

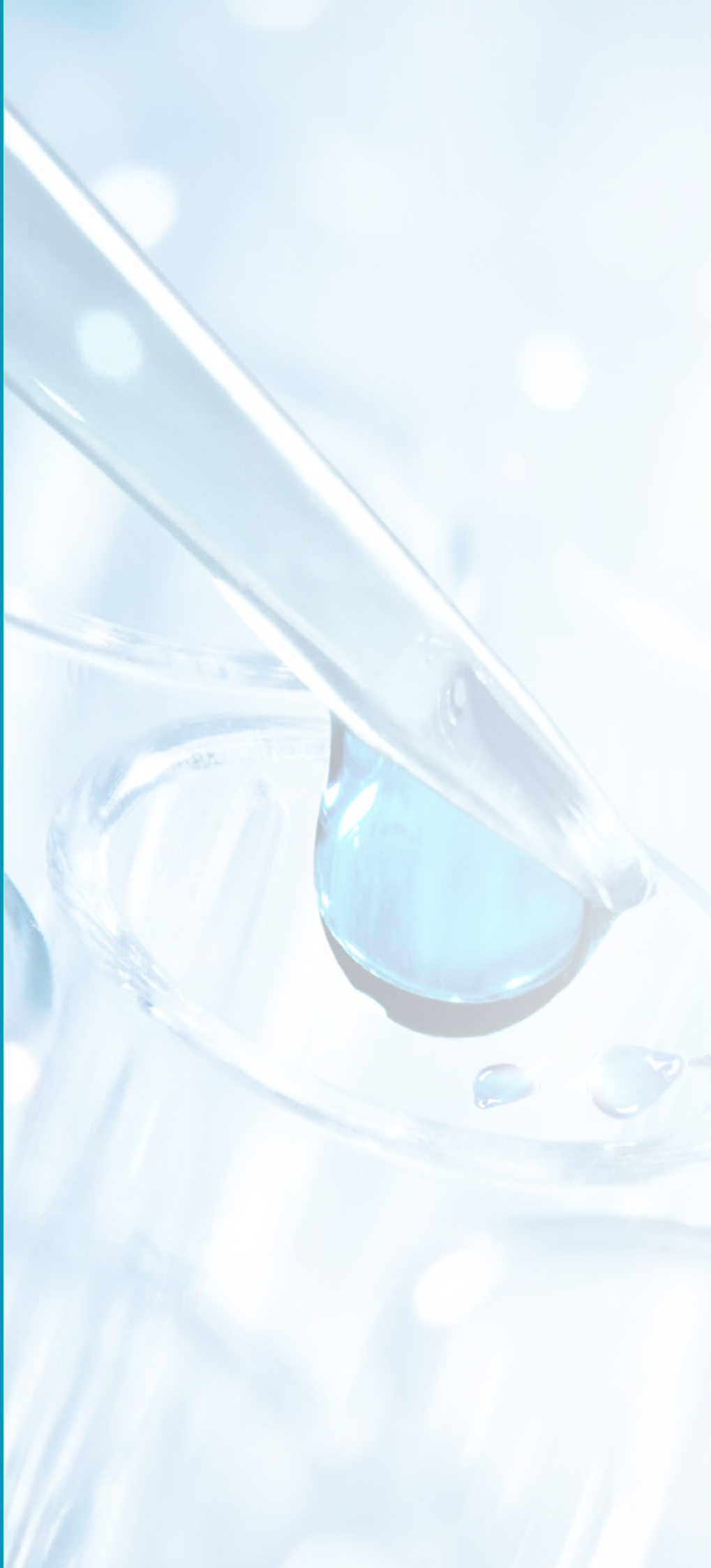
LIFE SCIENCES

2022

JULY

Changing the genetics of
commercial real estate in China

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Executive Summary

In recent times, especially during the ongoing COVID-19 pandemic, greater awareness of the importance of healthcare by an expanding pool of educated people around the world, greater spending by governments around the world, ageing populations in many regions, and advancement in medical science and associated technology, have motivated the global life sciences sector to increasingly realise new business opportunities.

Being one of the most important life sciences markets, China is no exemption. Driven by a host of factors, including:

- Organic industry growth;
- Population demographics;
- Spending power – public and private;
- National health coverage;
- Policy and reform, and;
- Research and innovation...

...China's life sciences sector has not gone unnoticed by investors in the sector, whether it's government investment, corporate investment or private individual investment.

According to estimates from askci.com, the market size of the national biopharmaceutical industry in 2020 was about RMB3.57 trillion. It is expected that the market size of China's biopharmaceutical industry will exceed RMB4 trillion in 2022, with continued room for growth thereafter.

According to Eastspring China, by 2035, China's aged population (aged 60 and above) is predicted to reach 409 million, representing a 28.5% share of the country's total population. By 2050, as estimated by the UN, the proportion of ageing people in China will likely exceed that of young and working people.

Spending as a percentage of GDP has been consecutively increasing on an annual basis in the country from 2010. According to the National Health Commission of the PRC, in 2020, healthcare expenditure in China equated to 7.12% of the country's GDP. On an individual citizen basis, we have seen disposable income in China rise as well. As disposable income rises, so individual citizens will be more willing to spend money on their healthcare and the healthcare of their families.

Over the last 10 years, China has embarked on significant healthcare reform, with a major objective being to extend healthcare services beyond the country's urban centres. At the beginning of this century, less than one-third of China's population had access to healthcare insurance. Now nearly 100% do.

Policy and reform are crucial features enterprises need

to be clearly aware of, especially in the China marketplace. Major life sciences-related policies issued by the authorities in China are many, including 'Healthy China 2030', the establishment of industry clusters, the '14th Five-Year Plan' and local provincial and city-level policies.

The level of research and innovation are key to cultivating new business opportunities within any industry sector within a region, including life sciences, and China has recognised this. Founding research and innovation are now conducted and achieved in many of the country's universities and this work has led to increased commercial R&D and growth in the number of new and ground-breaking life sciences industry products being produced in the country.

Real estate plays an integral role in the business success of any life sciences enterprise and making the right choice in terms of which location is best suited to establish business operations can often make or break the business.

Good choices are often derived from strategic study and analysis, and via much examination, many life sciences enterprises have chosen the Greater China region to be the location for their business operations in the APAC region.

In terms of locations, biotech parks in China are a good start for those life sciences enterprises either starting up or entering China for the first time. Today, countless local governments have set up biopharmaceutical industrial parks (BIPs) in China. Continually ever more domestic and overseas life sciences enterprises are drawn to station a business presence in their zones. Given this situation, these parks have been one of the chief proponents of the swift growth enjoyed by the life sciences industry sector in China.

According to sina.com, at the end of 2019, China had 387 national-level industrial zones – 219 for economic and technological development and 168 for high- and new- technology development. Of the total, 193 parks home in on the pharmaceutical industry.



When considering the four first-tier city markets in China and an outlook on the genetic development of the life sciences industry and related real estate, the following can be observed:

Beijing

In order to continue promoting the high-quality development of Beijing's life sciences industry and better seize business opportunities, the Beijing Municipal government has issued the 'Action Plan of the Beijing Municipal Government on Accelerating Medical and Health Collaborative Innovation (2021-2023)'. In the plan, the development goals are to make the total revenue of the life sciences industry in Beijing exceed RMB300 billion, to introduce at least 10,000 related industry professionals, to establish two to three digital medical benchmark enterprises, and to enlarge related office space to 3 million sq m, by the end of 2023. By then, the life sciences industry will become an important pillar for the development of Beijing's innovative industries.

Shenzhen

In 2019, 'The Opinions of the CPC Central Committee and the State Council on Supporting Shenzhen to Build a Pioneering Demonstration Zone of Socialism with Chinese Characteristics' was released to support Shenzhen's future development, including the development of its life sciences industry. In order to seize further strategic commercial opportunities within the life sciences industry, in January 2020, the Shenzhen Municipal People's Government issued 'The Guiding Opinions of Shenzhen Municipality on Promoting the Agglomeration Development of the Biopharmaceutical Industry, the Implementation Plan for the Agglomeration Development of the Biopharmaceutical Industry in Shenzhen (2020-2025), the Action Plan for the Development of the Biopharmaceutical Industry in Shenzhen (2020-2025) and Several Measures to Promote the Agglomeration and Development of Biopharmaceutical Industry in Shenzhen'. The '1+3' series of documents clearly demonstrate the future importance of the life sciences industry and aim to position Shenzhen as a centre where the integration of the industrial chain, value chain upgrading, and market chain optimisation can and will be realised over the course of the next several years.

Shanghai

In its '14th Five-Year Plan', Shanghai has planned to expand diversity in high-quality life sciences industry development. In 2021, Shanghai issued 'Several Opinions on Promoting the High Quality Development of the City's Biopharmaceutical Industry' and the 'Shanghai Municipal 14th Five-Year Plan for the Development of Traditional Chinese Medicine' to further promote the comprehensive development of the industry. This will be done via the encouragement of digitised, intelligent and greener manufacturing; the promotion of new industry modes, such as contract R&D and manufacturing organisation (CRO, CMO, CDMO, etc.); the further development of the TCM industry and the improvement in its business function level; the proper improvement in the capacity of industrial space, and; the accelerated business development and coordination among life sciences parks.

Guangzhou

Guangzhou's overall '14th Five-Year Plan' and Guangzhou's '14th Five-Year Plan for Strategic Emerging Industry Development' have been released successively, with both documents spelling out the importance of further development in the life sciences industry sector in Guangzhou and to make it a pillar industry within the city's overall economy. The city will also strive to enhance the innovation level and comprehensive competitiveness of the whole industry chain and enhance development in a number of related industry fields, such as biological medicines, modern Chinese medicines, chemical innovative medicines, high-end medical devices, and high-end healthcare. Given the support policies, the talent pool, and the academic and R&D resources present, Guangzhou's life sciences industry is expected to continue to develop rapidly. Simultaneously, the demand for office, R&D and production space of related enterprises will further rise.

Introduction

In its simplest form, life sciences is the study of living organisms. In reality, life sciences literally covers an A to Z of related scientific fields of study – from anatomy at one end of the alphabet spectrum all the way through to zoology at the other end.

Across the board, the life sciences industry has made tremendous development strides over the last 100 years – from vaccine development, to the discovery and use of insulin, to gene therapy, to the utilisation of 3D printing – all examples of the countless breakthroughs made during this time.

In recent times, especially during the ongoing COVID-19 pandemic, greater awareness of the importance of healthcare by an expanding pool of educated people around the world, greater spending by governments around the world, ageing populations in many regions, and advancement in medical science and associated technology, have motivated the global life sciences sector to increasingly realise new business opportunities.

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To accommodate this expanding investment, there is and will continue to be demand for associated life sciences real estate, whether it is large-scale biotech park space, individual lab space, office space, distribution warehouse space or pharmacy retail store space.

In our report, we touch upon the industry demand drivers mentioned above. We also provide more insight into some of the property types associated with life sciences in China as well as commentary and analysis on the current and future demand for life sciences property, by examining the genetics of the property markets in China's four first-tier cities.



1

The Macro-economy

China's macro-economy plays a vital role in the development of the life sciences industry sector in the country. When considering the macro-economy, there are many factors to deliberate in order to analyse future sector development opportunity. Four major factors to weigh up, however, are actual life sciences industry growth, China's population demographics, spending – public spending on the life sciences sector as well as the private spending power of individual citizens – and finally, national health coverage.

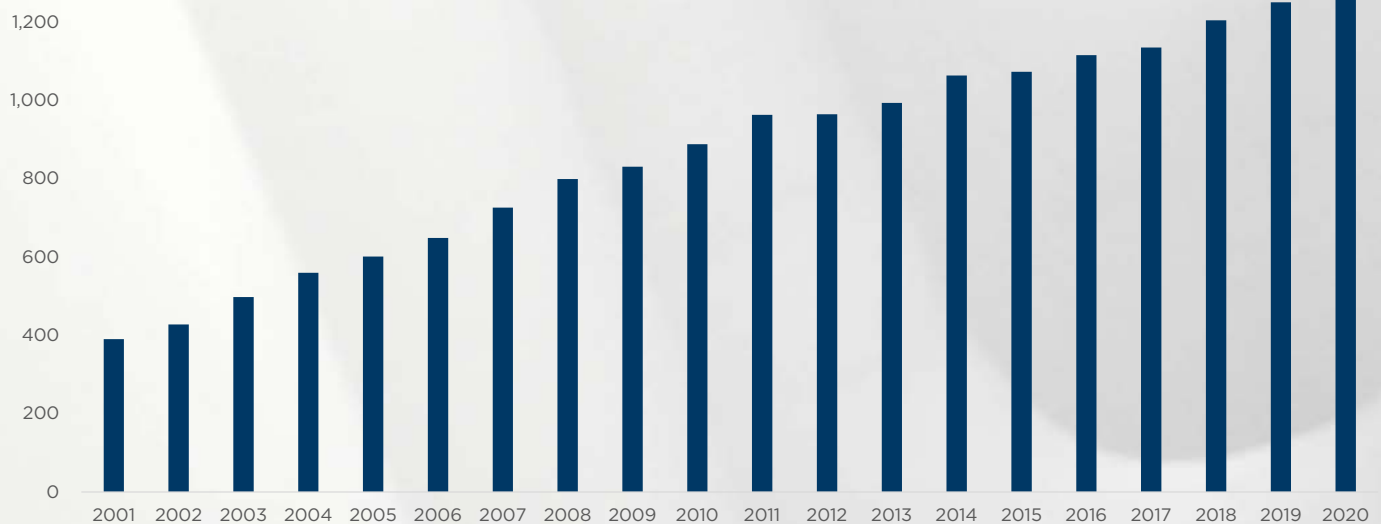
Industry Growth

When looking at the big picture, the market for pharmaceuticals and medical devices globally has greatly expanded over recent years. Recently, this growth has been spurred by the COVID-19 pandemic and the need for associated vaccines, medicines and medical devices and equipment. Ahead, given the

greater awareness of the importance of life sciences that COVID-19 has generated, the rising incomes of many people around the world, the greater pool of life sciences scientists and professionals and the greater involvement and integration of tech, we expect the global pharmaceutical and medical device market to further grow (Figure 1).

Figure 1: Global pharmaceutical market revenue (2001-2020)

US\$ (billion)



Source: Statista.com, Cushman & Wakefield Research

According to Torrey, globally, the top six countries for the pharma sector are the U.S., China, Switzerland, the UK, Germany and Japan. Over recent years, China has almost doubled its share of the industry's value globally (Table 1).

Table 1: The evolution of pharmaceutical sector value (2015-2021)

Country	Top 1000 global life science enterprises in terms of valuation in 2021			Top 1000 global life science enterprises in terms of valuation in 2020		Top 1000 global life science enterprises in terms of valuation in 2015	
	Count	Total Value (US\$ Million)	Value Share	Total Value (US\$ Million)	Value Share	Total Value (US\$ Million)	Value Share
United States	525	27,937.82	40.0%	23,261.68	38.7%	20,355.72	42.2%
China	280	8,402.61	12.0%	8,642.68	14.4%	3,150.91	6.5%
Switzerland	27	5,393.94	7.7%	4,987.75	8.3%	5,557.52	11.5%
United Kingdom	49	4,364.57	6.2%	3,284.54	5.5%	2,454.38	5.1%
Germany	37	4,139.35	5.9%	3,223.19	5.4%	2,986.56	6.2%
Japan	81	3,753.14	5.4%	4,281.14	7.1%	2,305.13	4.8%
Denmark	12	3,183.15	4.6%	1,995.72	3.3%	1,599.22	3.3%
France	48	2,317.42	3.3%	1,765.34	2.9%	2,037.63	4.2%
India	68	1,658.32	2.4%	1,200.71	2.0%	1,268.07	2.6%
South Korea	104	1,176.15	1.7%	1,150.98	1.9%	439.02	0.9%
Australia	12	1,174.28	1.7%	999.60	1.7%	325.59	0.7%

Source: Torrey Analysis, Cushman & Wakefield Research

Continued global growth in the pharmaceutical and medical device market will only have positive knock-on effects for China's life sciences sector as it further matures. Today, when making a global comparison, China's biopharmaceutical industry maturity level, in terms of genetic engineering and innovative medicine research and development (R&D), has reached or even surpassed the level seen in many other mature-market countries. For instance, after the National Medical Products Administration (NMPA, originally CFDA) became a member of The International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH) in 2017, more and more commercial rights of domestic innovative medicines have been licensed out in recent years. The number of relative deals has been boosted from 9 in 2017 to more than 20 each year since the COVID-19 pandemic.

What's more, according to estimates from askci.com, the market size of the national biopharmaceutical industry in 2020 was about RMB3.57 trillion. It is expected that the market size of China's biopharmaceutical industry will exceed RMB4 trillion in 2022, with continued room for growth thereafter (Figure 2).

China's economic growth and biopharmaceutical industry business expansion potential have not been lost on large overseas and domestic life sciences enterprises doing business in China. In the past, the majority of life sciences enterprises in China have fully understood the associated business opportunities to be had, by making sure the right R&D, manufacturing, sales, distribution and service platforms are set up in China to optimally serve the enterprise and its clients at any given time.

