China CRO/CDMO Sector

Big opportunities in China and abroad

OUTPERFORM (Initiation)

China Healthcare Sector

Jill WU, CFA
Tel: (852) 3900 0842
Email: jillwu@cmbi.com.hk

Amy Ge
Tel: (852) 3761 8778
Email: amyge@cmbi.com.hk

We initiate coverage on China CRO/CDMO sector with a positive view, based on strong demand in innovative drug R&D in China and potential market share gain in the global market for domestic CRO/CDMO companies.

- **Robust R&D spending in China and worldwide.** We expect both global and China R&D spending to grow strongly, led by 1) a more conducive regulatory environment with increase in FDA and NMPA drug approvals, 2) a shift by pharmaceutical companies towards externalized R&D models with around half of pipelines externally sourced, 3) a robust biotech funding environment for biotech companies, and 4) a smaller percentage of drug sales exposed to patent expirations. Frost & Sullivan (F&S) forecasts the global R&D expenditure to increase from US$174.0bn in 2018 to US$216.8bn in 2023E, representing a 4.5% CAGR. The increase in R&D expenditures has laid a foundation for the continuous growth of the global pharmaceutical R&D outsourcing services industry.
- **Increasing penetration of R&D outsourcing.** Given the lengthy and costly drug development process and growing number of small-sized pharmaceutical companies, we expect a larger proportion of R&D spending will be outsourced. Outsourcing industry is consolidating because pharmaceutical companies and biotech companies are outsourcing more work to fewer, more capable service providers by building long-term partnership with vendors. Thus, large CRO/CDMO companies have been actively expanding their business width through M&As in order to provide one-stop shop services for customers.
- **China-based CRO/CDMO companies to gain market share.** We believe China-based CRO/CDMO companies will continue to expand service width through M&As and expand footprints to overseas markets. China-based CRO/CDMO companies have strong competition advantages over overseas peers, given their improving technology, abundant talent pool and sufficient capital funding. We expect China-based CRO/CDMO companies to play more important roles in global markets. With expanding service capabilities and increasing market share from overseas markets, we believe China-based CRO/CDMO companies will see significant improvement in output per capital.
- Our top picks in China CRO/CDMO sector are **Tigermed (300347 CH), WuXi AppTec (603259 CH) and WuXi Biologics (2269 HK)**, given their comprehensive service capabilities, strong market positioning in China and early moves in globalization.

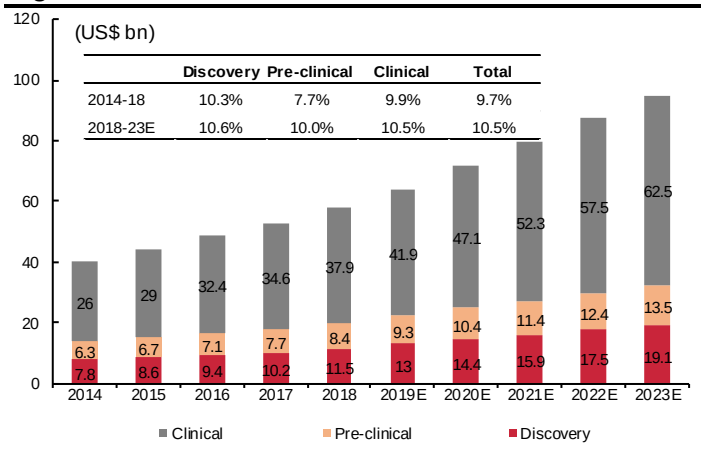
Valuation Table

Name	Ticker	Rating	Mkt Cap (US$ mn)	Price (LC)	TP (LC)	Up/Down side	P/E (x) FY20E	P/B (x) FY20E	ROE FY20E
Tigermed	300347 CH	Buy	6,874	64.50	86.79	35%	50.6	10.3	18.4
WuXi AppTec	603259 CH	Buy	21,110	91.30	116.64	28%	52.7	6.6	13.1
WuXi Biologics	2269 HK	Buy	15,260	92.45	106.18	15%	76.5	10.3	14.4

Source: Bloomberg, CMBIS estimates

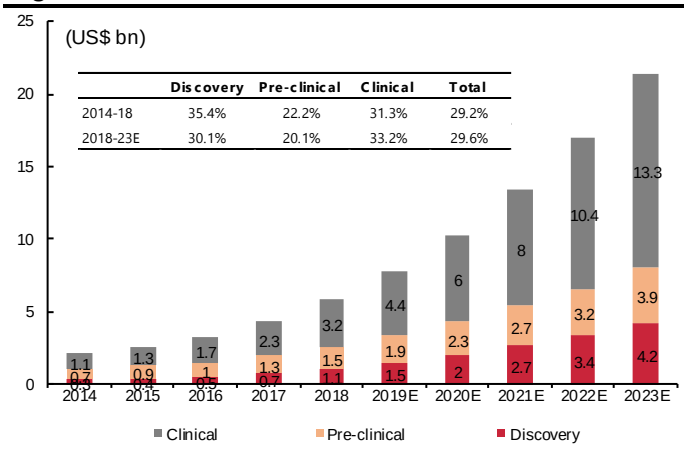
Focus Charts

Figure 1: Global CRO market and breakdown



Source: F&S, CMBIS

Figure 2: China-based CRO market and breakdown



Source: F&S, CMBIS

Figure 3: Global market share of R&D outsourcing industry (2017)

Company	Market share	2017 revenue (US$ mn)
IQVIA	3.50%	3,647
Covance	2.90%	3,037
Lonza	2.20%	2,293
DSM	2.10%	2,187
PAREXEL	2.10%	2,173
PPD	1.80%	1,900
Patheon	1.80%	1,870
PRA Health Sciences	1.80%	1,858
Charles River	1.80%	1,858
Catalent	1.70%	1,785
ICON	1.70%	1,758
Syneos Health	1.40%	1,460
WuXi AppTec	**1.10%**	**1,143**
Siegfried	0.70%	762
Cambrex	0.50%	526
Others	72.90%	75,845
Total global pharmaceutical R&D outsourcing market	**100.00%**	**104,100**

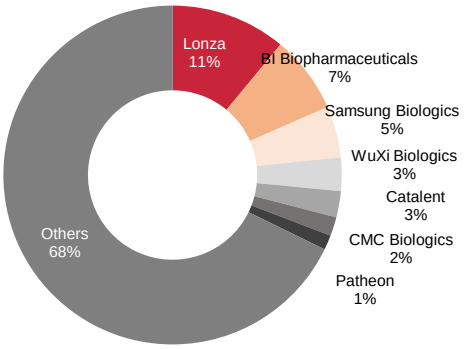
Source: WuXi AppTec, CMBIS

Figure 4: Market share of China-based outsourcing R&D services players (2017)

Company	Market share	2017 revenue (US$ mn)
WuXi AppTec	**8.30%**	**1,143**
Pharmaron	2.40%	337
TigerMed	1.80%	250
WuXi Biologics	1.70%	235
Asymchem Laboratories	1.50%	211
Others	84.30%	11,811
Total China pharmaceutical R&D outsourcing market	**100.00%**	**13,986**

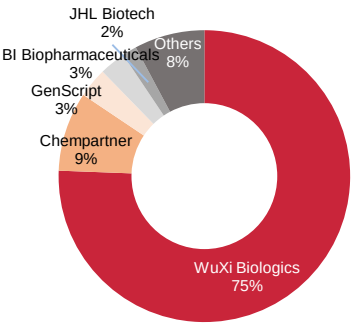
Source: F&S, WuXi AppTec, CMBIS

Figure 5: Market split of global biologics outsourcing market by revenue (2018)



Source: F&S, WuXi Biologics, CMBIS

Figure 6: Market split of China biologics outsourcing market by revenue (2018)



Source: F&S, WuXi Biologics, CMBIS

Contents

Investment Summary

Initiate China CRO/CDMO sector with a bullish view

In this report, we take a deep dive into China CRO/CDMO sector to understand the structural growth potential in China CRO/CDMO market.

We expect both global and China R&D spending to grow strongly, led by 1) a more conducive regulatory environment with increase in FDA and NMPA drug approvals, 2) a shift by pharmaceutical companies towards externalized R&D models with around half of pipelines externally sourced, 3) a robust biotech funding environment for biotech companies, and 4) a smaller percentage of drug sales exposed to patent expirations. Frost & Sullivan (F&S) forecasts the global R&D expenditure to increase from US$174.0bn in 2018 to US$216.8bn in 2023E, representing a 4.5% CAGR. The increase in R&D expenditures has laid a foundation for the continuous growth of the global pharmaceutical R&D outsourcing services industry.

We notice increasing number of innovative drug IND filings to the NMPA. According to Insight database, there were 217 innovative drug IND filings in 2015 while the number increased to 591 in the first 11 months of 2019. We forecast strong growth in China R&D spending, given 1) favorable government policies on encouragement of innovation, 2) capital inflows to Chinese biotech companies, and 3) rapid increase in R&D spending of Chinese pharmaceutical companies. According to F&S, R&D spending in China is relatively low but expected to grow significantly at 23% CAGR in 2018-23E to reach US$49bn by 2023E. As of 2023E, China's R&D spending will account for 23% of the world's total R&D spending.

Robust R&D spending in China and worldwide will drive the growth in R&D outsourcing demand. Given the lengthy and costly drug development process and growing number of small-sized pharmaceutical companies, we expect a larger proportion of R&D spending will be outsourced.

Outsourcing industry is consolidating because pharmaceutical companies and biotech companies are outsourcing more work to fewer, more capable service providers by building long-term partnership with vendors. Thus, pharma and biotech companies could benefit from a simpler outsourcing process, reduced oversight, shortened cycle times and lower comprehensive costs. Thus, large CRO/CDMO companies have been actively expanding their business width through M&As in order to provide on-stop shop services for customers.

We believe China-based CRO/CDMO companies will continue to expand service width through M&As and expand footprints to overseas markets by acquisitions. China-based CRO/CDMO companies have strong competition advantages over overseas peers, given their improving technology, abundant talent pool and strong capital support. We expect China-based CRO/CDMO companies to play more important roles in global markets. With expanding service capabilities and increasing market share from overseas markets, we believe China-based CRO/CDMO companies will see significant improvement in output per capital.

Our top picks in China CRO/CDMO sector are Tigermed, WuXi AppTec and WuXi Biologics, given their comprehensive service capabilities, strong market positioning in China and early moves in globalization.

Tigermed (300347 CH, BUY) is a unicorn player in China clinical CRO market with big growth potential from overseas expansion

Tigermed is the largest clinical CRO service provider in China, with an employee team of over 4,000 staff, providing full-services covering I-IV phase clinical trials.

After the “722” event, the strict regulatory environment in China has led to strong demand for high quality CRO services. Tigermed, as a leading full-service clinical CRO in China, has consolidated market share from small peers in China.

Chinese government has initiated a series of reforms to encourage the development of innovative drugs. We notice a significant rise in the number of ongoing clinical trials in China. In 2018, the total phase I-IV clinical trials in China rose by 22% YoY, while number of phase I trials in China increased significantly by 38% YoY. We would like to highlight that more phase I trials ongoing indicates that more drug candidates will enter into late-phase of trials in coming years which will drive the growth in clinical CRO demand in China.

Clinical trial demand in China will further accelerate thanks to the breakthrough of capacity bottleneck. Chinese authorities opened up the clinical trial institution recognition through filing system, which will significantly relieve the bottleneck of clinical trial resources in China and stimulate demand for clinical trial CRO.

Given China’s large patient pool, international pharmaceutical companies are including China as one sites in MRCTs to speed up the enrollment of patients. Meanwhile, Chinese pharmaceutical companies are doing many MRCTs for the purpose of product registration in overseas countries. Tigermed provides clinical CRO services for Chinese innovative products going global and multinational enterprises’ innovative products entering into Chinese market.

Tigermed has larger growth potential from overseas expansion. As of end-2018, Tigermed operates 11 overseas offices in Asia Pacific, Europe and North America. We believe Tigermed will further strengthen its global presence through acquisitions. As the Company already has established good network in Asia Pacific regions, US market could be the next emphasis for Tigermed.

Tigermed’s total backlog has increased at a 49% CAGR during 2015 and 2018 to RMB3.68bn as of end-2018. We estimate Tigermed’s net adjusted net profit will grow at 57.2%/40.1%/39.0% YoY in FY19E/20E/21E, respectively; and attributable net profit to increase 46.2%/38.5%/39.2% YoY in FY19E/20E/21E. Strong earnings growth will be mainly driven by solid clinical trial demand, increasing market share in China, and fast expanding overseas businesses.

WuXi AppTec (603259 CH, BUY) further strengthents its leading position in CRO/CDMO industry worldwide

WuXi AppTec is the largest CRO/CDMO player in China and a leading CRO/CDMO player worldwide. According to Frost & Sullivan (F&S), as of 2017, WuXi AppTec has 1.1% market share in global pharmaceutical outsourcing market, ranking No.13 in the global market.

Thanks to acquisitions, WuXi AppTec has built up integrated capabilities throughout the discovery, development and manufacturing spectrum for small molecule drugs, cell therapies and gene therapies. To leverage its one stop shop service capability, WuXi AppTec adopts "follow the molecule" strategy to provide services for one project at different stages of development. This practice could help WuXi AppTec to maximize income from each single project. WuXi AppTec's vertically integrated services also helps to enhance customer stickiness by providing seamless and highly efficient services.

Increasing demand in drug outsourcing demand in China, especially increasing demand in innovative drug development outsourcing has driven the revenue growth in WuXi AppTec. WuXi AppTec provides integrated drug discovery and R&D services to Chinese customers which span from early stage drug discovery to completion of IND filings with NMPA. These projects have success-based agreements with a milestone and/or royalty fee. As at Sep 30, 2019, WuXi AppTec has in total assisted Chinese customers in submitting 71 new-chemical entities IND filings and obtained 54 CTAs from NMPA. As a result, we expect meaningful milestone and royalty income from these integrated projects in coming years.

As of Jun 30, 2019, WuXi STA has 11 CDMO projects under China's Marketing Authorization Holder ("MAH") pilot program. WuXi STA has established strategic cooperation with many China-based biotech companies, providing "end-to-end" CMC support for new drug development from preclinical to commercial for these strategic partners.

WuXi AppTec is building capabilities in cell and gene therapies to support the evolving demands in this field. WuXi AppTec will double its testing capacity for cell & gene projects in the US by late 2019. In 1H19, the Company's cell and gene therapies CDMO/CMO facility in Wuxi city began operation, providing services to customers in China. F&S forecasts that the global cell and gene therapies CDMO/CMO market size was approximately US$1.5bn in 2018 and will grow to US$3.6bn by 2022E, implying a 24.5% CAGR between 2018 and 2022E. Meanwhile, Frost and Sullivan estimates that cell and gene therapies CDMO/CMO market size in China will reach around US$500mn by 2022E.

In order to maintain the leading position in drug discovery and development services, WuXi AppTec has consistently invested in innovative technologies to stay at the forefront of the industry, such as innovative biotechnology, AI and transformative technologies. As at Jun 30, 2019, WuXi AppTec maintained a diversified investment portfolio with 61 companies and funds (excluding investments in joint ventures and associates). As of Jun 30, 2019, WuXi AppTec had RMB2,516mn non-current portion of financial assets at fair value through profit or loss (FVTPL). Investment gain is volatile but will contribute significant positive gains over the long term.

We expect WuXi AppTec's adjusted non-IFRS net profit to grow by 32.9%/29.1%/27.7% YoY in FY19E/20E/21E, respectively; and net profit to change by -5.7%/33.2%/26.5% YoY in FY19E/20E/21E. Solid earnings growth will be mainly driven by solid CRO/CDMO outsourcing demand worldwide and consistent market share gain in the global market.

WuXi Biologics (2269 HK, BUY) to maintain strong growth momentum thanks to fast growing demand in biologicals outsourcing

WuXi Biologics provides vertically integrated biological CRO and CDMO services, including drug discovery, development and manufacturing services. As of 2018, WuXi Biologics is one of the top 4 biological CRO/CDMO companies worldwide with 3.2% market share.

We expect WuXi Biologics to gain market share from global competitors thanks to the Company's advanced technology platforms in cell line development, bispecific antibody development, ADC development, OMT technology, perfusion manufacturing, etc. In addition, benefiting from cheap labor costs and rich talent pool in China, WuXi Biologics can provide high quality services with competitive costs to its customers. WuXi Biologics' fast expanding manufacturing facility also enables the Company to meet the growing demand in biological CDMO worldwide.

WuXi Biologics adopts "follow-the-molecule" strategy. The Company tries to retain an early stage project to late stage and even commercialization to maximize revenue from a single project. As each project progresses from early stage of development to late stage and even commercialization, revenue from single project also increases. As of Jun 30, 2019, WuXi Biologics works on a total of 224 integrated projects, including 106 projects in pre-clinical development stage, 102 projects in early-phase (phase I and II) clinical development, 15 projects in late-phase (phase III) development and 1 project in commercial manufacturing.

WuXi Biologics can charge extra milestone fees or royalty fees from certain projects which can enable the company to share further upside from these projects. Milestone and royalty income are very high margin because limited expense is associated with such income. Yet, they depend on the progress and success of relevant projects. WuXi Biologics recognized US$30.6mn milestone revenue in 1H19 and US$30mn in 2018. The Company recorded US$2,894mn milestone fee backlog as of Jun 30, 2019. Nevertheless, due to the lengthy process for drug development, the milestone fee backlog may be realized during a prolonged time period and depends on the success of certain projects.

WuXi Biologics entered into vaccine CDMO market by establishing a joint venture with Shanghai Hile Bio-Technology (603718 SH) in Jul 2018. In May 2019, WuXi Biologics entered into a strategic partnership Letter of Intent (LOI) with a global vaccine leader. In Nov 2019, WuXi Vaccines announced to invest US$240mn to build a new vaccine manufacturing facility in Ireland. This facility will exclusively manufacture a vaccine follows the 20-year manufacturing LOI signed with the global vaccine leader. The value of the 20-year manufacturing contract is estimated to be more than US$3bn. We expect revenue contribution from this project to start from 2023E, depending on the timing of FDA approval of this vaccine product and timeline of facility construction in Ireland.

WuXi Biologics' backlogs experienced phenomenal growth during recent years, surging from US$1,478m by end-2017 to US$4,630m by Jun 30, 2019. The management expects to realize US$850m revenue out of the total US$4,630m backlog within the next three years.

We estimate WuXi Biologics' total net profit will grow at 54.3%/ 42.8%/ 46.8% YoY in FY19E/20E/21E, respectively, and adjusted non-IFRS net profit (excluding share-based compensation, listing expenses, FX gain/loss, etc.) will grow at 53.9%/ 44.6%/ 46.7% YoY in FY19E/20E/21E, respectively. Strong earnings growth will be mainly driven by strong outsourcing demand in biological products worldwide and consistent market share gain in both China and overseas markets.

Valuation Summary

Figure 7: China CRO/CDMO Sector – Comparison

Company	Ticker	Rating	Mkt Cap (US$ mn)	Net profit YoY FY19E	Net profit YoY FY20E	Net profit YoY FY21E	P/E (x) FY19E	P/E (x) FY20E	P/E (x) FY21E	P/B (x) FY19E	P/B (x) FY20E	ROE (%) FY19E	ROE (%) FY20E
H-share													
WuXi AppTec	2359 HK	NR	21,110	-5.7%	33.2%	26.5%	63.8	53.4	42.2	7.5	6.7	11.0	13.1
WuXi Biologics	2269 HK	Buy	15,260	54.3%	42.8%	46.8%	109.3	76.5	52.1	11.9	10.3	11.5	14.4
Pharmaron	3759 HK	NR	5,096	45.1%	36.4%	33.5%	48.9	35.9	26.8	9.0	7.4	17.9	20.1
Frontage	1521 HK	NR	1,078	92.4%	39.0%	32.3%	48.8	31.6	23.3	4.1	3.6	14.1	11.0
Viva	1873 HK	NR	873	60.1%	87.4%	46.6%	44.6	23.7	16.2	3.2	3.0	11.7	13.1
	Average			**49.3%**	**47.8%**	**37.1%**	**63.1**	**44.2**	**32.1**	**7.1**	**6.2**	**13.2**	**14.3**
A-share													
WuXi AppTec	603259 CH	Buy	21,110	-5.7%	33.2%	26.5%	70.2	52.7	41.6	7.4	6.6	11.0	13.1
Tigermed	300347 CH	Buy	6,874	46.2%	38.5%	39.2%	70.0	50.6	36.3	11.7	10.3	14.7	18.4
Pharmaron	300759 CH	NR	5,096	45.1%	36.4%	33.5%	61.1	44.8	33.5	11.2	9.2	17.9	20.1
Joinn Laboratories	603127 CH	NR	1,401	41.8%	38.9%	36.1%	64.2	46.2	33.9	12.6	10.5	19.6	22.4
Asymchem Laboratories	002821 CH	NR	938	32.8%	32.2%	32.2%	51.9	39.3	29.7	9.7	8.0	18.9	20.4
	Average			**32.0%**	**35.8%**	**33.5%**	**63.5**	**46.7**	**35.0**	**10.5**	**8.9**	**16.4**	**18.9**
Overseas													
IQVIA	IQV US	NR	27,910	10.1%	10.7%	12.1%	22.6	19.9	17.3	3.3	3.1	18.5	20.6
Syneos Health	SYNH US	NR	5,824	12.0%	14.1%	12.3%	17.5	15.7	14.0	2.0	1.8	11.6	12.2
ICON	ICLR US	NR	8,675	12.3%	11.1%	10.6%	23.5	21.0	18.9	5.4	4.7	24.9	23.4
PRA	PRAH US	NR	6,454	18.7%	12.8%	13.4%	20.0	17.7	15.6	6.5	5.4	32.2	29.3
Charles River	CRL US	NR	7,142	10.0%	13.4%	13.9%	22.3	19.8	17.4	4.5	3.9	21.9	19.5
Lonza	LONN SW	NR	25,422	8.2%	9.5%	14.0%	25.7	23.6	20.7	3.7	3.4	13.3	13.7
Catalent	CTLT US	NR	7,634	17.0%	16.1%	7.1%	28.0	26.4	23.0	3.8	3.5	18.0	14.0
	Average			**12.6%**	**12.5%**	**11.9%**	**22.8**	**20.6**	**18.1**	**4.2**	**3.7**	**20.1**	**19.0**

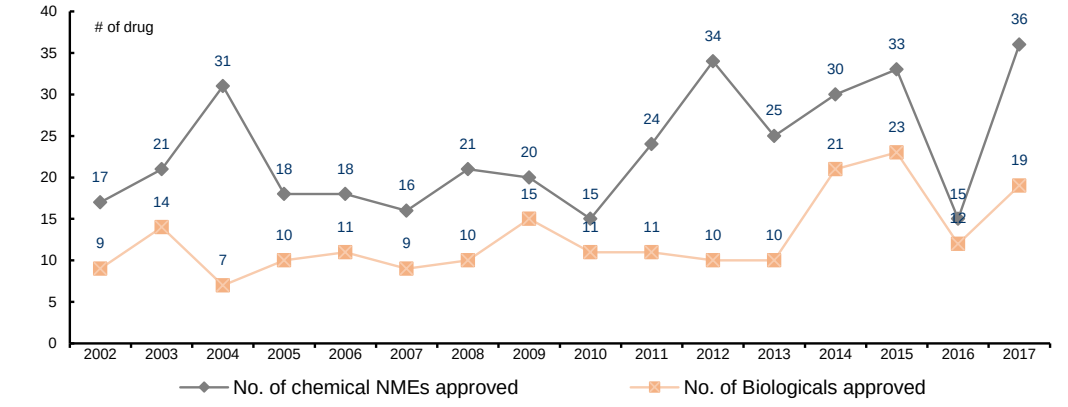
Source: Bloomberg, CMBIS estimates, as at Dec 12, 2019

Robust R&D spending to drive outsourcing demand

R&D spending is rising worldwide

The number of new drugs approved by the FDA increased from 27 in 2013 to 46 in 2017, reflecting a 14.2% CAGR. We also see increasing number of new biological products being approved by the US FDA which motivates pharmaceutical companies to invest more in biologicals R&D. In 2017, the US FDA approved 36 chemical NMEs (new molecular entities) and 19 new biological products.

Figure 8: FDA approval of chemical NMEs and biologicals

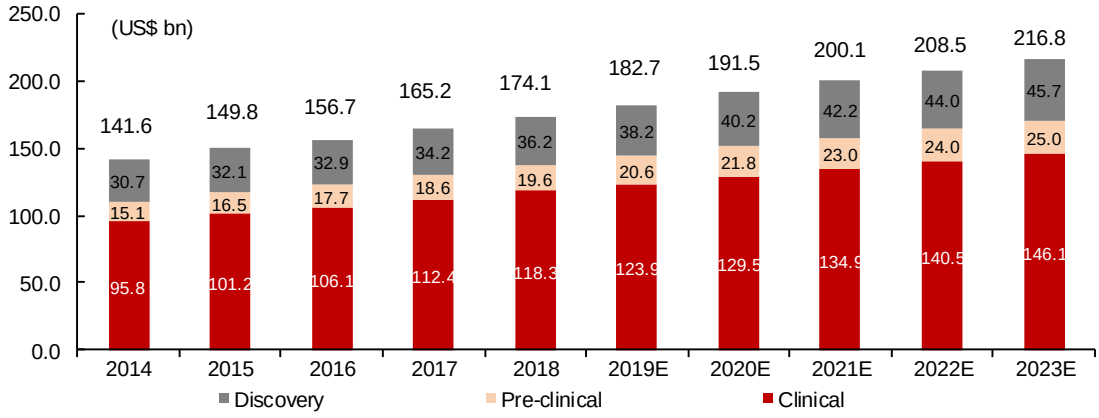


Source: EvaluatePharma, CMBIS

We expect both global and China R&D spending to grow strongly, led by 1) a more conducive regulatory environment with increase in FDA and NMPA drug approvals, 2) a shift by pharmaceutical companies towards externalized R&D models with around half of pipelines externally sourced, 3) a robust biotech funding environment for biotech companies, and 4) a smaller percentage of drug sales exposed to patent expirations.

