of technical derivation, and does not carry out systematical analysis and deduction of other factors. There is still some room for improvement in the aspects of deduction chain and the logical rigorousness and systematization.

Limitation III

The predictability of the future urban space itself is limited

- The future is based on creation rather than prediction. On the one hand, it is often impossible to predict the occurrence of "black swan" events such as the COVID-19 based on the empirical trends. On the other hand, due to the complexity of the city itself, The intervention measures adopted based on the purpose of problem-solving may also bring about new problems. These unpredictable events will generate many "butterfly effects", which will have an unpredictable impact on the future urban space. This report only puts forward some of the existing cognitions, and sorts out the relevant urban space scenarios, hoping to attract more attention and discussions and carry out diversified exchanges and in-depth research through the subsequent open research plan.

Limitation IV

The discussion about the living conditions of different groups is insufficient

- This report discusses more about the positive effects of technologies but less negative effects. There is a lack of discussion about the living conditions of different groups, especially vulnerable groups. As a result, the content of this report is not applicable to all cities in the next decade, and it is also not applicable to the lifestyle of all people. This report is limited to relatively positive thinking about the future, so more research is required to study the negative effects that different groups may be faced with, and explore the spatial forms that adapt to different lifestyle of groups and different cities in the future.

5 *The Conclusions for WeSpace*

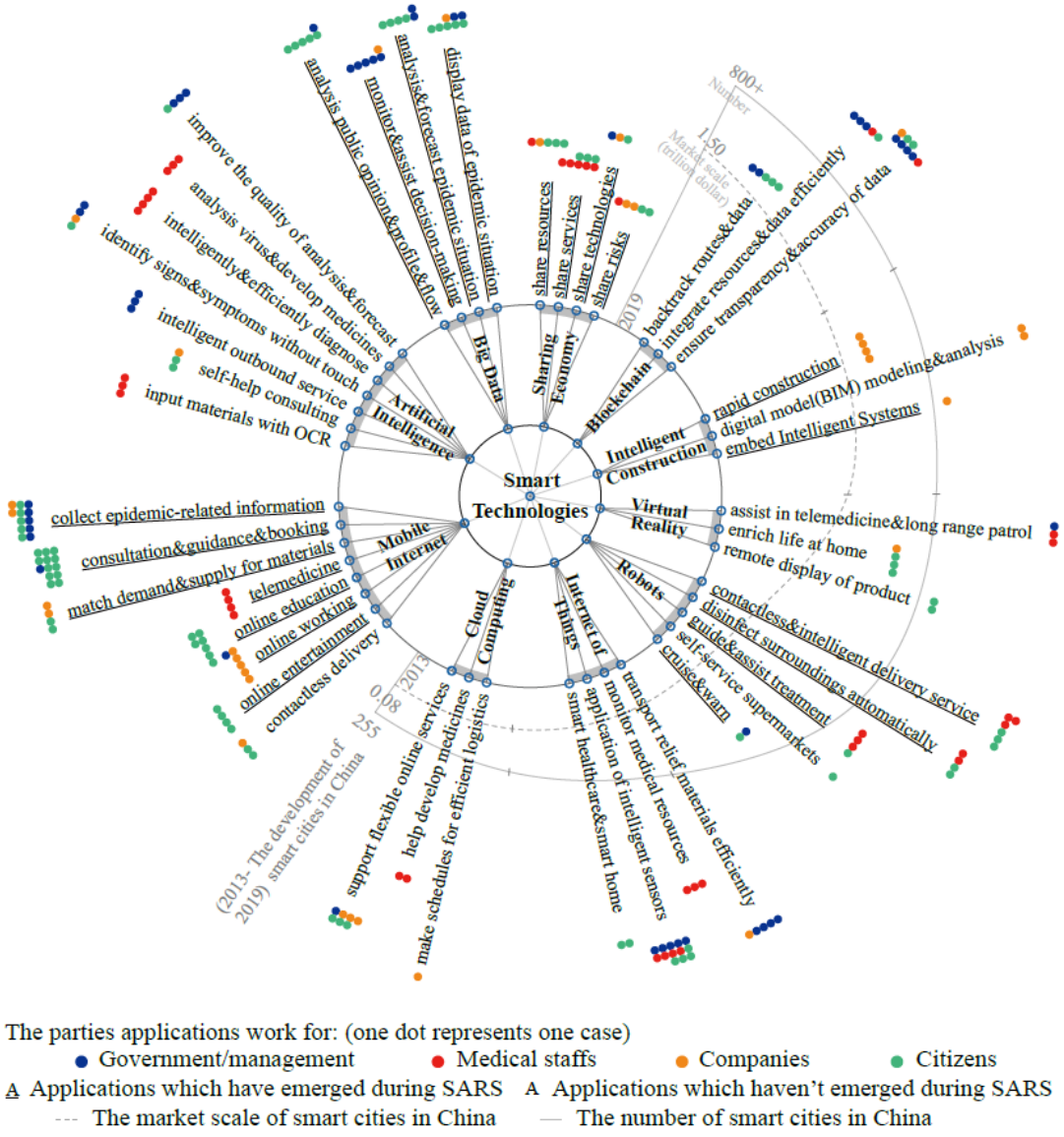
Technology and (future) urban space under the influence of COVID-19

