

SEKTOR ZDRAVOTNICTVÍ V ČÍNĚ

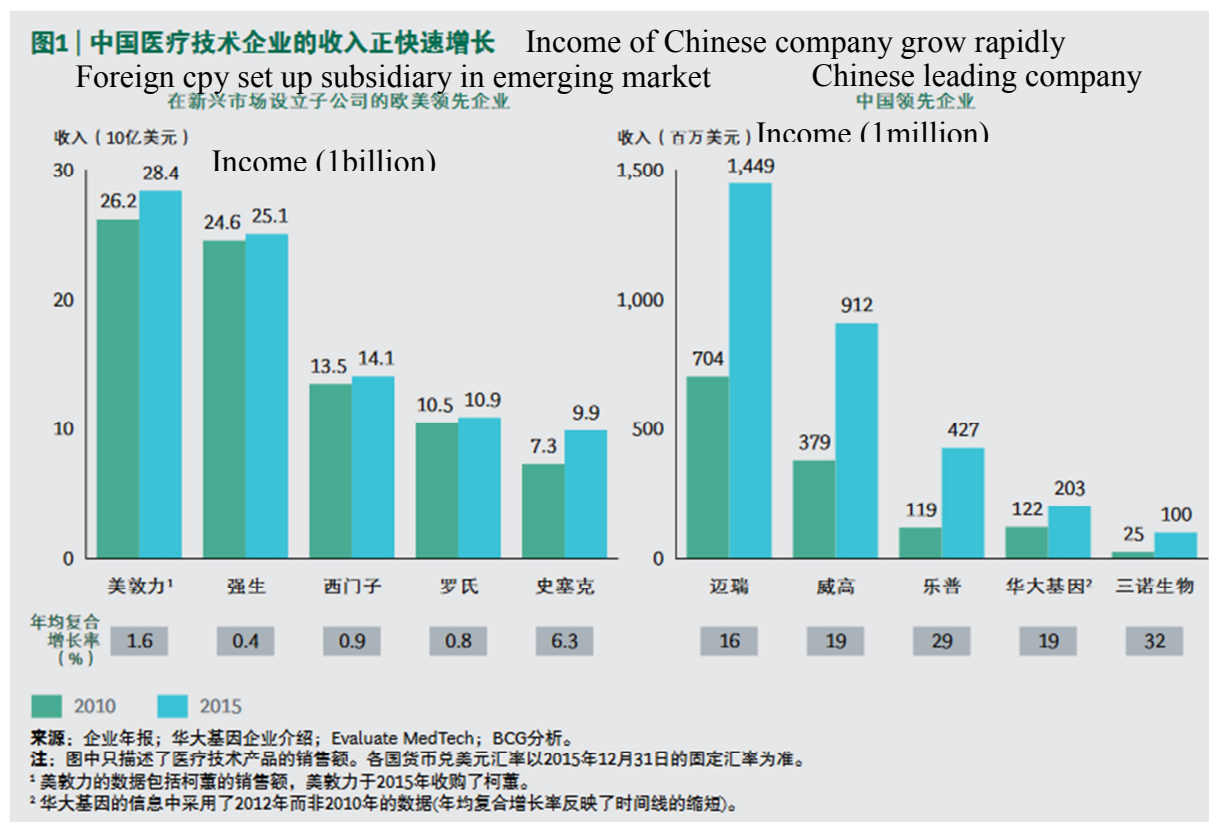
OBECNÝ PŘEHLED, REGIONÁLNÍ SPECIFIKA (ŠANGHAJ, PROVINCE JIANGSU, ZHEJIANG, ANHUI), ÚSPĚŠNÉ PŘÍPADY A PŘEKÁŽKY

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GENERAL OVERVIEW AND CHARACTERISTICS OF THE SECTOR IN CHINA

In October 2016 the State Council promulgated the "Healthy China 2030" concept. It clearly put forward the total size of health services in 2020 and 2030 will be more than 8 trillion and 16 trillion, "healthy China" strategy is going to lead in China's health care industry.

According to the latest report from the Boston Consulting Group (BCG), emerging markets such as China will reach 1/3 of the global medical technology market by 2022. The Chinese market will become the most potential in emerging market. Domestic companies will rely on the understanding of the local market and innovative products to quickly get the local market leading position, but they will also use overseas mergers and acquisitions to actively expand in the international market. Mindray, BGI and other emerging market enterprises will become global leader such as Lenovo, Huawei in the future. Among the hundreds of Chinese companies that are engaged in gene sequencing services, BGI is already a global leader in NIPT. In the CAR-T industry to treat blood tumor, the number of clinical trials in China is only second to the United States.



In 2016 China overseas mergers and acquisitions hit record highs. Chinese overseas mergers and acquisitions aim to introduce overseas research and innovation ability, hoping to have synergistic effect with their own R & D platform. In this will help overseas outstanding drugs and therapy landing in China. List of Major Overseas M & A Transactions in China Healthcare Industry (2013 till now) please see page 19

Foreign Company Status

China's prescription drug market growth has been slowed. But here is still one of the world's most opportunistic pharmaceutical markets. Top 10 prescription drug transnational giants in 2016, nine have been in the Chinese market for many years. Top 10: Johnson & Johnson, Pfizer, Bayer, Roche, Novartis, MSD, GSK, Sanofi, AbbVie, Gilead.



However, the multinational pharmaceutical companies are beginning to decline in China, which also led directly to most of their performance growth from the "lying to earn money" period of more than 20% slow to the current 10% or even lower in recent years. In 2016 China has annual sales of 116.6 billion US dollars to become the world's second largest pharmaceutical market, the struggle between foreign companies and domestic companies will be more intense.

Several companies reported a slowdown in sales growth in China, such as Merck's sales in China fell 3% in the first quarter of this year. AstraZeneca said its sales in China increased by 7% to \$ 782 million in the first quarter of this year, compared with 10% and 15% in 2016 and 2015 respectively. Sanofi said its sales in China grew by 9% in 2016, about half of the previous year's growth rate. GSK believes that its "mature" product sales in China fell 5% in the first quarter of this year, in part because of its competitive pressure on its hepatitis drug. Last year, its sales in China had fallen by 12%, the company said the reason is "the price cuts, including health care reform."

Foreign companies are beginning to adjust the product portfolio, reduce costs, localize market strategy, acquire and emerge local competitors. For example: GE Healthcare has developed portable ultrasound equipment for China to facilitate Chinese doctors to use outside the hospital. Medtronic choose localized marketing strategy. They develop marketing strategy from city to city in china in order to balance the market penetration. For large city hospitals, Medtronic has its own sales team for each area. In small cities, Medtronic encourages sales representatives to cover a wide range of products due to limited cost.

Product simplification is also becoming one of the cost strategies for foreign companies, durable, non-essential products is the optimal budget for the best choice especially for price-sensitive hospitals and medical services.

Merge & Acquisition is also an effective way. By this foreign companies can get cheaper price than self-production and access to production facilities. Also this will speed up the pace of the market. Many medical technology equipment need to spend years in the CFDA registration, and the acquisition of a registered business can skip wait time. Even through this foreign companies can enjoy local enterprises preferential treatment during tender and procurement.

Foreign companies also start shifting the focus from city's top three hospitals to the county and urban community hospital. Sanofi said their strategy in the future will focus on chronic diseases and grassroots market, which will be more to expand the community medical centers and retail pharmaceutical stores.

Following areas are the focus for investors to pay attention in 2017-2018.

A. Medicine and biotechnology

- 1、 consistency evaluation policy bought structural change on generic drug market
- 2、 two invoice policy implemented in drug procurement
- 3、 research and development era on new drug
- 4、 precision medical bought trend on new drug research and development

B. Medical technology and equipment

- 1、 two invoice policy influence on channel
- 2、 graded clinics bring the opportunity of domestic equipment
- 3、 new technology in the field of equipment
- 4、 precision medical gradually getting mature

5、 overseas investment and merge & acquisition continued strong

C. Medical service

1、 the next few years will be the outbreak of business innovation in the field of medical services

2、 foreign medical groups will become a new force in China's medical services market

D. Digital Health

Wearable equipment + remote diagnosis and treatment + AI will completely subvert the traditional medical services.