F&S forecasts the global R&D expenditure to increase from US$174.0bn in 2018 to US$216.8bn in 2023E, representing a 4.5% CAGR. The increase in R&D expenditures has laid a foundation for the continuous growth of the global pharmaceutical R&D outsourcing services industry.

Figure 9: Global R&D expenditure and breakdown by discovery, preclinical and clinical

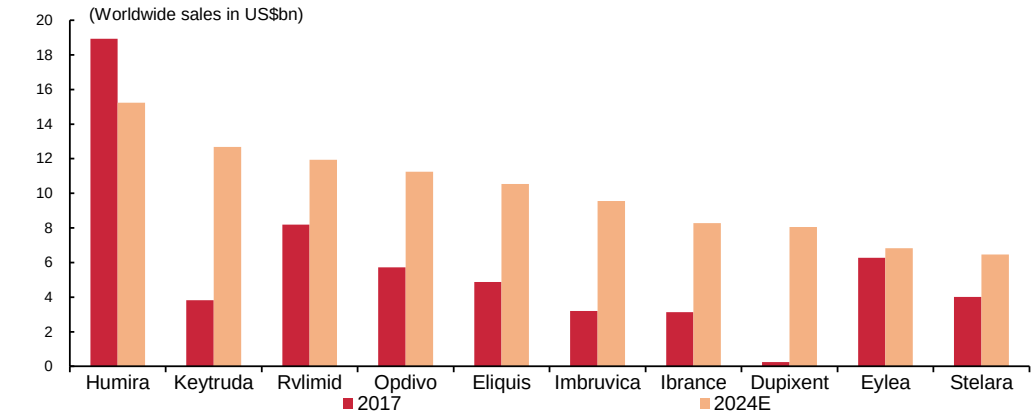


Source: F&S, Pharmaron Beijing, CMBIS

Increasing focus on biologics

Biological blockbusters could bring significant returns for pharmaceutical companies. EvaluatePharma forecasts that, as of 2024E, 6 out of the top 10 best-selling drugs worldwide will be biological products, including Humira, Keytruda, Opdivo, Dupixent, Eylea and Stelara.

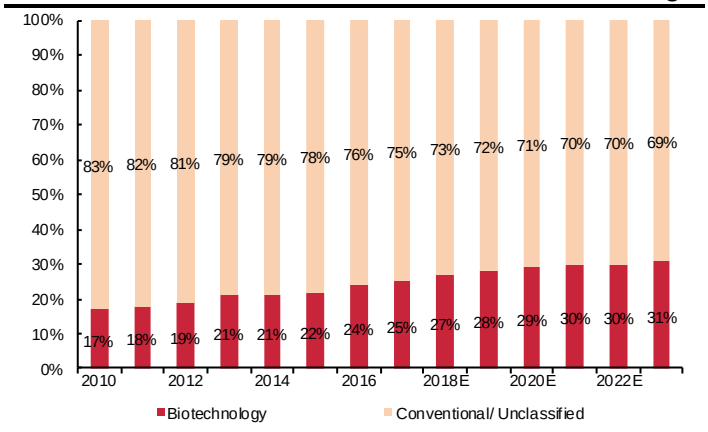
Figure 10: Global top 10 best-selling drugs



Source: EvaluatePharma, CMBIS

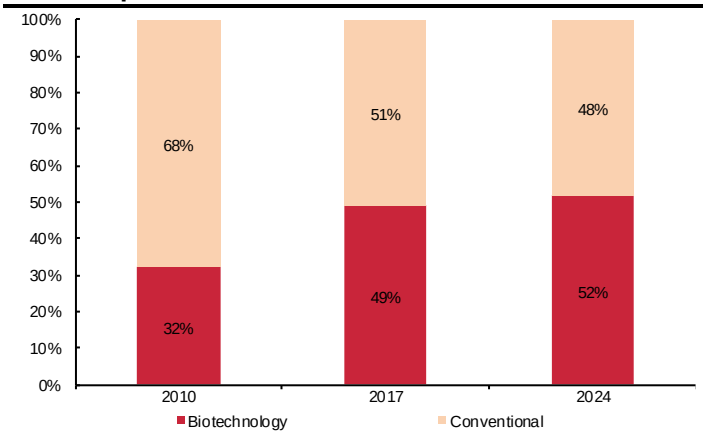
According to EvaluatePharma "World Preview 2018, Outlook to 2024", biotechnology products will account for 31% of the world's prescription drug and OTC drug sales by 2024E vs 25% in 2017. Similarly, within the world's top 100 products, biotechnology products will represent 52% of sales in 2024E from 49% in 2017. This also explains the reason for increasing R&D spending in biological products.

Figure 11: Worldwide Prescription Drug & OTC Pharmaceutical Sales: Biotech vs. Conventional drugs



Source: EvaluatePharma, CMBIS

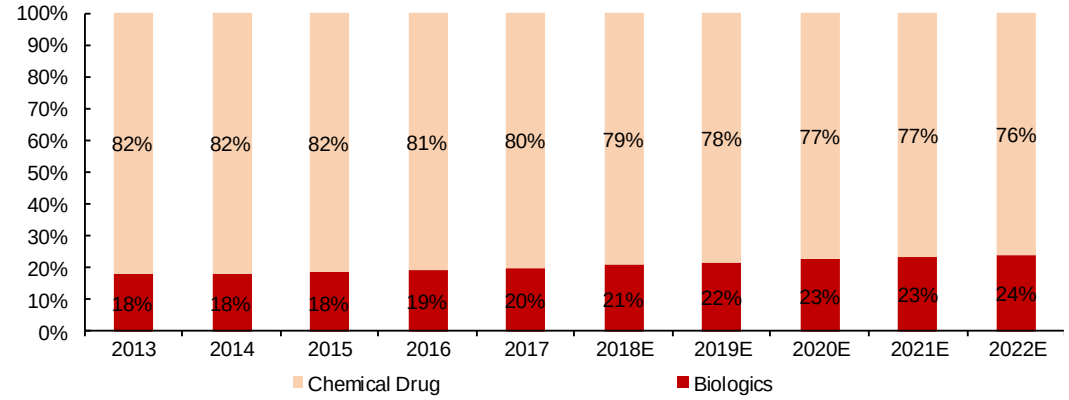
Figure 12: Increasing proportion of biotech products within Top 100



Source: EvaluatePharma, CMBIS

F&S forecasts a higher proportion of R&D budget will be invested in biologics, rising from 20.0% in 2017 to 24.0% by 2022E.

Figure 13: Global R&D spending by drug type



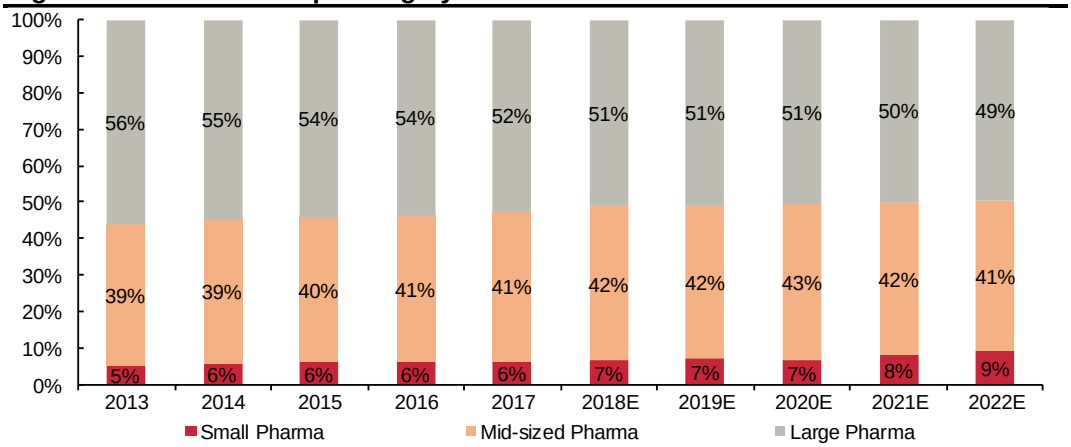
Source: F&S, WuXi AppTec, CMBIS

Growing number of small-sized pharma companies drives outsourcing demand

We see rising number of small-sized pharmaceutical companies as another driver of R&D outsourcing demand. In 2017, 39% of new drugs approved by FDA were originated from small-sized pharmaceutical companies. Due to capital and human resources constraints, small-sized pharmaceutical companies are more reliant on outsourcing services.

F&S forecasts small and mid-sized pharmaceutical companies to contribute 50.5% of global R&D spending in 2022E, up from 47.6% in 2017.

Figure 14: Global R&D spending by Pharma size

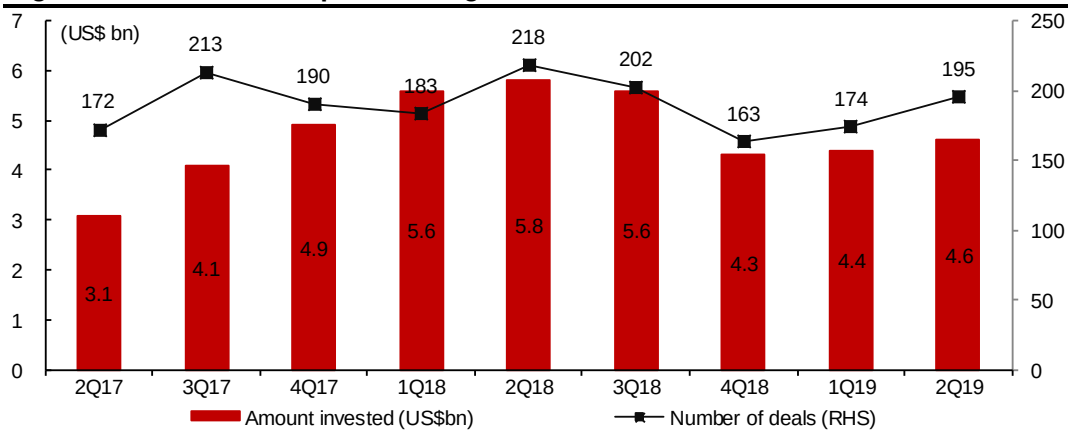


Source: F&S, WuXi AppTec, CMBIS

Small-sized pharmaceutical companies are usually loss making and are dependent on equity financing. We noticed stable venture capital investment in healthcare industry in the US and rapidly rising investment in healthcare industry in China.

According to the report published by PwC and CB Insights “Healthcare MoneyTree Report Q2 2019”, a total of US$4.6bn was invested in healthcare industry by venture capitals in 2Q19 while deal numbers reached 195 during the same period.

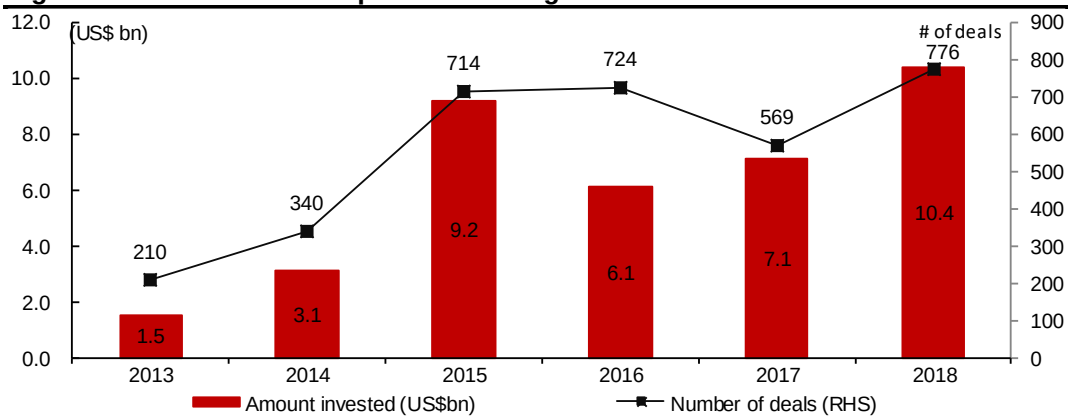
Figure 15: US venture capital funding in healthcare sector



Source: PwC CB Insights Healthcare MoneyTree Report Q2 2019, CMBIS

CV Source (投中研究院) estimates that China venture capital and private equity investment in healthcare sector rose significantly by 46% YoY in 2018, reaching US$10bn.

Figure 16: China venture capital/PE funding in healthcare sector



Source: CV source, CMBIS

Meanwhile, since mid-2018, Hong Kong Exchanges (HKEX) has opened-up for loss-making biotech companies to be listed. As of 9 Oct 2019, a total of 16 biotech companies have been listed in HKEX with an aggregate amount of HK$53.5bn was raised.

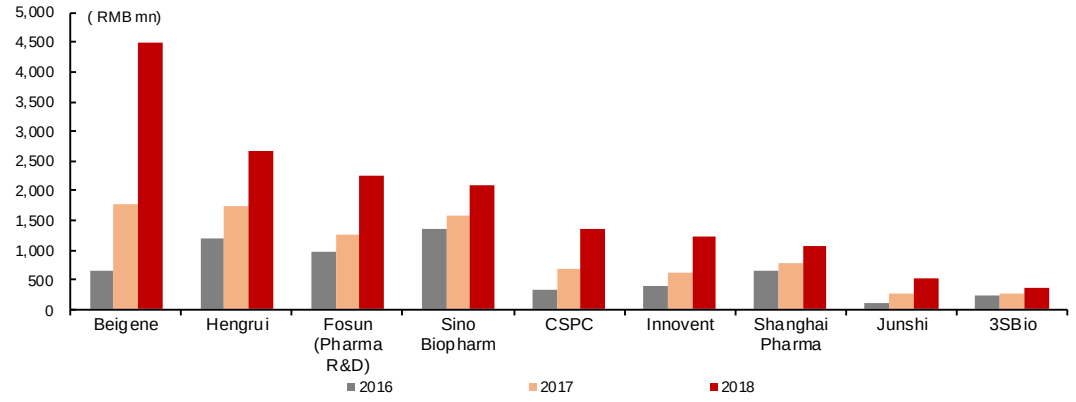
In mid-2019, the Chinese government launched a Technology and Innovation board (科创板) in Shanghai, allowing small-sized or loss-making high-tech companies to be listed. As of Oct 2019, 35 healthcare companies had filed applications for listing on Technology and Innovation board.

Thanks to sufficient funding from venture capitals, private equities, and listing on HKEX or the Technology and Innovation board, Chinese small-sized pharmaceutical companies will remain very active in R&D investments, in our view.

Aggressive R&D spending by Chinese pharma/biotech companies

Due to intensifying competition and policy reforms, Chinese pharmaceutical/biotech companies are aggressively expanding their R&D spending in recent years. For major Chinese pharmaceutical companies, their R&D expenses have more than doubled in the last three years.

Figure 17: R&D expenses of Chinese pharmaceutical companies are rising fast



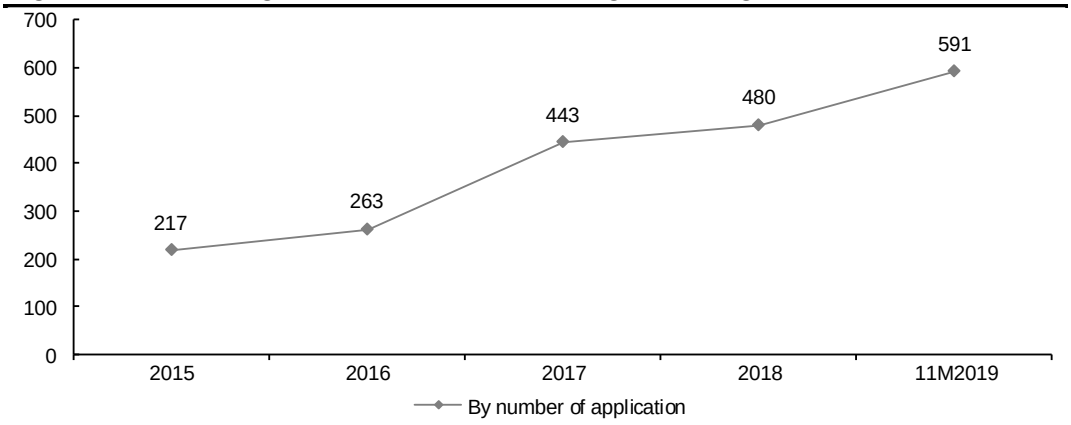
Source: Company data, CMBIS

The Chinese government has been carrying out a series of policies to encourage innovation in drug R&D. For instance, innovative drugs or first-to-market generic drugs can enjoy "priority review" status (优先审评) from the National Medical Products Administration (NMPA). This helps to accelerate the procedure for drug approval. As of Oct 2019, above 950 applications have received "priority review" status.

Moreover, the Chinese government has frequently changed its drug reimbursement list during recent years to include more innovative drugs for reimbursement. This helps to significantly enhance the affordability of innovative drugs and stimulate the sales of such drugs. The National Healthcare Security Administration (NHSA) released a new version of drug reimbursement list in Aug 2019. In Nov 2019, NHSA announced the results of NDRL price negotiations. A total of 150 drugs participated the negotiations, including 119 drugs joining negotiations for the first time and 31 drugs aiming to extend NRDL contracts. 97 out of the total 150 drugs successfully reached agreement with the government, implying a success rate of 65%. 70 drugs are newly added into the NRDL with an average price cut of 60.7% while 27 drugs extend contracts with an average price cut of 26.5%.

We notice increasing number of innovative drug IND filings to the NMPA. According to Insight database, there were 217 innovative drug IND filings in 2015 while the number increased to 591 in the first 11 months of 2019.

Figure 18: Increasing number of innovation drug IND fillings to the NMPA

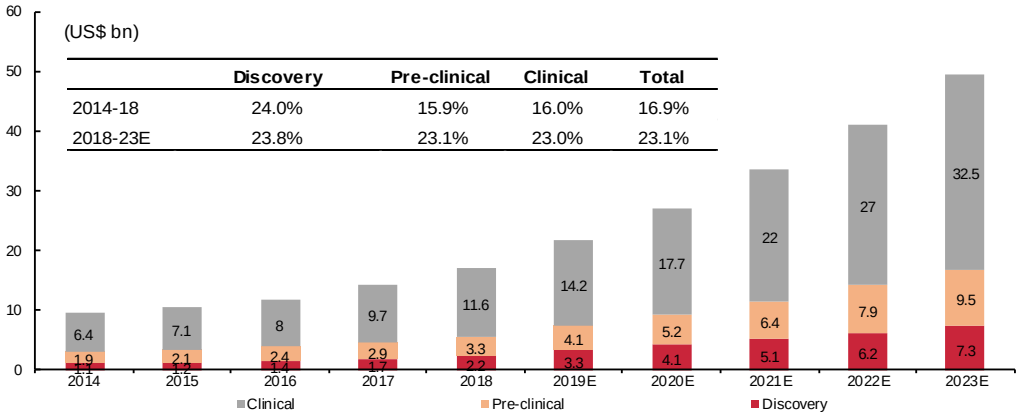


Source: Insight, CMBIS

We forecast strong growth in China R&D spending, given 1) favorable government policies on encouragement of innovation, 2) capital inflows to Chinese biotech companies, and 3) rapid increase in R&D spending of Chinese pharmaceutical companies.

According to F&S, R&D spending in China is relatively low but expected to grow significantly at 23% CAGR in 2018-23E to reach US$49bn by 2023E. As of 2023E, China's R&D spending will account for 23% of the world's total R&D spending.

Figure 19: China R&D expenditure and breakdown by discovery, preclinical and clinical



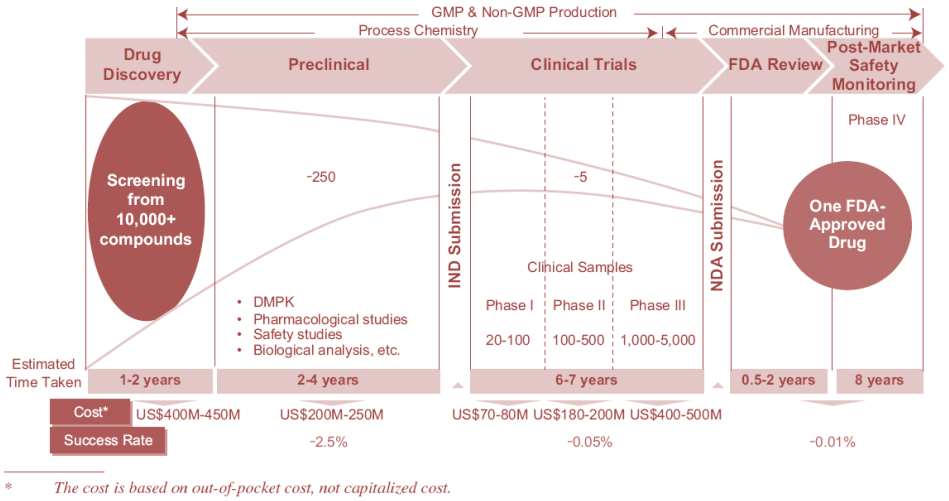
Source: F&S, Pharmaron Beijing, CMBIS

Outsourcing demand to outgrow R&D spending

Lengthy and costly drug development process drives outsourcing demand

Global and China pharmaceutical companies have increased the proportion of R&D outsourcing for better cost control and higher efficiency. Drug development process includes early stage R&D, pre-clinical, clinical research, commercialized manufacturing, etc. F&S estimates that, on average, development process of a new molecule takes more than 10 years and requires over US$1bn costs while the success rate for developing a new molecule from drug discovery to approval could be lower than 0.01%.

Figure 20: Drug development process



Source: Nature Review-Drug Discovery, CMBIS

As the patent protection period is usually 20 years for a certain innovative molecule, shortened R&D cycle will directly lead to longer remaining patent protection period after launch and higher return for pharmaceutical companies. Thus, we expect pharmaceutical companies to be more reliant on CRO companies in order to save time and money for drug R&D.

Pharmaceutical R&D outsourcing services mainly contain two types, 1) Contract Research Organisations (CROs), 2) Contract Development & Manufacturing Organisations/Contract Manufacturing Organisations (CDMOs/CMOs, briefly referred to as CDMOs).

CRO service providers usually help pharmaceutical companies to conduct a proportion of R&D work or organise clinical trials. Thus, CRO services usually can be divided into two types: 1) preclinical outsourcing services and 2) clinical outsourcing services.

Preclinical CROs mainly engaged in drug discovery and preclinical research services, including new drug discovery, target lead identification and lead generation & optimization, safety evaluation research services, pharmacokinetics, pharmacology and toxicology and animal models, etc. Major pre-clinical CRO players in preclinical CRO field include WuXi AppTec, Charles River, Pharmaron Beijing, ChemPartner, Joinn Lab, etc.

Clinical CROs mainly engaged in the provision of clinical trial services through Phase I to IV, clinical data management and statistical analysis, new drug registration and others. Major clinical CRO players include IQVIA, Covance, PRA Health, ICON, Tigermed, Boji Medical,

etc.

CDMOs provides drug manufacturing services for pre-clinical and clinical trial materials, APIs and preparations, packaging and labeling. They also provide development-related services such as process R&D, optimization, formula development, etc. Major CDMO players include Lonza, Boehringer Ingelheim, Catalent, Samsung Biologics, WuXi AppTec, WuXi Biologics, Asymchem Laboratories, Porton Pharma Solution, etc.

Figure 21: Pharmaceutical outsourcing service value chain

Source: F&S, Pharmaron Beijing, CMBIS

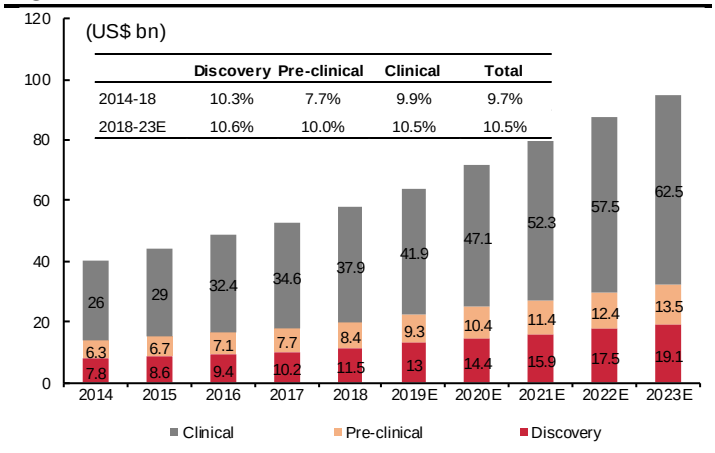
Larger fraction of R&D spending will be outsourced

The CRO market includes R&D services provided for drug discovery, pre-clinical and clinical stages. The global CRO market size is expected to grow from US$57.9bn in 2018 to US$95.2bn in 2023E, indicating a 10.6% CAGR, according to F&S.