Figure 2: China's biopharmaceutical industry market size (2020 and 2022)

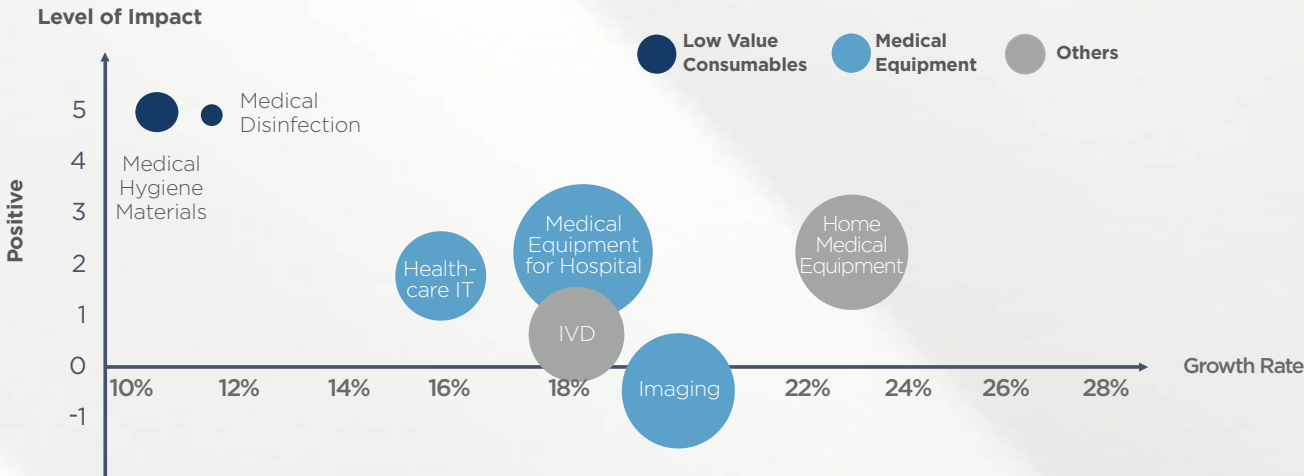


Source: askci.com, Cushman & Wakefield Research

Moving forward, once the COVID-19 pandemic is fully mitigated and overcome, there is likely to be greater investment and spending channelled into disease prevention infrastructure in China. Other enhancements are likely to concentrate on improved patient-centric life sciences products, equipment, systems and processes, community healthcare, healthcare insurance and life sciences technology.

Ahead, patient-centric healthcare hospital and in-home medical products, equipment imaging and information technology (IT) are likely to increase as a result of the COVID-19 outbreak. They were in high demand during the height of the outbreak in China, and going forward into the near future, demand for these products, equipment and technology is likely to remain high given the ongoing high vigilance surrounding the containment of the virus by all interested parties (Figure 3).

Figure 3: China – Certain medical products, equipment and technology to remain in high demand for the near-term future (2019)



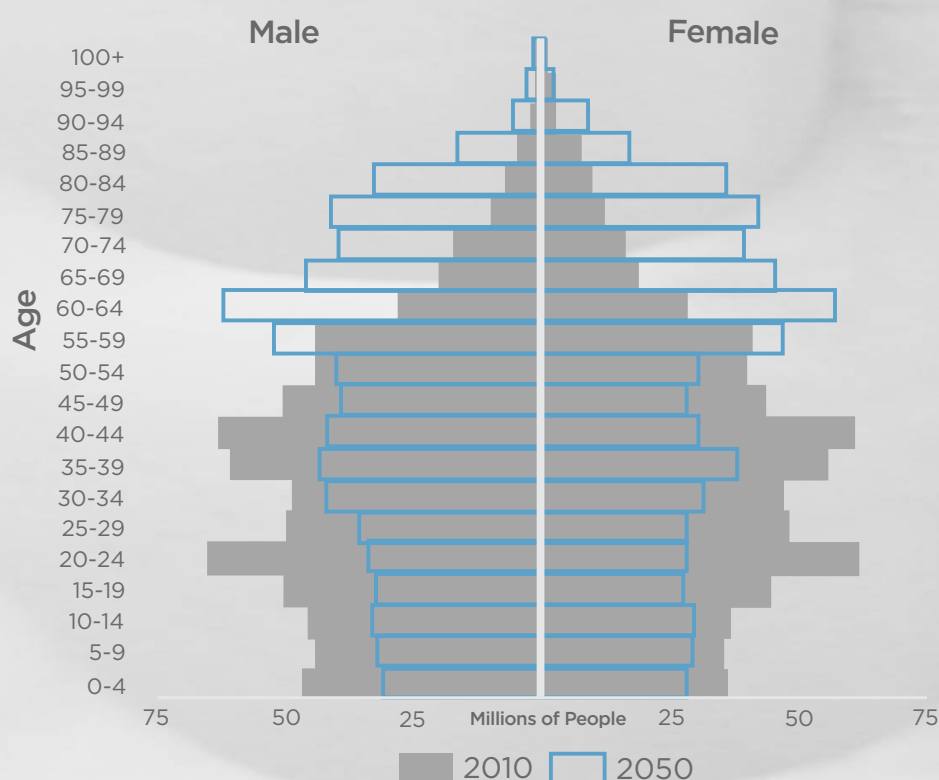
Source: China Medical Device Blue Book, EvaluateMedTech, Cushman & Wakefield Research

Over the longer term, we expect industry growth to continue for the foreseeable future as favourable demographic, macro-economic and policy factors continue to have an impact. More and more functional departments, as well as the Asia-Pacific headquarters of many life sciences enterprises have been and will be built in China to ensure sustainable business development for these enterprises into the future.

Population Demographics

Population demographics in China are moving in a favourable direction for life sciences enterprises. As people age, more often than not, an increase in the level of individual healthcare is required. According to Eastspring China, by 2035, China's aged population (aged 60 and above) is predicted to reach 409 million, representing a 28.5% share of the country's total population. By 2050, as estimated by the UN, the proportion of ageing people in China will likely exceed that of young and working people (Figure 4).

Figure 4: China's age pyramid (2010 and 2050)

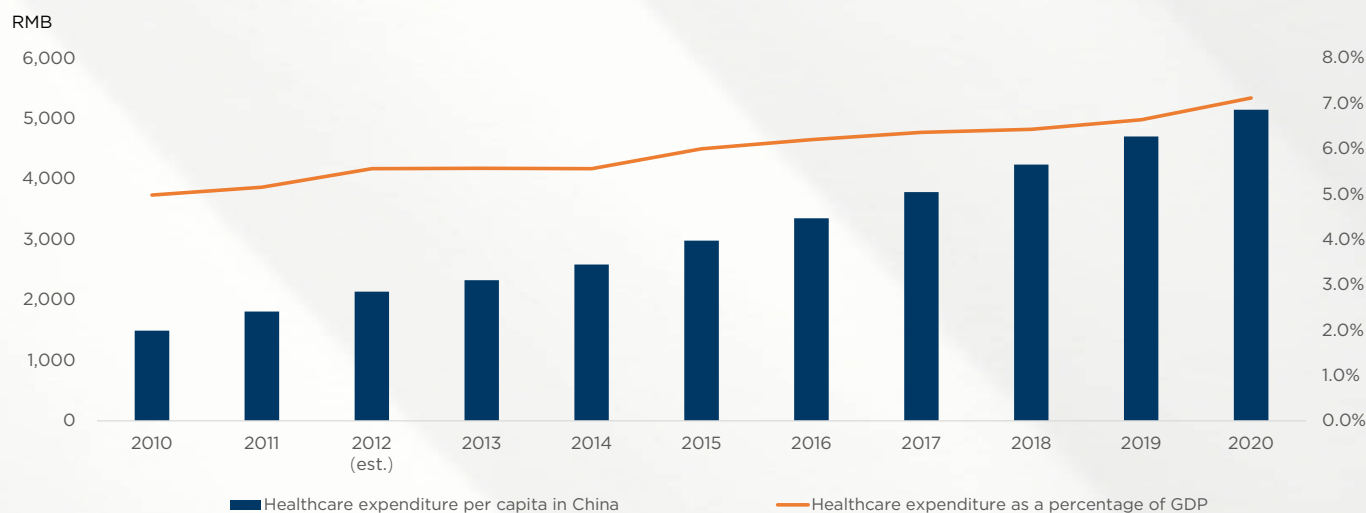


Source: UN Population Division, Cushman & Wakefield Research

Spending Power

Along with China's economic growth and ageing population, its healthcare spending growth has also benefitted life sciences sector businesses in China. Spending as a percentage of GDP has been consecutively increasing on an annual basis in the country from 2010. According to the National Health Commission of the PRC, in 2020, healthcare expenditure in China equated to 7.12% of the country's GDP (Figure 5).

Figure 5: China's healthcare expenditure (2010-2020)

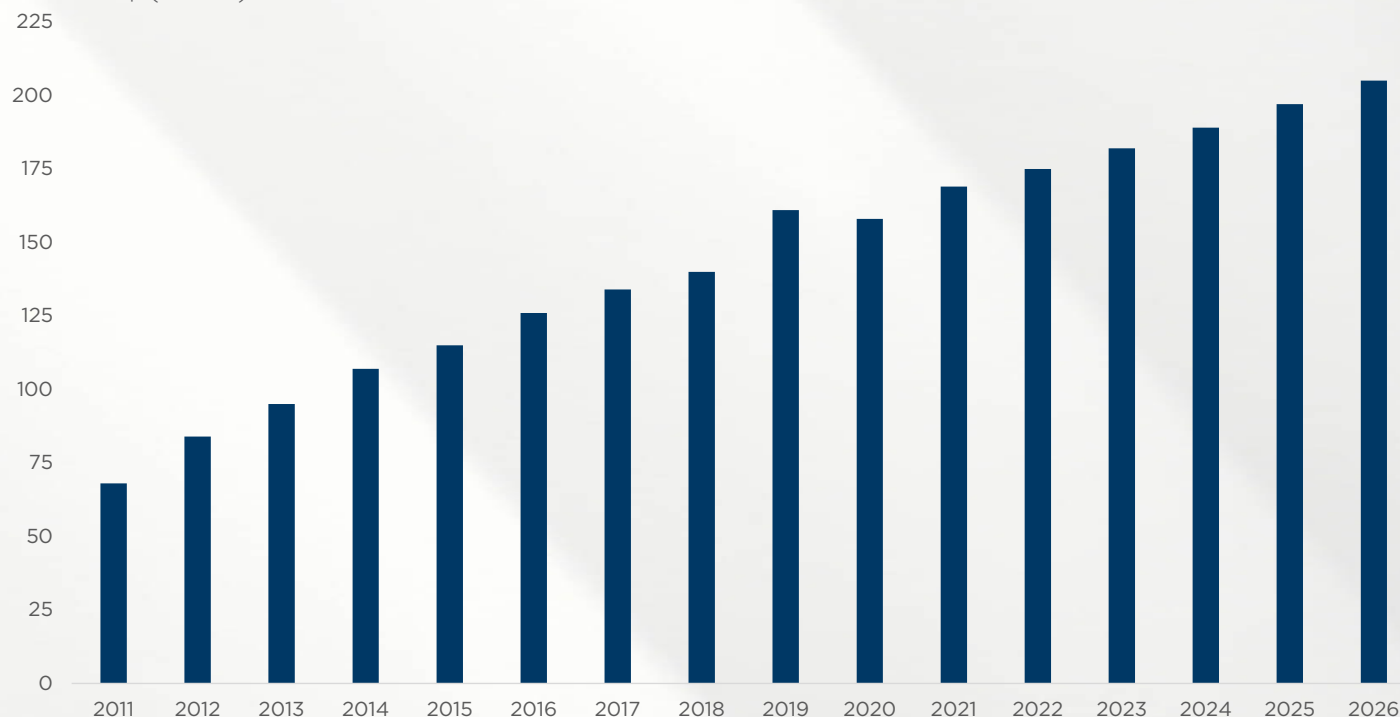


Source: National Health Commission (PRC), Cushman & Wakefield Research

On an individual citizen basis, we have seen disposable income in China rise as well. As disposable income rises, so individual citizens will be more willing to spend money on their healthcare and the healthcare of their families (Figure 6).

Figure 6: Medicine spending in China (2011-2026)

const. US\$ (billion)

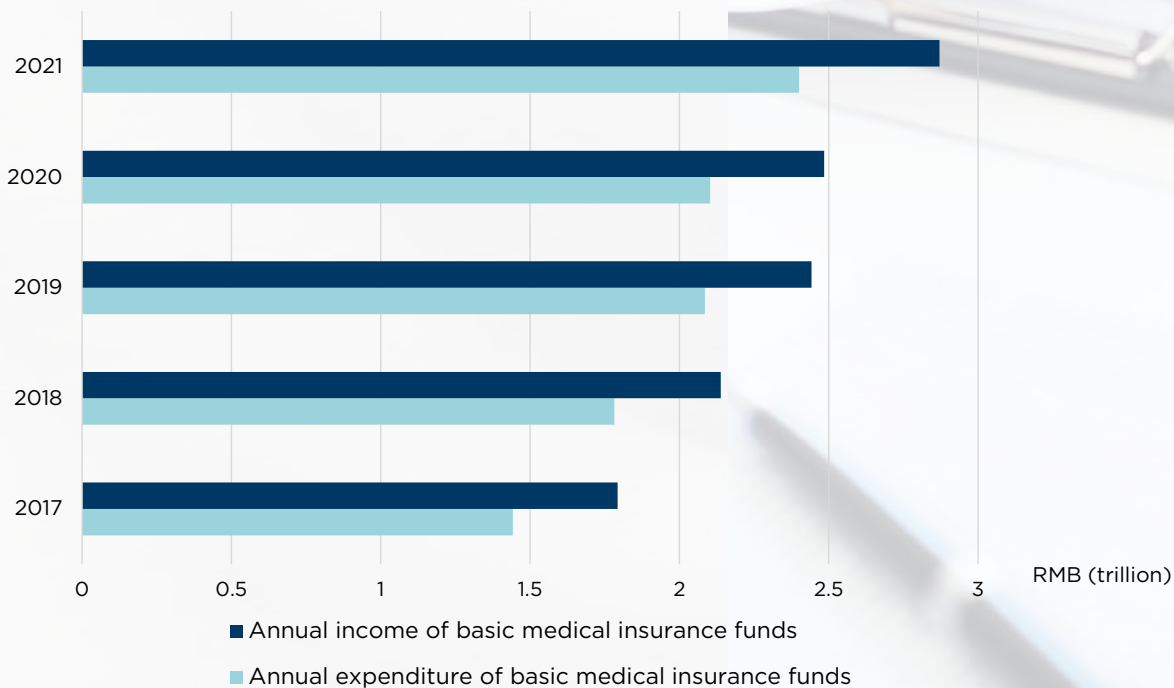


Source: IQVIA Institute, Cushman & Wakefield Research

National Health Insurance Coverage

Growing national health insurance coverage will also expand business opportunities for life sciences enterprises. As part of its 'Healthy China 2030' policy, China hopes to also achieve health equity by 2030. Over the last 10 years, China has embarked on significant healthcare reform, with a major objective being to extend healthcare services beyond the country's urban centres. At the beginning of this century, less than one-third of China's population had access to healthcare insurance. Now nearly 100% do (Figure 7).

Figure 7: National healthcare insurance income & expenditure (2017-2021)



Source: National Healthcare Security Administration, Cushman & Wakefield Research

Ahead, we expect the healthcare insurance market to continue to grow, both from a public expenditure perspective and from a private sector expenditure perspective.

2

Policy and Reform

Policy and reform are crucial features enterprises need to be clearly aware of, especially in the China marketplace. To capture any resulting business opportunities, it is crucial that life sciences enterprises in China continually stay abreast of new healthcare-related policies and reforms as they are enacted and implemented.

Policy

Over time, a number of significant healthcare-related policies have been ratified and effected and some of the more important ones are as follows:

National Policy

Healthy China 2030

The 'Healthy China 2030' plan encompasses a number of specific targets, which need to be achieved between 2020 and 2030. Some of these targets include:

- Optimising medical organisations;
- Developing new industries in the health service;
- Developing the fitness and leisure sports industry;
- Promoting the development of the medicine industry.

Of particular importance, the plan centres on the advancement of public health and disease prevention, which symbolises a considered move from treatment to prevention. On this note, the plan emphasises:

- Decreasing the health effects of second-hand smoking;
- Reducing obesity;
- Increasing overall physical activity, and;
- Preventing chronic diseases (Figure 8).

Figure 8: Healthy China 2030 Plan



Source: The National Health Commission – China, Cushman & Wakefield Research

The Establishment of Industry Clusters

In 2019, the National Development and Reform Commission (NDRC) issued the 'Notice on Accelerating the Construction of Strategic Emerging Industry Clusters' and published the first batch of 66 national-level strategic emerging industrial clusters, of which 17 are biopharmaceutical clusters distributed in 16 cities (Figure 9).



Figure 9: 17 biopharmaceutical clusters planned by the NDRC



Region	Biopharmaceutical industry cluster urban areas
Yangtze River Delta	Pudong New Area, Shanghai
	Hangzhou
	Suzhou
Southeast China	Guangzhou
	Xiamen
	Zhuhai
Beijing-Tiajin-Hebei-Region	Changping District, Beijing
	Daxing District, Beijing
	Tianjin Economic and Technological Development Zone
	Shijiazhuang
Chengdu-Chongqing Circle	Chengdu
	Banan District, Chongqing
Northeastern China	Harbin
	Tonghua
Shandong	Yantai
	Linyi
Hubei	Wuhan

Source: The NDRC, Cushman & Wakefield

The 14th Five-Year Plan

Among other aspects, the 14th Five-Year Plan (14th FYP) aims to promote:

- A robust public health system;
- The advancement of national healthcare insurance, and;
- The further development of traditional Chinese medicine (TCM).

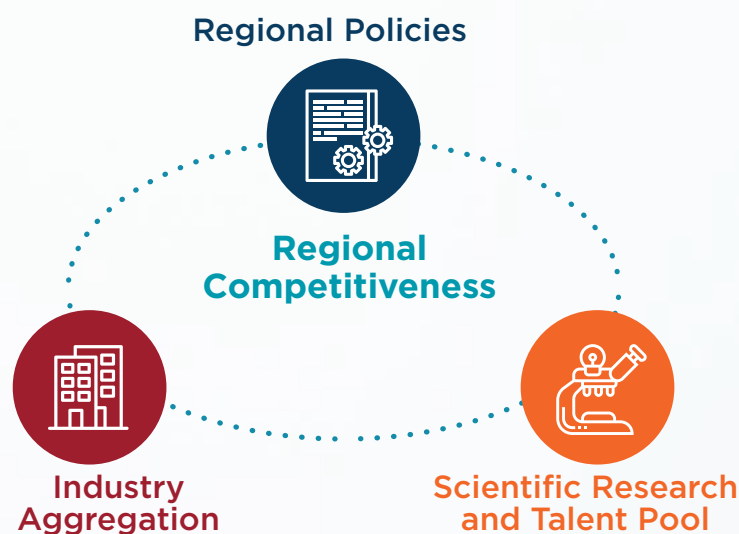
When considering a robust public health system, the 14th FYP aims to enhance vital disease control measures and community-level public healthcare.