- **On the one hand, the sudden outbreak of COVID-19 has exerted a huge impact on the definition and use of urban space at present**

  Public health events such as pandemics have shaped our cities and indirectly contributed to the birth of modern urban planning. Under the influence of a series of measures to reduce population aggregation and mobility such as home isolation, and cities lockdown, etc., the urban service and supply patterns have undergone comprehensive online transformation, and also have a direct impact on the daily needs of residents and life behaviors. The functional forms and usage patterns of spaces for living, employment, recreation and transportation in cities are faced with redefinition. During the pandemic, the living space began to carry functional attributes such as office, entertainment, and leisure, etc. The use frequency of urban public space is faced with a short-term decline. The users in the public space also fully keep social distance. In addition, the amount of public transportation has decreased, and space for walking and cycling has become more important.

- **On the other hand, emerging technologies play a key role in the normal operation and maintenance of urban space during pandemic prevention and control**

  The outbreak of the COVID-19 can be considered as a test of a series of general smart city technologies to some extent. It ultimately provides important support and guarantees for the efficient and precise governance of government/administrators, drug research and development and diagnosis of medical workers, remote operation and maintenance of companies, and active participation and feedback of the public. And it has greatly reduced the negative impact on various aspects of cities, and thus plays a critical role in flexible and healthy use of urban space and the monitoring and early warning of vulnerable areas or people under the combination of peace and disaster time and improve the resilience of the urban (space) from multiple dimensions.



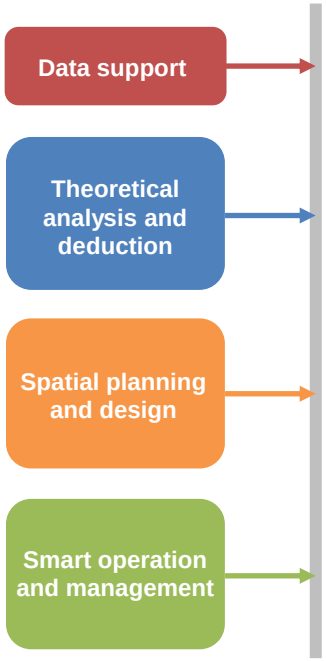
- **Applications of various smart technologies during COVID-19 in contrast with SARS**

Source: Li Weijian and Long Ying. Technologies and Cities: General Smart City Technologies Promote City Resilience. [J] Shanghai Urban Planning. 2020(02):64-71.

5 *The Prospects for WeSpace*

Opportunities in urban planning, design, construction, and management

- **The research and exploration of future urban space development will respond to important national policies, strategies and guidelines in the form of practice**



In Dec. 2012, the Ministry of Housing and Urban-Rural Development issued the "Interim Measures for The Administration of The National Smart City Pilot Program", pointing out that building smart cities is an important measure taken by the CPC and the State Council to promote innovation-driven development, promote a new type of urbanization and build a moderately prosperous society in all respects.

In Dec. 2015, the Central City Work Conference clearly brought forward the requirements of "ecological restoration and urban repair" and guided the direction of China's urban development and construction in the transition period. It is an important action to control "urban disease" and improve the human settlement environment.

In Mar. 2017, the Ministry of Housing and Urban-Rural Development promulgated the "Measures for Urban Design and Management", aiming to improve the level of urban construction, shape urban features and characteristics, promote urban design, and improve urban planning and construction management.

In May. 2019, the Ministry of Natural Resources issued the "Notice on Comprehensively Carry Out The Work of National Territory Spatial Planning ", pointing out the comprehensive start of national territory spatial planning, implementation the economic, social, industrial development goals to provide space protection, promote economic and social development pattern, urban space layout, industrial structure adjustment matching the carrying capacity of resources and environment.

In Apr. 2020, it was proposed in "Key Tasks for New-Type Urbanization Construction and Urban-Rural Integrative Development in 2020" that we should insist on the new development concept and speed up the implementation of new-type urbanization strategy with the promotion of people's urbanization as the core and the improvement of quality as the direction, and we should improve the system and mechanism for urban sustainable development, and promote the quality of urban development. We will implement new-type smart city actions and support the healthy and efficient operation of cities, and rapid intelligent response to emergencies.