The penetration rate of the global CRO services, measured as CRO market size as percentage of total pharmaceutical R&D spending, increased from 32.6% in 2014 to 37.2% in 2018 and may further rise to 48.0% in 2023E.

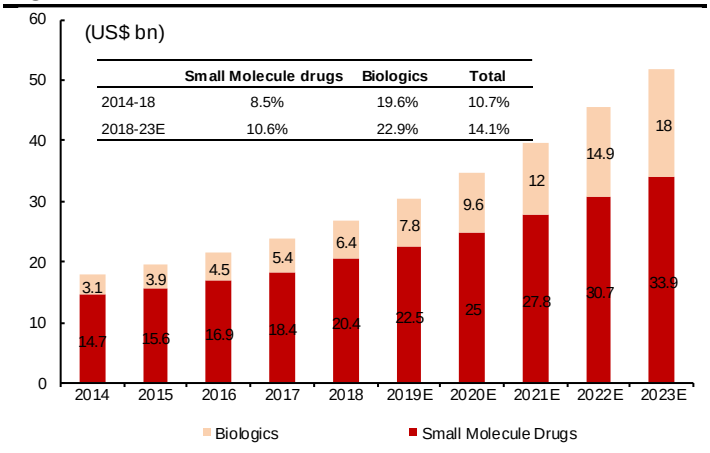
The CDMO market contains services for manufacturing of small molecule drugs and biologics. F&S forecasts the global CDMO market size to increase from US$26.8bn in 2018 to US$51.8bn in 2023E, representing a 14.1% CAGR. In particular, the CDMO for biologics may grow at a 22.9% CAGR to US$18.0bn in 2023E.

Figure 22: Global CRO market breakdown



Source: F&S, Pharmaron Beijing, CMBIS

Figure 23: Global CDMO market breakdown



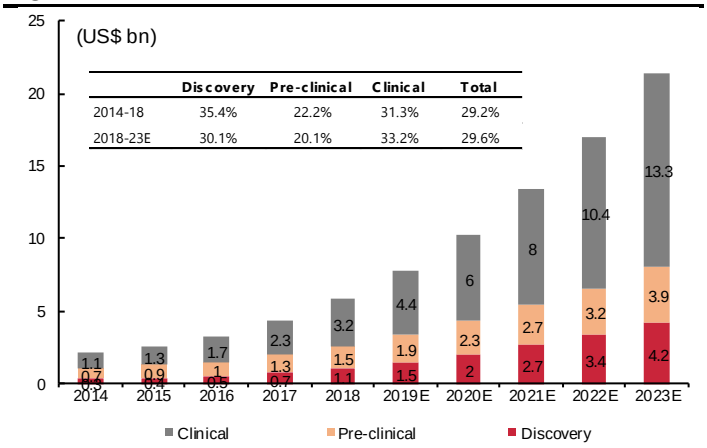
Source: F&S, Pharmaron Beijing, CMBIS

Similar to the US market, Chinese pharmaceutical CRO and CDMO market is also driven by 1) encouraging policies, such as NMPA's accelerated review of drug and improving reimbursement coverage, 2) pharmaceutical companies seeking for cost efficiencies, and 3) growing demand for high quality CROs from both Chinese pharmas' overseas expansion and increasing drug importation after China joining ICH.

According to F&S, the China-based CRO market size will rise from US$5.9bn in 2018 to US$21.4bn in 2023E, representing a CAGR of 29.6%. The penetration rate of the China-based CRO market will increase from 35.8% in 2018 to 49.3% in 2023E.

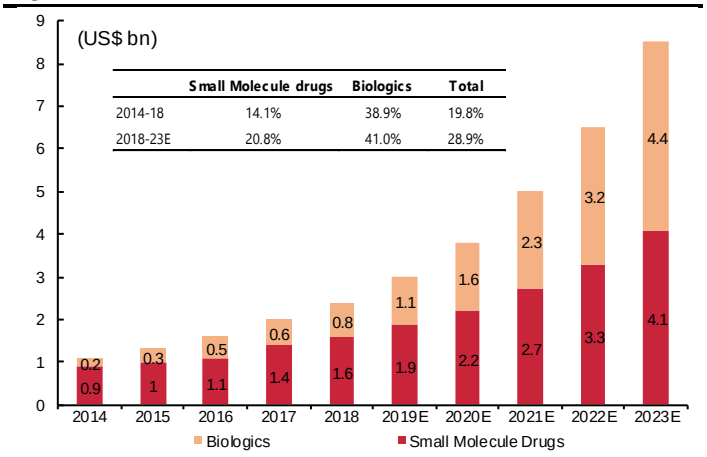
F&S estimates that China-based CDMO market size will increase from US$2.4bn in 2018 to US$8.5bn in 2023E, indicating a 28.9% CAGR, mainly driven by strong growth in biologics CDMO demand.

Figure 24: China-based CRO market and breakdown



Source: F&S, Pharmaron Beijing, CMBIS

Figure 25: China-based CDMO market and breakdown



Source: F&S, Pharmaron Beijing, CMBIS

China-based CRO/CDMO companies to gain global market share

Fragmented market landscape in China and worldwide

The world's top CRO/CDMO companies, including IQVIA, Covance, Parexel, Syneos Health, ICON, etc., are mainly focused on clinical research services. By contrast, China CRO/CDMO players mainly focus on pre-clinical services.

Figure 26: Service scope of global and China CRO/CDMO players

	Ticker	Market Cap US$ mn	Service scope						
			Drug discovery	Preclinical CRO	Clinical CRO	Clinical CDMO	Commercialized CDMO/ CMO	CSO	Consulting and others
Overseas players									
IQVIA	IQV US EQUITY	27,910			√			√	√
Covance	Privatized	N/A		√	√	√			√
Parexel	Privatized	N/A			√				√
Syneos Health	SYNH US	5,824		√	√				√
ICON	ICLR US	8,675			√				
PPD	Privatized	N/A			√				√
PRA	PRAH US	6,454			√				
Charles River	CRL US	7,142	√	√	√	√			
Lonza	LONN SW	25,422				√	√		
Samsung Biologics	207940 KP	21,741				√	√		
Boehringer Ingelheim	N/A	N/A				√	√		
Catalent	CTLT US	7,634				√	√		
China players									
Wuxi AppTec 药明康德	603259 CH	21,110	√	√	√	√	√		√
Wuxi Biologics 药明生物	2269 HK	15,260	√	√		√	√		
PharmaRon 康龙化成	300729 CH	5,096	√	√	√	√	√		
Joinn Lab 昭衍新药	603127 CH	1,401		√					
ChemPartner 睿智化学（量子生物）	300149 CH	938	√	√		√	√		
Medicilon 美迪西	688202 CH	500	√	√					
CrownBio 中美冠科	N/A	N/A	√	√					
Sundia 桑迪亚	N/A	N/A	√	√					
Frontage Lab 方达控股	1521 HK	1,078		√	√				
Tigermed 泰格医药	300347 CH	6,874		√	√				
Boji Medical 博济医药	300404 CH	330		√	√				
CTSmed 北京赛德盛	N/A	N/A			√				
FMD China 方恩	N/A	N/A			√				
Asymchem 凯莱英	002821 CH	4,206		√	√	√	√		
Porton Pharma 博腾股份	300363 CH	1,055				√	√		
Apeloa Kangyu 普洛药业	000739 CH	2,211				√	√		

Source: Companies' websites, annual reports and CMBIS, as at Dec 12, 2019.

The world's R&D outsourcing market is very fragmented while IQVIA as the largest player only has 3.5% market share. The combined market share of top 15 players was less than 30% as of 2017. According to F&S, as of 2017, WuXi AppTec had 1.1% market share in global pharmaceutical outsourcing market, ranking No.13 in the global market.

China R&D outsourcing industry is also fragmented with WuXi AppTec being the largest player taking 8.3% market share in 2017. F&S estimates that top 15 players in China has less than 25% market share in 2017.

Figure 27: Global market share of R&D outsourcing players (2017)

Company	Market share	2017 revenue (US$ mn)
IQVIA	3.50%	3,647
Covance	2.90%	3,037
Lonza	2.20%	2,293
DSM	2.10%	2,187
PAREXEL	2.10%	2,173
PPD	1.80%	1,900
Patheon	1.80%	1,870
PRA Health Sciences	1.80%	1,858
Charles River	1.80%	1,858
Catalent	1.70%	1,785
ICON	1.70%	1,758
Syneos Health	1.40%	1,460
WuXi AppTec	**1.10%**	**1,143**
Siegfried	0.70%	762
Cambrex	0.50%	526
Others	72.90%	75,845
Total global pharmaceutical R&D outsourcing market	**100.00%**	**104,100**

Source: WuXi AppTec, CMBIS

Figure 28: Market share of China-based outsourcing R&D services players (2017)

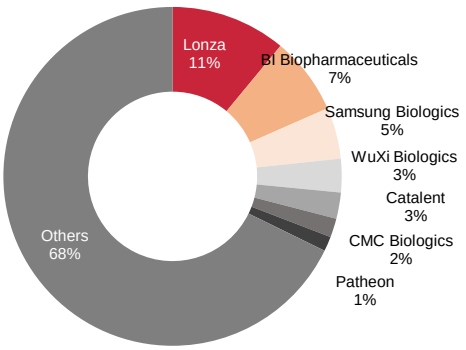
Company	Market share	2017 revenue (US$ mn)
WuXi AppTec	**8.30%**	**1,143**
Pharmaron	2.40%	337
TigerMed	1.80%	250
WuXi Biologics	1.70%	235
Asymchem Laboratories	1.50%	211
Others	84.30%	11,811
Total China pharmaceutical R&D outsourcing market	**100.00%**	**13,986**

Source: F&S, WuXi AppTec, CMBIS

In biological preclinical CRO and CDMO area, the world's top players are Lonza, Samsung Biologics, BI Biopharmaceuticals and WuXi Biologics. Global biologics outsourcing industry is also very fragmented. According to F&S, as of 2018, Lonza has 11% market share, being the largest player in the market, while BI Biopharmaceuticals occupies 7.4% market share, Samsung Biologics with 4.9% market share and WuXi Biologics with 3.2% market share.

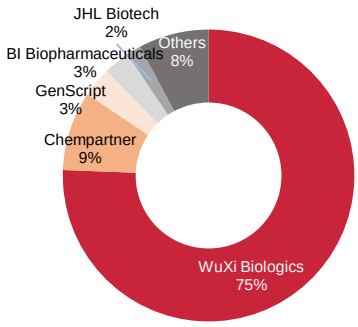
China's biologics CRO market is quite consolidated and mainly dominated by WuXi Biologics. WuXi Biologics ranked No.4 in the global biologics outsourcing market. Meanwhile, it has dominant China market with 75.6% market share by revenue in 2018, followed by 8.8% of Chempartner, 3.3% of GenScript, 2.9% of BI Biopharmaceuticals, etc. We believe WuXi Biologics will further gain market share in the global market thanks to its cost advantages and economy of scale.

Figure 29: Market split of global biologics outsourcing market by revenue (2018)



Source: F&S, WuXi Biologics, CMBIS

Figure 30: Market split of China biologics outsourcing market by revenue (2018)



Source: F&S, WuXi Biologics, CMBIS

Enhancing service capabilities through M&As

Outsourcing industry is consolidating because pharmaceutical companies and biotech companies are outsourcing more work to fewer, more capable service providers by building long-term partnership with vendors. Thus, pharma and biotech companies could benefit from

a simpler outsourcing process, reduced oversight, shortened cycle times and lower comprehensive costs. Thus, large CRO or CDMO companies have been actively expanding their business width through M&As in order to provide on-stop shop services for customers.

For instance, IQVIA/Quintiles completed over 50 acquisitions since its establishment in 1982. In 2012, Quintiles improved its drug development productivity through the acquisition of Expression Analytics, a provider of genomic sequencing, gene expression genotyping and bioinformatics to biopharma, academic and government customers. In 2014, Quintiles acquired Encore which enhances the company's expertise in electrical health records. In 2015, Quintiles formed a JV with Quest to provide comprehensive clinical trial laboratory services. In 2016, Quintiles was merged with IMS Health, becoming the largest CRO company worldwide.

China-based CRO companies are also active in M&As. Since establishment, WuXi AppTec has completed over 30 acquisitions, which are mainly located in China and the US. It's worth mentioning that in 2008, WuXi PharmaTech acquired US-based AppTec Laboratory Services Inc. for US$163mn. This acquisition allows WuXi PharmaTech to obtain biologics capabilities, and gain a significant US operational footprint. Through this acquisition, WuXi AppTec has laid the foundation for global operation.

We believe China-based CRO companies will continue to expand service width through M&As and expand footprints to overseas markets by acquisitions.

Figure 31: Major acquisitions in CRO/CDMO industry worldwide

Buyer	Target	Deal Type	Time	Services provided by target
Joinn Lab	Biomere	Acquisition	05-2019	Pre-clinical CRO
WuXi AppTec	Pharmapace	Acquisition	05-2019	Clinical CRO
WuXi AppTec	CW data	JV	10-2018	Other commercial products
WuXi AppTec	Engine Biosciences	Seed Round	01-2018	Biotechnology
WuXi AppTec	ResearchPoint Global	Buyout	11-2017	Drug discovery
WuXi AppTec	HD Biosciences	Buyout	01-2017	Drug discovery
WuXi AppTec	JW Therapeutics	JV	01-2016	Biotechnology
WuXi AppTec	Ambrx	Acquisition	06-2015	Drug discovery
WuXi AppTec	NextCODE Health	Acquisition	01-2015	Other devices and Supplies
Wuxi PharmaTech	AppTec Lab	Acquisition	01-2008	Biologic CRO/ CMO
Quintiles	Quest	JV	07-2017	Clinical CRO
Quintiles	IMS	Merger	05-2016	Healthcare industry data
Charles River	Blue Stream Labs	Acquisition	06-2016	Clinical CRO and commercial products
Charles River	WIL Research	Acquisition	04-2016	Drug discovery
ICON	Clinical Research	Acquisition	06-2016	Drug discovery
ICON	PMG Research	Acquisition	12-2015	Clinical CRO
LabCorp	Pathology	Acquisition	04-2016	Pre-clinical CRO
Tigermed	DreamCIS	Acquisition	09-2015	Clinical CRO

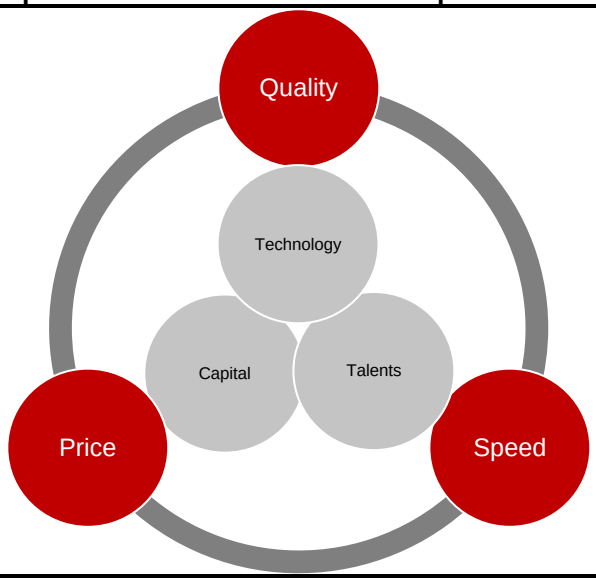
Source: F&S, company announcements, CMBIS

Competitive advantages for China CRO/CDMO players

We believe **quality, speed and price** are most important concerns when customers choose outsourcing services. Accordingly, outsourcing companies' core competitiveness lie in **technology, talents and capital.** With advanced technology, CRO/CDMO companies can provide high quality, well differentiated services to customers. Talents are essential for CRO/CDMO companies because only good talents can deliver quality services and develop good technology. Sufficient capital allows CRO/CDMO companies to a) build up enough capacity to ensure on time delivery to customers and b) recruit enough talents.

China CRO/CDMOs have competitive advantages in technology, talents and capital thanks to 1) consistent improvement in technologies, 2) abundant resources of talents and cheap labor costs in China, and 3) rich capital inflows into Chinese CRO/CDMO industry in past years.

Figure 32: Core competitiveness for CRO/CDMO companies



Source: CMBIS

Chinese CRO/CDMO companies can easily attract capital from both public and primary financial markets. Currently, over 30 China-based CRO/CDMO companies are listed in A or H shares. VIVA Biotech, Frontage, Pharmaron are newly listed in Hong Kong Stock Exchange (HKEX) in 2019. Medicilon is listed in Technology and Innovation board (科创板) in Nov 2019.

Private financing activities related to CRO/CDMO sector is very active. In 2018, CMAB Biopharma (苏桥生物) raised US$38mn Series A financing and US$34mn Series B financing. Biocytogen (百奥赛图) raised RMB410mn of Series C financing in Apr 2018 and RMB543mn of Series D financing in Aug 2019 and has grown into the largest services provider of genetically edited animal models in China. OPM Bioscience (上海奥浦迈), Crystal Pharmatech (晶云药物), TO Biopharm (澳斯康生物), MabPlex (迈百瑞), DMed Global (缔脉生物) also completed significant value of private financing since 2018. Significant amount of capital has flowed into China's CRO/CDMO industry.

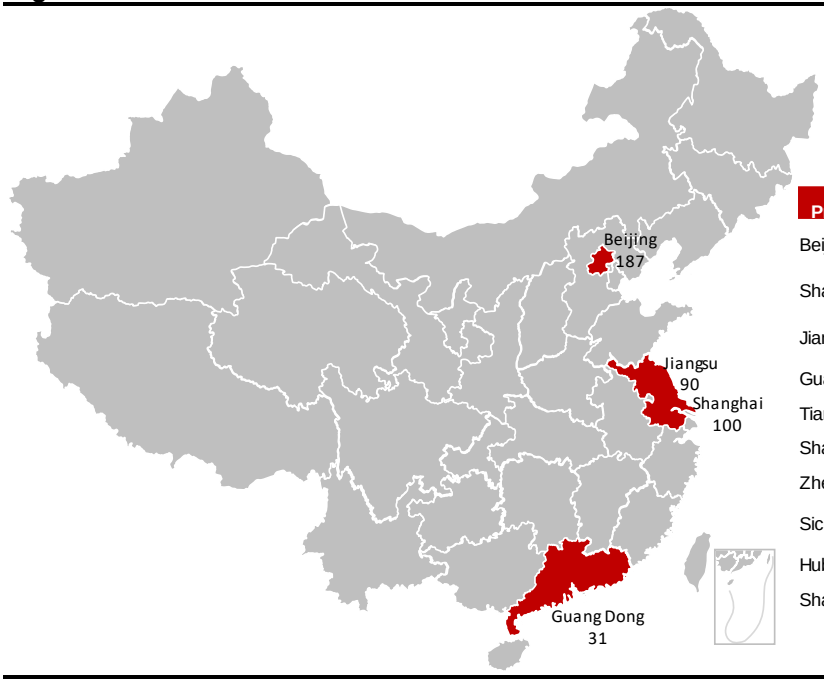
Figure 33: Major private financing activities of China-based CRO/CDMO companies (2018-2019)

Company	Business	Amount raised	Time of transcation	Round of transaction
CMAB Biopharma (苏桥生物)	Biological CDMO	US$38 mn	2018.01	Round A
		US$34mn	2018.04	Round B2
Bioscience （百奥赛图）	Animal models	RMB410mn	2018.04	Round C
		RMB543mn	2019.08	Round D
OPM Bioscience (上海奥浦迈)	Mass production of cell media	RMB100mn	2018.04	
Crystal Pharmatech (晶云药物)	CMC	RMB100mn	2018.12	Round B
TO Biopharm (澳斯康生物)	Biological CDMO	>RMB300mn	2019.01	Round A
MabPlex (迈百瑞)	Biological CDMO	RMB400mn	2019.01	initial-round
药研社	CRO	RMB300mn	2019.08	Round C
乐威医药	CDMO	~RMB100mn	2019.08	Round B
DMed (缔脉生物)	CRO	US$50mn	2019.10	Round B

Source: PE daily, 36kr, MedClub, company websites, CMBIS

Most China CROs are mainly located coastal areas, such as Beijing-Tianjin-Hebei Region, Yangtze River Delta and Pearl River Delta, where locates many pharmaceutical companies and universities or colleges, providing abundant talent resources.

Figure 34: China-based CRO/CDMO locations

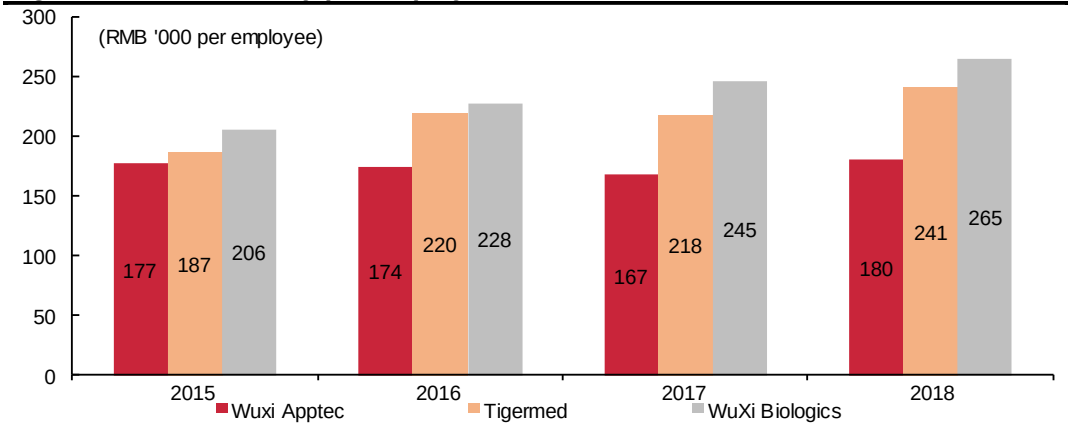


Province	# of companies	Company
Beijing	187	Crow n Bio, Pharmaron, Join Lab, etc.
Shanghai	100	Wuxi AppTec, Quntile, Meidi Xi, Parexel, etc.
Jiangsu	90	Huaw ei, Gen Script, etc.
Guangdong	31	Boji, Yushi, etc.
Tianjin	19	FMD, Asymchem, etc.
Shandong	15	Maibairui, Xinbo
Zhejiang	14	Tigermed, Cell Land
Sichuan	14	Novastar, hygeiapharm
Hubei	11	Lehehx, Procell
Shaanxi	10	Mingchen, Cmpharma

Source: HAMPA, CMBIS, as of Sep 2017

China also enjoy lower labor costs than US and Europe. Our calculation shows that average salary of leading China-based CRO/CDMO companies range from RMB180k~265k per year, or US$26~38k per year.

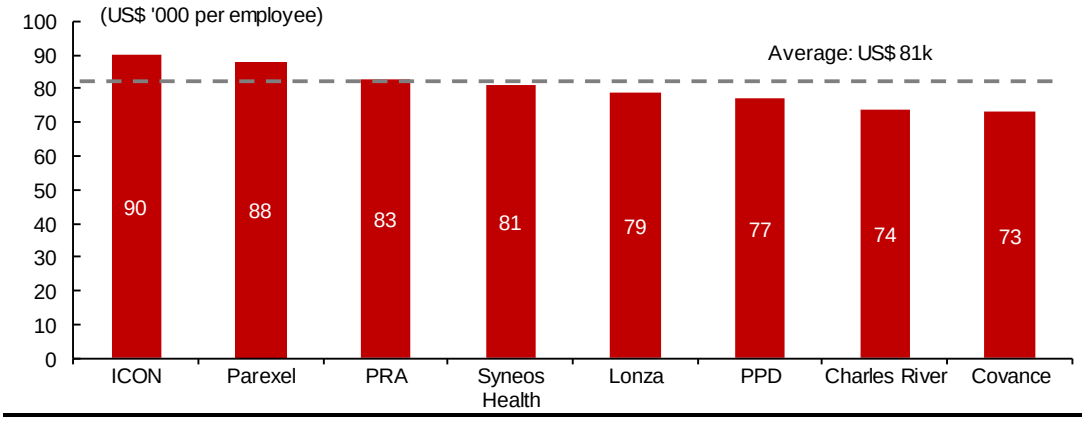
Figure 35: Annual salary per employee of China-based CROs



Source: Annual reports, CMBIS

According to data from PayScale, average salary of leading overseas CRO/CDMO companies is approximately US$81k per year, which is around 2.5 folds of the average salary of China-based CRO/CDMO companies.

Figure 36: Annual salary per employee of leading overseas CRO/CDMO companies



Source: PayScale, CMBIS

Thanks to competitive labor costs, China's pre-clinical trial and clinical trial costs are significantly lower than that in overseas countries. Pre-clinical trial and clinical trial costs in China was only 30%-60% of the costs in overseas, which attracts pharmaceutical companies to outsource R&D to China-based CRO companies.