1、 a major challenge & transformation: mobile medical to digital medical transformation is the essence of business innovation to technological innovation

2、 Large data and AI in the field of precision medical and auxiliary diagnosis are become popular

PROSPECTS FOR FUTURE DEVELOPMENT AND MAJOR CHALLENGES, PLANNED PROJECTS AND EXAMPLES OF PREVIOUS OR ONGOING IMPORTANT FOREIGN INVESTMENTS

A. Medicine and biotechnology

Future development

In 2016 for medical & pharmaceutical industry the terminal market size was 14,774 billion yuan, the growth rate has now slowed to 7.3%. Medical insurance control and the policies for the hospital industry both getting more straight further slowed the industry growth. The next period will be structural adjustment. The pharmaceutical industry will gradually transform from the extensive mass growth into a refined quality improvement.

Precision medical bought trend on new drug research and development. China's precision medical market in 2016 has reached 40 billion yuan, of which the target drug market size of 13 billion yuan, accounting for 32.5% of precision medical market share, the next five years is expected to grow more than 20%.

2017-2021中国医药市场展望

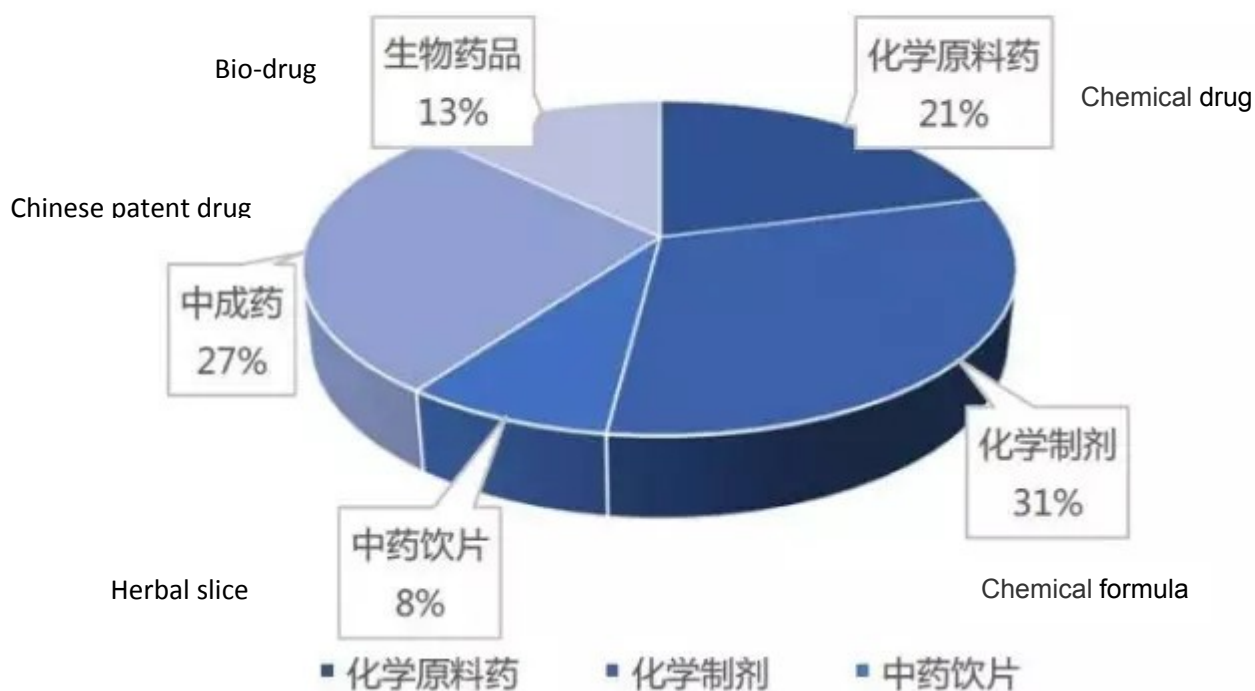
Outlook of Pharmaceutical Market



Data source: Southern Pharmaceutical Industry Economics Institute

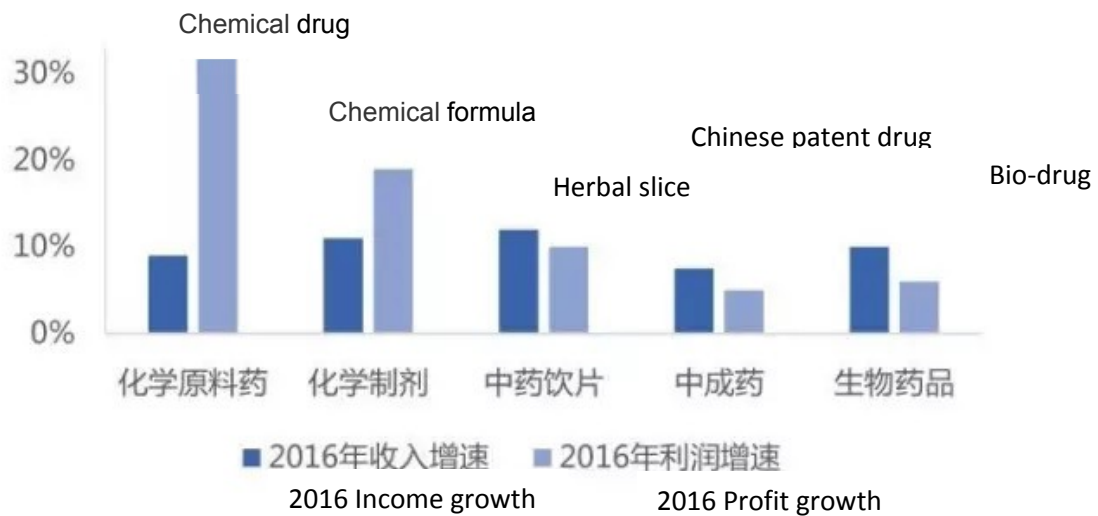
2016年医药制造业主要行业收入占比

manufacturing major income ratio



Sub - industry income and profit growth

医药制造业各子行业收入及利润增速

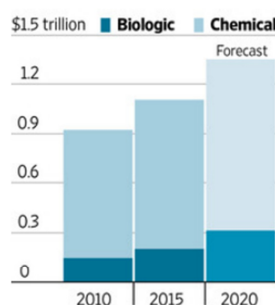


- Consistency evaluation policy brought structural change on generic drug market. The fundamental purpose is to enhance the quality of domestic generic drugs, which will be a significant impact on foreign drug companies in the market share and pricing range and more pressure comes along.
- Two invoice policy implemented in drug procurement, which circulation will be substantially reduced, and pharmaceutical business concentration will be enhanced. At the same time, the emerging professional CSO will grow rapidly in the future.
- China has long been a global supplier of cheap drugs and generic drugs, and now has become a major producer of bio-pharmaceuticals.

China's Biotech Boom

Biotech drugs will account for a quarter of the world's drug sales...

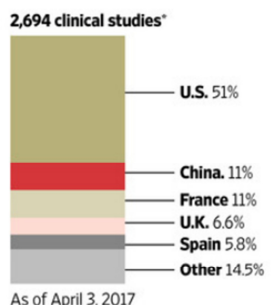
Drug sales



*Figures don't add up to 100 due to rounding †Compounded annual growth rate
Sources: Frost & Sullivan; U.S. National Institutes of Health

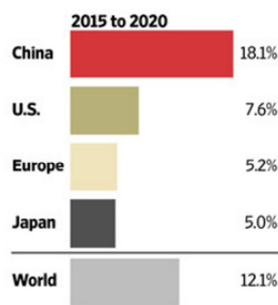
...with China accounting for many biotech drugs in development...