As for the advancement of the already mentioned national health insurance coverage, effort will continue to make sure funding for basic medical insurance is stable and sustainable medical benefits

Local Policy

Policy at the local level is also significant – especially for life sciences enterprises. Life sciences enterprises operating in China attach much business importance to regional policies, the local scientific research environment and talent pool, and an area's industry aggregation (Figure 10).

Figure 10: Life sciences enterprises in China: Top business considerations



Source: Cushman & Wakefield Industrial & Logistics, Cushman & Wakefield Research

are fine-tuned by modifying payment policies for medical insurance premiums, and as lists for medical benefits are further developed.

When considering TCM, support will be provided to give full play to TCM's distinctive strengths in disease prevention, treatment, and rehabilitation. Additionally, a stronger supervision system will ensure TCM product quality is further advanced, and effort will be made to make sure TCM is widely promoted internationally.

By comparing the industry environment (policy (including local financial support policies), scientific research, talent pool and industry aggregation), life sciences enterprises can then shortlist locations that best suit their businesses. Table 2 below shows eleven selected cities in China and outlines some of the key financial support policies on offer for important biopharmaceutical product R&D in each city (Table 2).

Table 2: Comparison of financial support policies for important biopharmaceutical product R&D in major cities in China (2021)

Upper Limit for Relative Subsidy (RMB million)	Innovative Drug	Innovative Medical Equipment	Exploration to Overseas Markets
Beijing	5	2	2
Shanghai	45	7	10
Shenzhen	74	5	5
Guangzhou	27	5	5
Chongqing	25	6	1
Suzhou	12	3	1
Chengdu	18	3	2
Hangzhou	48	6	0.5
Wuhan	40	10	0
Nanjing (Jiangning District)	15	3	2
Kunming	13.5	1	1

Source: HS Map, Cushman & Wakefield Research, Local government websites

Reform

Healthcare reform in China is continually evolving. Looking to the near- to mid-term future, a number of reforms are on the agenda, including:

1. Effort will be made to further advance medical treatment quality and efficiency;
2. Inventive methods to further combine disease prevention and treatment will be promoted;
3. Hospital management systems to be further modernised, and more medical centres to be constructed to quicken development and achieve even regional distribution;
4. Particular consideration to be paid to further cultivating community-level healthcare, particularly in urban and rural areas;
5. Actions to be undertaken to further advance the quality and scale of healthcare personnel;
6. A tiered, multi-level, and referral-based infectious disease treatment network to be further strengthened;
7. The means of assessment and approval to be further enhanced for innovative medicines, vaccines and medical devices, and;
8. Further reform will be enacted in relation to state-organized centralised procurement and use of medicines and medical consumables.

As the impact of healthcare reform in China reveals itself, the underlying forces in many parts of the life sciences market will continue to be altered. Ahead, and according to Boston Consulting, in China, patented medicines, off-patent originator (non EDL) medicines, differentiated generic (non EDL) medicines and EDL medicines will likely see robust sales growth given:

- New high-selling medicines being introduced;
- More diversified insurance schemes and improved insurance coverage;
- Rising incomes;
- Greater medicine affordability;
- Patent expiration;
- More medicines included on the national procurement list, and/or;
- The greater use of medicines throughout the basic healthcare system.

3

Research and Innovation

The levels of research and innovation are key to cultivating new business opportunities within any industry sector within a region, including life sciences. The foundation of research and innovation can be found in universities and the graduates they produce. Also important is the amount spent on the R&D of new products, and in the case of life sciences, these products could range from new medicines to new medical devices – and if these new products are truly ground-breaking, then this can lead to product innovation.

Universities

According to Statista, in 2020, the number of public colleges and universities in China totalled 2,738. 1,270 were universities and 1,468 were listed higher vocational colleges.

China normally distinguishes between universities, which offer four-year bachelor, master and doctorate degree programmes, and higher vocational colleges, offering practical three-year degree programmes. Apart from these two general higher education institutions, students in China can also gain degrees at public adult education institutions, from online and self-learning courses provided by public institutions and at private colleges and universities.

Finally, in order to create more world-class universities and further modernise the national higher education system, China has introduced a number of initiatives, including the 'Double First-Class University Plan' (Table 3).



Table 3: Selected important colleges and universities with well-established life sciences and medicine academic programmes in mainland China (2022)

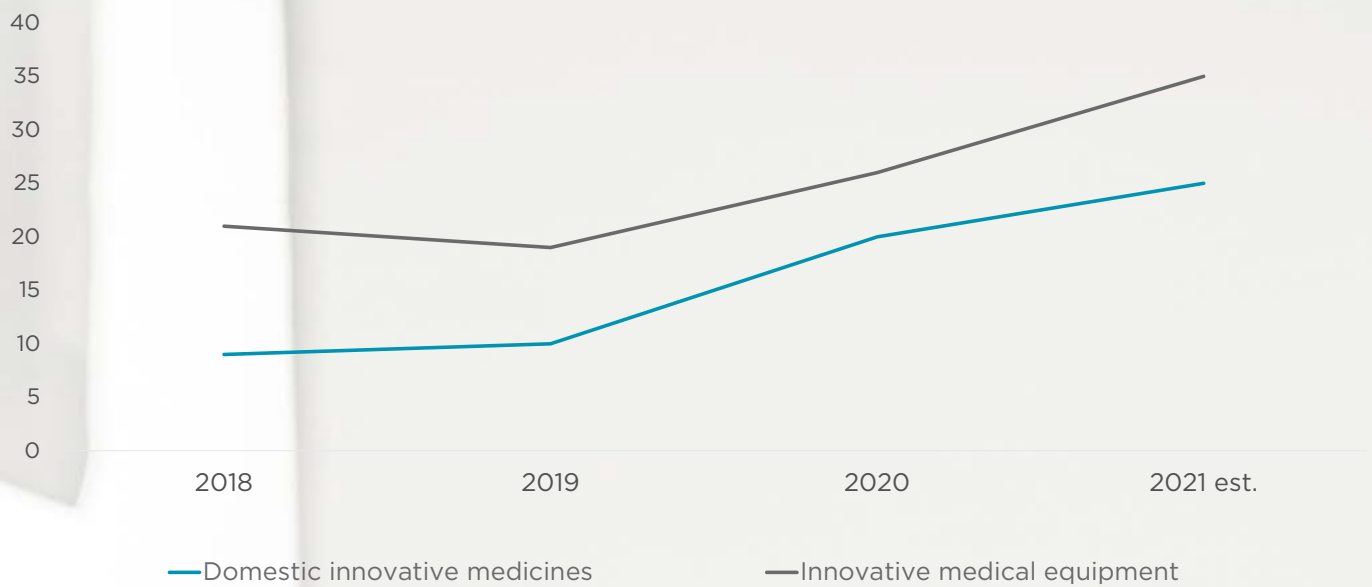
City	College/University
Beijing	Peking University
	Tsinghua University
	University of the Chinese Academy of Sciences
	Peking Union Medical College
Shanghai	Fudan University
	Shanghai Jiaotong University
	Tongji University
Guangzhou	Sun Yat-Sen University
Shenzhen	The Chinese University of Hong Kong, Shenzhen
	Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences
	Southern University of Science and Technology
Suzhou	National University of Singapore (Suzhou) Research Institute
	Nanjing University Suzhou Graduate School
Nanjing	Nanjing University
	China Pharmaceutical University
Hangzhou	Zhejiang University
Hefei	University of Science and Technology of China
Wuhan	Wuhan University
	Huazhong University of Science and Technology
Chengdu	Sichuan University

Source: QS Ranking, Cushman & Wakefield Research

Research and Development Spending

China is now one of the world's most important biopharmaceutical markets. By investing in related R&D, China is continually striving to make greater breakthroughs in the quality of medicine and medical equipment (Figure 11).

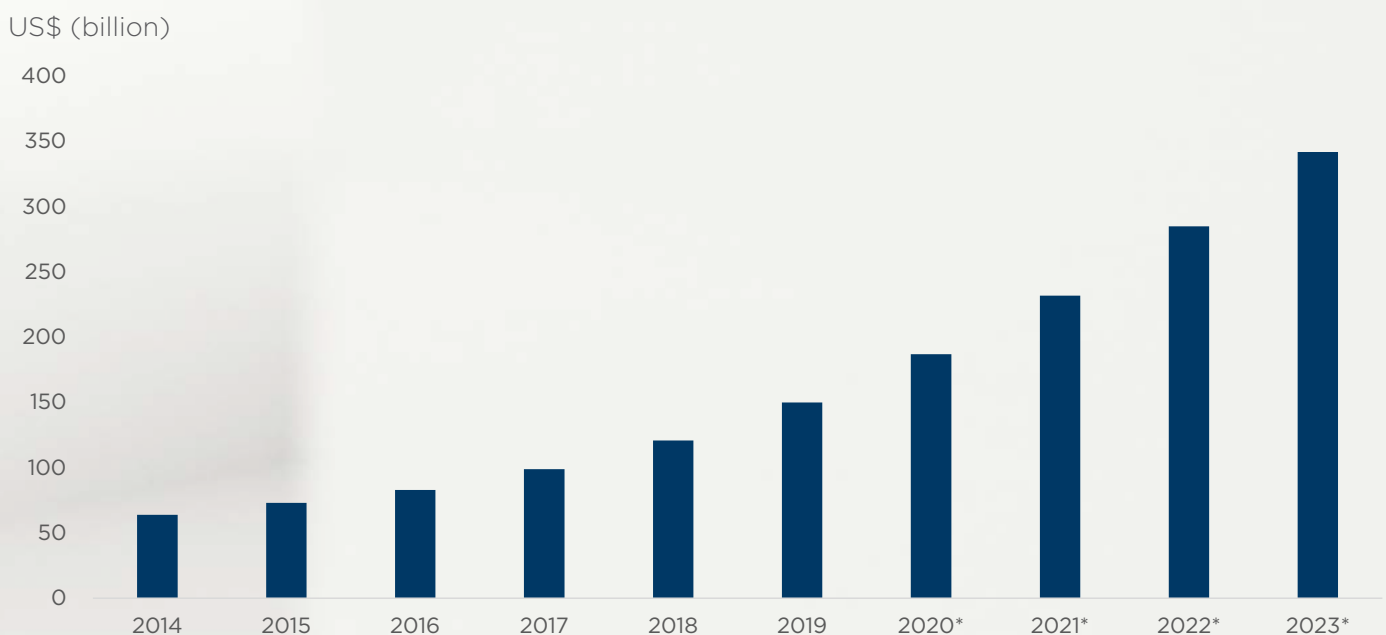
Figure 11: Number of new innovative medicines/medical equipment developed in mainland China (2018-2021)



Source: National Medical Products Administration, Pharnex Cloud, Cushman & Wakefield Research

According to Statista, by year-end 2019, pharmaceutical industry R&D spending in China reached around US\$150 billion. By 2023, this figure is expected to reach US\$342 billion, displaying a higher growth rate than the global average (Figure 12).

Figure 12: Pharmaceutical R&D expenditure in China (2014-2023)

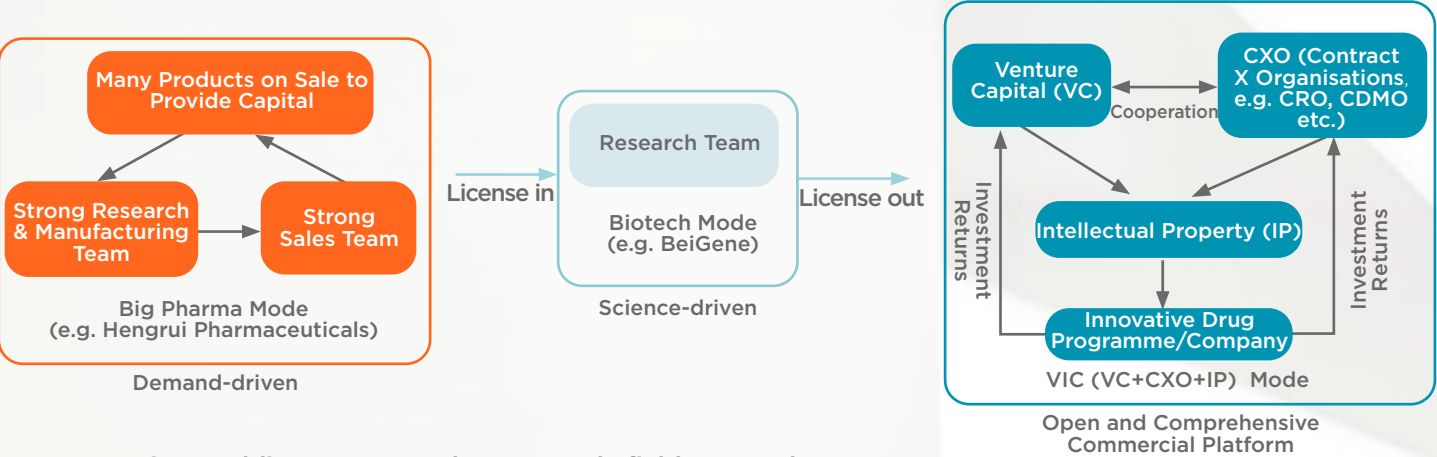


*Note: Estimated Values

Source: Statista, Cushman & Wakefield Research

Many of the top overseas life sciences enterprises have grown their operations as well as R&D facilities in China over recent years. Having a relatively lower cost base and a pool of talent are attractions for establishing more R&D facilities via a number of enterprise structures for these enterprises. Additionally, China's huge life sciences market and its solid growth potential offer motivation for both overseas and domestic life sciences enterprises to create new medicine products, and particularly new products for China's home market (Figure 13).

Figure 13: Three major commercial modes for the development of innovative medicines in China



Source: Various public sources, Cushman & Wakefield Research

Innovation

China is now home to a large number of smart medical enterprises, the lion's share of which are located in Beijing, Shanghai, Guangzhou, Jiangsu and Zhejiang. The majority of these enterprises focus on specific industry disciplines, such as smart wear, medical information, health management and telemedicine, and most are continuing to push the business boundaries by committing to and conducting R&D.

Stemming from R&D comes innovation and there are a number of ways the life sciences industry sector in China is continuing to innovate. Two examples include the utilisation of:

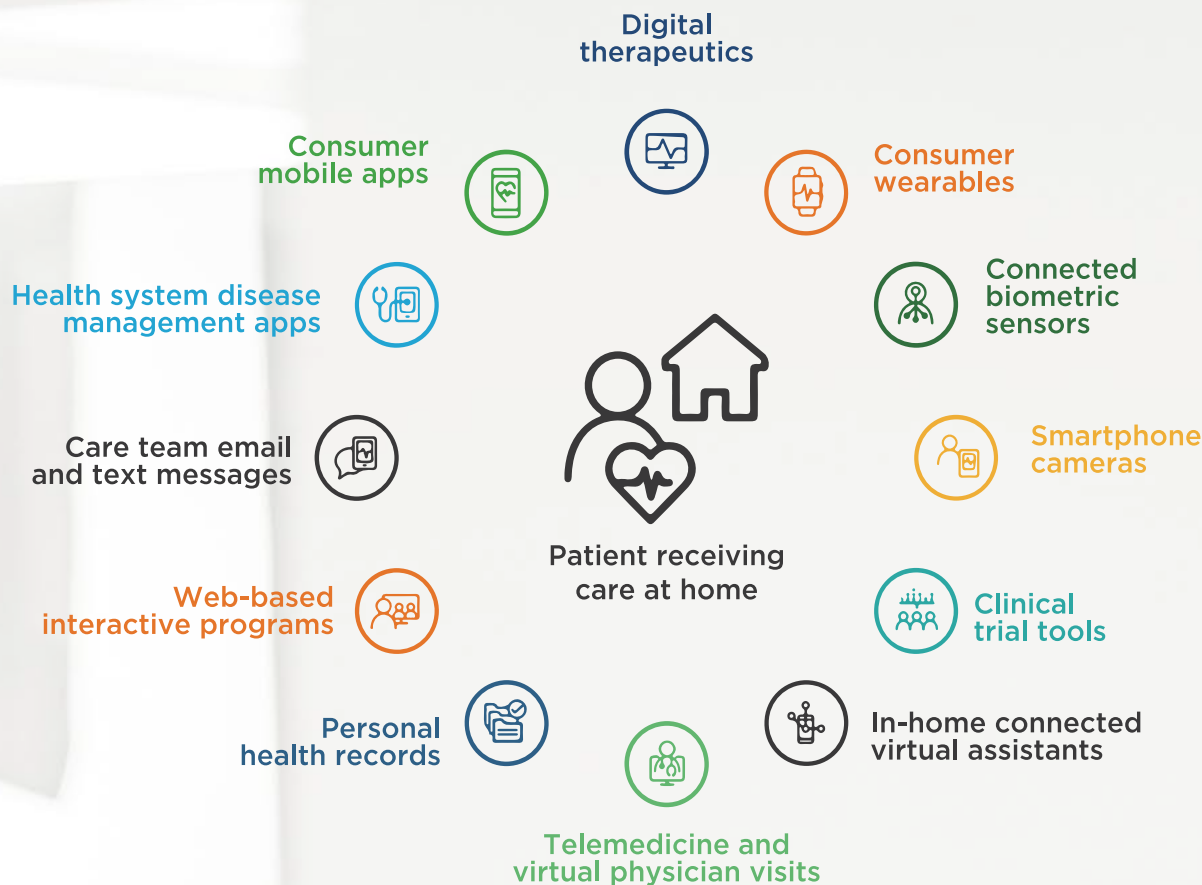
- Digital healthcare, and;
- Artificial intelligence (AI).