Figure 37: Significantly lower clinical trial costs in China

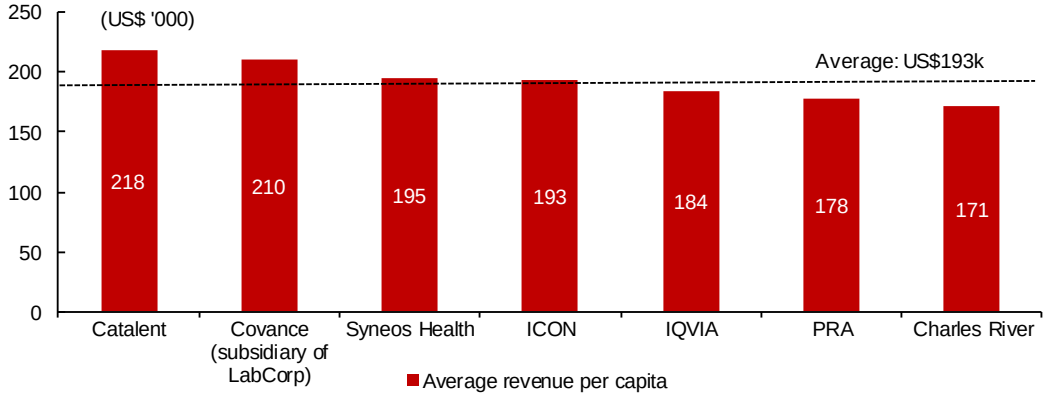
Phase	Item	China trial cost/ overseas trial cost
Pre-clinical trial	Compound screening	30%-60%
	Toxicity test	30%
	Animal test	30%
Clinical trial	Phase I	30%-60%
	Phase II-III	30%-60%

Source: Medicilon, CMBIS

Plenty of room for improvement in output per capita

For leading overseas CRO/CDMO players, the average output per capita of selected CRO/CDMOs was US$193k in FY18, ranging from US$171k to US$218k per capita.

Figure 38: Global leading CRO/CDMOs' revenue per capital (2018)

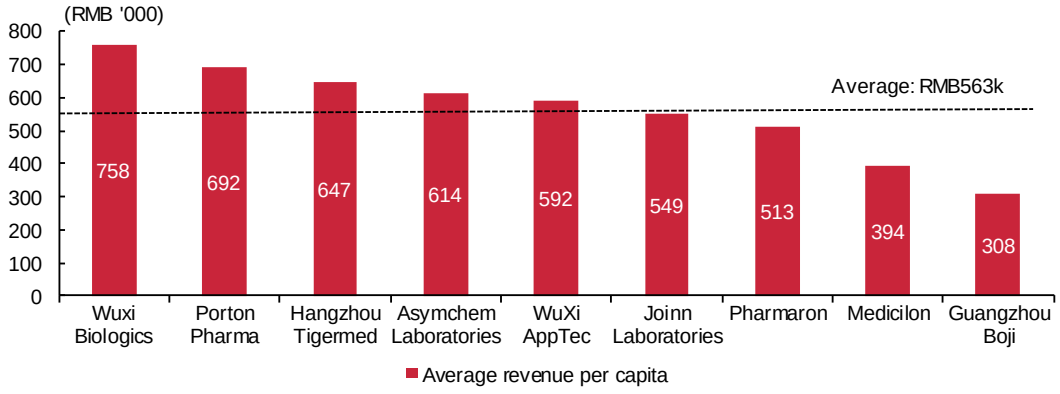


Source: Annual reports, CMBIS

For China leading CRO/CDMOs, WuXi Biologics recorded the highest output per capital of RMB758k (or US$108k) in FY18. The average output per capita of selected China CRO/CDMOs was RMB563k, or US$80k in FY18, which is 58% below the average level of global CRO/CDMO companies.

With improving operation efficiency, market consolidation and market share gain from international players, we believe China-based CRO/CDMO companies' output per capita will gradually catch up with the level of global peers.

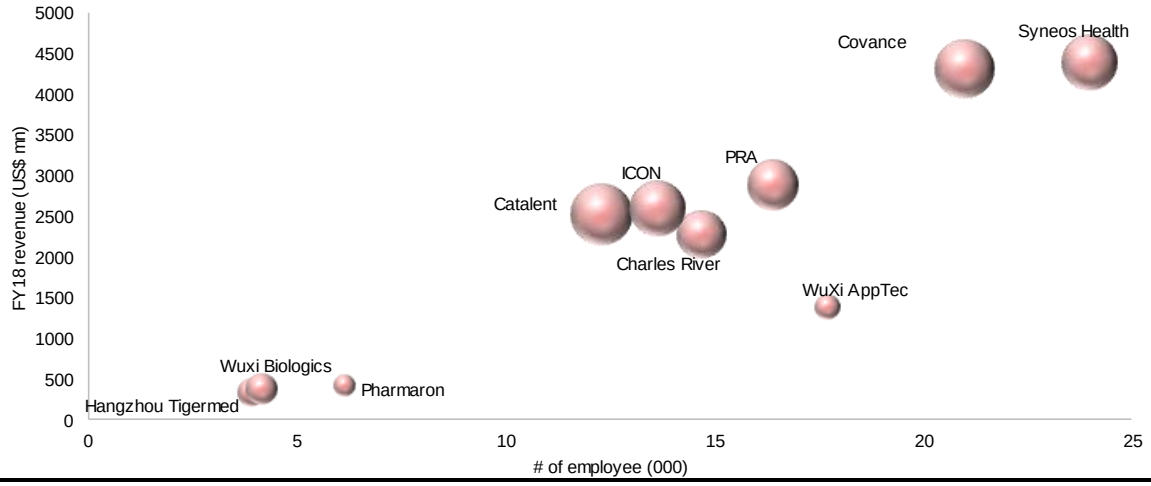
Figure 39: 2018 China CRO/CDMO revenue per capita



Source: Annual reports, CMBIS

Compared with global peers, China-based CRO companies still have small scale in terms of revenue size and employee size while China-based CRO companies also generate lower revenue per capital vs global peers.

Figure 40: Leading CRO/CDMOs' FY18 revenue versus # of employee



Source: Annual reports, CMBIS; Note: The size of the bubble represents average revenue per capita

Although China-based CRO/CDMO companies have lower revenue per capita compared with overseas peers, thanks to cost advantages, China-based players enjoy higher profit margins than overseas peers. Average ROIC of China peers was 13.5% in 2018 vs 7.7% for overseas peers, average gross margin of China peers was 41.1% in 2018 vs 31.5% of overseas peers. As of end-2018, most China-based players were in net cash position thanks to sufficient capital funding, while overseas peers had an average 100% net gearing ratio. Moreover, China-based CRO/CDMO companies were very active in expanding capacities with average Capex to sales ratio being 23.0% in 2018 vs 4.6% for overseas peers.

Figure 41: Comparison of key financial ratios between China and overseas peers (2018A)

Company	ROIC (%)	Adjusted ROE (%)	Adjusted net margin (%)	Gross profit margin (%)	EBITDA margin (%)	Net debt to equity ratio (%)	Operating cash flow to revenue (%)	Capex to revenue (%)
Overseas peers								
IQVIA	3.1	5.7	4.0	35.2	18.1	144.8	12.0	4.4
Lonza	6.5	12.3	13.7	37.8	24.7	57.2	19.6	9.5
ICON	20.4	26.2	12.9	30.0	16.9	-7.9	10.3	1.9
Catalent	4.4	18.0	6.6	30.6	18.7	212.7	15.2	7.2
Charles River	9.7	19.7	10.3	37.1	21.8	110.0	19.3	6.2
PRA Health Sciences	8.6	19.8	6.8	27.9	13.7	89.2	11.5	1.9
Syneos Health	1.2	4.8	3.2	21.8	9.9	93.5	6.9	1.2
Overseas peers average	**7.7**	**15.2**	**8.2**	**31.5**	**17.7**	**100.0**	**13.6**	**4.6**
China peers								
Wuxi AppTec	17.2	14.8	18.5	39.5	32.3	-42.5	-6.1	23.4
Wuxi Biologics	7.8	10.4	24.6	40.2	27.7	-51.1	-22.8	52.9
Tigermed	11.8	15.4	17.4	43.1	23.6	-1.6	18.3	4.0
Pharmaron	10.2	15.9	11.8	32.5	21.8	54.7	0.7	22.0
Asymchem Laboratories	17.3	18.5	23.1	46.5	30.6	-25.3	-6.5	29.6
Joinn Laboratories	16.0	17.7	26.2	53.0	34.6	-75.8	13.0	31.8
Frontage	23.7	41.8	18.6	40.8	21.9	-20.6	21.0	6.3
Porton Pharma	3.8	4.3	7.7	33.5	22.5	-23.7	-3.0	14.2
China peers average	**13.5**	**17.4**	**18.5**	**41.1**	**26.9**	**-23.2**	**1.8**	**23.0**

Source: Bloomberg, CMBIS

Risks from US-China trade war

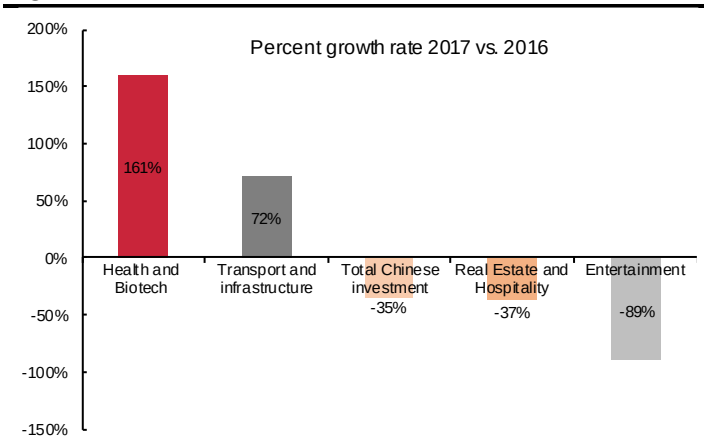
Dual sourcing vendors to mitigate risks

Currently, bioreactors and certain filtration equipment are on the commerce control list (CCL) of the US. Purchase of these need approval from Commerce Department. China-based CRO/CDMO companies usually have dual sourcing vendors from US, EU, Japan and China for key equipment and materials. In addition, China-based CRO/CDMO companies are building facilities in overseas countries such as US, EU, Southeast Asia, etc., in order to avoid the potential impact from trade war.

Potential restrictions on overseas acquisitions

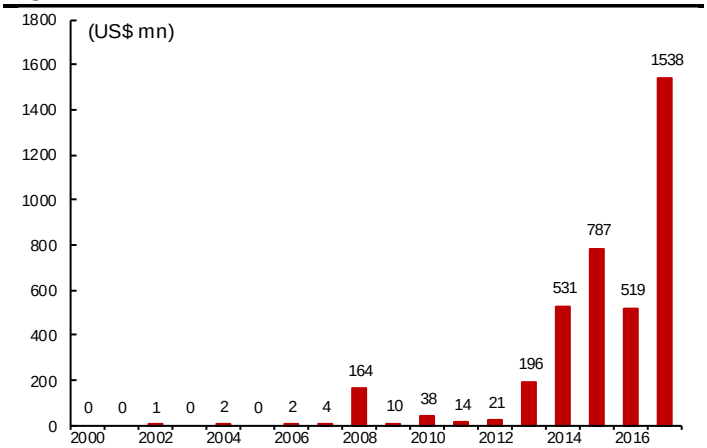
In past years, Chinese companies' investments in the US health and biotechnology industry has been rising fast. Due to the trade war between the US and China, Chinese CRO/CDMO companies' acquisitions in overseas countries may face restrictions or be delayed.

Figure 42: Growth of Chinese investments in the US



Source: Rhodium, CMBIS

Figure 43: Chinese investments in US biotech sector



Source: Rhodium, CMBIS

Tigermed (300347 CH)

Global excellence, China expertise

Initiate at BUY. Tigermed is the largest clinical CRO service provider in China, with an employee team of over 4,000 staff, providing full-services covering I-IV phase clinical trials. Our SOTP-based TP of HK$86.79 implies 49x FY21E P/E.

- **Strong demand in high-quality clinical CRO in China.** After the "722" event, strict regulatory environment in China has led to strong demand for high quality CRO services. Tigermed, as a leading full-service clinical CRO in China, has consolidated market share from small peers in China. Chinese government has initiated a series of reforms to encourage the development of innovative drugs. We notice a significant rise in the number of ongoing clinical trials in China. In 2018, the total phase I-IV clinical trials in China rose by 22% YoY, while number of phase I trials in China increased significantly by 38% YoY. We would like to highlight that more phase I trials ongoing indicates that more drug candidates will enter into late-phase of trials in coming years which will drive the growth in clinical CRO demand in China.
- **Relieve bottleneck in clinical trial resources.** Chinese authorities opened up the clinical trial institution recognition through filing system, which will significantly relieve the bottleneck of clinical trial resources in China and stimulate demand for clinical trial CRO.
- **Globalization opens up room for long-term growth.** Given China's large patient pool, international pharmaceutical companies are including China as one sites in MRCTs to speed up the enrollment of patients. Meanwhile, Chinese pharmaceutical companies are doing many MRCTs for the purpose of product registration in overseas countries. Tigermed provides clinical CRO services for Chinese innovative products going global and multinational enterprises' innovative products entering into Chinese market. As of end-2018, Tigermed operated 11 overseas offices in Asia Pacific, Europe and North America. We believe Tigermed will further strengthen its global presence through acquisitions. As the Company already has established good network in Asia Pacific regions, US market could be the next emphasis for Tigermed.
- We estimate Tigermed's net adjusted net profit will grow at 57.2%/40.1%/39.0% YoY *in* FY19E/20E/21E, respectively; and attributable net profit to increase 46.2%/38.5%/39.2% YoY in FY19E/20E/21E. Tigermed's financial assets for sale reached RMB1,360mn by 30 Jun, 2019, which will contribute meaningful investment gains over the long term.

Earnings Summary

(YE 31 Dec)	FY17A	FY18A	FY19E	FY20E	FY21E
Revenue (RMB mn)	1,687	2,301	2,967	3,904	5,101
Revenue YoY growth (%)	43.63	36.37	28.96	31.60	30.64
Net income (RMB mn)	301	472	690	956	1,330
EPS (RMB)	0.61	0.94	0.92	1.28	1.78
EPS YoY growth (%)	104.03	54.22	-2.44	38.47	39.18
P/E (x)	105.37	68.33	70.03	50.58	36.34
P/B (x)	12.73	12.09	11.70	10.27	8.78
Yield (%)	0.31	0.54	0.57	0.79	1.10
ROE (%)	11.86	16.70	14.71	18.41	21.99
Net gearing (%)	Net cash	Net cash	Net cash	Net cash	Net cash

Source: Company data, CMBIS estimates

BUY (Initiation)

Target Price	**HK$86.79**
Current Price	**HK$64.50**
Up/Downside	**+34.6%**

China Healthcare Sector

Jill WU, CFA
Tel: (852) 3900 0842
Email: jillwu@cmbi.com.hk

Amy GE
Tel: (852) 3761 8778
Email: amyge@cmbi.com.hk

Stock Data

Mkt Cap (HK$ mn)	48,346
Avg 3 mths t/o (HK$ mn)	418.99
52w High/Low (HK$)	70.70/ 24.43
Total Issued Shares (mn)	750

Source: Bloomberg

Shareholding Structure

Management	37.11%
Temasek	2.92%
Free float	59.97%

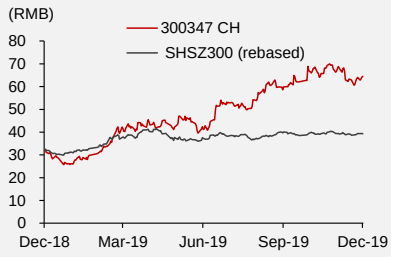
Source: SZSE

Share Performance

	Absolute	Relative
1-mth	-3.1%	-3.1%
3-mth	9.7%	10.5%
6-mth	51.7%	44.6%

Source: Bloomberg

12-mth Price Performance

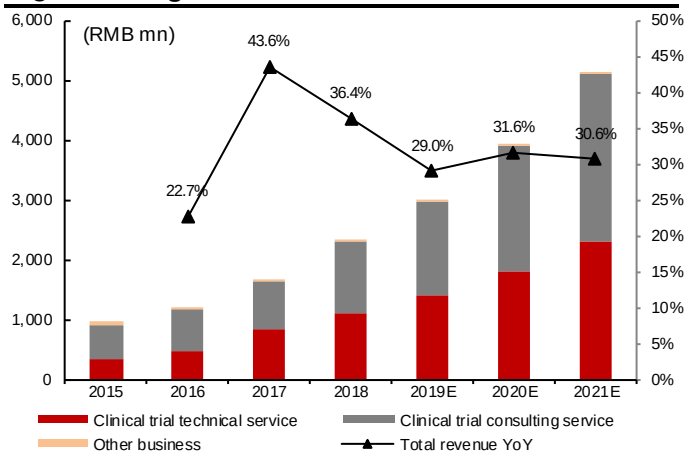


Source: Bloomberg

Auditor: BDO CHINA

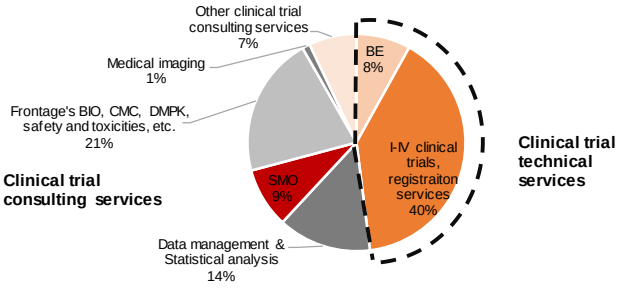
Focus Charts

Figure 44: Tigermed's revenue trend



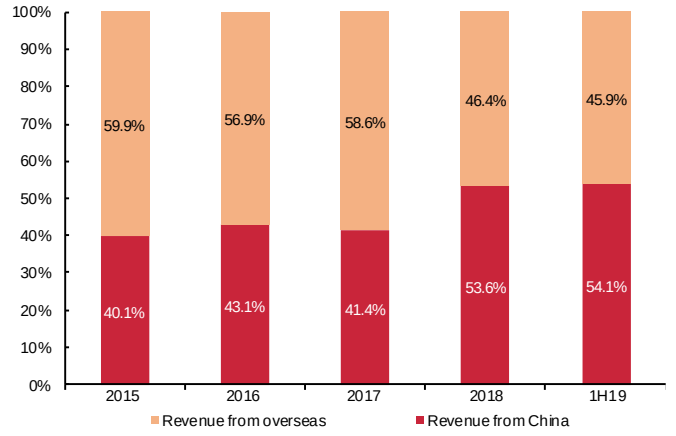
Source: Company data, CMBIS estimates

Figure 45: Tigermed's diversified services (2018)



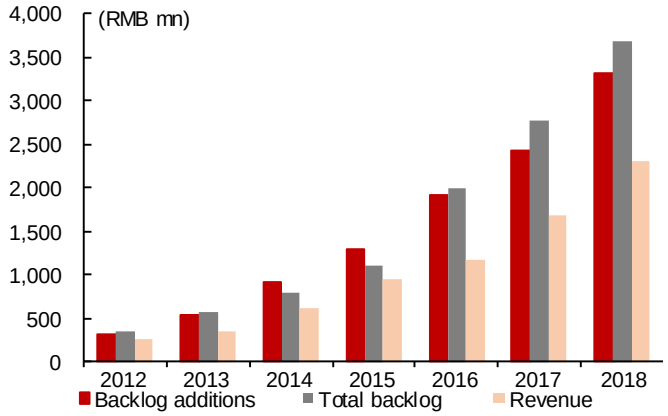
Source: Company data, CMBIS

Figure 46: Revenue breakdown by geography



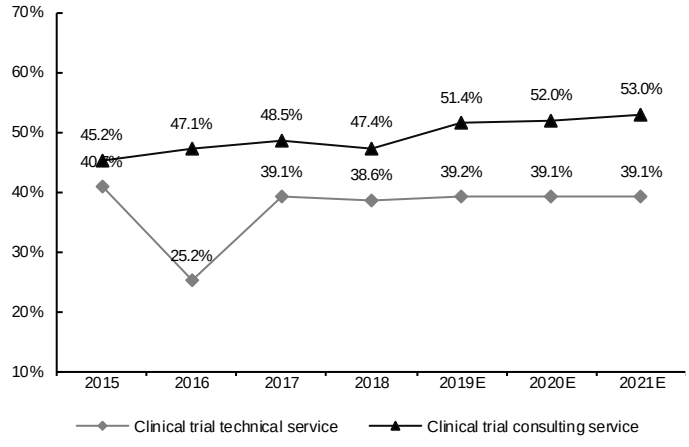
Source: Company data, CMBIS

Figure 47: Tigermeds' solid backlog growth



Source: Company data, CMBIS

Figure 48: GPM trend of business units



Source: Company data, CMBIS estimates

Figure 49: Major investment portfolio held by Tigermed

Invested companies	Type of business	Balance as of end-2018 (RMB mn)	% of sake owned
IntoCare	Medical device	17	9.07%
I-MAB	Biotech	15	13.79%
Fudan Haitai	Vaccine	15	4.29%
Blockade Medical	Medical device	13	4.29%
Lung Health	Medical device	10	0.73%
VILOF	Agriculture	10	0.89%
PharmaLegacy	CRO	10	6.55%
ZOEZEN	Medical device	10	1.34%
Med Circle	Marketing service	10	5.38%
Insight Lifetech	Medical device	9	7.15%

Source: Company data, CMBIS

Unicorn player in China's clinical CRO market

Strong presence in China's clinical CRO market

Headquartered in Hangzhou, Tigermed operates 33 subsidiaries with 95 offices across China and 11 others across the globe employing over 4,000 staff. Listed in A share in 2012, Tigermed is now the largest China-based clinical CRO service provider and is aggressively expanding its footprint in overseas markets.

As a leading CRO player in China, Tigermed provides one stop clinical trial services for innovative drugs, medical devices, biological products, etc. Tigermed's I-IV phase clinical trial services include clinical trial project management, medical writing, clinical trial monitoring, data management, medical imaging, cold chain transportation, central lab services, pharmacovigilance, site management organization (SMO), etc. The Company's pre-clinical CRO services contain bioanalysis, CMC, BE tests, PK/ PD. In addition, Tigermed also provides services such as clinical trial permission, medical translation, GMP consulting services, training & third-party audit, etc.

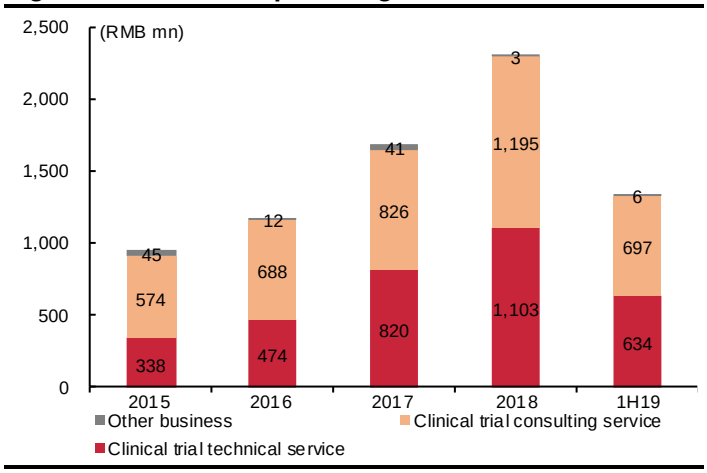
Tigermed has accumulated rich experiences in many therapeutic areas, including cancer, infectious diseases, cardiovascular and cerebra-vascular diseases, endocrine diseases, and autoimmune diseases.

Figure 50: Tigermed's diversified business scope

Source: Company data, CMBIS

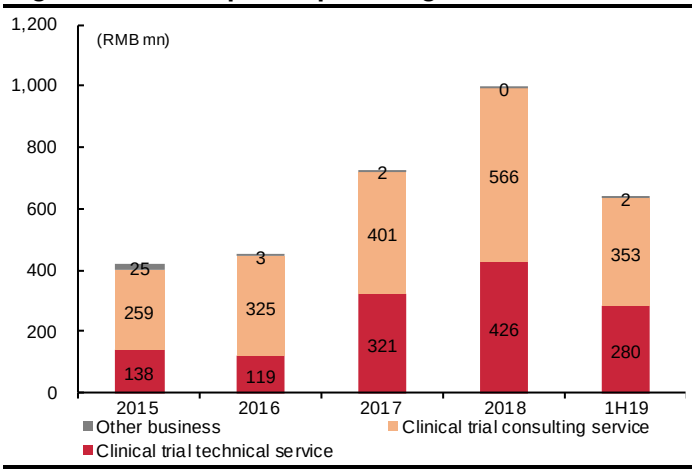
Tigermed's revenue mainly contains a) clinical trial technical services such as BE tests, I-IV clinical trials, registration services, and b) clinical trial consulting services such as data management, site management organization (SMO), bioanalytical services, CMC, DMPK, safety and toxicities, etc.

Figure 51: Revenue split of Tigermed



Source: Company data, CMBIS

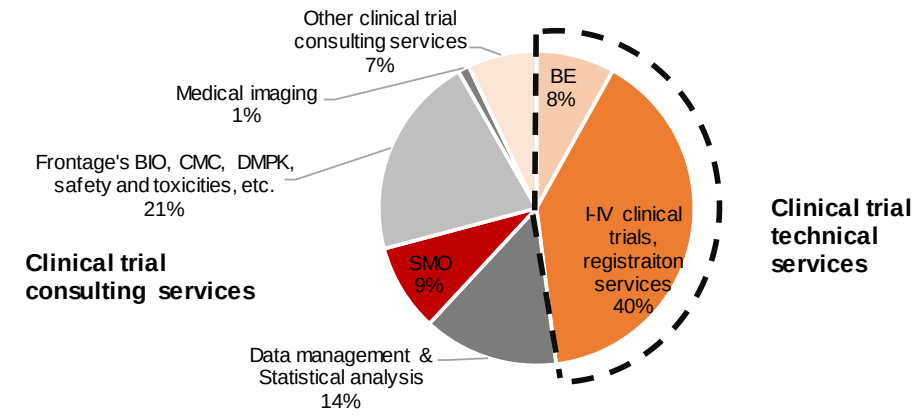
Figure 52: Gross profit split of Tigermed



Source: Company data, CMBIS

In 2018, I-IV clinical trials and registration services contributed 40% of Tigermed's total revenue, followed by Frontage's (1521 HK, a subsidiary of Tigermed) BIO, CMC, DMPK, safety and toxicity services contributing 21% of the total revenue, data management accounting for 14%, SMO for 9% and BE for 8%.