Open studies involving biologics



...and with its biotech-drug sector growing the fastest.

Fastest-growing markets†



THE WALL STREET JOURNAL.

Strength

- Foreign medicine and technology is far ahead the domestic with high quality standard.

- Competitive advantage in product quality, efficacy, market operation.

Weakness

- Reduced R & D efficiency.
- Domestic pharmaceutical companies have advantage in the compliance and low-cost marketing.
- the tilt of the relevant policies has been disintegrated (China used to allow foreign pharmaceutical companies to sell brand drugs at a higher price has been passed patent protection period, the price of these drugs is often 3 to 5 times the ordinary drugs.)
- patents have expired for many company (which means that domestic pharmaceutical companies can produce generic drugs to increase the substitutability of the same kind.)
- In 2015 state department transferred the original drug research single pricing to market pricing. In 2016 state department released consistency evaluation policy. These factors become a large extent exacerbated the market competition, eroding the market share of multinational pharmaceutical companies.

Opportunity

- In March CFDA issued a decision on the adjustment of the registration of imported drugs related matters (draft), release the clinical trials of imported drugs to speed up the approval of imported drugs. The generally predict from this news: for multinational pharmaceutical companies to enter the Chinese market, the time required for innovative drugs will be reduced by 1.5 years to 3 years. Novartis's treatment of renal cell carcinoma products Votrient and anti-cancer drug JAK1 / 2 inhibitor Jakavi has been approved in the Chinese market. Gilead Sciences to promote Sovaldi, Harvoni, Epclusa and TAF and other hepatitis C drugs listed in China, it set up operating center in Shanghai, and research and development base in Hangzhou. But on the other hand, CFDA increase production process verification on import drugs.
- Precision medical concept has a high cost and R & D risk, thus the domestic pharmaceutical companies tend to obtain exclusive foreign authorization or selection foreign drugs into the domestic development. Foreign pharmaceutical companies authorized Chinese companies can cut out compliance risk and save promotion costs. Small molecule drug formulation and new biological drugs will become a trend.
- Domestic enterprises face pressure under product and marketing due to the impact of consistency evaluation policy, the health insurance cost control policy and two invoice policy. This result in overseas mergers and acquisitions acceleration, with access to foreign companies' exclusive license can quickly enhance their competitiveness.
- Chronic diseases and cancer in the field of innovative drugs, bio-pharmaceutical companies and chemical drug research and development platform.

- Domestic enterprises search in the global selection of blockbuster drugs to bring into the domestic development.

Case study

May 16th, 2017 Boehringer-Ingelheim officially announced opening of BI Base in SH, zhangjiang. It is the first and the only one with international standards of bio-pharmaceutical base in China from multinational pharmaceutical companies. We learned that there are three innovative pharmaceutical companies entrusted to the base to start from the clinical production of biological to medicine processing business, which marks the first try-out of Marketing Authorization Holder(MAH). MAH system explicitly requires BI base for Shanghai enterprises, BeiGene need to first register in Shanghai. Chinese pharmaceutical companies can be accelerated through BI into Europe and the United States market, at the same time, multinational pharmaceutical companies can also use BI to enter the Chinese market. At the same time it will also promote the contract production (CMO) foreign business model to implement in China in a wider range. Due to the domestic policy constraint previously, many companies did not layout this area. Pfizer, Merck, Johnson & Johnson, Sanofi and other pharmaceutical giants have set up factories in China, the main demands are local production. And the future CMO will become a new model of competition for pharmaceutical companies.

M&A Cases

CITIC PE made 1.05 billion US dollars acquisition of Singapore's fourth largest global cardiac stent manufacturer Biosensors International Group; Fosun Pharma(SH) made 1.26 billion US dollars acquisition of Indian pharmaceutical company Gland; Luye Pharma made 245 million euros acquisition of European Acino AG; Sannuo acquisition Trividia and PTS cost more than 1.5 billion; Shanghai Pharma made 900 million acquisition Australia Vitaco.

And the first month of 2017, SanPower Group(Jiangsu) made 5.7 billion yuan acquisition of US bio-pharmaceutical company Dendreon 100% stake; and Fosun Pharma(SH) recently announced a maximum of 80 million US dollars to introduce the US biomedical company Kite cell immunotherapy. Both companies opened the curtain for Chinese-funded enterprises overseas mergers and acquisitions in 2017.

Hengrui(Jiangsu) introduced Tesaro's antiemetic medicine Rolapitant, Eddingpharm(SH) acquisition of Lilly's antibiotics. ZaiLab(SH) introduce study drug HM61713 for lung cancer from South Korea Company Hanmi Pharm; Pigbio(Suzhou) introduce study drug GKA from the Pfizer's diabetes field.

List of investors

- **New drug development:** Hengrui(Jiangsu)恒瑞医药, Hisun(Zhejiang)海正医药, Livzon 丽珠集团, Taikang Asset 泰康资产, SDIC 国投创新, Legend Captial(SH with branch)君联资本

- **Overseas high - quality mergers and acquisitions:** Luye Pharma 绿叶制药, Fosun Pharma(SH)复星医药, Humanwell 人福医药
- **Bio drug research and development and production:** SanPower Group(Jiangsu) 三胞集团, 3SBIO 三生制药, Wuxi Biologic(SH, Suzhou, Wuxi)药明生物
- **Projects of introduction overseas new drug:** ZaiLab(SH)再鼎医药, Hua Medicine(SH)华领制药, Hengrui(Jiangsu)恒瑞医药, Pigbio(Suzhou)派格生物

B. Medical technology and equipment

Future development

2011-2016 China's medical technology and medical equipment industry, the average annual compound growth rate of up to 20.7%, much higher than the global average of about 3% compound annual growth rate. In 2016, the size of the medical technology and medical device market in China was about 370 billion yuan, 20.1% increase from 2015. It is expected in 2019 the market size will reach about 600 billion. From both the medical methodology and from the level of consumption to measure, China's medical technology and equipment market has a huge room for growth.

National policy has an important guiding role in the future of medical technology and medical device markets. October 2016 issued "*on the medical device priority approval procedures for the notice*" clear the rare disease, malignant tumors and other six categories of medical equipment priority approval procedures. Apart from policy, the gradual aging of the population have increased the per capita medical expenses. The growth in demand for medical care will keep the medical device industry growth strong.

1. Two invoice policy influence on channel. Channel mergers and acquisitions, extension, and transformation will make the channel link more centered.
2. Third party services based on equipment is arising. From the Office of the Commission on the third party diagnosis, imaging and pathology of the document support, as well as large medical enterprises in this area of the layout and mergers and acquisitions can be seen, based on medical equipment and equipment, third-party diagnosis, imaging, pathology, maintenance, equipment packaging and other emerging intensive service model will effectively promote the development of the medical industry. There will be a lot of investment and acquisitions occurred.
3. New technology such as early detection, AI, 3D printing, medical robots and so on will bring disruptive revolution in diagnosis and treatment. They shall not only to the hospital to provide services, but also for the majority of the consumer market, such as a good combination of early detection, physical examination and other products and services. This will break through the hospital market to create a trillion level of health care market,

such as with large data, AI and other "Internet +" combination, or with new drug research and development docking, there will be immeasurable outbreak potentials.

4. Precision medical is getting mature. (Berry Genomics is leading company in genetic early detection, similar company as Novegene, Annoroad, Singlera Genomics, Geneseeq, Burning Rock Dx, Mega Genomics, Genecast, Gene+ and BioChain Diagnosis.)
5. The success of local Chinese medical technology companies is still limited to the low-tech threshold areas, such as in the area of patient care and orthopedic implants, which Chinese companies have occupied more than half of the market. But in the technology-intensive medical equipment market, such as endoscopy and minimally invasive surgery, Chinese enterprises accounted for very low market share.