Digital Healthcare

As China continues to encourage the digitalisation of healthcare services, there are enormous opportunities for the life sciences sector to deliver Internet-based healthcare services. What's more, according to Bain, 97% of Chinese survey respondents conveyed an interest in digital health services if the costs were covered by insurance.

Ahead, more advanced hi-tech healthcare solutions and the further advancement of digital healthcare delivery models are likely to be offered and occur, respectively. Moving forward, the life sciences sector in China will utilise digital health technologies and solutions much more to not only engage markets but also for the preclusion and monitoring of diseases (Figure 14).

Figure 14: China and its adoption of digital health technology

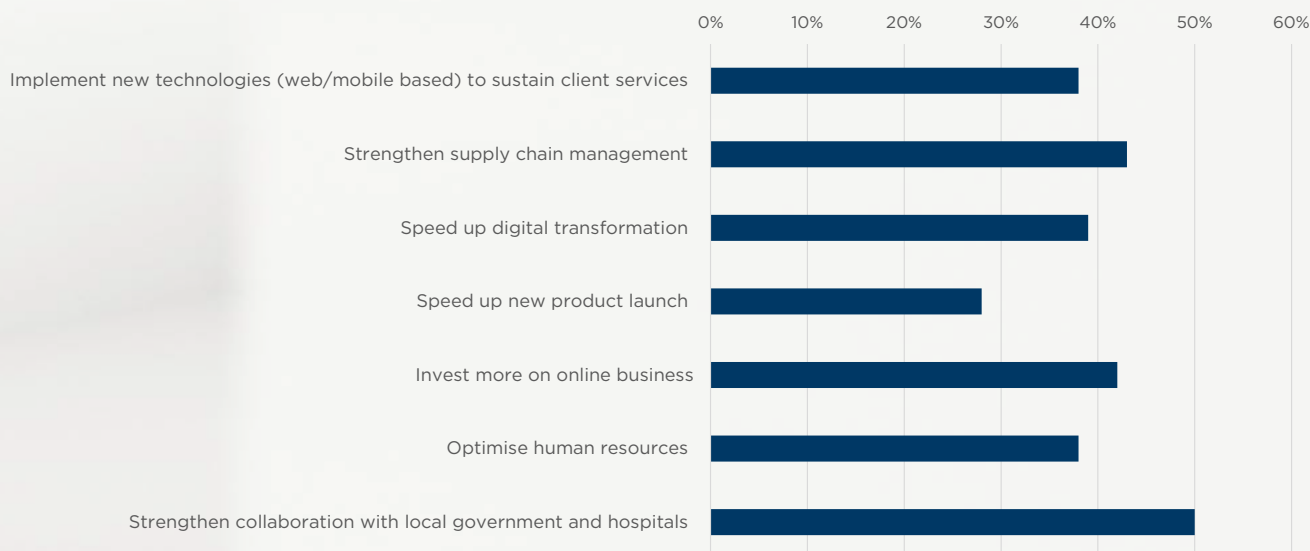


Source: IQVIA Institute, Cushman & Wakefield Research

Into the future, we also expect online Healthcare apps, such as JD Health, Ping An Good Doctor, Tencent WeDoctor, AliHealth, Ding Xiang Yuan and Chunyu Doctor to continue to grow their number of new users. This new opportunity has also not been lost on life sciences enterprises. According to a recent survey conducted by Deloitte, respondent enterprises said that out of the top actions they would take to mitigate the impact of the COVID-19 outbreak in the short term, they would:

- Invest more into online business platforms (42%);
- Speed up digital transformation (39%), and;
- Implement new technology to sustain client services (38%) (Figure 15).

Figure 15: What will your enterprise do in the short term to mitigate the impact of the COVID-19 outbreak on your business?



Source: Deloitte, Cushman & Wakefield Research

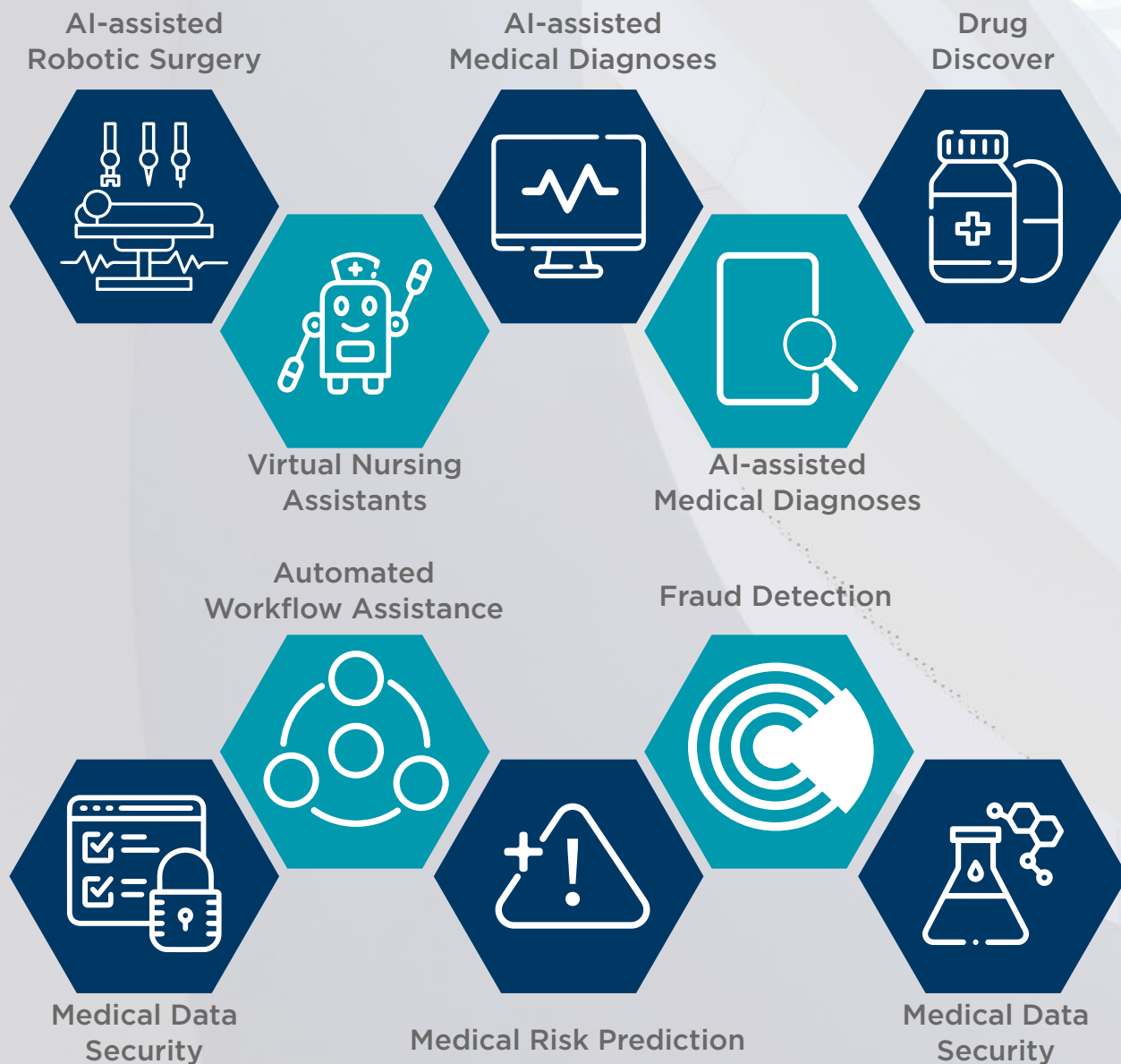
AI

In July 2017, The State Council of China published the ‘New Generation Artificial Intelligence Development Plan’. Two of the aims of this policy are to make the AI industry in China worth more than US\$62 billion and related industry value worth more than US\$774 billion by 2025.

Additionally, smart healthcare is one of five major AI-based applications together with smart manufacturing, smart city, smart agriculture, and smart national defence. With this, the ‘Internet + Healthcare Initiative’ was launched in 2018, which aims to further transform China’s healthcare system by embracing a multitude of AI-related technologies, including:

- AI-assisted radiology and pathology;
- Machine learning (ML), AI and data science for actionable insights;
- AI-assisted robots for surgery support, and;
- New medicine breakthroughs with the help of AI/ML (Figure 16).

Figure 16: 10 AI applications in healthcare



Source: Ignite, Cushman & Wakefield Research

4 Industry Landscape

For life sciences enterprises, there are a number of markets in China, including:

Urban/rural hospitals –

Continued urbanisation will result in greater demand for medicine supplies from hospitals in towns and cities in China. Currently, many life sciences enterprises in China deliver their products to wholesalers who then disseminate the majority of pharmaceutical end sales to the hospitals for patient use;

Pharmacies –

Pharmacies in China are expanding their store count. Together, they constitute the second largest sales channel for medicines in the country;

Online sales –

Given the expansion of online shopping in China, revenue from online medicine sales will continue to increase. Alongside this, pharmaceutical logistics systems are bound to improve, and distribution costs cut, and;

The export market –

According to Daxue Consulting, over 160 countries and areas receive pharmaceutical products made in China.

Digging a little deeper, the online market is changing. Currently, one of the largest pharmaceutical e-commerce players in China is Jianke – with over 100 million customers. However, since the COVID-19 outbreak, new players in the form of food delivery platforms have arrived, such as Meituan and Ele.me, given the delivery speed and convenience (Table 4).

Table 4: The process involved in purchasing medicine via food delivery apps in China

Buying medicine that doesn't require a prescription	Buying medicine that requires a prescription
<ol style="list-style-type: none"> 1. Open Meituan or Ele.me 2. Open the maiyao section 3. You will see a long list of pharmacies, ranked by price or distance from your house 4. Select the product you want to buy 5. Pay for the product 6. The product will arrive at your house within 1 hour 	<ol style="list-style-type: none"> 1. Open Meituan or Ele.me 2. Open the maiyao section 3. You will see a long list of pharmacies, ranked by price or distance from your house 4. Select the product you want to buy 5. Prescription medicine will require you to fill out a form which takes less than 1 minute 6. It will be confirmed or rejected instantly 7. Pay for the product 8. The product will arrive at your house within 1 hour

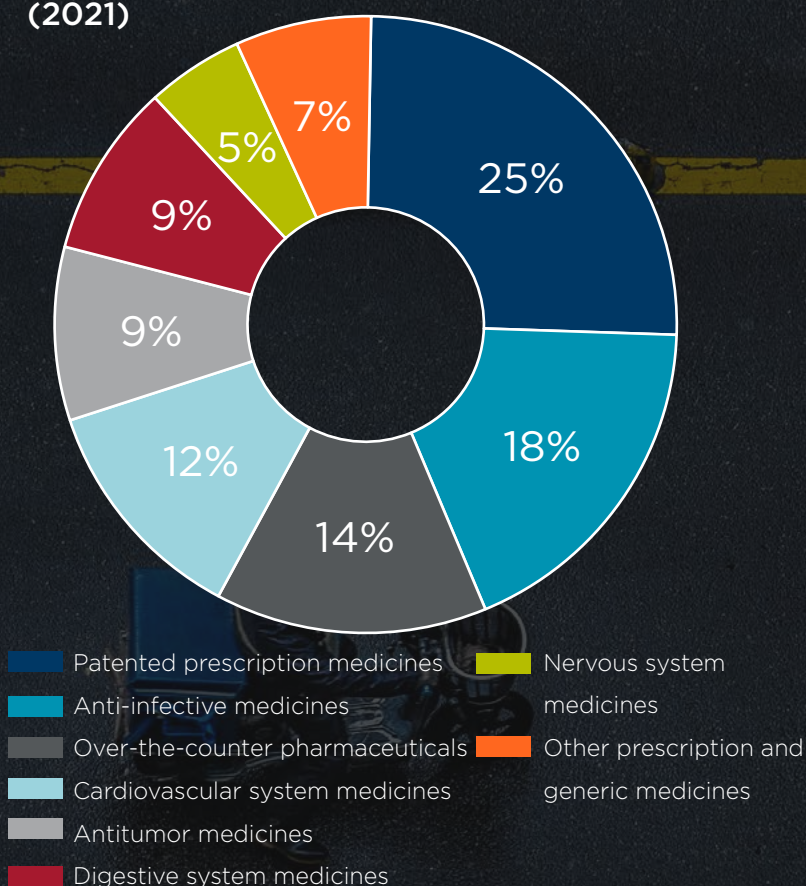
Source: Daxue Consulting, Cushman & Wakefield Research

What's more, when we break down the pharmaceutical market in China by major medicine type, the generic medicine segment takes the lion's share of industry revenue in China – with demand expected to increase in the future. Generics include anti-infective medicines, cardiovascular system medicines, anti-tumour and cancer medicines, and medicines for the digestive system. Both domestic and overseas life sciences enterprises have made large generic medicine-related business investments in China in the past and given the continued importance of this particular market segment, this type of business investment is expected to further increase in the future.

On the other hand, the patent medicine market is the second-largest medicine segment market in China. In this particular market segment, high profit also comes with high R&D costs, long R&D periods, and long return periods.

Finally, the third largest medicine market segment in China is the country's over-the-counter (OTC) market segment. Sales and revenue in this market segment are expected to remain strong, which will drive continued interest and business investment from both domestic and overseas life sciences enterprises (Figure 17).

Figure 17: China's pharmaceutical industry products – Percentage of industry revenue (2021)



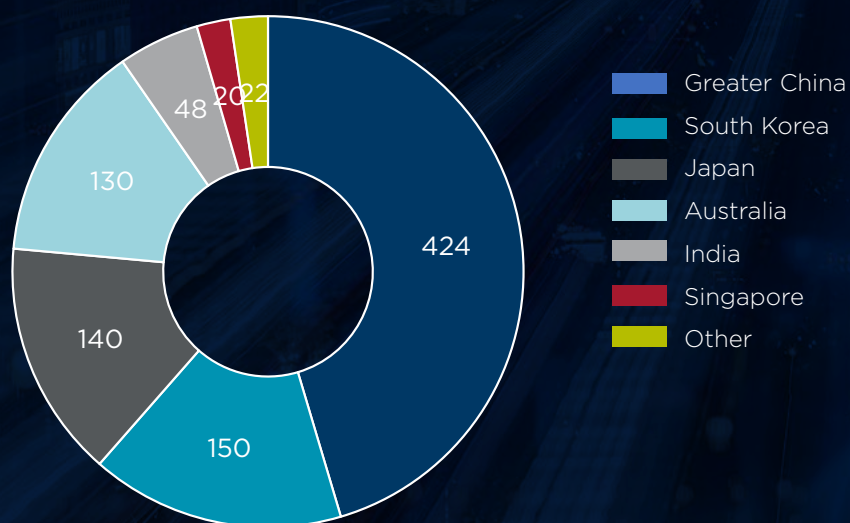
Source: IBISWorld, Cushman & Wakefield Research

5 Life Sciences Real Estate

Real estate plays an integral role in the business success of any life sciences enterprise and making the right choice in terms of which location is best suited to establish business operations can often make or break the business.

Good choices are often derived from strategic study and analysis and via much examination, many life sciences enterprises have chosen the Greater China region to be the location for their business operations in the APAC region (Figure 18).

Figure 18: APAC Country/region - Breakdown based on headquarters location (2019)



Source: Clarivate, Cushman & Wakefield Research

Location/Set Up Considerations

Thinking strategically about where to locate their businesses, life sciences enterprises also have to take into consideration the local city markets within a country and within those city markets, the sub-market dynamics as well as any present dedicated biotech parks.

There is also the specialised real estate associated with the life sciences sector to consider, whether it's an R&D lab, a manufacturing plant, an office, a warehouse or a pharmacy or even a data centre (Figure 19).



Figure 19: Examples of specialised real estate associated with the life sciences sector

R&D Labs Manufacturing Plants Warehouses
Pharmacies Offices Data Centres

Source: Cushman & Wakefield Research

When considering R&D labs, a new phenomenon which is now evident in the life sciences real estate market in China is the co-R&D lab.

As more and more life sciences start-up enterprises emerge, so the potential for new medical field discoveries has increased over recent years. Many of these start-ups, however, do not have the capital to construct and run dedicated labs to test and develop their life science medical products. This is where co-labs come into their own by providing much needed product testing and development leased lab facilities to enterprises, including start-up life sciences enterprises.

When built and operated in the right manner, flexible co-labs, whether they are wet, dry or damp labs, can help attract and retain talent as well as shorten the time from product discovery and development to the realisation of a fully curative medical product.

The location of each of these specialised real estate assets also have to be considered carefully to ensure the optimisation of business success. For example, having a manufacturing plant sited in a particular location, such as a particular biotech park, might qualify the overall business for a tax break and/or might be favourably looked upon by the authorities when seeking further business expansion at a future date.