Figure 53: Tigermed's diversified services by revenue contribution (2018)



Source: Company data, CMBIS

Building up full-service capabilities through acquisitions

Tigermed has established a one stop clinical trial platform through acquisitions. Currently, Tigermed has over 30 subsidiaries, providing a variety of services covering clinical trial project management, data management, medical imaging, central lab services, pharmacovigilance, SMO, bioanalytical, CMC, BE tests, etc.

In 2014, throught the acquisition of Frontage (方达), a US based CRO company, Tigermed expanded businesses into pre-clinical CRO and BE services. In 2015, Tigermed acquired BMD (北医仁智), an Academic Research Organization (ARO), and enhanced its capabilities in clinical trial design. In 2017, Tigermed acquired Taizhou Jyton-Kannel Medical Tech (捷通泰瑞) and entered into the field of medical device clinical CRO. In 2019, Tigermed acquired Shanghai Mosim (谋思医药) to further strengthen its capabilities in clinical study design, clinical pharmacology data analysis, modeling & simulation, etc.

Tigermed has actively conducted acquisitions in overseas markets to lift its global presence. In 2015, Tigermed acquired DreamCIS, the largest Korea-based CRO company. In 2018, the Company acquired Opera Contract Research Organization SRL to set its footprint in Europe. In 2019, Tigermed acquired minority stake in EPS Holding, a leading CRO company in Japan, for purpose of enhancing its business presence in Asia Pacific area.

Figure 54: Tigermed expanded business scope through acquisitions

Source: Company data, CMBIS

Figure 55: Tigermed provides a wide range of services via subsidiaries

Subsidiaries/ JV/Associates	% stake	I-IV Clinical trial	BE	Bioanalytical	DMPK	CMC	Safety & Toxicology	Data management & Statistical analysis	SMO	Medical imaging	Clinical pharmacology	PVG	Clinical trial inspection	Training	Central lab	EDC
Tigermed (parentco)	NA	✔						✔		✔			✔			
Frontage Laboratories	51%		✔	✔	✔	✔	✔									
Jyton-Kannel (medical device CRO)	100%	✔														
BMD	100%	✔														
DreamCIS	88%	✔						✔								
Romania Opera	51%	✔														
Hangzhou Yibai	49%	✔														
MacroStat	100%							✔								
Jiaxing-Tigermed	100%							✔								
Tigermed-BDM	100%							✔								
Hangzhou Simo	100%								✔							
Fantastic Bioimaging	70%									✔						
Tigermed-IntelliPV	83%											✔				
Guangzhou Tigermed	100%														✔	
Teddy Clinical Research Laboratory	37%			✔				✔							✔	
Jiaxing Clinflash	50%															✔
TaLenT MedConsultant	100%												✔	✔		
MOSIM	33%	✔						✔			✔		✔			

Source: Company data, CMBIS

Strong market position in China

Tigermed has accumulated rich clinical trial experiences with completion of 1,340 clinical trials, 880 registration affairs, 810 Multi-Regional Clinical Trials (MRCT), 7,800 medical imaging, 1,770 data management and statistical analysis, 206 central laboratories services.

Tigermed is mainly focused on clinical CRO services and has a leading market position in China. The Company has 95 offices across China with an extensive network covering over 730 domestic clinical trial institutions.

Tigermed mainly competes with international CRO companies in China, such as IQVIA, ICON, PARAXEL, Covance, PPD. There're also a few domestic clinical CRO companies such as Guangzhou Boji Medical & Biotechnology (Boji, 300404 CH), Fountain Medical Development (FMD, 方恩医药), R&D PharmaStudies (诺思格), WuXi Clinical (康德弘翼, a subsidiary of WuXi AppTec), MedKey (上海津石, a subsidiary of WuXi AppTec), etc.

Compared with other domestic clinical CRO companies, Tigermed has the largest team with over 4,000 staff, followed by Medkey with 1,800 employees and FMD with 1,700 employees. In terms of size of revenue, Tigermed recorded RMB2.3bn income in 2018, much higher than that of MedKey (estimated to be c.RMB500mn), Boji (RMB172mn), WuXi Clinical (estimated to be c.RMB120mn).

Figure 56: Tigermed has largest scale among China-based clinical CROs

Domestic clinical CRO		# of employee	Revenue (2018)
Tigermed	泰格	4,000	RMB2,301mn
MedKey (WuXi AppTec)	津石医药	1,800	RMB500mn (estimated)
WuXi Clinical (WuXi AppTec)	康德弘翼	850	RMB120mn (estimated)
FMD	方恩医药	1,700	NA
ClinPlus	普蕊斯	1,468	RMB196mn
Boji	博济医药	620	RMB172mn
R&G PharmaStudies	诺思格	500	NA

Source: Company data, Official websites, CMBIS

As Tigermed has consistently enhancing its full-service capabilities by providing high-quality, one-stop shop clinical CRO services, we believe Tigermed will further strengthen its market position in China and further gain market share from both international CROs and small-scale domestic CROs.

Urgent demand for high-quality clinical CRO

Market consolidation after "722" event

On Jul 22, 2015, NMPA issued a notice on self-inspection and verification of drug clinical trial data for registration application (《关于开展药物临床试验数据自查核查工作的公告》). This is named as "722" event. As a result of this policy, a large number of applications were withdrawn or rejected. This policy introduced a more stringent regulatory environment, which resulted in drug sponsors placing more emphasis on ensuring the authenticity and accuracy of data.

Among all 1,622 drug candidates investigated by NMPA in the "722 event", around 74% out of the 1,622 drug candidates were finally withdrawn, around 40 drug candidates were rejected by the NMPA. Tigermed also has 35 BE projects involved in the "722 event", while

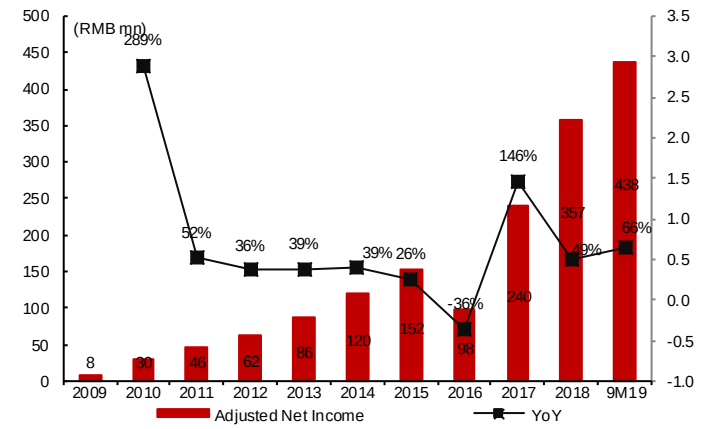
3 out of the 35 drug candidates were rejected by NMPA and a few projects were withdrawn by the applicants.

Since the "722" event, most CRO players suffered due to a) slow progress of existing projects, b) sharp decline in backlogs, and c) increase in operating expenses. As a result, Tigermed experienced the both net profit decline and squeezed profit margin in 2016.

Nevertheless, the strict regulatory environment has led to strong demand for high quality CRO services. We see that clinical CRO industry has consolidated after the "722 event" as many small clinical CRO companies phased out market during the period.

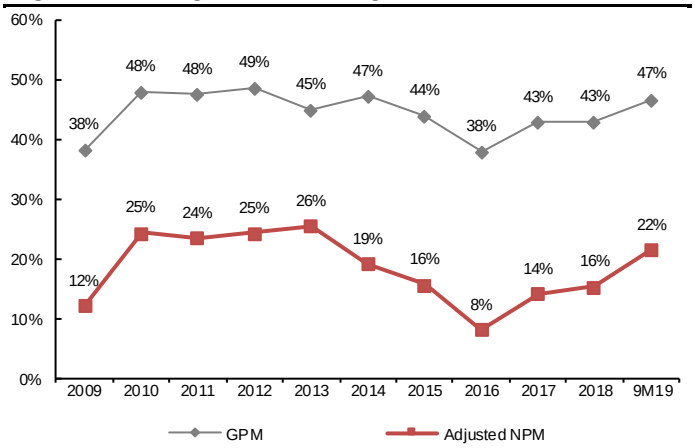
Tigermed has turned around its financial performance shortly after the "722" event. The Company's adjusted net margin has recovered from 8% in 2016 to 22% in 9M19 while its adjusted net profit experienced 146%/49%/66% YoY growth in 2017/2018/9M19.

Figure 57: Adjusted net profit of Tigermed



Source: Company data, CMBIS

Figure 58: Margin trend of Tigermed



Source: Company data, CMBIS

Increasing R&D spending in innovative drugs

Chinese authorities have issued several policies to encourage drug innovation, which has driven the increase in pharmaceutical companies' R&D spending and a further rise in R&D outsourcing to CRO companies.

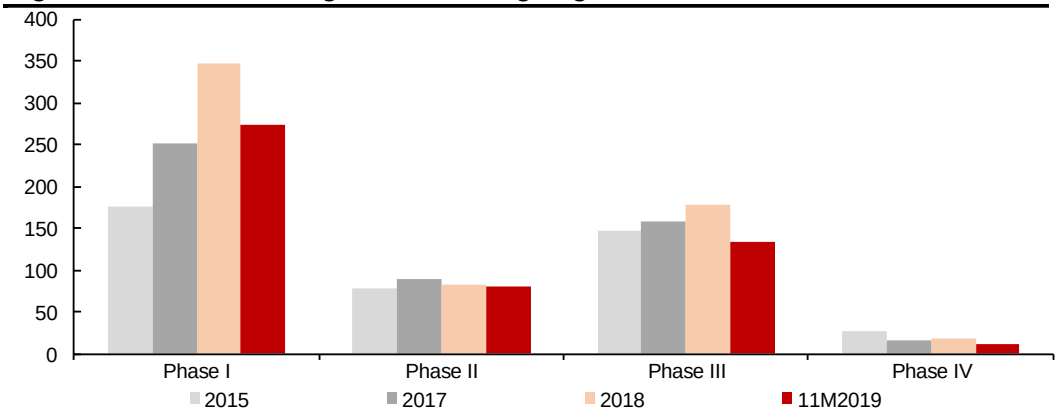
In Oct 2017, State Council released "Opinion on Strengthening Reform for the Drug and Medicine Device Review and Approval" (《关于深化审评审批制度改革鼓励药品医疗器械创新的意见》) which proposed a series of measures, including reforming of clinical trial regulation and speeding up of the review and approval process to promote innovative drugs.

In Jul 2018, the NPMA released "Revision of approval process for drug clinical trials" (《关于调整药物临床试验审评审批程序的公告》) which initiated the new 60-working day IND review system. Under its new process, the Chinese Center for Drug Evaluation (CDE) has 60 days to review a clinical trial application from the date of acceptance. If the CDE does not issue a rejection or seek additional information within that 60 days, then the application is considered approved and the clinical trial may proceed according to the submitted plan. This helps to significantly shortened the approval time for clinical trial applications from around 1 year to about 2 months.

Thanks to a series of regulatory reforms to encourage the development of innovative drug, we notice a significant rise in the number of ongoing clinical trials in China. In 2018, the total phase I-IV clinical trials in China rose by 22% YoY, while number of phase I trials in China increased significantly by 38% YoY. We would like to highlight that more phase I

trials ongoing indicates that more drug candidates will enter into late-phase of trials in coming years which will drive the growth in clinical CRO demand in China.

Figure 59: Fast increasing number of ongoing clinical trials in China



Source: Insight, CMBIS

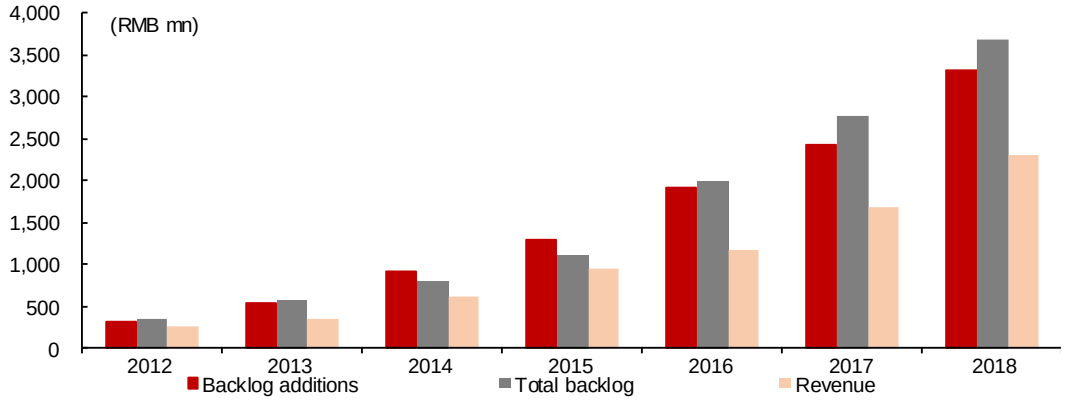
Thanks to its high-quality and one-stop services, Tigermed benefits from pharma companies' rising R&D investments in innovative drugs. By the end of 2018, Tigermed has participated in clinical trials of 166 domestic innovative drugs (including 28 new biological drugs and 138 new chemical drugs), including therapeutic areas such as infectious diseases (hepatitis, AIDS), oncology, endocrine diseases, cardiovascular diseases, etc. Of the 166 innovative drugs, 9 drugs have completed clinical trials and 6 drugs are already successfully launched in the market. In 2018, Tigermed helped Ascletis (1672 HK) to complete Phase III and part of Phase II trials for GANOVO, an innovative drug for treatment of hepatitis C. Tigermed also provided one-stop clinical trial services for the first domestic biosimilar, rituximab of Henlius (2696 HK).

Tigermed also took the leading position in orphan drug development. Among the 63 orphan drugs that received priority review status from NMPA, 5 of these orphan drugs are filed with the help of Tigermed.

Strong service backlog to drive future growth

Tigermed's total backlog has grown at a 49% CAGR during 2015 and 2018 to RMB3.68bn as of end-2018. Meanwhile, Tigermed's revenue has increased at a 34% CAGR between 2015 and 2018 and reached RMB2.30bn in 2018. We believe the strong backlog growth will drive the growth in Tigermed's total revenue.

Figure 60: Tigermed has strong backlog growth

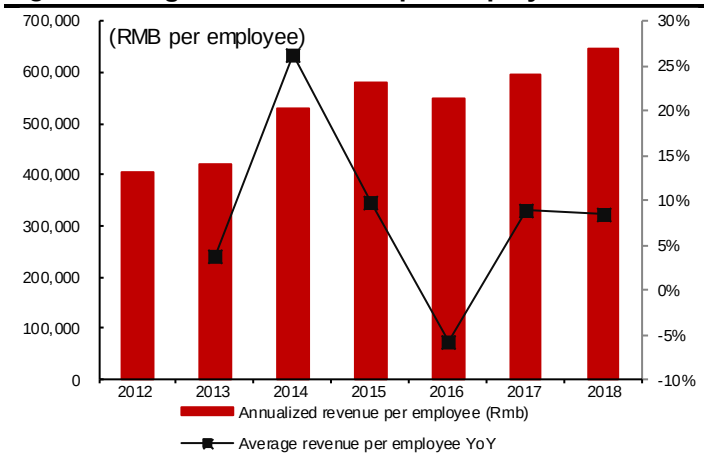


Source: Company data, CMBIS

Plently room for improvement in workforce productivity

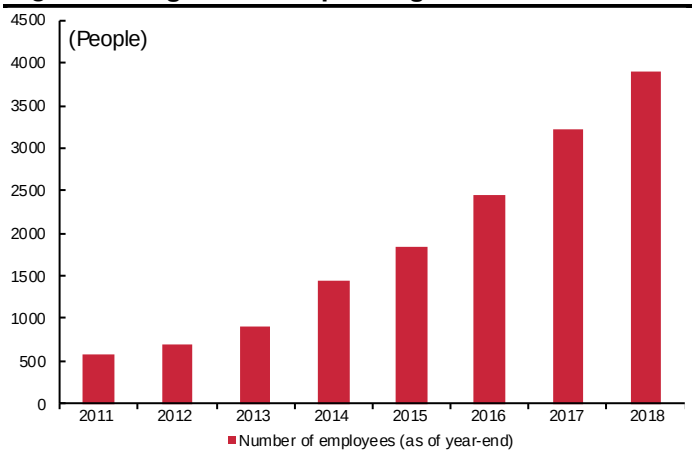
Tigermed's workforce has been expanding fast from 566 employees in end-2011 to 3,898 employees in end-2018. Meanwhile, Tigermed's workforce productivity has been consistently increasing every year, except for the year of 2016. Tigermed's average revenue generation per employee has risen from 0.40mn in 2012 to 0.65mn in 2018.

Figure 61: Tigermed's revenue per employee



Source: Company data, CMBIS

Figure 62: Tigermed's expanding workforce



Source: Company data, CMBIS

Nevertheless, compared with international CRO players, Tigermed's workforce productivity still has large room for improvement. For the overseas leading CRO players, Catalent recorded the highest output per capita of US$218k and the average output per capita of selected international CRO players was US$193k in 2018.

With established full-service capabilities, increasing income from MRCTs and expanding business presence in overseas markets, we believe Tigermed's workforce productivity will gradually catch up with the level of international CRO companies.

Relieve bottleneck in clinical trial resources

Policies opening up for clinical trial insitutions

In Aug 2019, the State Council released the new version of "Drug Administration Law" which will be effective from Dec 2019. According to the law, drug clinical trial institutions will be recognized through filing system instead of approvals. In Nov 2019, NMPA and National Health Commission (NHC) announced detailed policy about opening up of drug clinical trial institutions. According to the document, Class 2 or Class 3 hospitals will be qualified to conduct clinical trials after submission of applications while government approvals are no longer needed. The policy will be effective from 1 Dec, 2019.

With expanding capacity of clinical trial institutions, the bottleneck of clinical trial resources in China will be lifted. We believe Tigermed, as the largest full-service clinical CRO in China, will benefit from the fast-growing clinical trial demand in Chinese market.

As of May 2019, a total of 742 drug clinical trial institutions have passed the NMPA's Good Clinical Practice (GCP) recognition. In Oct 2019, the NMPA announced that additional 154 drug clinical trial institutions have received GCP recognition. In addition, as of Nov 2019, there're 814 NMPA recognized medical device clinical trial institutions.

Nevertheless, there are still challenges to initiate studies as quickly as in other countries, including with tasks such as completing ethic review by the institutional review boards and obtaining approval from the bureau controlling the collection of human genetic information.

Building self-owned clinical trial institutions

Tigermed has made great efforts to build up self-owned clinical trial institutions to support the surging demand in clinical trials in China. In 2017, Tigermed acquired 49.47% stake in Hangzhou Yibai (杭州颐柏). Hangzhou Yibai aims to invest in more than 5 hospitals which mainly focus on providing clinical trial services. Hangzhou Yibai has built Kangbai Hospital (康柏医院) which commenced operation in Aug 2018. Kangbai Hospital has 99 beds for BE or Phase I studies. In Oct 2019, Kangbai Hospital received the GCP recognition of clinical trial institution from NMPA, allowing the hospital to conduct Phase I, PK, BE studies and Phase II-IV trials in Neurology areas. From 2017, Tigermed started to co-construction of Phase II-IV clinical trial institutions with hospitals. As of end-2018, more than 200 hospitals have intention to cooperate with Tigermed while above 80 hospitals agree to sign agreements with Tigermed. Tigermed targets to build more than 200 Phase II-IV clinical trial institutions across China, covering above 15 therapeutic areas.

Moreover, Tigermed actively co-construction BE centers with hospitals. Since 2017, Tigermed has cooperated with 18 hospitals to build BE centers with approximately 1,000 beds. This alleviated bottlenecks in BE center resources for the Company.

Globalization opens up room for growth

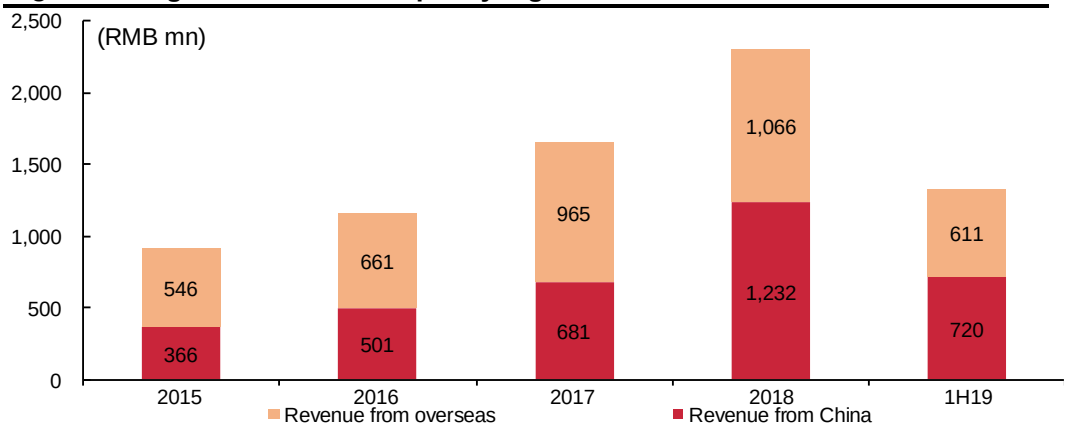
Expanding overseas service network

Due to the global innovation efforts and the reform of China's pharmaceutical sector, investment in pharmaceutical R&D in China has grown rapidly. Given China's large patient pool, international pharmaceutical companies are including China as one sites in MRCTs to speed up the enrollment of patients. Meanwhile, Chinese pharmaceutical companies are doing many MRCTs for the purpose of product registration in overseas countries.

Hence, for CRO companies, best development opportunities emerge as Chinese innovative products go global and multinational enterprises' innovative products move faster into the Chinese market.

As a leading China-based clinical CRO, Tigermed has 54% of revenue from China and 46% of revenue from overseas markets in 1H19. In recent two years, income from China has risen fast thanks to business recovery from the "722 event" and the fast-increasing R&D investment in China. We think income from overseas markets will speed up thanks to the Company's efforts in global expansion.

Figure 63: Tigermed's revenue split by region



Source: Company data, CMBIS

Currently, the Company's overseas income mainly come from clinical consulting services such as data management, bioanalytical services, etc. Tigermed aims to provide more clinical trial technical services in overseas markets. Tigermed has participated in many MRCT projects in mainland China, Taiwan, South Korea, Singapore, etc.

In 2018, Tigermed acquired Romania based CRO company, Opera CRO SRL, which helped to enhance the Company's business capabilities in Europe. As of end-2018, Tigermed operates 11 overseas offices in Asia Pacific, Europe and North America.

We believe Tigermed will strengthen its global presence through acquisitions. As the Company already has established good network in Asia Pacific regions, US market could be the next emphasis for Tigermed. Although the Company is building up its own team in the US, we think acquisitions will be the most efficient way to strengthen the Company's service capabilities in the US.

Figure 64: Tigermed expands business in overseas markets

Source: Company data, CMBIS

Meeting the surging MRCT demand

In Jun 2017, China became the eighth regulatory member of the International Council for Harmonization (ICH). Since the joining of ICH, NMPA has implemented changes to its regulations to align its standards to other global standards, including reforming its drug review system and implementing ICH guidelines. The Chinese authorities have actively promoted the faster entry of international drugs into the Chinese market, as well as support the innovation of domestic pharmaceutical industry.

In Jul 2018, the NMPA issued the "Technical Guiding Principles for the Acceptance of the Overseas Clinical Trial Data of Drugs" (《接受药品境外临床试验数据的技术指导原则》) in order to further expedite drugs registration in China. The qualified overseas clinical trial data can be directly used for drug registration in China, which makes the simultaneous R&D work of new drugs feasible inside and outside China. The policy also allows qualified overseas bioequivalence (BE) data of generics to be used for drug registration in China.

Given more pharmaceutical companies now include China as one of the sites of MRCTs of innovative drugs, there has been increasing demand in MRCTs in China, leading to good opportunities for high-quality clinical CROs such as Tigermed to gain MRCT orders. Furthermore, Chinese pharmaceutical companies are actively conducting MRCTs for their innovative drugs in order to obtain overseas approvals.

Tigermed is well positioned to meet the surging demand in MRCTs as the Company has strong market presence in China and expanding global service network. In Jul 2019, Tigermed helped enrollment of the first patient in Singapore for the Phase II/III MRCT of AZD3759 (an EGFR TKI developed by China-based Jiangsu Chentai Pharma). This is a new milestone for Tigermed as this is Tigermed's first MRCT project in Singapore. To date, Tigermed has experiences in conducting MRCTs in mainland China, Taiwan, South Korea, Australia and Singapore.