…

(Some national policies, strategies, or guidelines)

- **For the development of emerging technologies in the future, the above-mentioned relevant policies and guiding concepts should be adhered to and actively integrate into the current specific theoretical and methodological frameworks of national territory spatial planning and urban design. Strengthen the top level design and macro guidance of technologies so as to be more scientific, sustainable, and human-oriented to provide positive and orderly guidance for the high-quality development of future urban space.**

Source: Cpcnews. http://cpc.people.com.cn/n1/2015/1223/c64094-27963704.html.Ministry of Housing and Urban-Rural Development. http://www.mohurd.gov.cn/fgjs/jsbgz/201704/t20170410_231427.html.
Ministry of Natural Resources of the People's Republic of China. http://gi.mnr.gov.cn/201905/t20190530_2439129.html.
National Development and Reform Commission. https://www.ndrc.gov.cn/xxgk/zcfb/tz/202004/t20200409_1225431.html

5 *The Prospects for WeSpace*

■ Tech for Good and healthy, sustainable development of future urban space

- **Fully direct the technology to do good things and promote its positive effect on future urban space**
- **Evaluate and warn in time for the negative effects of technology to suppress potential technological risks**

"Tech for Social Good" …… ——Tencent

"Make it easy to do business anywhere" …… ——Alibaba

"Make the complicated world simpler through technology" …… ——Baidu

"Do not be evil" …… ——Google

"Technology that benefits everyone is truly powerful" …… ——Apple

…

(The mission, vision or values of some tech companies)

- **During the development and application of science and technology, The emergence of potential problems such us the violation of ethics and values, imbalance of technology and cultural heritage and humanistic care cannot be avoided.**
- **People are the scale of technology, and all sectors of society should jointly face various new problems brought by new technologies and applications, seek consensus and explore solutions, promote the positive role of new technologies in human society and urban space, and identify and circumvent adverse effect, oppose the evil of technology. We advocate that all parties in the society have a social welfare perspective rather than a simple user perspective, and jointly promote the healthy and sustainable development of future society and urban space.**

5 The Prospects for WeSpace

■ Subsequent plan

- ***The relevant studies, opinions and design progresses related to "Future Urban Space" will be updated every year and formed annual report***

- ***WeSpace Academic Support Plan in 2020: "Tsinghua-Tencent" Emerging Technologies × Future Urban Space project***

Introduction of the Project

The 2020 "Tsinghua-Tencent" Emerging Technology × Future Urban Space project is jointly established by Tencent Research Institute, Tencent Cloud, School of Architecture of Tsinghua University, and Beijing City Lab. The funds are supported by Tencent and jointly managed and operated by School of Architecture of Tsinghua University and Beijing City Lab. The project supports college students with academic potential (including M.S. students and Ph.D. students) to carry out special investigation and research

Framework

The future urban space under the influence of emerging technologies: It is required to combine the eight future research issues raised in this report

Time line

June, 2020	• Online publicity of the project at the early stage (see the additional publicity materials for details)
June to July, 2020	• Start accepting individual project applications
July, 2020	• The project committee announces the funding list and conducts centralized (online) training
August, 2020 to July, 2021	• The funded students complete the research project and submit a research report. The funded students are required to report the research progress and related findings to the project instructors every three months, and discuss the problems during the investigation and research with the instructors
August, 2021	• The project committee reviews the research reports, and lists the ratings and publishes on the website of the funds. In addition to the corresponding rewards, excellent research reports can also be considered for publication, and the authors can also apply for a subsequent rolling support plan

Funds support

The "Tsinghua-Tencent" Emerging Technology × Future Urban Space project sets up an advisory committee, committee and secretary general. The advisory committee provides academic advice and guidance for the funds. The committee manages the funds, organizes and participates in reviews, and makes decisions and guidance. The secretary general is responsible for the daily operation of this funds, contacts and communicates with universities, research institutes or social units to promote the funds

The joint research group of the report

School of Architecture, Tsinghua University

- **Long Ying:** Research Professor of School of Architecture, Tsinghua University. Founder and Executive Director of Beijing City Lab
- **Yan Tingwen:** Research Assistant of School of Architecture, Tsinghua University
- **Li Weijian:** Research Assistant of School of Architecture, Tsinghua University
- **Zhang Enjia:** PhD candidate of School of Architecture, Tsinghua University
- **Chen Jingjia:** Graduate student of School of Architecture, Tsinghua University
- **Li Pai:** Research Assistant of School of Architecture, Tsinghua University
- **Tong Chen:** Visiting Student of School of Architecture, Tsinghua University

Tencent Research Institute

- **Liu Jinsong:** Senior Researcher of Tencent Research Institute
- **Liu Qiong:** Senior Researcher of Tencent Research Institute
- **Zhou Zhenghua:** Senior Researcher of Tencent Research Institute
- **Wu Pengyang:** Senior Researcher of Tencent Research Institute
- **Li Ruilong:** Senior Researcher of Tencent Research Institute
- **Wang Gang:** General Manager of Government Industry of Tencent Cloud
- **Dong Ting:** Senior Manager of Government Product Operation of Tencent
- **Li Yongtao:** Senior architect of WeLing of Tencent Cloud
- **Jiang Xiangjun:** Senior architect of WeLing of Tencent Cloud

Contact: ***ylong@tsinghua.edu.cn***

清華大學建筑学院 School of Architecture, Tsinghua University BCL Tencent Research Institute Tencent Cloud

- Beijing City Lab. https://www.beijingcitylab.com
- Tencent Research Institute. https://www.tisi.org
- Tencent Cloud Assistant. https://intl.cloud.tencent.com

For more information:

https://www.beijingcitylab.com/projects-1/48-wespace-future-city-space/

How to cite:

Beijing City Lab and Tencent. WeSpace. Version 2. 2021.02.24

Contact: ***ylong@tsinghua.edu.cn***