Strength

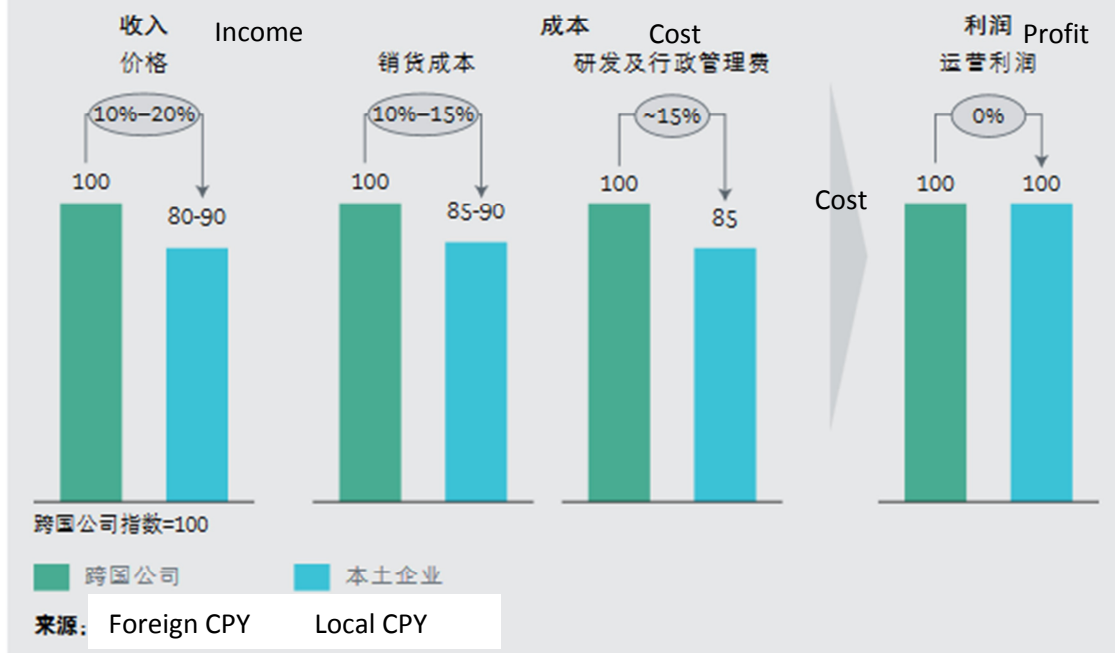
- Medical equipment, high-tech equipment and cutting-edge technology such as cloud diagnosis are managed by foreign countries, they rely on technical funds and market channels and other advantages to enter the emerging markets, which bring them a considerable voice, and play active role in high-tech equipment in emerging markets import and localization.

Weakness:

- High cost for foreign companies: Low cost is one of the biggest competitive advantages for local medical technology companies. Mindray for example, their mid-range ultrasound diagnostic equipment is able to maintain a good profit while it is priced lower than the foreign company.
- Localized products, lack of government support.

图3 | 本土企业的成本和收入低于跨国公司，但利润相当

Local company has lower cost and income than foreign company, but equal profit(Ultrasonic equipment)
中国中档超声设备的成本分解



Opportunity

- Overseas investment and merge & acquisition continued strong. Mergers and acquisitions in mature areas. In vitro diagnosis, gene sequencing, innovative medical equipment as a high technical barriers and fast growth areas will sure become hot spot for acquisition. Since the end of 2016, the investment institutions and large enterprises in medical equipment investment market grows mainly steady, much attention were paid to stable investment opportunities like sales profits, mature channels. Meanwhile they also actively seek overseas technology companies to investment in order to achieve the introduction of products, and complement the advantages of domestic channels. We expect this year's investment institutions, especially the US dollar funds, to follow this trend and continue to increase investment or even mergers and acquisitions of overseas technology-based medical devices, as the overall commercialization of medical devices is faster than new drugs. It has become an effective way for domestic enterprise to introduce foreign technology, overseas business into China business.
- The technological change will be a definite trend in the development of the equipment market. In Medical Robot field, foreign companies ReWalk, Cyberdyne, Hocoma, Woodway and other companies of the exoskeleton robot has put into use, as well as Chinese 's companies DIH, Fourier Intelligence, SF Robot and other rehabilitation medical equipment company.
- Various types of third party service companies based on equipment
- New technology

M&A Cases

Cases for 2016 till now, Andon made 93.88 million euros acquisition of eDevice and medical testing equipment. ZiXin Pharmaceutical acquired Nabsys2.0 aiming into the genetic testing. BOE (SH branch) invested 50 million US dollars in Israeli noninvasive medical equipment company Cnoga; Sannuo made 200 million US dollars in acquisition of the US PTS diagnosis to get a hold into POCT diagnostic field in IVD industry.

In the field of third-party inspection, leading enterprise KingMed Diagnosis will go public, rising star such as Chain Medical Labs(Hangzhou), Beijing Harmony Health Medical Diagnosis continue to get rapid development. In the field of third-party imaging, RIMAG has gained A round investment from Goldman Sachs. Laoken and SINOPHARM Group(SH) are activated in third-party disinfection area. Third-party Maintenance Company such as Kunya medical (SH) and Kendu Healthcare (SH) are landing new board with access to investment.

3D printing has been initially put into use in orthopedic equipment in recent years, such as 3D knee replacement from Stryker, 3D hip joint from Love & Health Group, and Shanghai Ketai Medical Device (SH). Another major area for 3D printing is dental, overseas giants BEGO, PLANMECA and other medical giants have produced 3D printing equipment suitable for oral applications. 3D Systems, EOS have also been initially introduced to the Chinese hospital.

In the precision medical field, IBM together with DHC Software steps in the market. October 9, DHC Software released a notice that they and IBM signed a "software licensing and joint development agreement", the two parties will establish a joint team to carry out for precision medical data analysis and transformation of the joint development.

List of investors who invest in medical equipment

Medical equipment platform: Mindray 迈瑞医疗, Yuwell(Jiangsu)鱼跃医疗, Shinva 新华医疗, WEGO 山东威高

Medical equipment specialized: Lepu Medical 乐普医疗, MicroPort(SH)微创医疗, DAAN GENE 达安基因, KHB(SH)科华生物, SANNUO 三诺生物, Shanghai Kinetic Medical 凯利泰

Third-party service: Dian Diagnostics(Zhejiang)迪安诊断, KingMed Diagnosis 金域检验

Traditional medicine: Salubris 信立泰, Haisco Pharmaceutical Group 海思科, Haiyao Pharmaceutical 海南海药, Beilu Pharmaceutical 北陆药业

Non-medical company: Hongda High-Tech Holding 宏达高科, TCL, San Power Group 三胞集团

C. Medical service

Future development

Benefiting from the Chinese government's policy on national health insurance, China's health care market has maintained rapid growth over the past five years, reaching a total size of nearly 3 trillion, with an annual compound growth rate of more than 15%. While the non-public health care market grew faster, more than 25%, close to 300 billion market size. At the same time, by the current implementation of China's new health care reform policy, the medical service market is facing a period of base remodeling, which the next five years will slow down growth, the average annual compound growth rate is expected to be about 10%, but non-public the growth rate of the medical services market will remain above 20%. And as the second "five-year plan" start in 2017, now is time to invest in medical service.

Significant improvements in the medical environment will facilitate the industry to enter a relatively healthy development stage. Before the various "protectionism" began to be gradually broken, public hospitals have gradually lost the spoiled status. As the government gradually rationalizes the relationship between various types of medical institutions, as well as due to information transparency brought about by medical awareness changes, the entire patients flow model will be a big change, which will change the current market structure.