Figure 65: Several MRCTs supported by Tigermed

Trial registration No.	Drug candidates	Applicants	Phase	Indication		Trial status	Date of trial posted
CTR20190397	Selexipag	Actelion Pharmaceuticals	II	PAH in children	儿童肺动脉高压	Ongoing	2019-07-02
CTR20182354	Aprocitentan	Idorsia Pharmaceuticals	III	Refractory hypertension	难治性高血压	Ongoing	2019-04-16
CTR20182356	Aprocitentan	Idorsia Pharmaceuticals	III	Refractory hypertension	难治性高血压	Ongoing	2019-04-15
CTR20180367	Macitentan	Actelion Pharmaceuticals	III	Fontan circulation	用于 Fontan 术后成年和青少年受试者的治疗	Ongoing	2018-10-25
CTR20181245	Bemarituzumab/FPA144	Five Prime Therapeutics	III	Gastric cancer, Esophagus cancer	晚期胃癌和食管癌	Ongoing	2018-09-04
CTR20180881	Ataluren	PTC Therapeutics	III	Duchenne Muscular Dystrophy	无义突变型杜氏肌营养不良症	Ongoing	2018-08-03
CTR20132047	Macitentan	Actelion Pharmaceuticals	III	PAH	肺动脉高压	Ongoing	2016-12-07
CTR20132227	Selexipag	Actelion Pharmaceuticals	III	Pulmonary arterial hypertension (PAH)	肺动脉高压	Ongoing	2016-12-07
CTR20140739	Macitentan	Actelion Pharmaceuticals	II	Chronic thromboembolic pulmonary hypertension (CTEPH)	慢性血栓栓塞性肺动脉高压(CTEPH)	Ongoing	2016-01-15
CTR20140468	Macitentan	Actelion Pharmaceuticals	III	Eisenmenger Syndrome	艾森曼格综合征	Completed	2016-01-04
CTR20132091	Macitentan	Actelion Pharmaceuticals	III	Eisenmenger Syndrome	艾森曼格综合症	Completed	2015-07-22
CTR20140738	Macitentan	Actelion Pharmaceuticals	II	CTEPH	慢性血栓栓塞性肺动脉高压	Completed	2015-07-17
CTR20140120	Panobinostat	Novartis	III	Multiple Myeloma	复发的多发性骨髓瘤	Completed	2015-02-13

Source: Insight, CMBIS

Establishing strategic cooperation with clients

In Jul 2019, Tigermed and AstraZeneca (China) signed a strategic cooperation agreement, announcing that the two sides will carry out omni-directional strategic cooperation in the process of clinical research and development of innovative pharmaceutical products. AstraZeneca (China) and Tigermed will cooperate intensely in clinical trials, registration, data management, statistical analysis, biological analysis / central laboratory, coordination of clinical trial research center, medical writing / medical supervision service, medical imaging, drug vigilance, third-party inspection and training, clinical cold chain logistics and more aspects.

We think this is a milestone which indicates that Tigermed has the capability to provide high-quality and one-stop services to international pharmaceutical companies.

Tigermed has also entered into strategic cooperation with several pharmaceutical and medical device companies, such as B Braun, Haihe Biopharma, Zhejiang CONBA Pharma, etc.

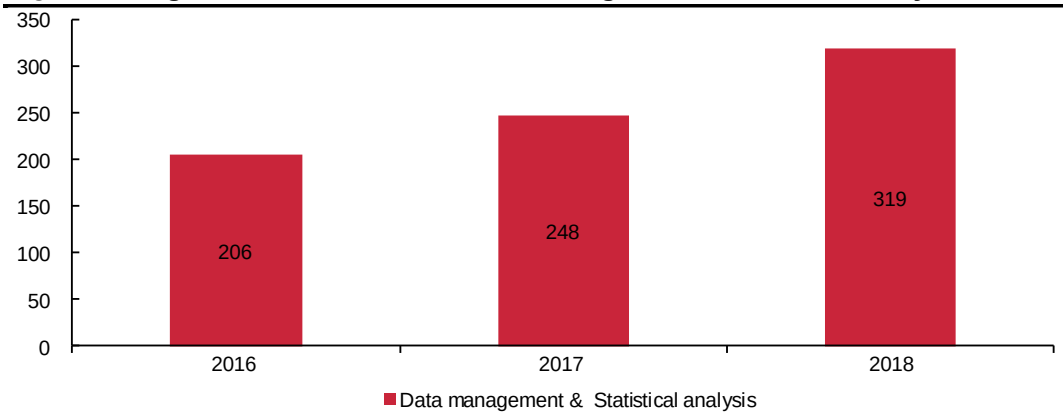
High-margin data management services performed well

Consolidating data management services into MacroStat platform

Tigermed mainly provides data management services through three subsidiaries including MacroStat (美斯达), Jiaxing Tigermed (嘉兴泰格) and Taiwan Tigermed (台湾泰格). Since 2016, Tigermed consolidated data management services to MacroStat platform in order to enhance operating efficiencies.

As of 2018, Tigermed had professional data management staff team based in Shanghai, Jiaxing, Wuhan, Taiwan, New Jersey, etc. In 2018, Tigermed conducted over 650 data management projects and generated RMB319mn revenue, up 28.5% YoY.

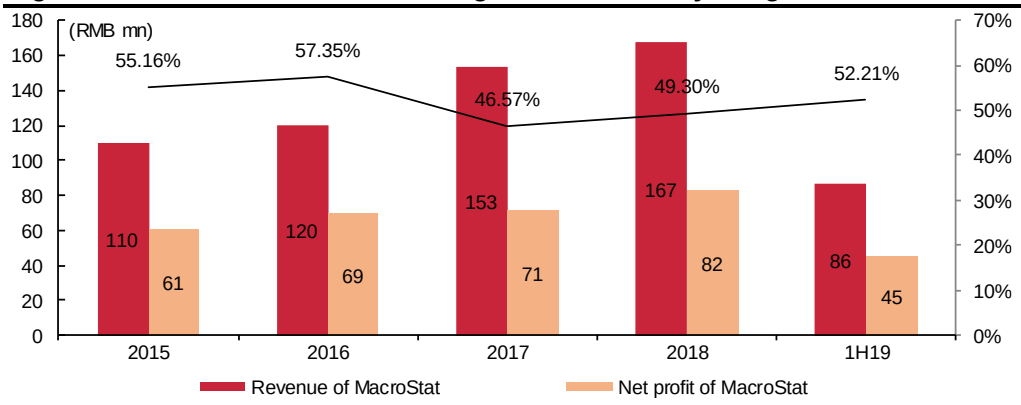
Figure 66: Tigermed's revenue from data management & statistical analysis services



Source: Company data, CMBIS

MacroStat has maintained a high net margin of around 50% since 2015. Majority of Tigermed's data management orders are from overseas. Hence, Tigermeds' average revenue outpout per employee from data management business is as high as c. RMB1mn. We estimate that data management & statistical analysis contributed around RMB165mn revenue and RMB82mn net profit in 1H19, accounting for c.29% of Tigermed's total net profit.

Figure 67: MacroStat delivered solid growth and steady margins



Source: Company data, CMBIS

Frontage to keep strong growth momentum

Frontage as a unique player in preclinical CRO services

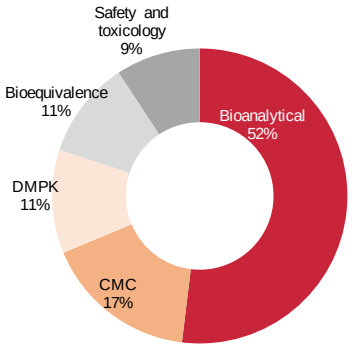
Frontage Holdings (1521 HK) was founded by Dr. Song Li in the US in 2004. In 2014, Tigermed acquired 67% stake in Frontage with a cash consideration of US$50mn. Frontage went public in HK in May 2019. As of 30 Jun 2019, Tigermed holds 51.45% stake in Frontage Holdings.

Frontage provides integrated, scientifically-driven research, analytical and development services throughout the drug discovery and development process. It operates in the US and China, the two largest pharmaceutical markets in the world. Leveraging a "Two Countries, One System" approach, the Company offers customers in both countries standardized services with high quality.

Frontage's bioanalytical services are offered throughout the drug discovery and development process both in the US and in China. Frontage also provides DMPK, safety and toxicology and CMC services in the US and bioequivalence services in China.

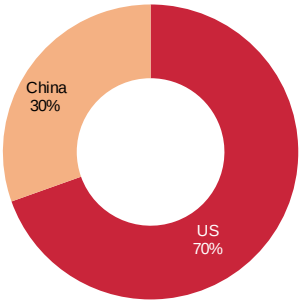
Frontage generated majority proportion of revenue from operation in the US, accounting for 70% of the total revenue in 1H19 while China contributed 30% of total revenue. Bioanalytical is the major focus of Frontage which contributed 52% of Frontage's total revenue in 1H19, followed by CMC for 17%, DMPK 11%, etc.

Figure 68: Frontage's revenue split by service category (1H19)



Source: Frontage, CMBIS

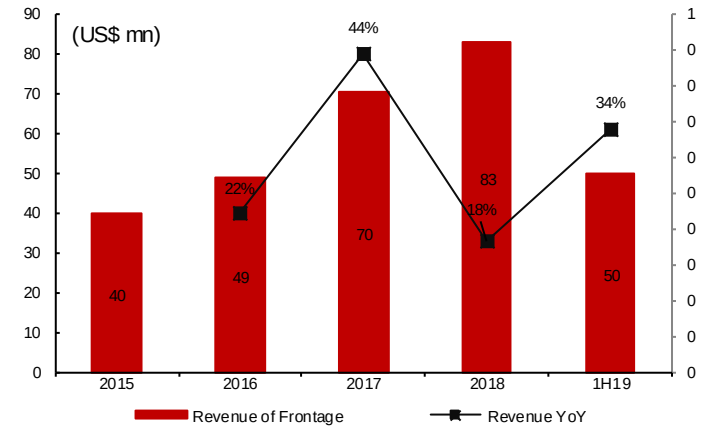
Figure 69: Frontage's revenue split by geography (1H19)



Source: Frontage, CMBIS

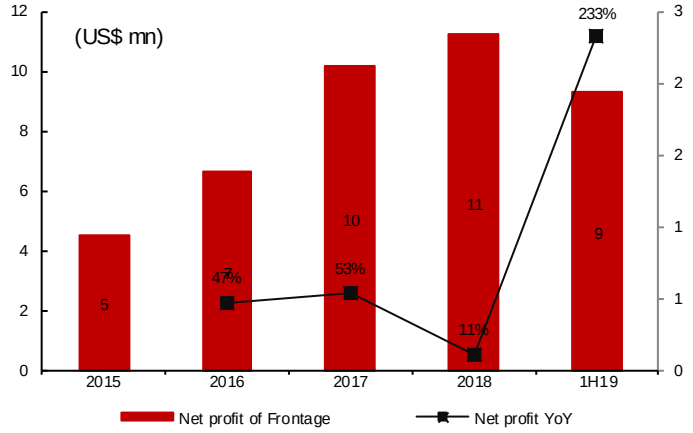
In 1H19, Frontage recorded US$49.7mn revenue (+34% YoY), US$9.3mn net profit (+233% YoY) while adjusted net profit reached US$12.1mn, up 139% YoY. We estimate that Frontage contributed approximately RMB30mn attributable net profit to Tigermed in 1H19, accounting for c.10% of Tigermed's core net profit in 1H19.

Figure 70: Frontage's revenue growth



Source: Frontage, CMBIS

Figure 71: Frontage's net profit growth

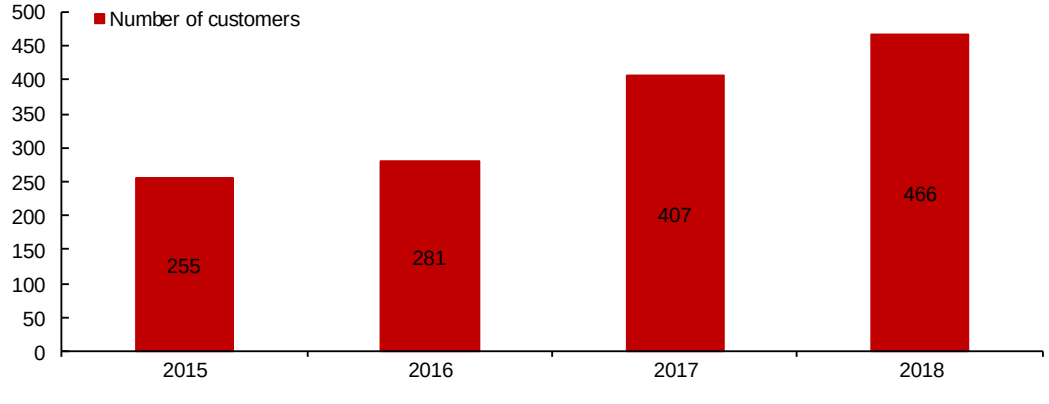


Source: Frontage, CMBIS

Frontage's contracted future revenue (represents future service revenues from work not yet completed or performed under all signed contracts or customer's purchase orders in effect) was approximately US$87.0mn as at 30 Jun 2019, up 18% from US$73.7mn as at 31 Dec 2018. This implies that strong backlogs will further drive the revenue growth in Frontage.

Frontage has a diversified customer base and its total number of its customers expanded from 255 in 2015 to 466 in 2018. Most of Frontage's customers are biotechnology and pharmaceutical companies, including leading pharmaceutical companies, such as Janssen, BeiGene, Blueprint, Fresenius Kabi, Celgene, Rhodes and Duke in the US and the Yangzijiang Pharma, Hisun Pharma, Luye Pharma, Simcere Pharma and Chia Tai Tianqing in China. Stable and long-term relationships with customers brings sustained growth for Frontage.

Figure 72: Frontage's customer base expands fast



Source: Frontage, CMBIS

Diversification of service scope

Frontage also actively expand business scope through acquisitions. In Apr 2018, Frontage acquired 100% stake in Concord, a US-based CRO company, at a consideration of US$5mn. We believe this acquisition benefits Frontage through 1) increasing capacity for DMPK and bioanalytical services, 2) expanding service scope into safety and toxicology and 3) enhancing capability in agrochemical related services. In 1H19, Frontage's DMPK and safety & toxicology revenue rallied significantly by 65% YoY and 114% YoY, respectively, which was mainly due to the consolidation of Concord.

In Nov 2019, Frontage acquired 100% stake in RMI Laboratories, a US-based CRO focusing on quantitative and qualitative drug metabolism services, with a cash consideration up to US$5.55mn. RMI offers a variety of services, including a full range of metabolite profiling and identification ("ID") services, such as early discovery soft spot analysis, late discovery cross species comparison, and pre-clinical animal radiolabeled mass balance studies.

Frontage also aims to further expand its business in China into CMC, DMPK, safety & toxicology areas. In Oct 2019, Frontage acquired 25.96% stake in Frontage Laboratories (Suzhou) at a cash consideration of RMB14.4mn. Upon the completion of the acquisition, Frontage will increase its stake in Frontage Suzhou to 75%. Frontage Suzhou mainly provides CMC services. Through this acquisition, Frontage expands CMC services in China. We think Frontage may also expand its services in China to DMPK, safety & toxicology through acquisitions of Chinese CRO companies.

We believe Frontage will keep its strong growth momentum thanks to a) capacity increase in US and China, b) diversification of service types including providing CMC, DMPK, safety and toxicology services in China and expansion into biological drug services, c) business expansion via acquisitions.

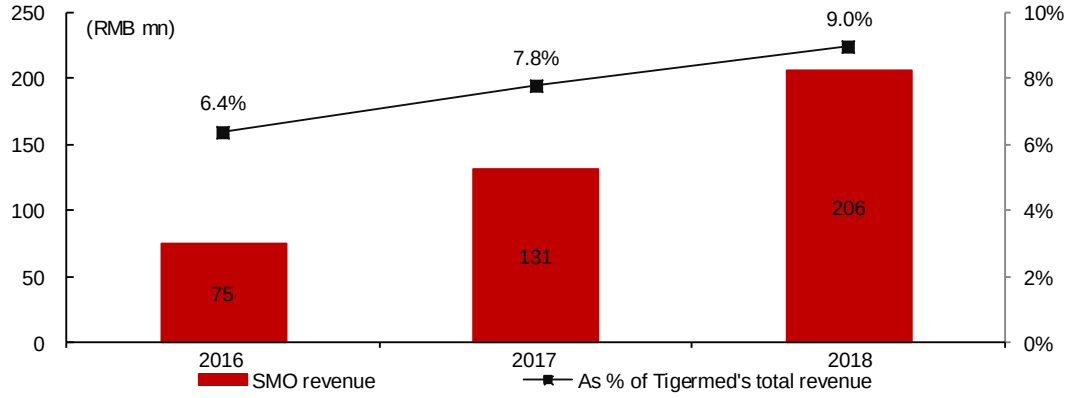
SMO business expands fast

Site management organization (SMO) is an organization that provides services to the investigator at clinical site. Some examples of SMO services include: documentation preparation, data collection and input, subject recruitment and follow up, reporting of serious adverse events, etc. Demand in SMO services has rallied fast in China because of increasing number of ongoing clinical trials and limited human resources in clinical trial institutions.

Tigermed provides SMO services through its wholly-owned subsidiary, Hangzhou Simo (杭州思默). Founded in 2011, Hangzhou Simo has become the largest SMO service provider in China. As of end-2018, Hangzhou Simo had over 1,000 employees with local Clinical Research Coordinators (CRCs) in 775 institutions in 95 cities across China. In 2018, Hangzhou Simo had over 700 projects ongoing, including 110 global projects.

In 2018, Tigermed recorded RMB206mn revenue from SMO business in 2018, up 57% YoY, contributing 9.0% of the Company's total revenue.

Figure 73: Tigermed's SMO revenue grows fast

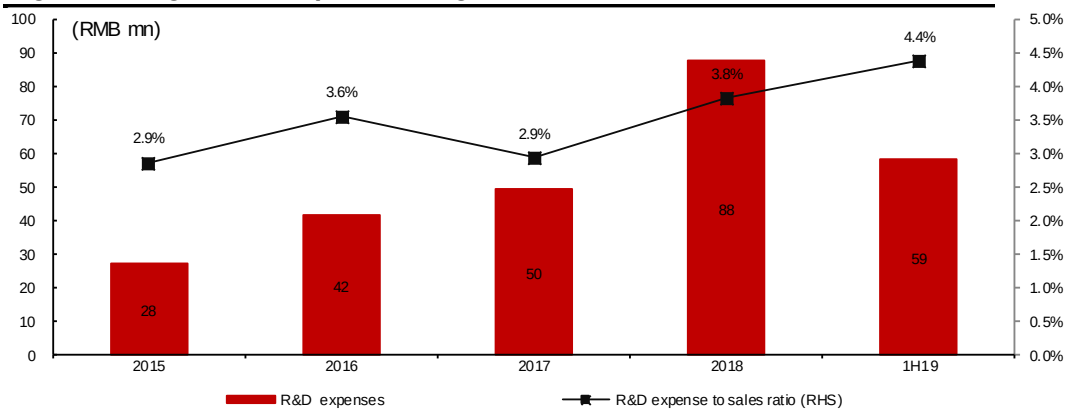


Source: Company data, CMBIS

Consistent efforts on technology upgrade

Tigermed has consistently invested in R&D for technology upgrade, such as AI technology for clinical trials, EDC IT system for clinical trial data management, cloud storage system for clinical trial data management, etc.

Figure 74: Tigermed keeps investing in R&D



Source: Company data, CMBIS

EDC system to enhance data management efficiency

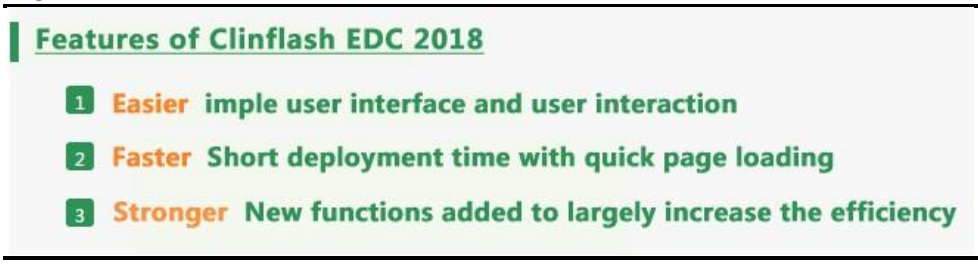
An electronic data capture (EDC) system is a computerized system designed for the collection of clinical data in electronic format for use mainly in human clinical trials. EDC replaces the traditional paper-based data collection methodology to streamline data collection and expedite the time to market for drugs and medical devices. EDC can increase data accuracy and decrease the time to collect data for studies of drugs and medical devices.

Clinflash Healthcare Technology is a subsidiary of Tigermed. Clinflash is a leading provider of cloud-based solution and relevant professional services in field of clinical development in China. Clinflash Electronic Data Capture (EDC) system has been applied in more than 350 clinical trials since the initial launch in 2014.

In Nov 2018, Clinflash Healthcare Technology released the new version of EDC system. The new system has three key improvements: 1) new data processing technology; 2) new user interface and interaction; 3) new server and hardware.

After the “722 event”, China authorities now have higher requirements for the quality of clinical trial data reliability. Clinflash EDC system can largely increase the efficiency for data input, view and audit, saving time for clinical trial procedures. Especially, the system is well designed to adapt to the application scenarios in China and meet the needs of clinical trials in China.

Figure 75: Features of Clinflash EDC 2018



Source: Company data, CMBIS

Figure 76: Interface of Clinflash EDC 2018

Source: Company data, CMBIS

Enhancing clinical trial design capability

In Mar 2019, Tigermed acquired 23% stake in Mosim and after the acquisition, Tigermed owns a total of 33% stake in Mosim. Mosim is a leading clinical pharmacology CRO in China and it has expanded services to biostatistics, data management, clinical operation and medical writing, etc.

Mosim has core technologies in early clinical trial design based on computer modeling and simulation which could help to save time and development costs for drug development. When the demand for innovative drug development is surging in China, there’s lack of CRO companies with strong clinical trial design capabilities. The acquisition of Mosim could enhance Tigermed’s capabilities in early clinical trial design and expand the Company’s service scope for innovative drugs.

Clinical trial modeling and simulation (M&S) allows drug developers to test different trial designs in silico before exposing patients to an experimental drug. The tangible business value for M&S results from: 1) optimizing trial design (the number of patients, length,

desired outcomes, protocols) to provide needed information on dosing and drug interactions, etc., 2) eliminating the need for clinical trials in selected situations and populations (e.g., pediatrics or rare/orphan diseases, oncology, special populations), 3) predicting what will happen under certain conditions, e.g., dosing, interactions with other drugs (DDI), in different patient populations.

M&S can deliver significant business, scientific, and clinical value to biopharma companies that are able to fully integrate it in their drug development and regulatory strategy to reduce costs, accelerate time to filing, and improve the likelihood of regulatory approval. The use of M&S is becoming more pervasive throughout the development process; for example, 90% of the 2015 new drugs and biologics approved by the FDA leveraged M&S for dose selection, safety determinations, trial design, bridging studies, and other drug label information.

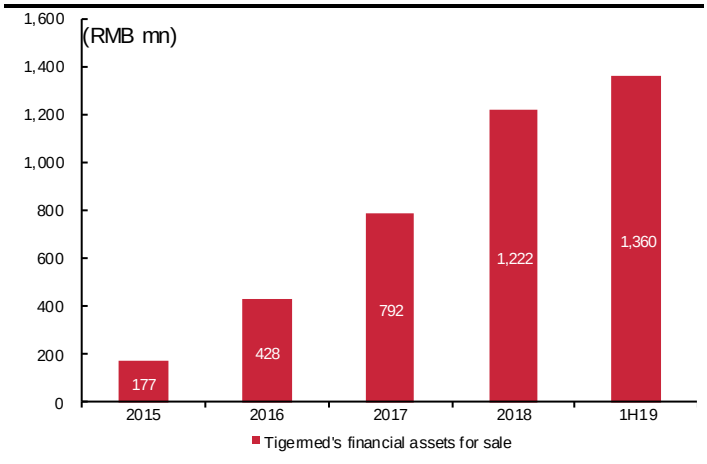
Meaningful income from investments

Significant positive contribution from investment gains

Tigermed has invested in many start-up companies. Most of Tigermed's investments are made at the early stage of these start-up companies and these investments are recognized as Tigermed's financial assets for sale.

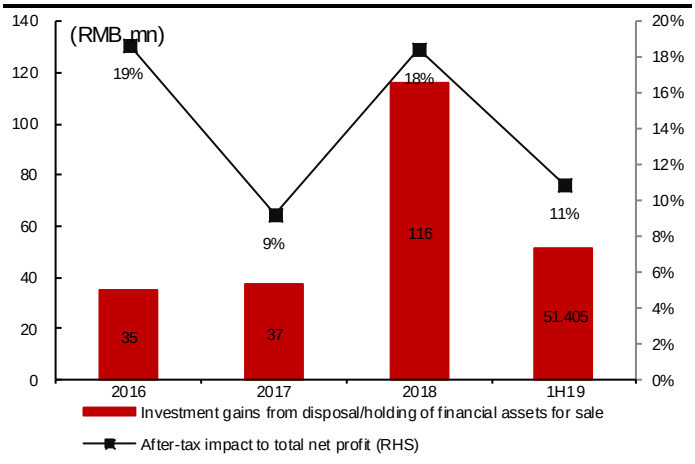
Tigermed's financial assets for sale increased fast from RMB177mn by end-2015 to RMB1,360mn by 30 Jun, 2019. Investment gains from financial assets for sale (after-tax) contributed around 9-19% of Tigermed's total net profit during 2016-1H19.