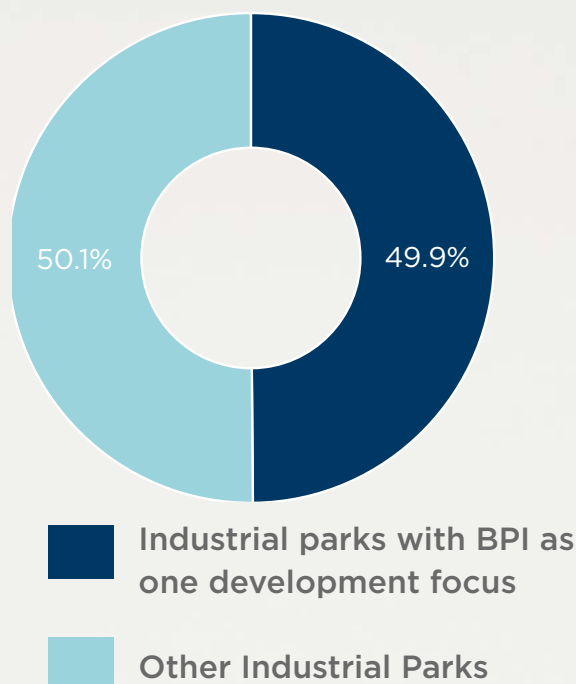


Biotech Parks

In terms of locations, biotech parks in China are a good start for those life sciences enterprises either starting up or entering China for the first time. Today, countless local governments have set up biotech parks, or more specially biopharmaceutical industrial parks (BIPs) in China. Continually ever more domestic and overseas life sciences enterprises are drawn to station a business presence in their zones. Given this situation, these parks have been one of the chief proponents of the swift growth enjoyed by the life sciences industry sector in China.

According to sina.com, at the end of 2019, China had 387 national-level industrial zones – 219 for economic and technological development and 168 for high and new technology development. Of the total, 193 parks home in on the pharmaceutical industry (Figure 20).

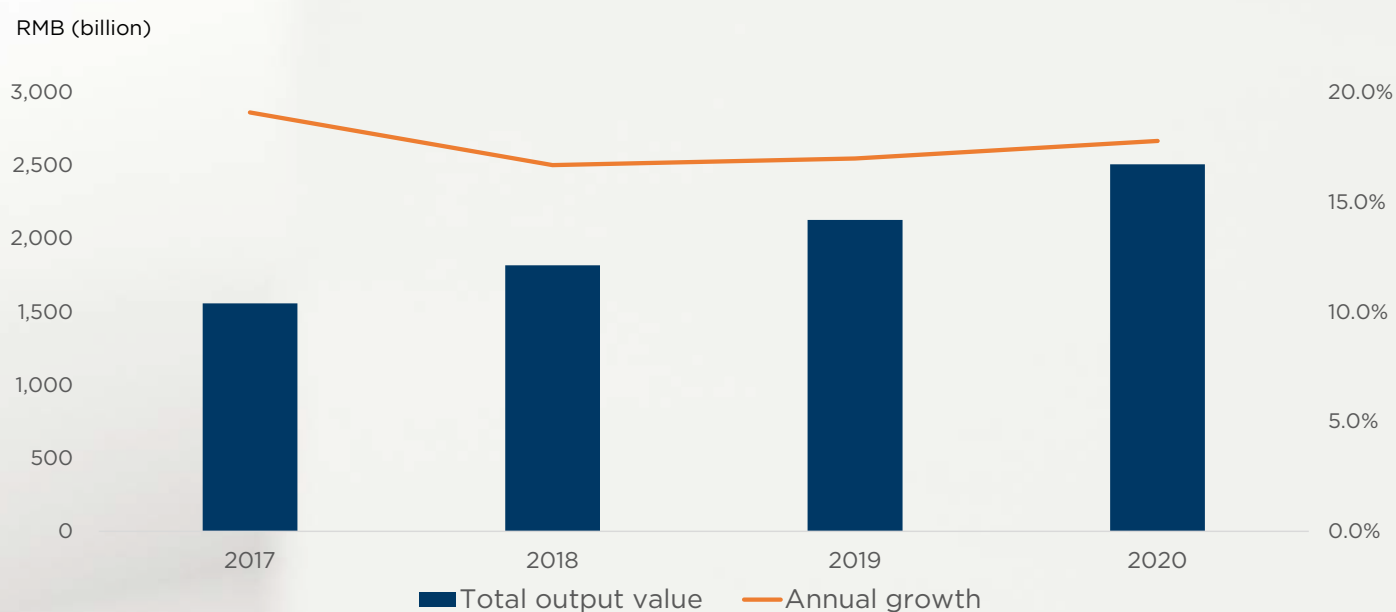
Figure 20: National-level industrial parks with biopharmaceutical industry (BI) as a development focus in China (2019)



Source: sina.com, Cushman & Wakefield Research

In 2020, according to AskCI.com, the output value of Chinese BIPs was more than RMB2,510 billion and by 2025 this value is expected to exceed RMB5,840 (Figure 21).

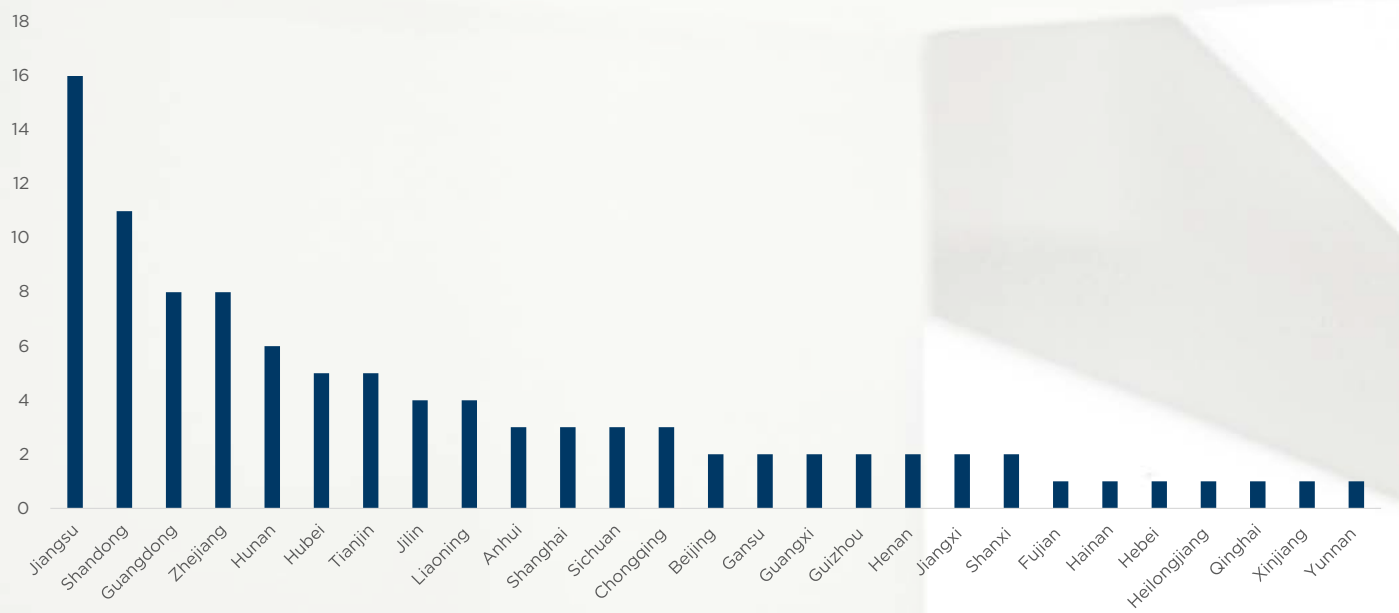
Figure 21: Output value of Chinese BIPs (2017-2020)



Source: AskCI.com, Cushman & Wakefield Research

In terms of geographical distribution, most BIPs in China are sited in the Bohai Rim area, the Yangtze River Delta region or the Pearl River Delta region. In terms of particular locales, according to sina.com, Jiangsu, Shandong and Guangdong provinces had the largest number of such parks in China. With investment and development in other regions, BIPs have also sprouted in Central China and in Western China (Figure 22).

Figure 22: Distribution of the top100 BIPs in China (2021)



Source: sina.com, Cushman & Wakefield Research

Table 5: Representative BIPs in China

Name
Zhongguancun Life Science Park
Beijing E-Town Bio
China Bio-Medicine Park (Daxing, Beijing)
Shanghai Zhangjiang Pharma Valley
Shanghai International Medical Zone
Guangzhou Science City
Guangzhou Internation Bio Island
Shenzhen State Biological Industry Base
Shenzhen International Bio Valley
Chengdu Medical City
Zhejiang Yuhang Biomedical Hi-Tech Industrial Area
Hangzhou Biopharma Town
Nanjing Biotech and Pharmaceutical Valley
Nanjing Life Science Town
Suzhou BioBAY
Wuhan BioLake
Xiamen Bio Bay
National Health Technology Park (Zhongshan)
Shijiazhuang National Biological Industry Base
Lianyungang Life Health Industrial Park

Source: China Biomedical Industry Barometer 2.0, Cushman & Wakefield Research

At the present time, BIP development in China is still evolving, as they compete for enterprise investment (Table 5).

What's more, park infrastructure, systems, management, support services and related policies, are constantly being advanced and tweaked. Moreover, pioneering enterprises, universities, investment institutions, public service platforms and government agencies are all being integrated into park development, with the hope that these parks can create an edge to support further investment and business growth and expansion in the future. In China, Suzhou BioBAY is a good example of a fully integrated biotech park (Figure 23 and Case Study 1 in the Appendix).

Offices

Office space, whether its location is in a biopharmaceutical industrial park, in a suburban location, or in a downtown CBD location, is a key component of a life sciences enterprise's real estate portfolio. When considering leased Grade A offices, in some city-level markets, overseas life sciences enterprises dominate. In others, it is domestic enterprises which dominate. Of late, contract research organisations (CROs), contract manufacturing organisations (CMOs) and contract sales organisations (CSOs), have surfaced as new drivers for quality office space demand in several of China's city-level markets.

When specifically considering Grade A office space options, life sciences enterprises are no different from other enterprises regarding their criteria for selecting the optimal quality office location (Figure 24).

Figure 23: Suzhou BioBAY, Suzhou timeline

2006-2009: Initial exploration period	
2006	Initial construction commenced.
2007	First facilities officially opened.
2010-2015: Rapid development period	
2010	BioBAY was first promoted as a national science and technology enterprise incubator, becoming the first national incubator in the field of biomedicine in Suzhou.
2011	Suzhou Industrial Park Bio-Industrial Co., Ltd integrated all wholly owned subsidiaries.
2013	Suyu Biomedical Industrial Park officially laid its foundation stone.
2015	Suzhou Bio Industrial Park, located on Sangtian Island within Suzhou Industrial Park, was officially opened.
Since 2016: Industry-leading period	
2017	Phase II B Zone attracted its initial occupiers and was officially renamed as BioBAY.
2019	The Hong Kong subsidiary was established.
2020	Phase II B Zone was officially opened.
2021	Phase III A Zone was established.
Present	Phase IV and Phase V zones are under construction.

Source: Suzhou BioBAY, Cushman & Wakefield Research

Figure 24: General criteria life sciences enterprises consider when locating to new Grade A office space

Office Quality Design, construction, fitout, integrated technology, sustainability, property management	Office Space Lease Terms Rent, maintenance fee, etc	Accessibility Metro, rail, air, bus, car parking, their production plants (if established)
Amenities Retail, green space, business facilities	Business Clustering Same industry enterprises – Upstream and downstream	Availability of Enterprise Supportive Government Policies (Environment Impact Assessment, etc.)
Availability of Talent		

Source: Cushman & Wakefield Research

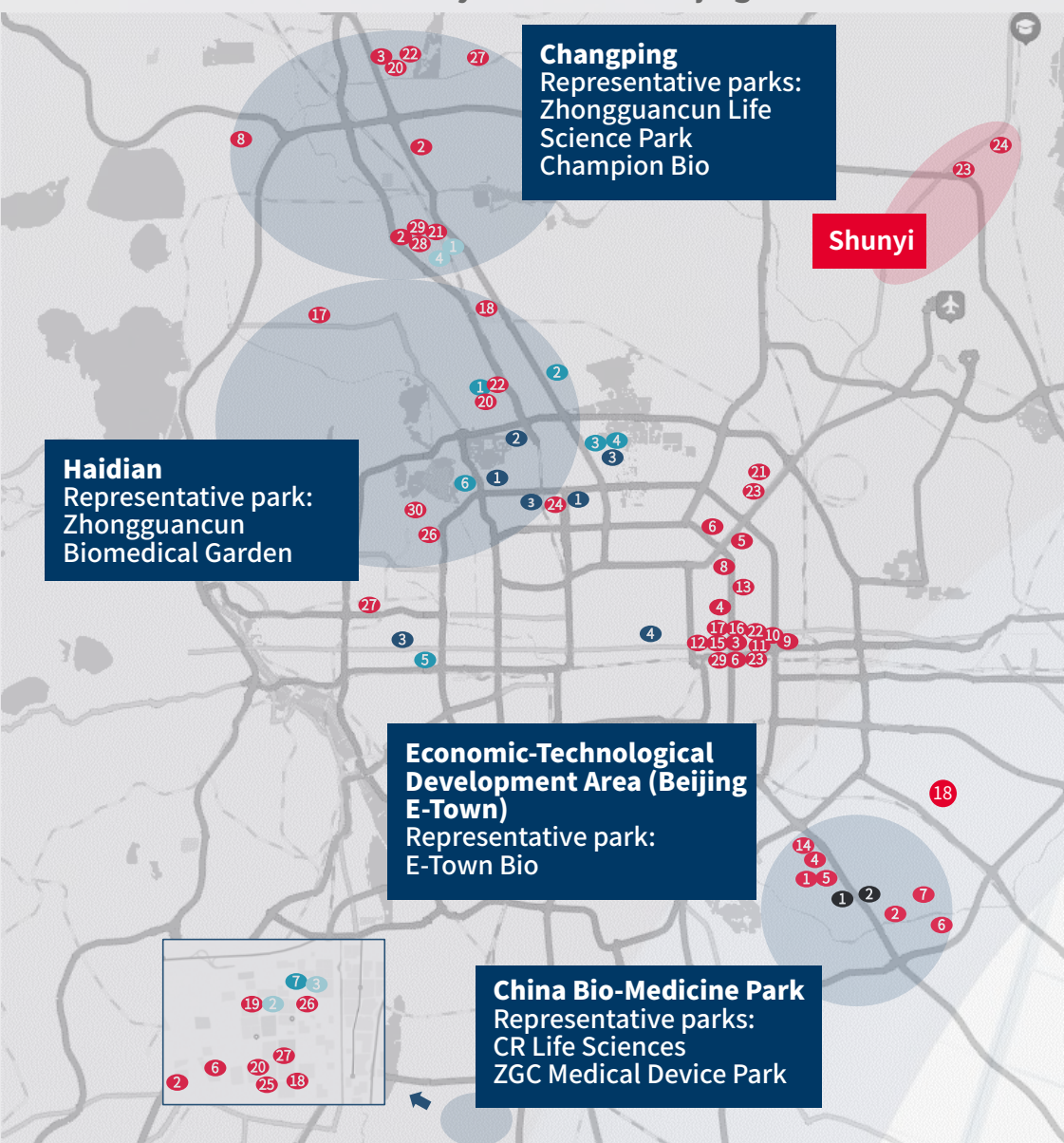
A close-up, low-angle shot of a microscope, focusing on the objective lenses and the stage. The image is heavily blue-tinted, giving it a scientific and high-tech feel. The lighting is dramatic, with some highlights on the metal parts of the microscope.

6 City Markets

When considering the life sciences industry and the related real estate market at the city level, China has a number of important markets. For the purposes of this report, we will examine four of them: the four first-tier cities of Beijing, Shanghai, Shenzhen and Guangzhou.

Beijing

Map 1: Location of selected life sciences enterprises, related academic institutions and life sciences industry clusters in Beijing



Well-known life sciences enterprises

1. Varian Medical Systems
2. CR Pharma
3. Novartis
4. Bayer
5. Sanofi
6. Fresenius Kabi
7. AstraZeneca
8. Boehringer Ingelheim
9. GlaxoSmithKline
10. AbbVie
11. Johnson & Johnson
12. Roche
13. Abbott
14. GE Healthcare
15. Medtronic
16. Shanghai Pharma
17. Amgen
18. Tong Ren Tang
19. Union Pharma
20. Sinovac
21. Novo Nordisk
22. Mindray
23. Merck KGaA
24. Sinopharm
25. Minhai Biotechnology
26. China Traditional Chinese Medicine Holdings
27. SL Pharma
28. Syngenta
29. BeiGene
30. Shouyao Holdings

Important scientific & talent resources

1. Peking University
2. Tsinghua University
3. University of Chinese Academy of Sciences
4. Peking Union Medical College

Production bases

1. Shouyao Holdings New Medicine R&D and Industrialisation Base (under construction)
2. BDA New Medicine Production and R&D Base

Key R&D centres

1. Mindray Beijing Institute
2. Global Health Drug Discovery Institute
3. Institute of Biophysics, Chinese Academy of Sciences
4. Beijing Institute of Genomics, Chinese Academy of Sciences/China National Center for Bioinformation
5. Academy of Military Medical Sciences
6. Beijing Institute of Biomedicine
7. Artemisinin Research Center (under construction)

New innovation platform/incubator/accelerator

1. Shouyao Holdings New Medicine R&D and Industrialization Base (under construction)
2. BDA New Medicine Production and R&D Base



Characteristic industry clusters



Emerging industry clusters

Market Dynamics

As the nation's capital and an important centre for technology innovation, Beijing is home to numerous higher education institutions and research institutes and has one of the largest professional talent pools in the country. These advantages have provided the life sciences industry in Beijing with highly favourable conditions for its ongoing development. Since 2018, Beijing has successively established a number of administrative agencies closely related to the pharmaceutical industry, such as the Beijing Bureau of Economy and Information Technology and the Beijing Municipal Health Commission. Beijing has also released a number of welfare policies in terms of financial support, talent introduction, and product R&D. The city authorities have also helped launch more than 40 key projects, such as the setting-up of AstraZeneca's North China headquarters, and many high-level industry platforms and incubators. According to the Beijing Municipal Bureau of Statistics, the number of researchers and developers in bioengineering and new pharmaceutical industries in key areas in Beijing increased from 20,664 in 2014 to 32,609 in 2021, up by 57.8%. Meanwhile, R&D expenditure rose from RMB4.2 billion in 2014 to RMB20.7 billion in 2021, up by 399%, and in addition, the total revenue of related enterprises rose from RMB117.6 billion in 2014 to RMB461.2 billion in 2021, up by 292%.