The state position clearly and implement more stringent cost control on the public hospital. Now it is turn for private medical care to improve survival situation to provide more quality services to upgrade. Some of the business models that provide affordable, high-quality healthcare services for non- insurance patients are more responsive to China's new healthcare market environment, such as consumer health care, improved health care, etc. Due to the clear target groups' ability and willingness to pay more are relatively strong. Through high-quality services as a core marketing strategy will be more and more accepted by the public.

Opportunity

Foreign medical groups will become a new force in China's medical services market. China's health care market is one of the few areas where foreign investment is relatively low, which was largely subject to national policy control. In the past few years, the Chinese government has gradually relaxed the access to foreign company, more and more foreign medical groups began to set up joint venture medical institutions in China, introduce foreign excellent management experience and medical resources to China. Although in the past experience, foreign investment in China's medical service market in the success stories are not many, instead there were a lot of failure cases, but this does not prevent them into China's enthusiasm and determination. It is foreseeable that in the next few years, there will be more and more foreign medical institutions in the Mainland, and then brings challenges to domestic enterprises, forcing them to improve their competitive strength.

- Specialist hospitals and small medical institutions, including medical cosmetic, rehabilitation, community health care, Chinese medicine, assisted reproductive (IVF)
- Third-party service providers, including third-party imaging centers, third-party surgery centers, third-party laboratories, etc.

Case study

Artemed Shanghai Hospital is located in the Shanghai Free Trade Zone, the main shareholders are Germany Artemed Group and SilverMoutian, and joint venture part is Chinese company from SilverMoutian holdings. The design process of Artemed Shanghai is currently underway and will soon be released for public viewing. The ground-breaking is set to kick off by the end of 2016.

Artemed Shanghai position itself to be a comprehensive hospital for orthopedics and cardiovascular diagnosis and treatment. They plan to incorporate into the Chinese health insurance system, which is still under process. Apart from that, they also plan to carry out experimental promotion "Diagnosis- related Groups" (hereinafter referred to as "DRG system"), the specific content is still in communication with the relevant departments.

At present, the construction of the hospital is in an orderly manner, the architectural design part has been basically completed, planning in the first quarter of 2018 put into operation. The hospital has two planning phases. Phase I is to set up 200 beds, the establishment of integrated clinics, specialized in orthopedics and trauma diagnosis and treatment. The second phase is specialized in cardiovascular disease diagnosis and treatment features, which is currently being advanced.

Germany Artemed Group to enter the Chinese market with no intention to only serve the high-end crowd of medical care, but also to establish price in the medical treatment to the public hospital line. They committed to the implementation of the new medical payment system and collaborate into the Chinese health insurance. Patient satisfaction will be the primary goal, and provide cost-effective high-quality medical services for more patients.

■ Weakness for foreign hospitals

The disadvantage is that foreign hospitals may be difficult to enter the health care system, and higher price are not conducive to attract low-income patients.

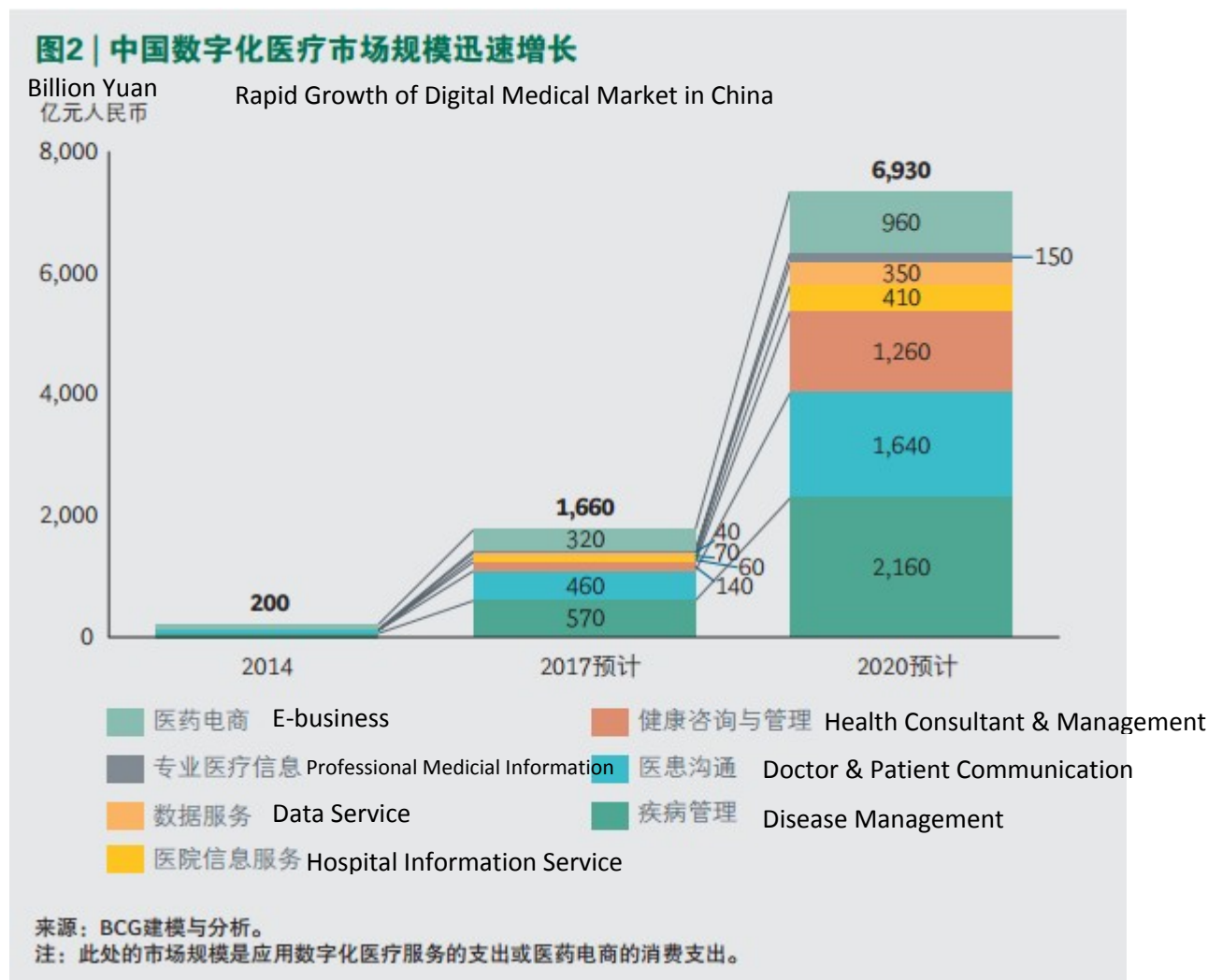
List of investors who invest in medical service

- Traditional medical service: Aier Eye Hospital Group(SH)爱尔眼科,TC Medical 通策医疗
- Traditional medicine: Hengkang MedicalGroup 恒康医疗,Kangmei 康美药业, Yibai Pharmaceutical 益佰药业
- Traditional medical device: Lepu Medical 乐普, Yuwell(Jiangsu)鱼跃医疗, Shinva 新华医疗,WEGO 威高
- Non-medical company:Yihua 宜华健康,China Mobile 中国移动,Longfor 龙湖地产,AUX 奥克斯,Taikang Group 泰康保险

D. Digital Health

Future development

Investment and financing trends in the digital health sector have seen significant changes in 2016. The market has found the AI and the big data of this new hot direction, three tumor companies SINYOO (SH), LinkDoc and Medbanks had completed financing in a short period of time in the mid-year.



1. Internet hospital on an outbreak period. As of March 20, 2017 the number of Internet hospitals has reached 79. 48 on-line hospitals are under operation of, and 31 on-line hospitals are under construction. It is expected the number of Internet hospitals will be up to 100 till the end of 2017. Internet hospital including Wuzhen We doctor, Ningbo Cloud Hospital, Zhoushan Online Hospital, The First Affiliated Hospital (Zhejiang University).