Figure 77: Tigermed's financial assets for sale increased fast



Source: Company data, CMBIS

Figure 78: Tigermed's investment gains from financial assets for sale



Source: Company data, CMBIS

Tigermed usually invests in minority stakes in start-up companies. The portfolio is very diversified. As of end-2018, the Company holds a variety of investment portfolio covering business areas such as biotech, medical devices, CROs, vaccines, etc. Tigermed usually realizes gains before potential IPOs of these start-up companies.

Through financial investments, Tigermed supports the development of these start-up companies and these companies can also potentially become Tigermed's customers.

Figure 79: Major investment portfolio held by Tigermed

Invested companies		Type of business	Balance as of end-2018 (RMB mn)	% of sake owned
英途康医疗科技	IntoCare	Medical device	17	9.07%
天境生物	I-MAB	Biotech	15	13.79%
复旦海泰生物	Fudan Haitai	Vaccine	15	4.29%
Blockade Medical	Blockade Medical	Medical device	13	4.29%
朗合医疗器械	Lung Health	Medical device	10	0.73%
丰宁平安高科	VILOF	Agriculture	10	0.89%
澎立生物	PharmaLegacy	CRO	10	6.55%
铸正机器人	ZOEZEN	Medical device	10	1.34%
医点通	Med Circle	Marketing service	10	5.38%
深圳北芯	Insight Lifetech	Medical device	9	7.15%

Source: Company data, CMBIS

Risks lie in policy environment

Potential price cuts for generic drugs may hurt pharmaceutical companies' incentives in conducting bioequivalence tests. Our calculation shows that bioequivalence income was around 11% of Frontage's total 1H19 revenue while attributable net profit from Frontage accounts for c.10% of Tigermed's core net profit in 1H19. Despite the minimal current earnings from bioequivalence tests, the decreased demand in bioequivalence tests could also hurt Tigermed's revenue from bioanalytical services related to bioequivalence tests.

Chinese government has released a series of policies to encourage the development of innovative drugs, which stimulated the demand in innovative drug clinical trials. In case of large price cuts in innovative drugs during price negotiations with NHSA (National Healthcare Security Administration), this may hurt pharmaceutical companies' incentives in developing innovative drugs.

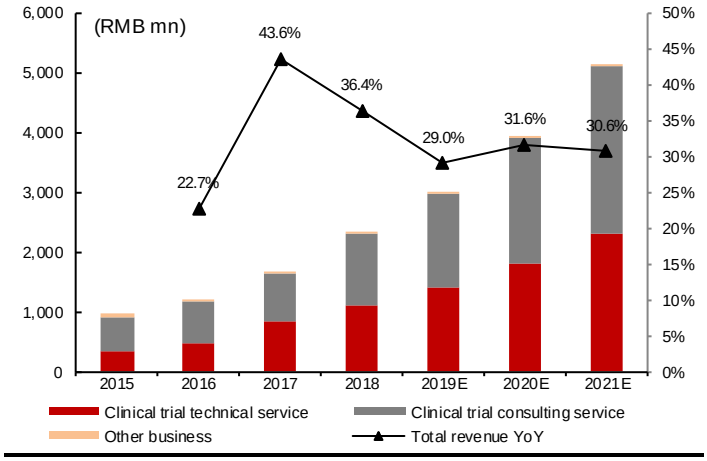
As of 30 Jun 2019, Tigermed has RMB1.0bn goodwill. In case the performance of acquired targets is below expectation, there may be risks of goodwill impairment.

Solid financial performance

Expect revenue/adjusted NP to grow at 30.4%/45.2% CAGR in FY19-21E

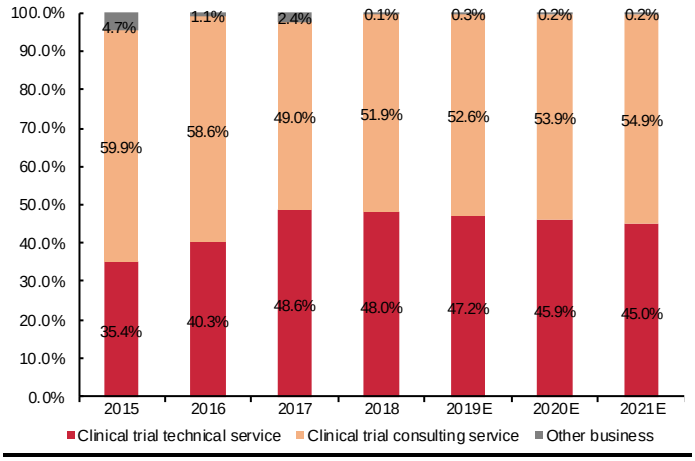
We estimate revenue from clinical trial technical service/ clinical trial consulting service will grow at 27.6%/32.8% CAGR in FY19-21E. We forecast total revenue to grow at 29.0%/31.6%/30.6% in FY19E/20E/21E, driven by 1) strong service backlog of RMB3.68bn on hand by end-2018, 2) strong demand for high-quality clinical CRO as a significant rise in the number of ongoing clinical trials in China, 3) relieve of clinical trial capacity bottleneck thanks to policy loosening in China, and 4) the Company's globalization efforts with more orders from MRCT or overseas trials.

Figure 80: Tigermed revenue growth estimates



Source: Company data, CMBIS estimates

Figure 81: Tigermed revenue breakdown



Source: Company data, CMBIS estimates

Figure 82: Tigermed revenue forecasts

RMB (mn)	2015	2016	2017	2018	2019E	2020E	2021E
Clinical trial technical service	338	474	820	1,103	1,400	1,791	2,293
YoY		*40.0%*	*73.2%*	*34.5%*	*26.8%*	*28.0%*	*28.0%*
Clinical trial consulting service	574	688	826	1,195	1,559	2,105	2,799
YoY		*20.0%*	*20.0%*	*44.6%*	*30.5%*	*35.0%*	*33.0%*
Other business	45	12	41	3	8	8	8
YoY		*-72.2%*	*226.1%*	*-93.5%*	*213.3%*	*0.0%*	*0.0%*
Total revenue	**957**	**1,175**	**1,687**	**2,301**	**2,967**	**3,904**	**5,101**
YoY		*22.7%*	*43.6%*	*36.4%*	*29.0%*	*31.6%*	*30.6%*

Source: Company data, CMBIS estimates

We expect GPM to improve gradually to 45.6%/46.0%/46.7% in FY19E/20E/21E, due to improving gross margin from clinical trial consulting services and higher proportion of revenue from high-margin clinical trial consulting services. We expect adjusted NPM to be 18.9%/20.1%/21.4% in FY19E/20E/21E, respectively. We estimate net adjusted net profit will grow at 57.2%/40.1%/39.0% YoY in FY19E/20E/21E, respectively; and attributable net profit to increase 46.2%/38.5%/39.2% YoY in FY19E/20E/21E.

Figure 83: P&L forecasts

RMB (mn)	2015	2016	2017	2018	2019E	2020E	2021E
Revenue	957	1,175	1,687	2,301	2,967	3,904	5,101
YoY		*22.7%*	*43.6%*	*36.4%*	*29.0%*	*31.6%*	*30.6%*
Cost of services	(535)	(728)	(963)	(1,309)	(1,614)	(2,109)	(2,720)
% of revenue	*-55.9%*	*-62.0%*	*-57.1%*	*-56.9%*	*-54.4%*	*-54.0%*	*-53.3%*
Gross profit	422	447	724	992	1,353	1,795	2,381
GPM	*44.1%*	*38.0%*	*42.9%*	*43.1%*	*45.6%*	*46.0%*	*46.7%*
Business taxes	(2)	(3)	(5)	(9)	(11)	(14)	(18)
% of revenue	*-0.2%*	*-0.2%*	*-0.3%*	*-0.4%*	*-0.4%*	*-0.4%*	*-0.4%*
Selling and distribution expenses	(32)	(36)	(40)	(54)	(87)	(86)	(107)
% of revenue	*-3.3%*	*-3.0%*	*-2.4%*	*-2.4%*	*-2.9%*	*-2.2%*	*-2.1%*
Administrative expenses	(169)	(229)	(236)	(314)	(345)	(429)	(536)
% of revenue	*-17.7%*	*-19.5%*	*-14.0%*	*-13.7%*	*-11.6%*	*-11.0%*	*-10.5%*
R&D expenses	0	0	(50)	(88)	(124)	(156)	(194)
% of revenue	*0.0%*	*0.0%*	*-2.9%*	*-3.8%*	*-4.2%*	*-4.0%*	*-3.8%*
Finance cost	5	0	(12)	(7)	(31)	(12)	(15)
% of revenue	*0.5%*	*0.0%*	*-0.7%*	*-0.3%*	*-1.0%*	*-0.3%*	*-0.3%*
Asset impairment loss	(10)	(19)	(23)	(51)	(17)	(40)	(40)
% of revenue	*-1.1%*	*-1.7%*	*-1.4%*	*-2.2%*	*-0.6%*	*-1.0%*	*-0.8%*
Other gains	0	0	8	5	2	0	0
% of revenue	*0.0%*	*0.0%*	*0.5%*	*0.2%*	*0.1%*	*0.0%*	*0.0%*
Investment gains	6	38	53	119	152	213	298
% of revenue	*0.6%*	*3.2%*	*3.2%*	*5.2%*	*5.1%*	*5.4%*	*5.8%*
Fair value gains (losses)	(6)	0	(4)	5	(2)	0	0
% of revenue	*-0.6%*	*0.0%*	*-0.2%*	*0.2%*	*-0.1%*	*0.0%*	*0.0%*
Asset disposal gains (losses)	0	1	(0)	(0)	(0)	0	0
% of revenue	*0.0%*	*0.1%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Non-operating income & expenses	7	13	14	10	6	0	0
% of revenue	*0.7%*	*1.1%*	*0.9%*	*0.4%*	*0.2%*	*0.0%*	*0.0%*
Profit before tax	220	212	431	606	895	1,271	1,769
PBT margin	*23.0%*	*18.1%*	*25.6%*	*26.3%*	*30.2%*	*32.5%*	*34.7%*
Minority Interests	(18)	(16)	(31)	(35)	(70)	(124)	(173)
Profit attributable to shareholders	156	141	301	472	690	956	1,330
NPM	*16.3%*	*12.0%*	*17.8%*	*20.5%*	*23.3%*	*24.5%*	*26.1%*
YoY		*-10.0%*	*114.0%*	*56.9%*	*46.2%*	*38.5%*	*39.2%*
Adjusted net profit (non-IFRS)	145	98	240	357	561	786	1,092
Adjusted NPM	*15.2%*	*8.3%*	*14.2%*	*15.5%*	*18.9%*	*20.1%*	*21.4%*
YoY		*-32.9%*	*146.0%*	*48.8%*	*57.1%*	*40.1%*	*39.0%*

Source: Company data, CMBIS estimates

Valuation

Initiate BUY with TP HK$86.79 (34.6% Upside)

We derived our 12-month TP from SOTP valuation methodology and our TP of HK$86.79 is based on 50x FY21E P/E multiple of core CRO business and 3x PB multiple of investment business, in order to reflect both the core operating business as well as returns from investment assets. We assign 50x FY21E P/E to Tigermed's CRO business, reflecting the expected 45.2% core profit growth CAGR in FY19-21E, and Tigermeds' unicorn leading position in China's clinical CRO industry.

We also did a valuation cross check with DCF model and derived value per share of HK$87.5 based on 8-year DCF model with a WACC of 10.62% and a terminal growth rate of 4%.

Figure 84: Tigermed–SOTP valuation

SOTP valuation	2021E
Attributable non-IFRS net profit (RMB mn, 2021E)	1,092
PE multiple of core business (2021E)	50.0
Valuation of CRO business (RMB mn)	**54,603**
Fair value of financial assets for sale (RMB mn)	3,482
PB multiple of investment business (2021E)	3.0
Valuation of investment business (RMB mn)	**10,447**
SOTP valuation (RMB mn)	**65,050**
# of shares	749,524,444
Target price (RMB per share)	**86.79**

Source: Company data, CMBIS estimates

Figure 85: Peers' valuation

Company	Ticker	Rating	Mkt Cap (US$ mn)	Net profit YoY FY19E	Net profit YoY FY20E	Net profit YoY FY21E	P/E (x) FY19E	P/E (x) FY20E	P/B (x) FY19E	P/B (x) FY20E	ROE (%) FY19E	ROE (%) FY20E
H-share												
WuXi AppTec	2359 HK	NR	21,110	-5.7%	33.2%	26.5%	63.8	53.4	42.2	7.5	6.7	11.0
WuXi Biologics	2269 HK	Buy	15,260	54.3%	42.8%	46.8%	109.3	76.5	52.1	11.9	10.3	11.5
Pharmaron	3759 HK	NR	5,096	45.1%	36.4%	33.5%	48.9	35.9	26.8	9.0	7.4	17.9
Frontage	1521 HK	NR	1,078	92.4%	39.0%	32.3%	48.8	31.6	23.3	4.1	3.6	14.1
VIVA Biotech	1873 HK	NR	873	60.1%	87.4%	46.6%	44.6	23.7	16.2	3.2	3.0	11.7
	Average			**49.3%**	**47.8%**	**37.1%**	**63.1**	**44.2**	**32.1**	**7.1**	**6.2**	**13.2**
A-share												
WuXi AppTec	603259 CH	Buy	21,110	-5.7%	33.2%	26.5%	70.2	52.7	7.4	6.6	11.0	13.1
Tigermed	300347 CH	Buy	6,874	46.2%	38.5%	39.2%	70.0	50.6	11.7	10.3	14.71	18.41
Pharmaron	300759 CH	NR	5,096	45.1%	36.4%	33.5%	61.1	44.8	11.2	9.2	17.9	20.1
Joinn Lab	603127 CH	NR	1,401	41.8%	38.9%	36.1%	64.2	46.2	12.6	10.5	19.6	22.4
Asymchem Lab	002821 CH	NR	938	32.8%	32.2%	32.2%	51.9	39.3	9.7	8.0	18.9	20.4
	Average			**32.0%**	**35.8%**	**33.5%**	**63.5**	**46.7**	**10.5**	**8.9**	**16.4**	**18.9**

Source: Bloomberg, CMBIS estimates, as at Dec 13, 2019.

Figure 86: Tigermed's DCF model

DCF Valuation (in Rmb mn)	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	613	926	1,282	1,784	2,408	3,227	4,292	5,665	7,422	9,648
Tax rate	16.38%	15.06%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
EBIT*(1-tax rate)	513	787	1,090	1,516	2,047	2,743	3,648	4,816	6,308	8,201
+ D&A	61	62	67	72	90	112	137	168	203	243
- Change in working capital	8	(110)	(215)	(257)	(321)	(398)	(489)	(597)	(722)	(867)
- Capx	(92)	(100)	(100)	(100)	(125)	(155)	(191)	(233)	(281)	(338)
FCFF	**491**	**639**	**842**	**1,232**	**1,691**	**2,302**	**3,106**	**4,154**	**5,508**	**7,240**
Terminal value										**113,739**
% change in FCFF		30.24%	31.77%	46.23%	37.31%	36.10%	34.92%	33.75%	32.59%	31.45%

Terminal growth rate	**4.00%**
WACC	**10.62%**
Cost of Equity	13.35%
Cost of Debt	5.00%
Equity Beta	0.90
Risk Free Rate	3.00%
Market Risk Premium	11.50%
Target Debt to Asset ratio	30.00%
Effective Corporate Tax Rate	15.00%
Terminal value	50,727
Total PV	65,370
Net debt	(1,334)
Minority	1,160
Equity value	65,544
# of shares	749,524,444
DCF per share (in Rmb)	**87.45**

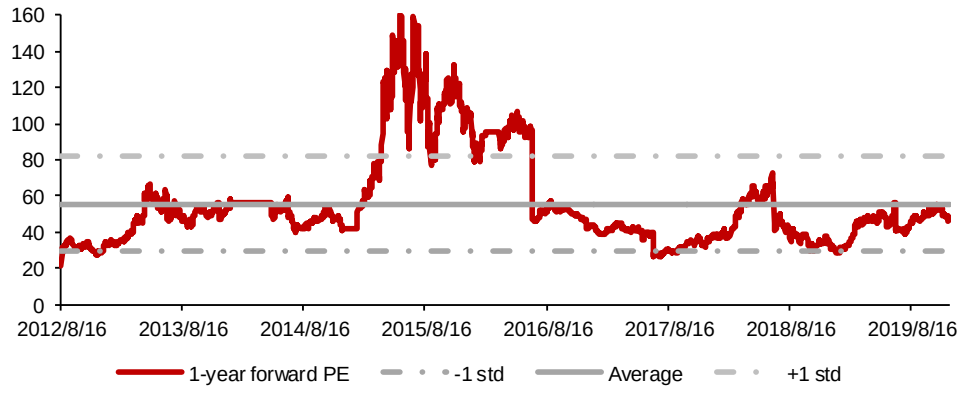
Source: Company data, CMBIS estimates

Figure 87: Sensitivity analysis of DCF model

		Terminal growth rate				
		3.00%	**3.50%**	**4.00%**	**4.50%**	**5.00%**
Equity beta	**0.70**	104.44	112.41	121.98	133.66	148.26
	0.80	89.60	95.43	102.26	110.37	120.17
	0.90	78.00	82.39	**87.45**	93.33	100.26
	1.00	68.71	72.10	75.95	80.35	85.44
	1.10	61.11	63.78	66.78	70.17	74.02

Source: Company data, CMBIS estimates

Figure 88: Historical 1-year forward PE ratio of Tigermed



Source: Company data, CMBIS estimates

Financial Summary

Income statement

YE Dec 31 (RMB mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Revenue	**1,687**	**2,301**	**2,967**	**3,904**	**5,101**
Clinical field service	820	1,103	1,400	1,791	2,293
Clinical test technical service	826	1,195	1,559	2,105	2,799
Other business	41	3	8	8	8
Cost of sales	(963)	(1,309)	(1,614)	(2,109)	(2,720)
Gross profit	**724**	**992**	**1,353**	**1,795**	**2,381**
Business taxes	(5)	(9)	(11)	(14)	(18)
Selling expenses	(40)	(54)	(87)	(86)	(107)
Admin expenses	(236)	(314)	(345)	(429)	(536)
R&D expenses	(50)	(88)	(124)	(156)	(194)
Operating profit	**394**	**526**	**785**	**1,110**	**1,526**
Finance costs, net	(12)	(7)	(31)	(12)	(15)
Investment gains	53	119	152	213	298
Other gains	(4)	(31)	(11)	(40)	(40)
Pre-tax profit	**431**	**606**	**895**	**1,271**	**1,769**
Income tax	(99)	(99)	(135)	(191)	(265)
Minority interests	(31)	(35)	(70)	(124)	(173)
Net profit	**301**	**472**	**690**	**956**	**1,330**

Cash flow summary

YE 31 Dec (RMB mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Total net profit	**332**	**507**	**760**	**1,080**	**1,503**
Depreciation and amortization	33	61	62	67	72
Change in working capital	(27)	8	(110)	(215)	(257)
Investment loss (gain)	(53)	(119)	(152)	(213)	(298)
Other operating activities	31	65	52	54	57
Operating cash flow	**315**	**522**	**613**	**773**	**1,078**
Capex	(1,008)	(843)	(400)	(500)	(700)
Acquisition of subsidiaries	(536)	(28)	0	0	0
Other investing activities	697	504	(100)	(100)	(100)
Investing cash flow	**(846)**	**(367)**	**(500)**	**(600)**	**(800)**
Net proceeds from shares issued	715	59	1,650	0	0
Bank borrowing	75	340	0	0	0
Acquisition of non-controlling interests					
Dividends and interests paid	(62)	(127)	(307)	(394)	(547)
Other financing activities	(25)	(262)	0	0	0
Financial cash flow	**702**	**10**	**1,343**	**(394)**	**(547)**
FX changes	(9)	7	0	0	0
Net change in cash	162	173	1,456	(221)	(270)
Cash at the beginning	364	525	704	2,161	1,940
Cash at the end	**537**	**704**	**2,161**	**1,940**	**1,670**

Balance sheet

YE 31 Dec (RMB mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Non-current assets	**2,238**	**2,677**	**3,247**	**3,953**	**4,939**
Fixed asset	202	255	300	340	375
Intangible assets	17	28	23	18	13
Financial assets available for sale	792	1,222	1,771	2,484	3,482
Goodwill	1,049	1,033	1,016	976	936
Other non-current assets	178	139	137	135	133
Current assets	**1,346**	**1,603**	**3,174**	**3,183**	**3,188**
Cash	537	704	2,161	1,940	1,670
Inventories	0	1	2	3	4
Trade and bills receivables	632	782	894	1,123	1,397
Prepayments, deposits and other receivables	31	47	47	47	47
Other current assets	146	69	69	69	69
Current liabilities	**733**	**1,209**	**1,213**	**1,228**	**1,247**
Borrowings	242	603	603	603	603
Trade and other payables	34	44	44	44	44
Other current liabilities	457	562	566	581	600
Non-current liabilities	**49**	**37**	**39**	**41**	**43**
Borrowings	17	3	3	3	3
Other non-current liabilities	31	34	36	38	40
Total net assets	**2,801**	**3,034**	**5,168**	**5,866**	**6,837**
Minority interest	**310**	**366**	**1,036**	**1,160**	**1,333**
Shareholders' equity	**2,491**	**2,669**	**4,133**	**4,706**	**5,505**

Key ratios

YE 31 Dec	FY17A	FY18A	FY19E	FY20E	FY21E
Sales mix (%)					
Clinical trial technical services	49	48	47	46	45
Clinical trial consulting services	49	52	53	54	55
Other business	2	0	0	0	0
Total	100	100	100	100	100
Profit & loss ratios (%)					
Gross margin	43	43	46	46	47
EBITDA margin	28	29	33	35	36
Pre-tax margin	26	26	30	33	35
Net margin	18	21	23	24	26
Effective tax rate	23	16	15	15	15
Balance sheet ratios					
Current ratio (x)	2	1	3	3	3
Trade receivables turnover days	117	112	110	105	100
Trade payables turnover days	12	11	11	11	11
Net debt to equity ratio (%)	Net cash	Net cash	Net cash	Net cash	Net cash
Returns (%)					
ROE	12	17	15	18	22
ROA	9	12	12	15	18
Per share					
EPS (RMB)	0.61	0.94	0.92	1.28	1.78
DPS (RMB)	0.20	0.35	0.37	0.51	0.71
BVPS (RMB)	5.07	5.34	5.51	6.28	7.34

Source: Company data, CMBIS estimates

CMB International Securities | Equity Research | Company Initiation

WuXi AppTec (603259 CH)

Strengthening leading position in global CRO/CDMO industry

BUY (Initiation)

Target Price	**HK$114.73**
Current Price	**HK$91.30**
Up/Downside	**+25.7%**

Initiate at BUY. WuXi AppTec is a leading CRO/CDMO player in China and worldwide. Our SOTP based TP of HK$114.73 implies 52x FY21E P/E.

- **One-stop shop for drug outsourcing services.** WuXi AppTec has built up integrated capabilities throughout the discovery, development and manufacturing spectrum for small molecule drugs, cell therapies and gene therapies. WuXi AppTec adopts "follow the molecule" strategy to provide services for one project at different stages of development. This practice could help WuXi AppTec to maximize income from each single project and enhance customer stickiness.
- **Benefit from increasing drug outsourcing demand in China.** WuXi AppTec provides integrated services to Chinese customers which span from early stage drug discovery to completion of IND filings with NMPA. These projects have success-based agreements with a milestone and/or royalty fee. As at Sep 30, 2019, WuXi AppTec has in total assisted Chinese customers in submitting 71 new-chemical entities IND filings and obtained 54 CTAs from NMPA. As a result, we expect meaningful milestone and royalty income from these integrated projects in coming years.
- **High growth in CDMO business thanks to strong overseas demand and "MAH" projects.** CDMO business was mainly driven by fast-growing demand from overseas and increasing number of "MAH" projects. We highlight that Tesaro's niraparib (a PARP inhibitor) has contributed significant income for the CDMO business. As of Jun 30, 2019, WuXi STA has 11 CDMO projects under China's Marketing Authorization Holder ("MAH") pilot program.
- **Cell & gene therapies will be the next growth engine.** WuXi AppTec is building capabilities in cell and gene therapies to support the evolving demands in this field. In 1H19, the Company's cell and gene therapies CDMO/CMO facility in China also began operation. Frost & Sullivan (F&S) forecasts that the global cell and gene therapies CDMO/CMO market size was approximately US$1.5bn in 2018 and will grow to US$3.6bn by 2022E, implying a 24.5% CAGR between 2018 and 2022E.
- We expect WuXi AppTec's adjusted non-IFRS net profit to grow by 32.9%/29.1%/27.7% YoY in FY19E/20E/21E, respectively; and net profit to change by -5.7%/33.2%/26.5% YoY in FY19E/20E/21E. Moreover, WuXi AppTec maintained a diversified investment portfolio with 61 companies and funds which will lead to significant investment gains over the long term.