At the same time, the life sciences industry, as a beneficiary of the COVID-19 pandemic, is also developing rapidly. According to Cushman & Wakefield, new office leases and relocations by life sciences enterprises accounted for 4.6% of total office lease transactions by area in 2021, which was the highest since 2014 and ranked 4th among all industries. In Q1 2022, this proportion has further climbed to 10.6%.

In terms of the office submarkets in the city, the CBD is favoured by life sciences enterprises. According to Cushman & Wakefield, most of the world's top 500 life sciences enterprises entering the Chinese market have established functional offices in Beijing, and most of them are now

concentrated in the CBD submarket. During the past five years, 9.4% of office leasing transactions in the CBD were related to the life sciences industry.

Business park areas, however, are still dominant, with the majority of life sciences enterprises in Beijing being clustered into four distinct industrial clusters. These clusters are the Daxing Biomedical Industry Base and the Beijing Economic Technological Development Area in the south, and Changping district and Haidian District in the north. Among them, the Daxing Biomedical Industry Base has attracted many well-known domestic and overseas life sciences enterprises in recent years, such as Fresenius Kabi, Tong Ren Tang, Union Pharma, Sinovac R&D, etc. What's more, according to released data by the China Bio-Medicine Park, by the end of 2021, more than 5,000 enterprises had settled in the base, and the total industrial output value exceeded RMB100 billion. Meanwhile, the Beijing Economic-Technological Development Area is a national and municipal biomedical innovation incubation base, which has gathered some of the world's top 500 life sciences enterprises, such as GE Healthcare, Bayer, Sanofi, AstraZeneca, etc. According to the official website, being one of the leading industries, the life sciences industry in the area enjoyed a total output value of over RMB164.99 billion in 2021, an increase of 209.6% compared with 2020. Finally, Haidian and Changping have gathered about 43.2% of the city's life sciences enterprises. Many have settled in Zhongguancun Life Science Park, Champion Bio and Zhongguancun Biomedical Garden. So far, these parks have attracted many well-known enterprises, such as Novo Nordisk, Mindray and the Peking Union Medical Biological Incubation Centre. In addition, Shunyi District, as an emerging area, has not only gathered Merck KGaA Beijing, Sinopharm Group and other well-known life sciences enterprises, but also regards the life sciences industry as one of the major sectors to develop in the future.

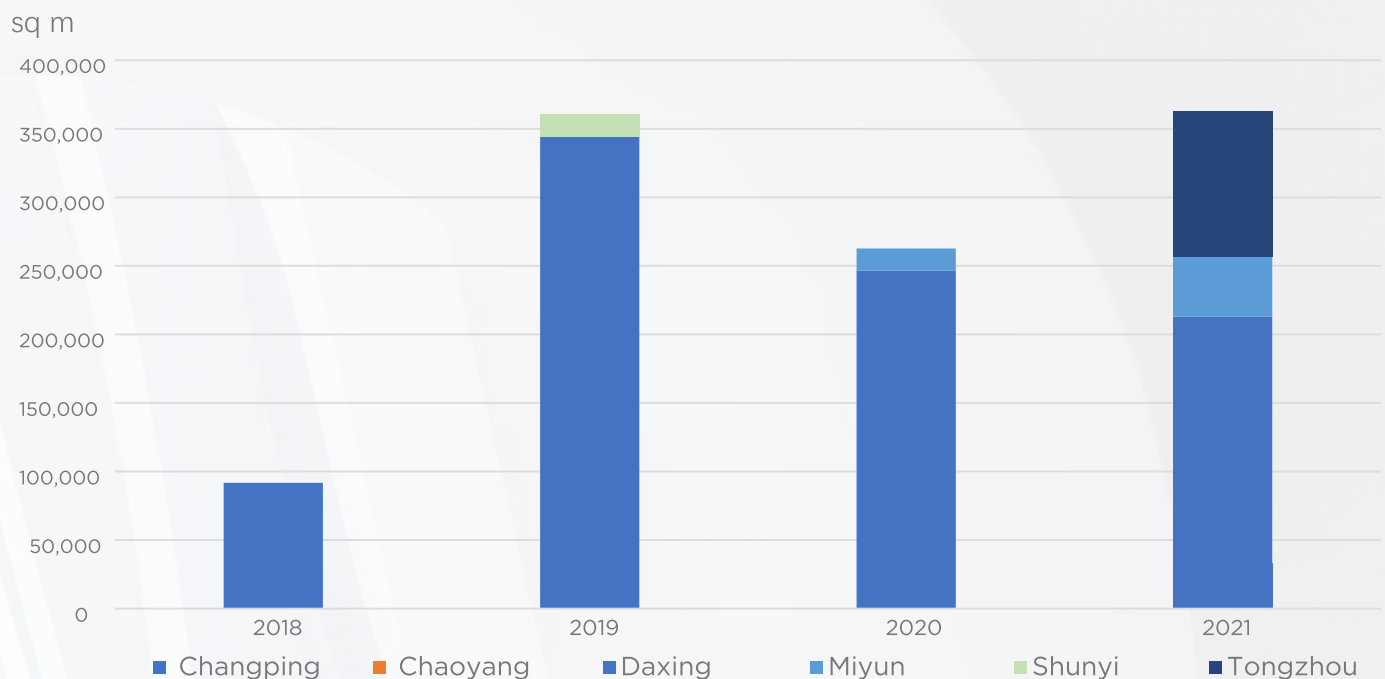


Market Outlook

In order to continue promoting the high-quality development of Beijing's life sciences industry and better seize business opportunities, the Beijing Municipal government has issued the 'Action Plan of the Beijing Municipal Government on Accelerating Medical and Health Collaborative Innovation (2021-2023)'. In the plan, the development goals are to make the total revenue of the life sciences industry in Beijing exceed RMB300 billion, to introduce at least 10,000 related industry professionals, to establish two to three digital healthcare benchmark enterprises, and to enlarge related office space to 3 million sq m, by the end of 2023. By then, the life sciences industry will become an important pillar for the development of Beijing's innovative industries.

In H2 2021, the released 'Beijing's Implementation Plan on Accelerating the Construction of a Benchmark City for the Global Digital Economy' also highlighted the life sciences industry as one of the six major industries for Beijing's future development. Meanwhile, the major tasks included in the '2022 Beijing Government Work Report' highlighted the importance of high-precision and advanced industries, especially in the life sciences sector. Additionally, the life sciences industry has also cooperated well with the high-tech industry to become a "dual engine" to promote the development of Beijing's innovative industries. Lastly, supported by government policies and the development goals, we can expect the life sciences industry to help drive further office market leasing demand in the future.

Figure 25: Life sciences industry-related land supply in Beijing (2018-2021)



Source: CREIS, Cushman & Wakefield Research

Figure 26: Beijing Grade A office take-up by area by the life sciences industry – MNC/Domestic enterprise breakdown (2021)

MNC: 30%

Domestic: 70%

Source: Cushman & Wakefield Research

Table 6: Major Grade A office leasing transactions in Beijing – Life sciences industry (2021)

Building	Submarket	Tenant	Area (sq m)	Leasing Type
Parkview Green	CBD	Bayer	12,000	Relocation
China Overseas Plaza	Others	SinoMed Medica	10,000	Relocation
SK Tower	CBD	BeiGene	10,000	Relocation
CP Centre	CBD	Roche	5,000	Relocation
Office Park	CBD	MSD	2,500	New Lease

Source: Cushman & Wakefield Research

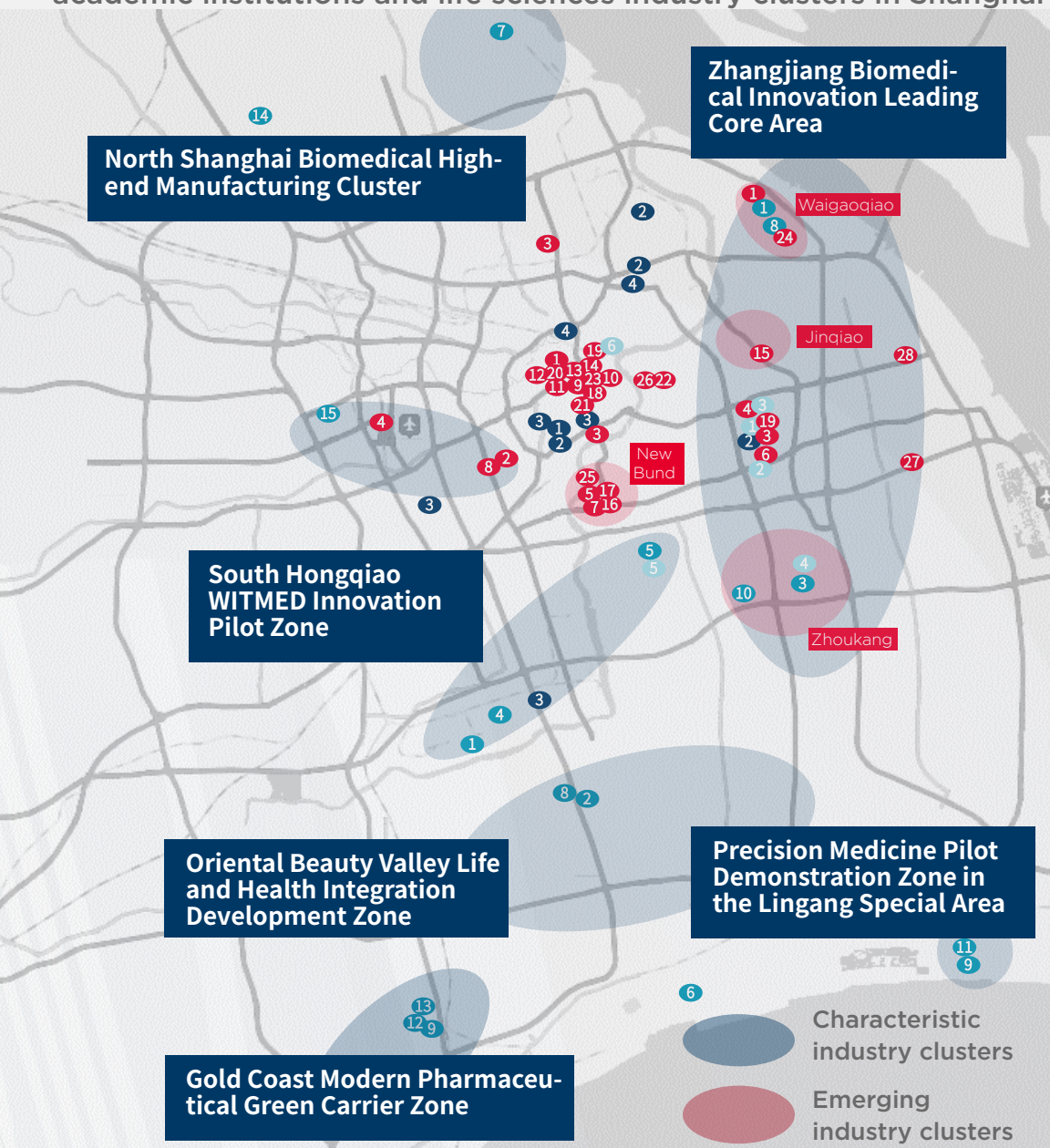
Table 7: Major real estate investment deals in Beijing – Life sciences industry (2021)

Property	Location	Price (RMB Million)	Purchaser	Vendor	Area (sq m)
Greenland Huigu Centre No.6 Building	Changping	110	Eyebright Medical	Greenland Group	4,139

Source: Cushman & Wakefield Research

Shanghai

Map 2: Location of selected life sciences enterprises, related academic institutions and life sciences industry clusters in Shanghai



Well-known life sciences enterprises

1. Cardinal Health China/Shanghai HQ
2. Johnson & Johnson China HQ
3. Sinopharm
4. Roche
5. Siemens Healthineers
6. Novartis Park
7. Bayer China HQ
8. MSD China HQ
9. AbbVie China
10. GlaxoSmithKline (GSK) China
11. Sanofi Asia & China HQ
12. Bristol Myers Squibb China HQ
13. Pfizer China HQ
14. Abbott China
15. Thermo Fisher Scientific China HQ
16. Takeda Pharmaceutical China HQ
17. Medtronic China HQ
18. Shanghai Pharma
19. AstraZeneca China HQ
20. Boehringer Ingelheim
21. Amgen China HQ
22. Gilead Sciences China HQ
23. Eli Lilly China
24. Wuxi AppTec HQ
25. IQVIA China
26. Parexel International
27. Medicilon
28. Kinetic

Important scientific & talent resources

1. Chinese Academy of Sciences Shanghai Branch
2. Fudan University
3. Shanghai Jiao Tong University
4. Tongji University

Key R&D centres

- | | |
|--|--|
| 1. Johnson & Johnson Pharmaceuticals/Medical Devices | 6. Shanghai Pharma · Shanghai Zhongxi Sunye Pharmaceutical |
| 2. Sinopharm Shanghai Institute of Biological Products | 7. CanSino SPH Biologics |
| 3. Siemens Healthineers | 8. WuXi Biologics Integrated Facilities |
| 4. Sino-American Shanghai Squibb Pharmaceuticals | 9. WuXi STA/WuXi ATU |
| 5. Medtronic China R&D Centre Shanghai Plant | 10. Shanghai Haini Pharmaceutical |
| | 11. Junshi Biotechnology |

12. Baxter Healthcare
13. Asymchem Jinshan Biotechnology R&D Centre
14. United Imaging Industrialisation Demonstration Base
15. Innovent Global R&D Centre (under construction)

New innovation platform/incubator/accelerator

- | | |
|---|--|
| 1. ATLATL Center for Innovation & Research/Innovation Cluster | 5. Medtronic Mlab |
| 2. Johnson & Johnson Innovation JLABS @Shanghai | 6. AstraZeneca Shanghai International Life Science Innovation Campus (iCampus) & AI iLab |
| 3. Roche Innovation Center Shanghai (RICS)/Roche Accelerator | |
| 4. Siemens Healthineers Shanghai Innovation Centre | |

Source: Cushman & Wakefield Research

Market Dynamics

As one of the first cities in China for overseas life sciences enterprises to settle in, under the guidance and planning of the government over the past 20 years, Shanghai has grown into an important biotechnology industry agglomeration centre focusing on biomedicine and high-end medical equipment. In 2008, Shanghai's biomedical industry achieved a total economic volume of RMB103.46 billion and by 2020, the scale of Shanghai's biomedical industry reached RMB600 billion. Consequently, with an annual compound growth rate of 15.8%, in just 12 years, the industrial scale increased sixfold. The intensity of policy support, talent attraction, the concentration of internationally renowned biotechnology enterprises and the convenience of investment and financing are second to none in the country. Among the Fortune 500 companies, almost all the life sciences-related enterprises in China have functional business departments located in Shanghai. These business departments include regional headquarters, production/wholesale bases, research laboratories, incubators and accelerators to name a few.

In 2021, along with comprehensive economic recovery after the initial phase of the epidemic, the development of biotechnology-related industries continued to maintain a high-quality growth trend. As one of the three major strategic industries in Shanghai, the output value of Shanghai's biomedical manufacturing industry increased by 18.3%. In the same year, eight Class 1 new medicines were approved for marketing. With the central government's support for Pudong to build a 'Socialist Modern Pilot Area' in 2021, the Municipal People's Congress has issued regulations related to the establishment and acceleration of biomedical innovation in the Zhangjiang and Lingang areas. Shanghai has formed a '1+5+X' biomedical industry layout to fully integrate the city's resources and create a whole high-quality industry chain. Additionally:

- In the CBD, such as Jing'an Temple, Nanjing West Road, People's Square, Huaihai Road, etc., the office market has actively introduced international life sciences enterprise headquarters which have in turn gathered much talent.
- In the 'Golden Central Development Belt' region planned by the government, such as the Caohejing, New Bund, Zhangjiang and Jinqiao areas, large-scale business parks and industrial parks will continue to support and enrich the life sciences industry sector in not only Shanghai but China as well. Of note, the 'Zhangjiang R&D + Made in Shanghai' policy has become an important development strategy for Shanghai's life sciences industry. Besides, New Bund, Jinqiao and other areas, benefitting from some preferential policies in Pudong, will continue to gather more and more well-known biotech and pharmaceutical enterprises.
- In suburban markets, such as Zhoupu, Kangqiao, Jinshan, North Shanghai, Lingang, Fengxian, Pujiang and other regions in and around Shanghai, more industrial land and facility space will be made available for the development of related manufacturing plants and commercial pilot zones for the life sciences industry.