2. A major challenge & transformation: It has transform from "mobile" business model innovation to "digital" technological innovation. This trend is consistent with the path of US industry development, which reflects the development of China's is following the characteristics of the United States.

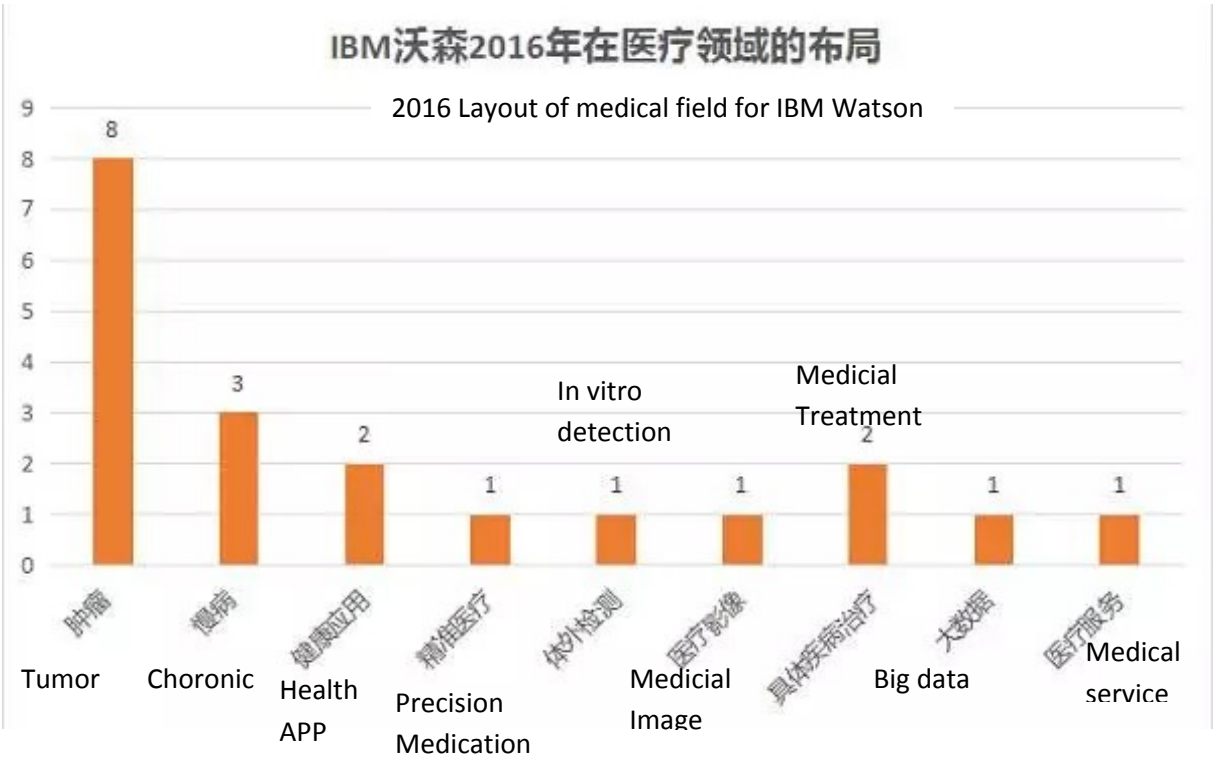
3. Large data and AI in the field of precision medical and auxiliary diagnosis are become popular but the growth will be bumpy. Large data and AI is the representative of technological innovation. From the international trend is also the case: as the basis of AI, large data company such as Flatiron Health has been in early 2016 to get Roche led the \$ 175 million huge financing. IBM Watson to provide diagnostic assistance through the study of the literature has been tried to put into practical application.

This also indicates that the current substantial progress in the domestic focus on data accumulation and imaging diagnosis, there is a huge space on the future development of AI industry. AI in China will remain in a relatively early stage in the recent years, but the health of large data will be able to take the lead to mature. The final success of large data companies is not necessarily the largest amount of data companies, but must be those who have the ability to develop industry standards, control data quality, and grasp the policy risk of industry competitors.

Health and AI are areas that require long-term investment. In the development process, the domestic traditional yuan fund cycle is short, it is inevitable that the industry will be pushed to the realm of the cusp, and this time is clearly too early; and long-term dollar funds in the face of Chinese health data, taking into account the policy sensitivity, often its investment itself may bring uncertainty to the enterprise policy. So the industry is most in need of domestic cutting-edge industry forces support, as Watson only backed by IBM to have the financial ability to complete a lot of acquisitions and research and development.

Case study

IBM Watson in China



1. **Hangzhou:** In August 12, 2016, IBM and Hangzhou Cognitive Network Technology Co., Ltd(Hangzhou Cognitive) jointly announced that in China there are 21 hospitals planned to use IBM Watson for Oncology from Memorial Sloan Kettering Cancer Center. It is collaborative effort to help Chinese doctors to build cancer treatment programs through cognitive computing platforms. As an important part of IBM's deep collaboration with Hangzhou Cognitive, the initial use of 21 hospitals will serve as an industry leader to better promote Watson cancer solutions across hospitals in China. This is also the first project of Watson Health in China. In 2017, Hangzhou Cognitive will convert the program including recommended solution and medication solutions into Chinese. The current program is using foreign program and medical cases. This year they want to show the local recommended program, and plan to complete more than 50,000 cases in China.

2. **Zhejiang:** On December 26, Zhejiang Provincial Hospital together with Century(Hangzhou) and Hangzhou Cognitive jointly announced the establishment of the Watson Joint Consultation Center, which will collaborate on the long-term cooperation of IBM Watson for Oncology. IBM's supercomputer Watson digests and absorbs 25,000 medical cases, opening the application of AI in Chinese medical field in Zhejiang Provincial Hospital. It means that China's medical industry will open a new era of AI assisted diagnosis.

3. Watson together with Pfizer (SH) will use computer to discover cancer drug. IBM Watson and Pfizer (SH) reached an agreement that IBM's supercomputer Watson will be used for cancer drug research and development. Pfizer (SH) use Watson learning ability in natural language processing and cognitive capabilities to identify new drug in Immuno-oncology, combination therapy and patient selection strategies.

List of investors who invest in digital health

- Internet leader: Baidu 百度, ALI 阿里, Tencent 腾讯, Mi 小米

- Mobile medical for traditional medical information: Wining (SH) 卫宁软件, Wonders Information(SH) 万达信息, Nuosoft 东软集团, BSOFT(HangZhou) 创业软件 etc.

- Traditional pharmaceutical company extension: Tasly 天士力, Haiyao Pharmaceutical 海南海药, Kangmei 康美药业, Fosun(SH) 复星集团, Joicare 健康元 etc.

- Large industry platform industry integration(real estate and communication company): Longfor 龙湖地产, Yihua 宜华地产, ChinaTelecom 中国电信

List of Major Overseas M & A Transactions in China Healthcare Industry (2013 till now)

see next page

上市公司	交易标的	标的所在国	交易规模 (亿美元)	并购比例	交易时间	行业类别
FOSUN PHARMA 复星医药	 Gland	印度	12.6	86.08%	2016.7	生物制药 Bio-drugs
 三胞集团	Dendreon Pharmaceuticals	美国	8.19	100%	2017.1	生物制药 Bio-drugs
 绿叶集团	 HCA	澳大利亚	6.88	100%	2015.12	医疗服务 Med Service
 人福医药	 Epic	美国	5.5	100%	2016.5	生物制药 Bio-drugs
FOSUN PHARMA 复星医药	 Espirito	葡萄牙	5	96%	2014.10	医疗服务 Med Service
 Hepailin	 SPL	美国	3.37	100%	2013.12	生物制药 Bio-drugs
 三诺	 Nipro	美国	2.73	100%	2015.10	医疗器械 (血糖) Med-equip(Blood sugar)
 绿叶	 Acino	瑞士	2.6	100%	2016.7	生物制药 Bio-drugs
 上海医药	 Vitaco	澳大利亚	2.35	100%	2016.8	医疗保健用品 Health care-equip)
FOSUN PHARMA 复星医药	 Alma	以色列	2.21	95.2%	2013.4	医疗器械 (医疗美容) Med-equip(cosmetics)
 海普瑞	 赛湾生物	美国	1.82	100%	2015.8	生物科技 Bio-tech
 万润股份	 MP 公司	美国	1.37	100%	2015.10	生物制药 Bio-drugs
 江河创建	 Vision eye institute	澳大利亚	1.3	100%	2015.7	医疗服务 Med Service
 迈瑞	 Zonore	美国	1.05	100%	2013.6	医疗器械 (超声) Med-equip(ultrasound)
 三诺生物	 PTS	美国	1.03	100%	2016.10	医疗保健设备 Health care-equip)
 和邦生物	 STK	以色列	0.9	51%	2015.11	生物制药 Bio-drugs
 三胞集团	 Natali	以色列	0.7	100%	2014.4	医疗服务 Med Service

Requirements for foreign companies – tariff (duties) and non-tariff barriers (technical requirements, laws prohibiting foreign companies to invest in some sectors) for importers or foreign companies

"Foreign Investment Industry Guidance Catalog (Revised 2017)" is passed on 23 May, which will be announced in the near future.

Foreign investors shall not act as individual industrial and commercial households, individual-owned enterprise investors, and farmer professional cooperatives, engaged in business activities.

Medical institutions (limited to joint ventures, cooperation)

Foreign investors shall not engage in prohibited items in the special management measures for foreign investment access (*negative list of foreign investment access*), and shall not set up foreign-invested partnership enterprises in the restricted foreign-funded projects.

■ Catalogue for restricted foreign investment industry

1. Chloramphenicol, penicillin G, hygromycin, gentamicin, dihydro streptomycin, amikacin, tetracycline hydrochloride, oxytetracycline, midecamycin, columnaric acid, ciprofloxacin Acid, norfloxacin, fluoxic acid
2. Antipyrine, paracetamol, vitamin B1, vitamin B2, vitamin C, vitamin E, a variety of vitamin preparations and oral calcium production
3. varieties of vaccine production which belongs to national immunization program
4. Narcotic drugs and a class of psychotropic drugs production of raw materials (Chinese holding)
5. Production of blood products

■ Catalogue for prohibited foreign investment industry: 1. steamed fried and other processing technology for Chinese medicine tablets, and the production of confidential prescription Chinese Traditional Patent Medicine. 2. Human stem cells, gene diagnosis and treatment technology development and use. 3. Chinese herbal medicine processing which included in the "Wild Medicinal Resources Protection Regulations" and "China rare and endangered plant protection list"

■ Catalogue for encouraging foreign investment industry:

1. Production of new compound drugs or active ingredient drugs (including APIs and preparations)
2. Amino acids: fermentation production of tryptophan, histidine, methionine and other production
3. New anti-cancer drugs, new cardiovascular and cerebrovascular drugs and the development of new nervous system drugs and production

4. The use of bio-engineering technology of new drug production
5. AIDS vaccine, hepatitis C vaccine, contraceptive vaccine and cervical cancer, malaria, hand, foot and mouth disease and other new vaccine production
6. Development and production of marine drugs
7. Pharmaceutical preparation: the use of sustained-release, controlled release, targeting, transdermal absorption of new technologies such as new formulations, new products
8. Development and production of new pharmaceutical excipients
9. Animal anti-bacterial raw materials production (including antibiotics, chemical synthesis)
10. Veterinary antimicrobials, anthelmintic, insecticides, anti-coccidiosis products and new formulations
11. Development and production of new diagnostic reagents
12. Electronic endoscope manufacturing
13. Fundus camera manufacturing
14. Medical imaging equipment (high field strength superconducting magnetic resonance imaging equipment, X-ray computed tomography equipment, digital color ultrasonic diagnostic equipment, etc.) manufacturing of key components
15. Medical Ultrasonic Transducer (3D) Manufacturing
16. Boron neutron capture therapy equipment manufacturing
17. Image - guided Moderate Intensity Modulated Radiation Therapy System
18. Hemodialysis machine, blood filter manufacturing
19. Automatic enzyme free system (including loading, ELISA, washing board, incubation, data processing and other functions) equipment manufacturing
20. Drug quality control of new technologies, new equipment manufacturing

21. New technology for the analysis of effective substances in natural medicine, new technology for extraction, development and manufacture of new equipment
22. Biological engineering and biomedical engineering technology, biomass energy development technology
23. Intelligent emergency medical rescue equipment manufacturing
24. Elderly, disabled and child services
25. Pension agency

Regional specifications (Shanghai, Jiangsu, Zhejiang and Anhui provinces)

Shanghai

- ✧ "Healthy Shanghai 2030" planning to start during this year. Health care industry has become a pillar industry in Shanghai.
- ✧ For now there are more than 90 tertiary and secondary public medical institutions in Shanghai, which provide foreign medical services through franchise medical care and 29 foreign-funded medical institutions. In addition, a number of Sino-foreign joint venture hospitals with international advanced management experience are under construction.
- ✧ Shanghai marked the development of advanced medical services into the city's regional health planning, clearly pointed out to form a diversified medical market, the introduction of international quality medical resources, the construction of a number of advanced medical service agencies, and promote decentralization, optimize the social medical institutions set up and approval. So far SH had set up the Shanghai International Medical Park and the new Hongqiao International Medical Center. Xuhui is one of the most concentrated areas in Shanghai and even the nation's life and health research and development institutions and medical institutions. Fenglin area concentrated in Shanghai most of the life and health research institutions, Johnson & Johnson, MSD China, Quintiles, HISUN and a number of the world's top 500 enterprises R & D center have also settled in here.

■ Case study

- ✧ The Health Industry Summit (tHIS) 2017 opened in Shanghai on May 15th with well over two hundred thousand healthcare industry professionals from more than 150 countries and regions in attendance. Now in its third edition, tHIS has been firmly established as the world's largest health industry event with 160 individual events and conferences. It comes at a crucial time as China drives forward its "Healthy China 2030 Plan" initiative to realize among other goals an industry growth target of RMB 16 trillion (USD 2.3 trillion) by 2030 and an increase of average citizen lifespan by 3 years to 79 years.

Key events at tHIS 2017 included China's three top medical equipment and pharmaceutical exhibitions (CMEF, PHARMCHINA and API China), and the leading healthcare investment forum - Healthcare China 2017. This year's investment forum was attended by more than 1000 CEOs, investors and institutions.

The exhibition featured the entire industry value chain and showcased tens of thousands of the latest technologies and products. Emerging technologies such as VR, AR, wearables and AI featured strongly on the show floor as well as in the key forums. During tHIS 2017, World Medical Robots Innovation and Development Summit was held to reflect the growing trend for robotics and AI applications.

Over 7000 exhibiting companies from 30 countries were at the show including medical device giants like GE, United Imaging, Siemens, Philips and Mindray as well as major pharmaceutical groups in China including Sinopharm, Shanghai Pharma and CR Pharmaceuticals. The majority of the most innovative companies in the medical field choose CMEF as their Global or Asia Pacific new product launch platform and more than 600 new product launches took place during the 4 days of the show. Among the new products released, United imaging launched its uVR 4D vision explorer platform, enabling more detailed dissect structure and spatial information, while GE launched its first cloud based digital application for medical equipment management APM (asset performance management), which was developed by their China team. BGI also attended with their gene sequencer BGISEQ-500, a benchtop high-throughput open sequencing platform that provides end-to-end solutions.



Natural Health and Nutrition Expo were among the fastest growing segments in the portfolio, helped by the expected population boom in light of the reversal of the single child policy last year as well as a growing health conscious middle class in China. Popular international brands like Blackmores, Nature Made and Garden of Life made their debut at the show along with 700 suppliers of health food and supplements, bringing with them popular product lines tailored to the Chinese market.