Market Outlook

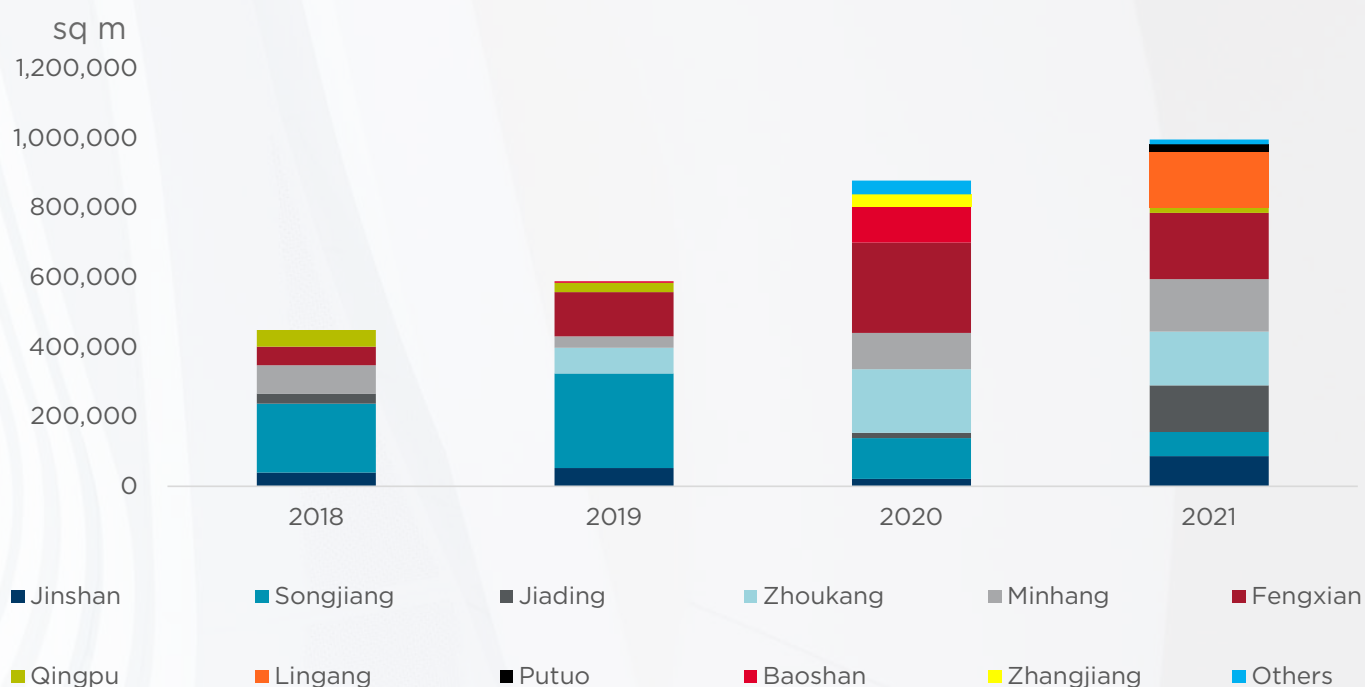
In its '14th Five-Year Plan', Shanghai has planned to expand diversity of high-quality life sciences industry development. In 2021, Shanghai issued 'Several Opinions on Promoting the High Quality Development of the City's Biopharmaceutical Industry' and the 'Shanghai Municipal 14th Five-Year Plan for the Development of Traditional Chinese Medicine' to further promote the comprehensive development of the industry. This will be done via:

- The encouragement of digitised, intelligent and greener manufacturing;
- The promotion of new industry modes, such as contract R&D and manufacturing organisations (CRO, CMO, CDMO, etc.);
- The further development of the TCM industry and the improvement in its business function level;
- The proper improvement in the capacity of industrial space, and;
- The accelerated business development and coordination among life sciences parks.

Medicine innovation research and development, high-end medical equipment, smart medical treatment, digital healthcare and the incorporation and utilisation of AI have become industry development hot spots and Shanghai aims to be a centre for these types of life sciences industry advancements over the next few years.

In addition, in view of the possible environmental impact of the industry, green and sustainable industry development have gradually become focuses for investors and occupiers alike when examining their related real estate footprint. Subsequently, industry players in the market are paying more attention to whether a real estate project and/or related land has passed/can pass the Environmental Impact Assessment (EIA). What's more, if there is a need to build a laboratory or a need to carry high-quality experimental equipment, life sciences enterprises today have higher requirements for the floor load-bearing capacity of the property, sewage facilities, etc. Therefore, in view of these priorities, we expect business parks and industrial parks in Shanghai, including in the New Bund, Pujiang, Zhoupu, Kangqiao, Jinqiao and other areas in Pudong New Area, as well as related factories in Fengxian, Jinshan, North Shanghai and in surrounding cities and counties (such as Suzhou, Nantong, etc.) to further raise industry standards in order to continue to attract industry investment.

Figure 26: Life sciences industry-related land supply in Shanghai (2018-2021)



Source: CREIS, Cushman & Wakefield Research

Figure 29: Shanghai Grade A office take-up by area by the life sciences industry – MNC/Domestic enterprise breakdown (2021)

MNC: 37% **Domestic: 63%**

Source: Cushman & Wakefield Research

Table 8: Major Grade A office leasing transactions in Shanghai – Life sciences industry (2021)

Building	Submarket	Tenant	Area (sq m)	Leasing Type
New Bund Center	New Bund	Takeda Pharmaceutical	8,000	Relocation
New Bund International Square	New Bund	Baxter	8,000	Relocation
Crystal Plaza	New Bund	Junshi Biosciences	6,000	Relocation
New Bund Times Square	New Bund	CStone Pharmaceuticals	4,700	Relocation
New Bund Center	New Bund	Luoxin Pharmaceutical	3,000	Relocation
Corporate Avenue	Xintiandi	Profex Medical Technology	3,000	Renewal

Source: Cushman & Wakefield Research

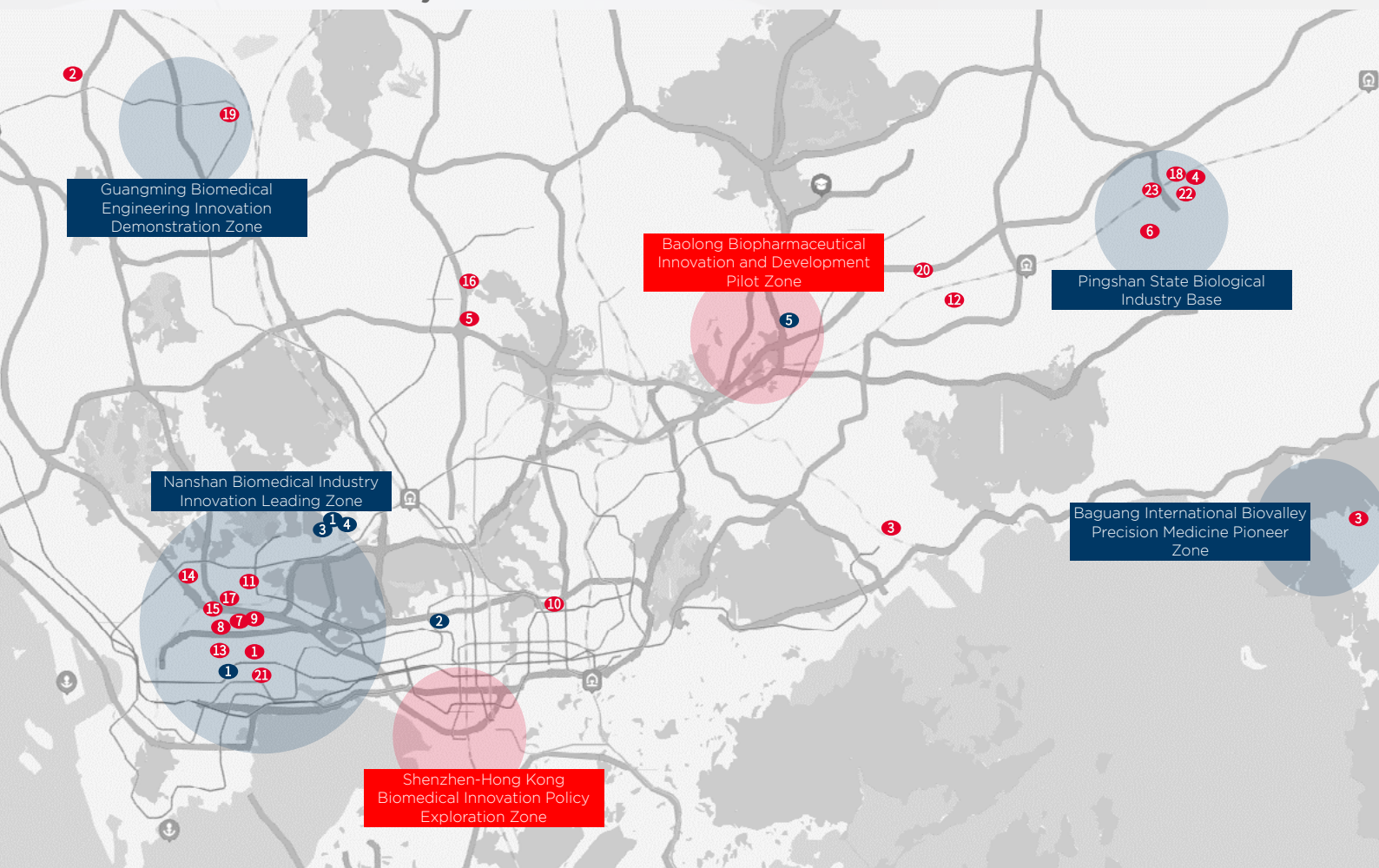
Table 9: Major real estate investment deals in Shanghai – Life sciences industry (2021)

Property	Location	Purchaser	Vendor	Area (sq m)
No.1-12 Gudan Road	Zhangjiang	MicroPort	Huabo Info+Fengjun Enterprise	69,200
Starcrest Medical Valley	Zhangjiang	Gaw Capital	Starcrest Capital	26,156
Ruili Tower	Xuhui District	MicroPort	Ruili	20,996

Source: Cushman & Wakefield Research

Shenzhen

Map 3: Location of selected life sciences enterprises, related academic institutions and life sciences industry clusters in Shenzhen



Well-known life sciences enterprises

1. Mindray
2. BioKangtai
3. BGI
4. Snibe
5. CR Sanjiu
6. Salubris
7. Joincare
8. Hepalink
9. APT Medical
10. Sinopharm Accord
11. Chipscreen
12. YHLO
13. SonoScape
14. Bioeasy
15. Hybio
16. Lifotronic
17. Neptunus
18. Edan
19. Weiguang Biological

20. Glory Medical
21. LifeTech
22. Ascentawits
23. Turier Biotech

Important scientific & talent resources

1. Shenzhen University
2. Shenzhen PKU-HKUST Medical Center
3. Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences
4. Southern University of Science and Technology
5. The Chinese University of Hong Kong, Shenzhen



Characteristic industry clusters



Emerging industry clusters

Market Dynamics

Since Shenzhen was recognised by the National Development and Reform Commission as the first batch of national bio-industry bases in 2005, the scale of Shenzhen's life sciences industry has maintained rapid growth. The Shenzhen Municipal Government began to focus on building a life sciences industry cluster in 2009 and identified biomedicine as one of the seven strategic emerging industries in 2018. As of 2021, there were 45 listed life sciences enterprises in Shenzhen, including 15 A-share listings, three Hong Kong-listed companies, and 27 on the New Third Board. In terms of industry segmentation, there are 20 medical device enterprises, 17 pharmaceutical enterprises, and two pharmaceutical commercial enterprises. Shenzhen's top life sciences enterprises are mainly concentrated in three industry-related major fields: genetic testing, medical devices, and medicine.

Shenzhen is an important birthplace of and core cluster for China's medical device industry. According to Askci.com, in 2020, the gross production output of the medical device industry in Shenzhen reached over RMB80 billion, nearly 10% of the total for mainland China. Meanwhile, the total export value generated by the medical device industry in 2020 contributed to a 14% share of the export value for the region, marking out Shenzhen as the number one ranking city among medium-sized and large cities in mainland China in terms of medical device exports. By June 2021, there were more than 1,300 medical device manufacturing enterprises in Shenzhen.

At present, Shenzhen's life sciences industry is mainly concentrated in Nanshan District. In this district, enterprises involved in medical devices, biomedicine, biomedical engineering, and cutting-edge fields, such as high-end chemical preparation, biological products, and high-performance medical devices have established a business presence. Leading life sciences enterprises that have settled in Nanshan include Mindray, Joinecare, Salubris, Hepalink, Weihang Medical and Fusen Pharmaceutical. In addition, many new commercial business zones in Shenzhen have also accelerated their own life sciences industry development, including the Shenzhen (Pingshan) State Biological Industry Base and the Guangming Biomedical Engineering Innovation Demonstration Zone.

- The Shenzhen (Pingshan) State Biological Industry Base – There are 824 existing life sciences enterprises in Pingshan. The base has enjoyed an average annual growth rate of more than 100 enterprises and an increase in output value of more than 30%. In the future, Pingshan plans to cultivate and introduce more CRO, CMO and other platform institutions and plans to promote the construction of international Phase I clinical hospitals, so as to form a full-process life sciences industry chain, including education, research, and production. In the future, the base targets to have an industry output value of over RMB40 billion and aims to house over 1,500 related enterprises.
- The Guangming Biomedical Engineering Innovation Demonstration Zone – Guangming offers an initial 100,000 sq m of life sciences-related business space, which meets the needs of life sciences enterprises from start-ups to leading enterprises. At the same time, the first special support policy, the 'Several Measures of the Guangming District on Supporting the Integration and Development of the Industrial Chain of the Synthetic Biologics Innovation Chain' document, aims to make Guangming a leading centre in the field of synthetic biology in Shenzhen.

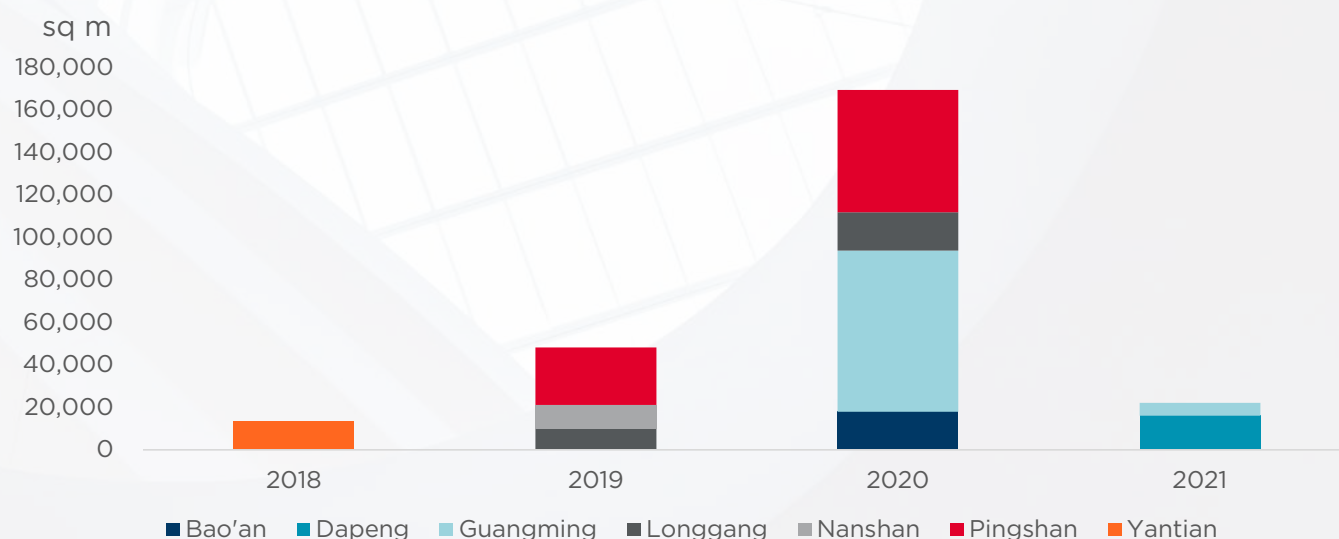


Market Outlook

In 2019, 'The Opinions of the CPC Central Committee and the State Council on Supporting Shenzhen to Build a Pioneering Demonstration Zone of Socialism with Chinese Characteristics' was released to support Shenzhen's future development, including the development of its life sciences industry. In order to seize further strategic commercial opportunities within the life sciences industry, in January 2020, the Shenzhen Municipal People's Government issued 'The Guiding Opinions of Shenzhen Municipality on Promoting the Agglomeration Development of the Biopharmaceutical Industry, the Implementation Plan for the Agglomeration Development of the Biopharmaceutical Industry in Shenzhen (2020-2025), the Action Plan for the Development of the Biopharmaceutical Industry in Shenzhen (2020-2025) and Several Measures to Promote the Agglomeration and Development of Biopharmaceutical Industry in Shenzhen'. The '1+3' series of documents clearly demonstrate the future importance of the life sciences industry and aim to position Shenzhen as a centre where the integration of the industrial chain, value chain upgrading, and market chain optimisation can and will be realised over the course of the next several years.

Following on from this development vision, Shenzhen plans to initially build an industrial system with an active innovative industry environment, effectual infrastructure, and a reasonable spatial layout by 2025. The industrial agglomeration in the city will form a spatial pattern of 'one core and multiple centres'. In addition to Pingshan and Guangming, the Baolong Biopharmaceutical Innovation and Development Pilot Zone and the Baguang International Biovalley Precision Medicine Pioneer Zone will be further developed as well. In Baolong, three industrial sites have been listed to build innovation laboratories and public service platforms, such as a bio equivalency (BE) platform, a good laboratory practice (GLP) platform, a CRO/CMO platform, a quality testing platform, etc., to meet the needs of R&D and production in the future. In Baguang, incubators and entrepreneurship parks have officially started construction. In the future, the industrial land will be used to focus on cutting-edge medical technology research, such as gene sequencing and stem cell clinical research.