- ✧ Roche innovation center in Shanghai Zhangjiang Hi-Tech Park Innovation Center is expected to be completed in 2018, which put investment amounted to 863 million yuan. It will effectively promote Roche and local research institutions to cooperate, while attracting the top international scientific and technological personnel rooted in China. Roche has been first foreign-funded enterprises who became stationed in Zhangjiang Hi-Tech Park's since 1994, it committed to Shanghai Roche's third largest global strategic center, and to which enhance the international standard industry-wide value chain, to promote the entire Chinese pharmaceutical industry R & D innovation.



Jiangsu: Jiangsu is China's medical equipment industry province. It is said that Jiangsu medical equipment business accounts for about one-fifth of the country. Suzhou, Wuxi, Changzhou medical device industry output accounted for the province's total output value of medical equipment industry 60%. It has built Taizhou National Pharmaceutical High-tech Industrial Development Zone, Nanjing, Lianyungang, Suzhou, Wuxi, Changzhou and other key pharmaceutical industry base.

Jiangsu is accelerating the adjustment of the province's medical device industry structure to the advanced development. It has shown four major characteristics: 1. industrial scale continued to expand; 2. products gradually towards advanced, intelligent; 3. good investment environment and market order to attract domestic and foreign manufacturers come to invest; 4. industrial concentration with industrial-intensive areas.

GE Healthcare, Siemens, NUTRICIA, SYSMEX and other international medical device brands are base in Wuxi; Changzhou High-tech Zone Biomedical Industrial Park, Wujin District West Taihu Lake Medical Industrial Park, Changzhou International Medical Equipment City, guide and encourage medical equipment research institutions, production and operation enterprises into the park development. Suzhou has gathered all kinds of biotechnology companies amounted to more than 3,000, the formation of the park biological nano-park, high-tech zone medical equipment industrial park, Kunshan small nucleic acid, Taicang biopharmaceuticals, Wuzhong District pharmaceutical industry base and other characteristics of the gathering area.

■ Case study

Jiangsu Jumao who has been known for traditional medical equipment had official release its wisdom medical strategy, and launched several intelligent medical equipment. Jumao has marching into the wisdom medical fields.

Jumao released a medical and health data service platform, a smart positioner, blood pressure blood oxygen bracelet, smart sphygmomanometer and other intelligent home medical equipment products.

Data show that China's current home medical equipment market has more than 50 billion yuan scale, and the wisdom medical equipment market development is more rapid, 2016 market size has more than 10 billion yuan. As a typical application of the Internet + medical market, home medical equipment market and even the wisdom of medical equipment market has now become business battleground.

Jumao sensed potential development of this market. The company began planning and implementation of smart medical projects in 2016, and invested a lot of manpower and resources to establish specialized research and development center in Shenzhen, after more than six months to achieve the fruits of the present results.

The core of the company's wisdom medical project is the Health Data Cloud Platform. It collects and analyzes user's physical data, combined with professional algorithms, self-owned and third-party service agencies to provide users with personalized, customized health services, intelligent health service platform. As a source of health data, intelligent home medical equipment will become the main force of the medical device market, which is the reason Jumao has stepped into the wisdom medical and intelligent medical equipment field, but also the future development of company's opportunities.



Jumao in Shanghai International Medical Devices Exhibition, May 15, 2017.

JUMAO | 巨贸

智能·血压手环

ECG芯片+PPG光电传感器
随时随地监测心血管健康状况



植入ECG芯片+PPG光电传感器

- ECG芯片植入, 随时随地监测心血管健康状况
- PPG光电传感器24小时不间断监测心率数据
- HRV和心血管健康指数, 直观展示健康状况
- PPG光电传感器+三轴加速度传感器, 全天候心率和睡眠监测
- 血压心律检测、来电提醒、消息检测、多平台分享



心率检测



睡眠监测



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Zhejiang: Health industry is becoming the new economic growth in Zhejiang Province, according to an average annual growth rate of 15%, it is estimated by 2020 the total industrial chain output will exceed one trillion.

Hangzhou Jiangdong Health Industrial Park: East China Pharm had invested 2 billion yuan for Phase I project, which combined with research and development, manufacturing, sales as one of the biggest biomedical science and technology park project. They has been prepared the second phase of the project to set pharmaceutical research and development, pharmaceutical industry, drug distribution, pharmaceutical logistics to one line, this year is expected to complete the investment 100 million yuan. South Ocean has built their core business here, as

one of the three production bases, the total investment of this project is 790 million yuan, and the estimated annual output value is 20 billion yuan.

Around the ecological cultivation of herbs, deep processing of products, Jinhua focus on cultivating the backbone of Chinese medicine industry enterprises, and the revitalization of Zhejiang authentic herbs.

Wisdom medical industry is also rising, Zhoushan Islands "network hospital", Ningbo "cloud hospital", Wuzhen "We doctor" had been established.

■ Case study

The first batch of more than 100 Wuzhen Internet hospital pharmacy dating point has official landing in 2016. This marks the Wuzhen Internet hospital drugstore officially upgraded to "pharmacy + clinic." In the case of Internet hospitals, it facilitates the sinking of online quality medical resources to pharmacies, retailing pharmacies from traditional pharmacies upgrading to appointment centers, electronic prescription centers, inspection centers and remote consultation centers, as well as prescription outflows.



Photos from 77th PHARMCHINA, May 2017

Anhui: Anhui health industry started late, Research & Development investment is insufficient, and so is the ability of independent innovation. However, the special geographical position and resource advantages have created the conditions for the

development of health industry in Anhui Province, especially the traditional Chinese medicine industry (Bozhou City is the national Chinese herbal medicine trading market) There is huge market demand for the development of health industry with government attention and policy support, which is a strong backing for the development of health industry.

"Internet "+ to rebuild the health industry: health industry including traditional pharmaceuticals, medical equipment, and other fields including biotechnology, digital health care, health management and emerging areas attract investment to the industry.

Develop in different direction from Anhui

Area	Main City	Direction
North	Bozhou,Fuyang	Chinese herbal medicine cultivation, production and research and development
Middle	Hefei,Bangbu	Biopharmaceutical and medical services
South	Huangshan,Chizhou	Tourism, culture, health and leisure

■ **Case study**

Sino-US (Hefei) cross-border Investment Summit held in Hefei April 10, 2017, so was the unveiling ceremony of Incubation Platform of Zhong'an Chuang Gu. Activities attracted a large number of medical equipment, precision medical, biomedical, inspection & testing, health management and other international cutting-edge health science and technology projects participants. iHealth, 3S Ventures from US, domestic company like Cybenaut, Anhui high-tech investment, Anhui venture capital, Hefei venture capital, Hefei high investment and other investment institutions to participate in more than 100 activities. Part of the investment institutions also reached an initial investment intention with the participating projects, Hefei High-tech Zone and 16 projects held a centralized signing ceremony. Project including cutting-edge technologies such as neonatal ophthalmic diseases screening and genetic analysis, pension intelligent monitoring platform, they are expected to achieve transformation in Hefei. April 15 there are a number of medical health projects from Israel settled in Hefei, the project covers medical equipment, precision medical, biomedical and other fields.



The seminar had attracted a large number of top scientists from the United States in the field of health, bringing near infrared II fluorescence surgery precision navigation project, a new ultra-fine electronic endoscope, pathological imaging intelligent diagnostic system, ART advanced drug release technology, Neonatal ophthalmic diseases screening and genetic analysis, pension intelligent monitoring platform and other projects. China's booming market has brought a lot of opportunities, as well as more and more positive signal open to overseas enterprises and science technology projects, making overseas start-ups are looking forward to get the market here. Sanjeev Saxena's cancer screening technology project has been funded by the seminar to \$ 21 million.