Figure 29: Life sciences industry-related land supply in Shenzhen (2018-2021)



Source: CREIS, Cushman & Wakefield Research



Figure 30: Shenzhen Grade A office take-up by area by the life sciences industry – MNC/Domestic enterprise breakdown (2021)

MNC: 6% **Domestic: 94%**

Source: Cushman & Wakefield Research

Table 10: Major Grade A office leasing transactions in Shenzhen – Life sciences industry (2021)

Building	Submarket	Tenant	Area (sq m)	Leasing Type
Gemdale Center	Futian CBD	Beijing Boxin Natural Biotechnology Co., Ltd	1,800	Relocation
China Resources Tower	Houhai	Wayon Yining Health	600	Relocation
Block C, China Resources Land Building	Science Park	Fusen Pharmaceutical	500	New lease

Source: Cushman & Wakefield Research

Table 11: Major real estate investment deals in Shenzhen – Life sciences industry (2021)

Property	District	Price (RMB Million)	Purchaser	Vendor	Area (sq m)
Leli Precision Factory	Bao'an	600	A pharmaceutical company under the Genzon Group	Lorom Industrial	52,624

Source: Cushman & Wakefield Research

Guangzhou

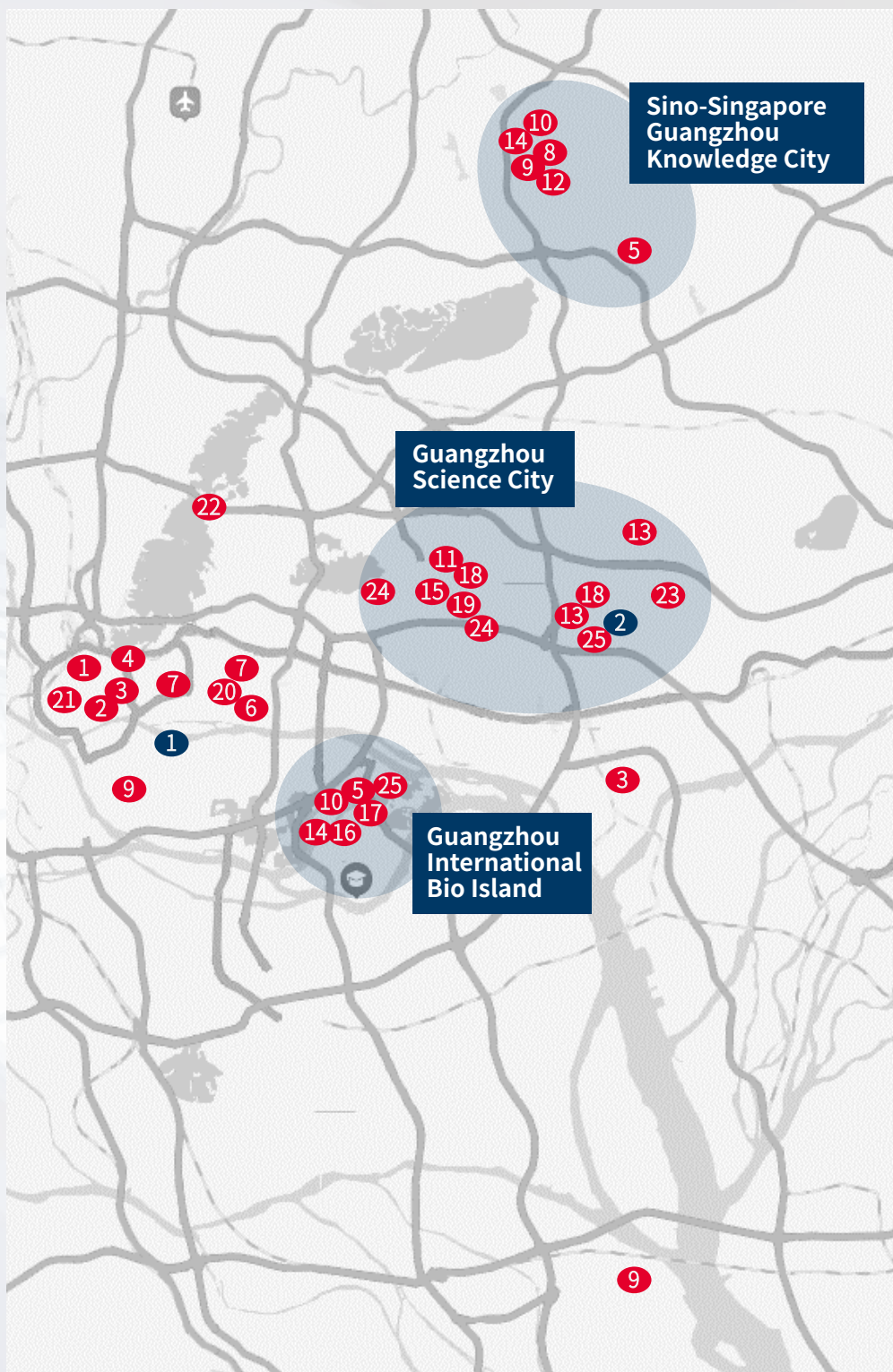
Map 4: Location of selected life sciences enterprises, related academic institutions and life sciences industry clusters in Guangzhou

Well-known life sciences enterprises

1. GlaxoSmithKline (GSK)
2. Sanofi
3. Fresenius
4. Abbott
5. AstraZeneca
6. Boehringer Ingelheim
7. Roche
8. GE Healthcare
9. Lonza
10. BeiGene
11. Daan Gene
12. InnoCare
13. Bio-Thera
14. Hengrui Pharma
15. Wondfo
16. KingMed
17. Burning Rock
18. Guangzhou Xiangxue Pharmaceutical/XPB
19. Medprin
20. Astellas
21. Guangzhou Pharmaceutical Holdings Limited/GPHL
22. BaiYunShan Pharmaceutical General Factory
23. Guan Hao Biotech
24. Boji Medical Technology
25. ApicHope Pharmaceutical

Important scientific & talent resources

1. Sun Yat-sen University
2. Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences



Characteristic industry clusters

Source: Cushman & Wakefield Research

Market Dynamics

The life sciences industry is one of the strategic emerging industries that Guangzhou is now focusing on developing. Since 2017, the Guangzhou Municipal Government and various district governments have successively issued special policies to support the development of the industry, including the 'Five-Year Action Plan for the Development of The Biopharmaceutical Industry in Guangzhou (2017-2021)' issued in 2017, the 'Several Provisions on Accelerating the Development of the Biopharmaceutical Industry in Guangzhou (Revised)' released in 2020, and the 'Detailed Rules for the Implementation of the Opinions on Accelerating the Development of the Biopharmaceutical Industry in Huangpu District, Guangzhou (Revised)' circulated in 2022.

These supporting policies have pushed for high-quality development of the industry in the city. In recent years, the scale of the life sciences industry in Guangzhou has gradually grown, the industrial system has become increasingly more optimised, and industrial agglomeration has become more evident. According to the Guangzhou Municipal Bureau of Statistics, during the '13th Five-Year Plan' period, Guangzhou's life sciences industry achieved an added value of RMB137.68 billion, with an average annual growth rate of 7.2%. In 2021, the life sciences industry in the city achieved an industrial added value of RMB19.08 billion, an increase of 9.5% year-on-year. Meanwhile, Guangzhou's university resources, scientific research institutions and rich clinical medical resources also provide a good foundation for connecting both the upstream and downstream life sciences industrial chain. A number of local enterprises with high technology and great development potential have been cultivated and grown, such as Guangzhou Pharmaceutical, Xiangxue Pharmaceutical, Daan Gene and KingMed Diagnostics. At the same time, the favourable industrial development environment has also attracted a number of well-known enterprises from home and abroad to set up regional headquarters, offices, R&D bases or production plants in Guangzhou, including Roche, AstraZeneca, and Sanofi.

In 2022, more than 3,000 life sciences enterprises have gathered in Huangpu District, Guangzhou, of which more than 10% are high-tech enterprises. At present, Guangzhou has formed a basic industrial

spatial layout centred on a 'Two Cities and One Island' concept. In more detail, 'Two Cities' entails the two projects: Guangzhou Science City and Sino-Singapore Guangzhou Knowledge City. 'One Island' involves Guangzhou International Bio Island. Among them, Guangzhou International Bio Island is positioned as an R&D centre, while Guangzhou Science City is set to be a pilot incubation area, and Sino-Singapore Guangzhou Knowledge City will be positioned to gather technology transformation carriers. Other notable parks and zones that are expected to play an important life sciences industry development role in Guangzhou are Baiyun Beauty Bay, Datansha International Health Ecological Island and Guangdong-Hong Kong-Macao Greater Bay Area Life and Health Industry Innovation Zone.

- Guangzhou International Bio Island is located on the border of Haizhu District and Panyu District. After nearly 10 years of development, the project has gathered nearly 100 life sciences R&D institutions and related enterprises. Bio Island has also played an important part in the development of the Sino-Israel Life Science Parallel Incubation Center, U.K.-China Science Bridges, and other international life sciences cooperation platforms.
- Guangzhou Science City, located in the middle of Huangpu District, is a core component of the national biology industry base. Science City is also an important innovation incubation platform and technology transformation platform for Guangzhou's life sciences industry. At present, it has gathered many technological innovation enterprises, including Xiangxue Pharmaceutical, Bio-Thera Solutions, and Daan Gene.
- Located in the northern part of Huangpu District, Sino-Singapore Guangzhou Knowledge City is a bilateral cooperation project between China and Singapore. At present, Knowledge City focuses on growing the life sciences industry, and has attracted R&D and production projects associated with well-known life sciences enterprises from home and abroad, such as BeiGene, InnoCare, Hengrui Pharma and so on.

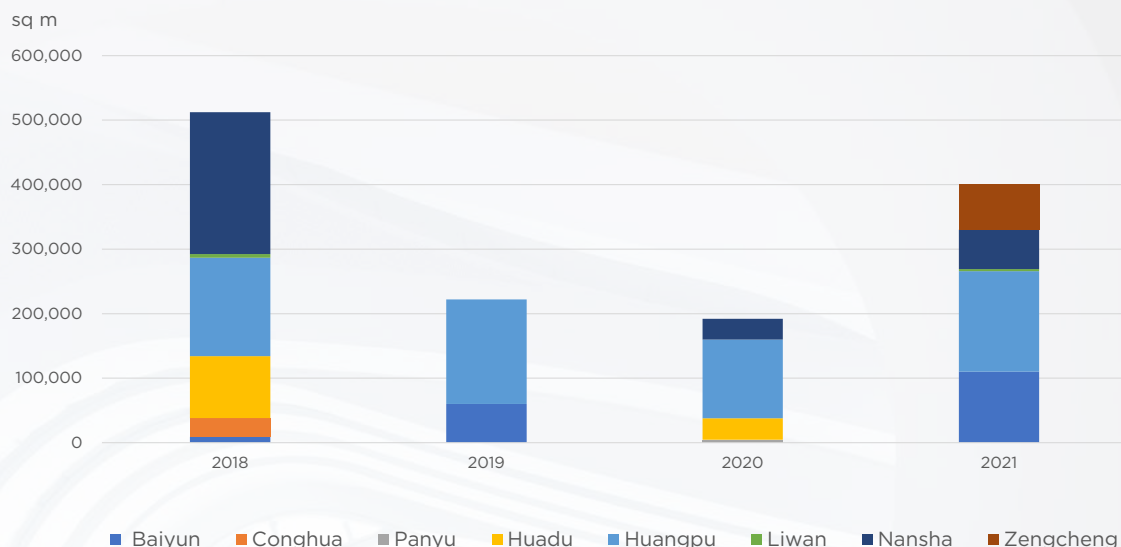


Market Outlook

Guangzhou's overall '14th Five-Year Plan' and Guangzhou's '14th Five-Year Plan for Strategic Emerging Industry Development' have been released successively, with both documents spelling out the importance of further development in the life sciences industry sector in Guangzhou and to make it a pillar industry within the city's overall economy. The city will also strive to enhance the innovation level and comprehensive competitiveness of the whole industry chain and

enhance development in a number of related industry fields, such as biological medicines, modern Chinese medicines, chemical innovative medicines, high-end medical devices, and high-end healthcare. Given the support policies, the talent pool, and the academic and R&D resources present, Guangzhou's life sciences industry is expected to continue to develop rapidly. Simultaneously, the demand for office, R&D and production space of related enterprises will further rise.

Figure 31: Life sciences industry-related land supply in Guangzhou (2018-2021)



Source: CREIS, Cushman & Wakefield Research

Figure 32: Guangzhou Grade A office take-up by area by the life sciences industry - MNC/Domestic enterprise breakdown (2021)

MNC: 68%

Domestic: 32%

Source: Cushman & Wakefield Research

Table 12: Major Grade A office leasing transactions in Guangzhou - Life sciences industry (2021)

Building	Submarket	Tenant	Area (sq m)	Leasing Type
Lumina Guangzhou	Yuexiu	Johnson & Johnson	2,800	Relocation
China International Centre	Yuexiu	Roche Pharmaceutical	2,000	Renewal
China International Centre	Yuexiu	Parexel	1,000	Renewal
Lumina Guangzhou	Yuexiu	Sanofi	800	Relocation

Source: Cushman & Wakefield Research

Key Takeaways

China's life sciences industry is driven by a host of factors, including:

- Organic industry growth;
- Population demographics;
- Spending power – public and private;
- National health coverage;
- Policy and reform, and;
- Research and innovation.

All these factors and more are filtering down and influencing what is happening at the city level and China's four first-tier cities are no exception.

Each city, whether it is Beijing, Shanghai, Shenzhen or Guangzhou, is strongly emphasising the importance of the future development of the life sciences industry.

Through support policies, these cities are changing the genetics of their real estate as they prepare to make the life sciences industry a key driver for their individual economies in the future.



BioBAY Suzhou

A world-class bio-industry ecosystem

Summary:

Suzhou is an important life sciences industry development centre in China. Located and well-established in the city, Suzhou BioBAY is at the very heart of cutting-edge industry innovation. Currently, the park is not only driving industry progression in Suzhou and in China but is also pushing sector advancement beyond.

Timeline of major events/milestone reached:

2006-2009: Initial exploration period

2006 Initial construction commenced.

2007 First facilities officially opened.

2010-2015: Rapid development period

2010 BioBAY was first promoted as a national science and technology enterprise incubator, becoming the first national incubator in the field of biomedicine in Suzhou.

2011 Suzhou Industrial Park Bio-Industrial Co., Ltd integrated all wholly owned subsidiaries.

2013 Suyu Biomedical Industrial Park officially laid its foundation stone.

2015 Suzhou Bio Industrial Park, located on Sangtian Island within Suzhou Industrial Park, was officially opened.

Since 2016: Industry-leading period

2017 Phase II B Zone attracted its initial occupiers and was officially renamed as BioBAY.

2019 The Hong Kong subsidiary was established.

2020 Phase II B Zone was officially opened.

2021 Phase III A Zone was established.

Present Phase IV and Phase V zones are under construction.

Overview:

- Located in Suzhou, Suzhou BioBAY is the innovation base within Suzhou Industrial Park. Its purpose is to foster the development of the life sciences industry.
- BioBAY has gathered more than 550 high-tech R&D enterprises and has formed an industrial clustering of enterprises involved in new medicine creation, medical equipment production and biotechnology.
- 23 enterprises established in BioBAY are listed in and outside China.
- BioBAY has attracted over RMB50 billion in capital investment thus far.



How It Was Done:

- BioBAY commenced construction in 2006.
- BioBAY targets biotech start-up or fledgling enterprises and focuses on incubating innovative start-ups in three main areas: medicine development, medical devices and biotechnology.
- The success of Cold Spring Harbor Asia in 2010 marked a turning point for Suzhou BioBAY in its quest for commercial development and expansion.
- In 2013, YuanBio Venture Capital established a biological industry fund of RMB500 million under management.
- In BioBAY, Innovent reached a strategic cooperation with Lilly to build the largest biotechnology industrialisation technology platform and production base in China in line with international standards. In 2019, the launch of “TYVYT” developed by Innovent marks a significant achievement in the pursuit of anti-tumour immunotherapy in China.
- BioBAY cooperated with Changshu to build BioBAY-Changshu, which is a new highlight of Suzhou Industrial Park’s ‘going out’ strategy. At present, industrial clustering is taking shape and is expected to form an RMB10 billion-level biomedical industrialisation base in the next five years.
- Four domestic new PD-1 medicines developed by Junshi Biosciences, Innovent, Hengrui Shengdiya and BeiGene have been approved for marketing one after another successively. Three of these four medicines are developed or produced in BioBAY.

Key Takeaways:

- BioBAY provides a high-quality service platform for innovative start-ups. It encompasses many research institutes, R&D institutions and national innovation bases, including the Suzhou Institute for Drug Innovation (SIDI), the Suzhou Institute for Systems Medicine, the Suzhou Institute’s Centre for Excellence in Molecular Cell Science, etc. It has also gathered entrepreneurial projects led by 72 top national experts as well as Chinese and overseas academicians.
- BioBAY is located in Dushu Lake Higher Education Town, which is home to many universities. Preferential policies are given in terms of taxation, capital investment, and talent employment.
- Since 2012, BioBAY, as a limited partner, has collaborated with well-known industry venture capital institutions, such as 6 Dimensions Capital, TF Capital, Lilly Asia Ventures, and Medtronic-Sequoia Innovation Venture Fund.
- Along with YuanBio Venture Capital and Ming Bioventures, BioBAY has also participated

in the launch of industrial funds focusing on early and mid-stage venture projects. Moreover, the abundance of industrial capital has become another factor in enhancing the park’s push and achievement in terms of innovation.

- In 2020, Suzhou proposed to benchmark and learn from the experience of Boston in the United States and turn Suzhou into ‘China’s Pharmaceutical Valley’. The new positioning of the city is and will be of great significance to BioBAY.

Results:

- Projects such as the Cold Spring Harbour Conferences Asia have helped Suzhou BioBAY become a global hub for academic and industrial exchanges in the field of life sciences.
- In 2014, GenePharma was listed on the National Equities Exchange and Quotations (NEEQ); in 2016, BeiGene was listed on the NASDAQ; Innovent was listed on the HKEX (Hong Kong Stock Exchange) in 2018; in 2019, Cstone Pharmaceuticals, Ascentage Pharma, SinoMab and Alphamab Oncology were listed on the HKEX, and BrightGene listed on the Shanghai Stock Exchange (SSE) STAR Market; in 2020, Kintor Pharma, JW Therapeutics, and Harbour BioMed were listed on the HKEX. Finally, in 2021, Gracell, HOB, CareRay, Basecare, and Adagene were listed on the NASDAQ, the HKEX and the SSE STAR Market.

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Life Sciences

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