Earnings Summary

(YE 31 Dec)	FY17A	FY18A	FY19E	FY20E	FY21E
Revenue (RMB mn)	7,765	9,614	12,868	16,616	21,139
Revenue YoY growth (%)	26.96	23.80	33.85	29.13	27.22
Net income (RMB mn)	1,227	2,261	2,131	2,839	3,591
EPS (RMB)	1.31	2.23	1.30	1.73	2.19
EPS YoY growth (%)	21.16	70.45	-41.66	33.20	26.52
P/E (x)	69.77	40.93	70.17	52.68	41.64
P/B (x)	12.71	5.09	7.42	6.60	5.81
Yield (%)	0.00	0.06	0.43	0.57	0.72
ROE (%)	19.25	12.85	11.04	13.07	14.57
Net gearing (%)	Net cash	Net cash	Net cash	Net cash	Net cash

Source: Company data, CMBIS estimates

China Healthcare Sector

Jill WU, CFA
Tel: (852) 3900 0842
Email: jillwu@cmbi.com.hk

Amy Ge
Tel: (852) 3761 8778
Email: amyge@cmbi.com.hk

Stock Data

Mkt Cap (HK$ mn)	148,485
Avg 3 mths t/o (HK$ mn)	801.66
52w High/Low (HK$)	100.47/ 50.34
Total Issued Shares (mn)	1,468

Source: Bloomberg

Shareholding Structure

Management	28.2%
A public shareholders	61.4%
H public shareholders	10.4%

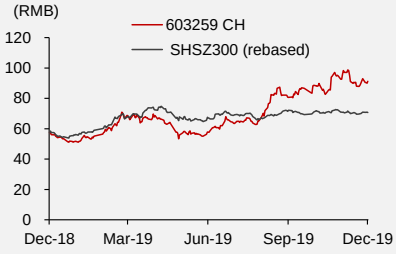
Source: SSE, HKEx

Share Performance

	Absolute	Relative
1-mth	-2.8%	-2.8%
3-mth	11.4%	12.2%
6-mth	55.6%	48.3%

Source: Bloomberg

12-mth Price Performance

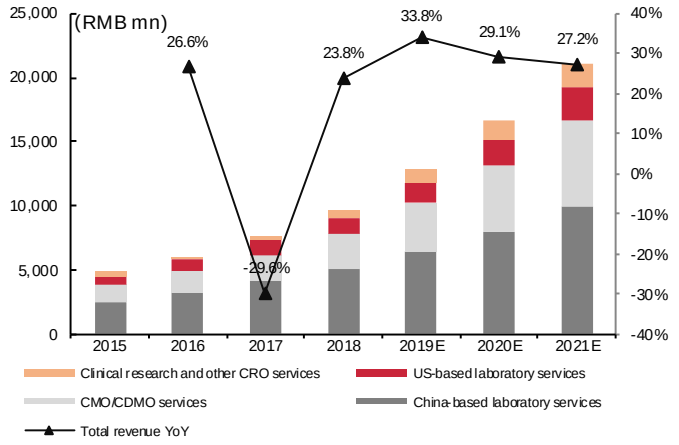


Source: Bloomberg

Auditor: Deloitte Touche Tohmatsu

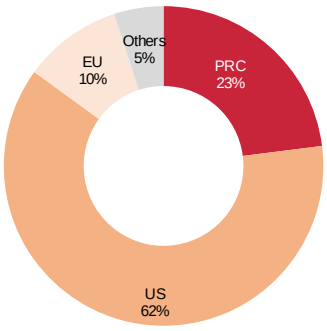
Focus Charts

Figure 89: WuXi AppTec's revenue trend



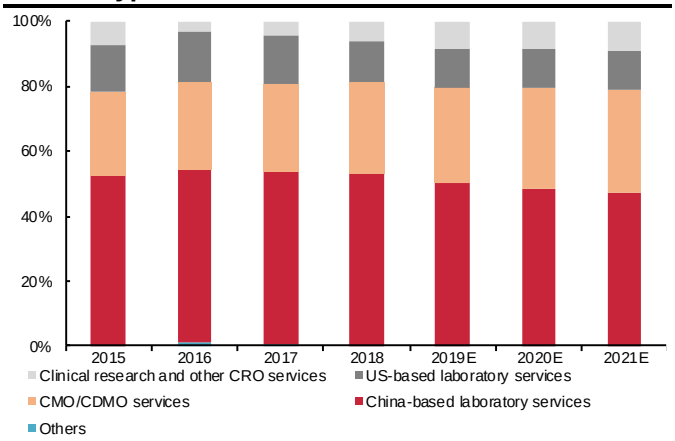
Source: Company data, CMBIS estimates

Figure 90: 1H19 revenue mix by customer base



Source: Company data, CMBIS

Figure 91: WuXi AppTec's Revenue breakdown by service type



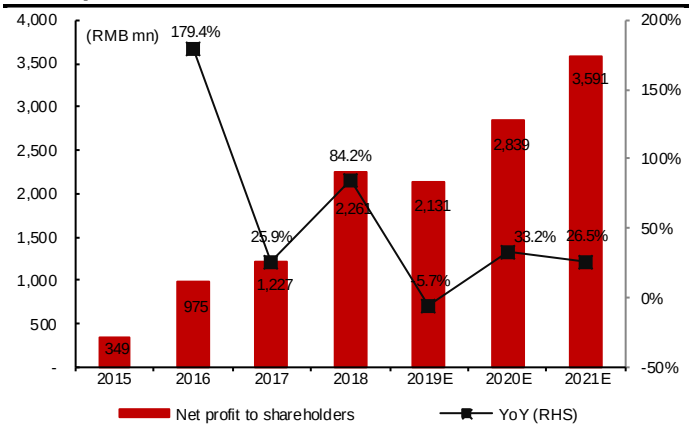
Source: Company data, CMBIS

Figure 92: Top 1 player in China CRO/CDMO market (2017)

Company	Market share	2017 revenue (US$ mn)
WuXi AppTec	**8.3%**	**1,143**
Pharmaron	2.4%	337
TigerMed	1.8%	250
WuXi Biologics	1.7%	235
Asymchem Laboratories	1.5%	211
Others	84.3%	11,811
Total China pharmaceutical R&D outsourcing market	**100.0%**	**13,986**

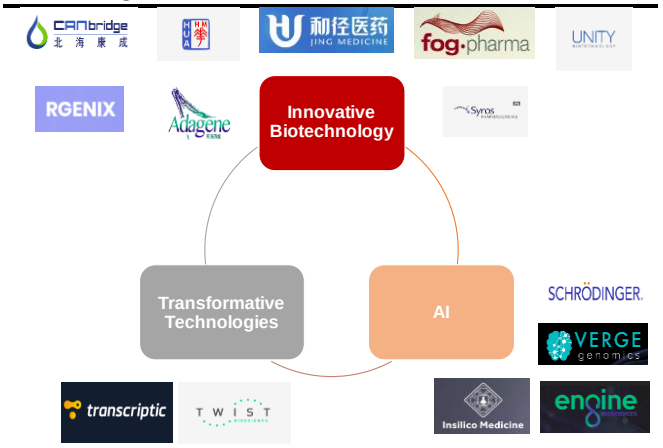
Source: F&S, CMBIS

Figure 93: WuXi AppTec's net profit trend (2015-2021E)



Source: Company data, CMBIS estimates

Figure 94: WuXi AppTec's investments in new technologies



Source: Company data, CMBIS

Global leading CRO/CDMO player

A-H dual listing provides multiple funding channels

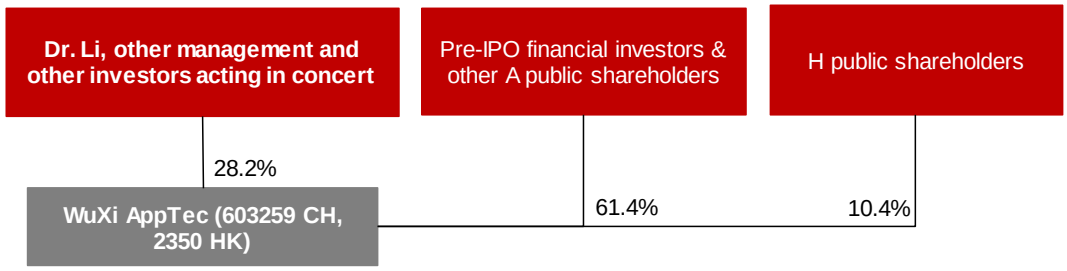
WuXi AppTec (formerly known as WuXi PharmaTech) was founded by Dr. Li, Dr. Zhao, Mr. Xiaozhong Liu and Mr. Zhaohui Zhang in 2000. The Company was listed in NASDAQ in 2007 and privatized in 2015. The Company then spins out a few businesses such as WuXi Biologics, WuXi NextCode, etc.

WuXi AppTec mainly focus on businesses such as chemical drug preclinical CRO/CDMO, clinical CRO, gene and cell therapy CDMO, etc. Benefiting from solid R&D outsourcing demand worldwide, especially in China, WuXi AppTec has kept strong growth momentum during recent years. By charging milestone and royalty fees, WuXi AppTec enjoys extra income on top of service fees. The Company also invests into start-up companies with innovative technologies and has benefited from the synergies between its invested companies.

WuXi AppTec went public again in A share in May 2018 and completed listing in Hong Kong in Dec 2018. As CRO/CDMO business is capital intensive, WuXi AppTec enjoys multiple funding sources thanks to its A-H dual listing status.

As of Nov 2019, Dr. Li, founder of the Company, controlled around 28% of WuXi AppTec's shares. As of Nov 2019, the remaining restricted A shares account for approximately 28% of the total outstanding shares.

Figure 95: Shareholding structure of WuXi AppTec (as of Nov 2019)



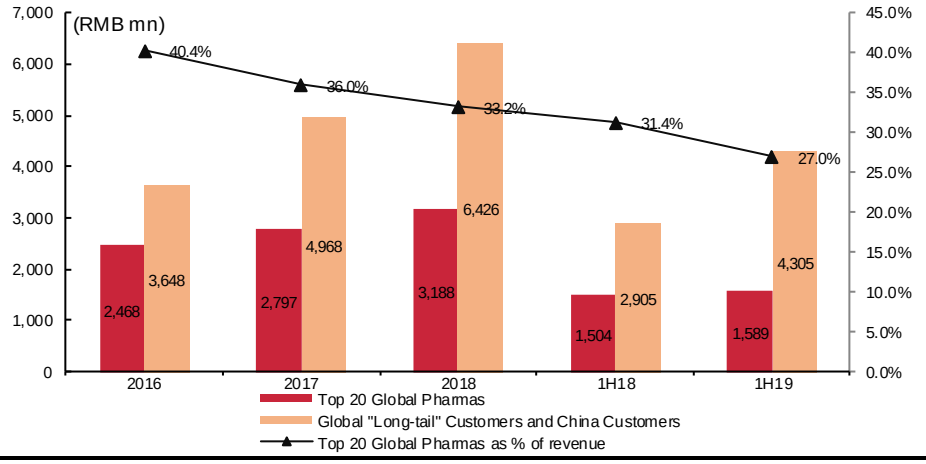
Source: Company data, CMBIS

Strong presence in global pharmaceutical R&D outsourcing market

WuXi AppTec has a strong, loyal and expanding customer base. In 1H19, the Company added nearly 600 new customers and provided services to more than 3,600 active customers in over 30 countries, including all of the top 20 global pharmaceutical companies, according to F&S report.

WuXi AppTec adopts "long-tail" customer strategy, by consistently diversifying its customer base to small and mid-sized pharmaceutical companies. The Company's proportion of revenue from top 20 global pharmaceutical companies decreased from 40.4% in 2016 to 27.0% in 1H19.

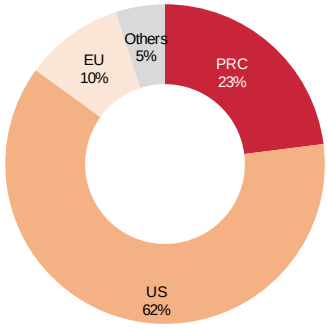
Figure 96: WuXi AppTec's diversified revenue sources



Source: Company data, CMBIS

WuXi AppTec generates majority of its revenue from overseas customers. In 1H19, revenue from US customers contributes 62% of the Company's total revenue, while China customers and EU customers account for 23% and 10% of total revenue, respectively. This demonstrates the Company's strong presence in the global market.

Figure 97: Company's revenue mix by customer base



Source: Company data, CMBIS

WuXi AppTec is the largest CRO/CDMO player in China and a leading CRO/CDMO player worldwide. According to F&S, as of 2017, WuXi AppTec had 1.1% market share in global pharmaceutical outsourcing market, ranking No.13 in the global market. This industry is very fragmented while IQVIA as the largest player only has 3.5% market share. The combined market share of top 15 players was less than 30% as of 2017.

Figure 98: Global pharmaceutical R&D outsourcing market share (2017)

Company	Market share	2017 revenue (US$ mn)
IQVIA	3.5%	3,647
Covance	2.9%	3,037
Lonza	2.2%	2,293
DSM	2.1%	2,187
PAREXEL	2.1%	2,173
PPD	1.8%	1,900
Patheon	1.8%	1,870
PRA Health Sciences	1.8%	1,858
Charles River	1.8%	1,858
Catalent	1.7%	1,785
ICON	1.7%	1,758
Syneos Health	1.4%	1,460
WuXi AppTec	**1.1%**	**1,143**
Siegfried	0.7%	762
Cambrex	0.5%	526
Others	72.9%	75,845
Total global pharmaceutical R&D outsourcing market	**100.0%**	**104,100**

Source: F&S, CMBIS

WuXi AppTec is the largest CRO/CDMO service provider in China, taking 8.3% market share as of 2017, followed by Pharmaron (300759 CH, 3759 HK) taking 2.4% market share. Chinese market is also fragmented as the top 15 players has less than 25% market share as of 2017. Although WuXi AppTec is already the largest player in China, the Company still has large room for further market share gain.

Figure 99: China pharmaceutical R&D outsourcing market share (2017)

Company	Market share	2017 revenue (US$ mn)
WuXi AppTec	**8.3%**	**1,143**
Pharmaron	2.4%	337
TigerMed	1.8%	250
WuXi Biologics	1.7%	235
Asymchem Laboratories	1.5%	211
Others	84.3%	11,811
Total China pharmaceutical R&D outsourcing market	**100.0%**	**13,986**

Source: F&S, CMBIS

One stop shop for drug outsourcing services

Established in WuXi city in 2000, WuXi AppTec mainly conducted pre-clinical CRO business before 2007. WuXi AppTec has actively acquired a variety of companies since 2008 which has largely diversified the Company's business into many new areas. Thanks to acquisitions and self-establishment, WuXi AppTec has built up integrated capabilities throughout the discovery, development and manufacturing spectrum for small molecule drugs, cell therapies and gene therapies.

WuXi AppTec has made a number of high-quality acquisitions such as AppTec, Abgent, Crelux, HD Biosciences and WuXi Clinical Development, etc. In May 2019, the Company acquired Pharmapace, Inc., a clinical research services company with expertise of providing high quality biometrics services, which has allowed WuXi AppTec to further enhance its global clinical trial services capabilities.

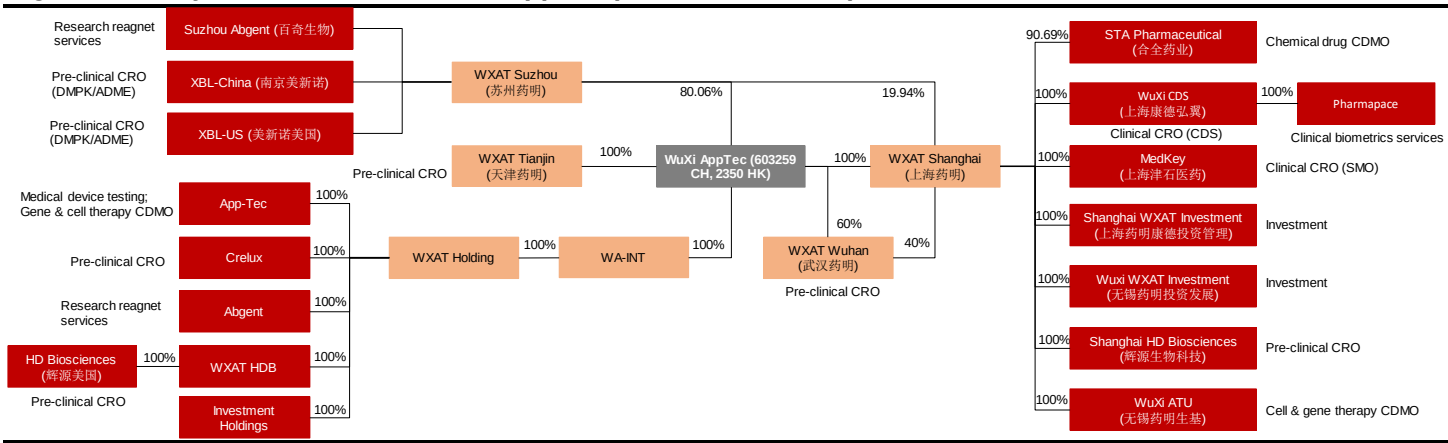
Figure 100: WuXi AppTec established full-spectrum service capabilities through acquisitions

Date of acquisition	Acquisition target	Location of acquisition target	Equity interests acquired	Business of acquisition target	Consideration
Jan 2008	AppTec Laboratory Services	US	100%	Biopharmaceutical and medical device testing	US$163mn
Oct 2011	Abgent	China, US	100%	Biological research reagent products and services	NA
Oct 2011	MedKey Med-Tech Development / Jiecheng Med-Tech Development	China	100%	Clinical trial site management organization (SMO)	NA
Feb 2015	XenoBiotic Laboratories (XBL)	China, US	100%	DMPK (Drug Metabolism and Pharmacokinetics)/ADME (absorption, distribution, metabolism, and excretion) services	RMB259mn
Feb 2016	WuXi PRA	China	49%	Clinical research services	RMB26mn
Apr 2016	Crelux	Germany	100%	Drug discovery services (Pre-clinical CRO)	RMB46mn
May 2017	Shanghai HD Biosciences	China, US	100%	Biology focused preclinical drug discovery CRO	NA
Oct 2017	ResearchPoint Global (RPG)	US	100%	Clinical research services	
May 2019	Pharmapace	US	100%	Biometrics services for all phases of clinical trials	NA

Source: Company data, CMBIS

WuXi AppTec provides services through its business units and subsidiaries located in China, US, Europe and other regions. The Company's major subsidiaries include STA Pharma (chemical CDMO), WuXi CDS (clinical development services (CDS)), MedKey (site management organization (SMO)), AppTec (medical device testing, gene & cell therapy CDMO), etc.

Figure 101: Major subsidiaries of WuXi AppTec (as of Jun 30, 2019)



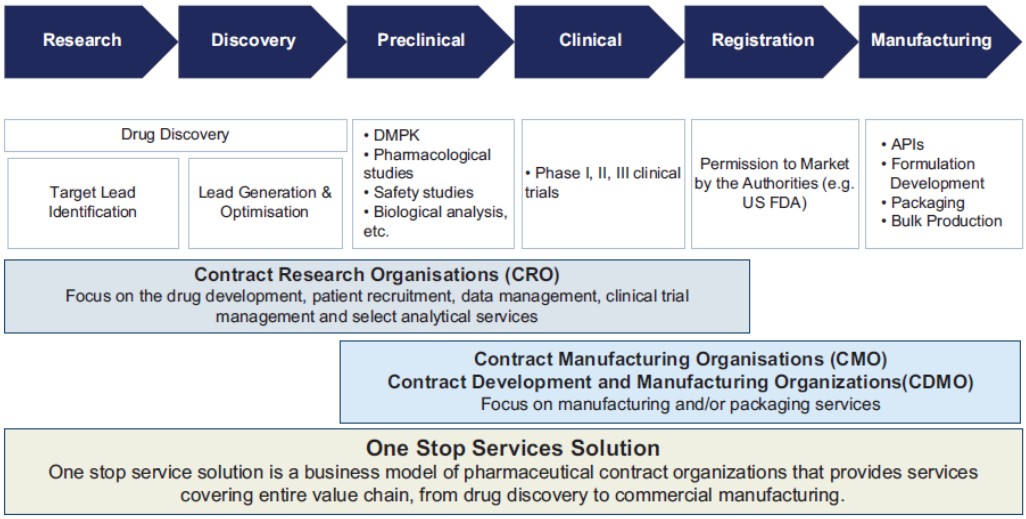
Source: Company data, CMBIS

WuXi AppTec's service spectrum includes contract research organization (CRO) services and contract development and manufacturing organization (CDMO) services for chemical drugs, cell & gene therapies, medical devices, etc. The Company provides one stop shop services covering the entire pharmaceutical value chain, ranging from drug discovery to manufacturing.

To leverage its one stop shop service capability, WuXi AppTec adopts "follow the molecule" strategy to provide services for one project at different stages of development. This practice

could help the Company to maximize income from each single project. WuXi AppTec's vertically integrated services also helps to enhance customer stickiness by providing seamless and highly efficient services.

Figure 102: WuXi AppTec provides one stop shop services



Source: Company data, CMBIS

WuXi AppTec categorized its income into four segments, including 1) China-based laboratory services, 2) CMO/CDMO services, 3) US-based laboratory services and 4) clinical research services.

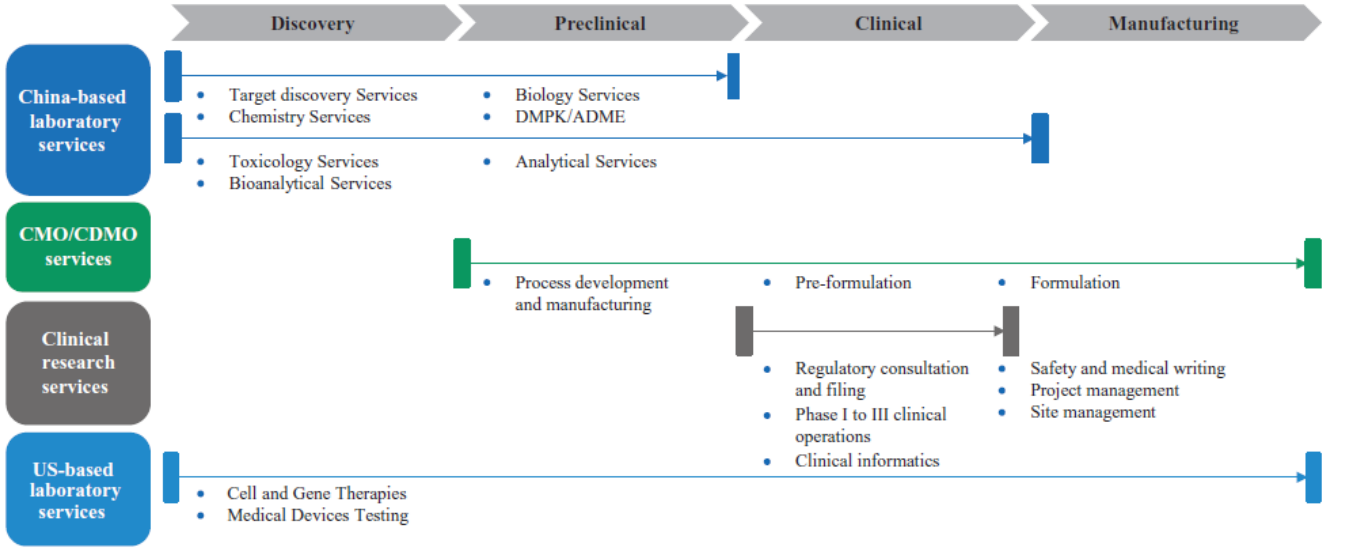
China-based laboratory services mainly include chemistry services, biology services, drug metabolism and pharmacokinetics (DMPK)/ absorption, distribution, metabolism and excretion (ADME), and toxicology, bioanalytical services, etc.

CMO/CDMO (briefly referred to as CDMO) services focus on development and manufacturing of advanced intermediates, active pharmaceutical ingredients (APIs) and finished doses.

US-based laboratory services mainly contain discovery, testing and manufacturing services for cell and gene therapies and testing services for medical devices.

Clinical research services mainly focus on clinical trial support, monitoring, data analysis, regulatory filing, and site management organization (SMO) services.

Figure 103: WuXi AppTec's service categories

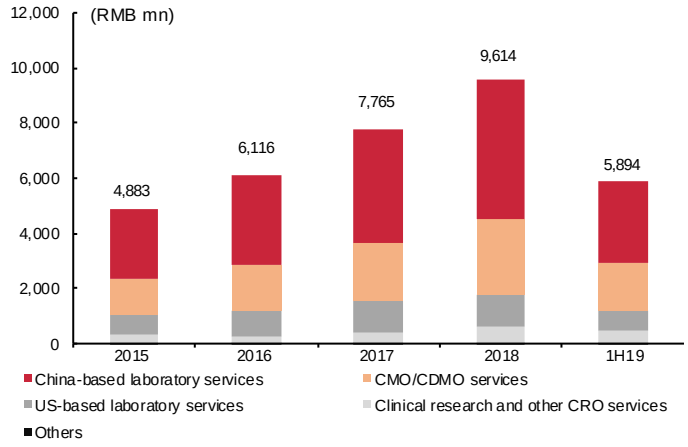


Source: Company data, CMBIS

In 1H19, WuXi AppTec generates 52% of total revenue from China-based laboratory services, 29% of revenue from CMO/CDMO services, 12% from US-based laboratory services and the remaining 8% from clinical research services.

WuXi AppTec recorded 25% revenue growth CAGR during 2016 and 2018. Strong revenue growth was mainly driven by solid performance of China-based laboratory services, CMO/CDMO services and clinical research services.

Figure 104: Company's revenue mix by service type



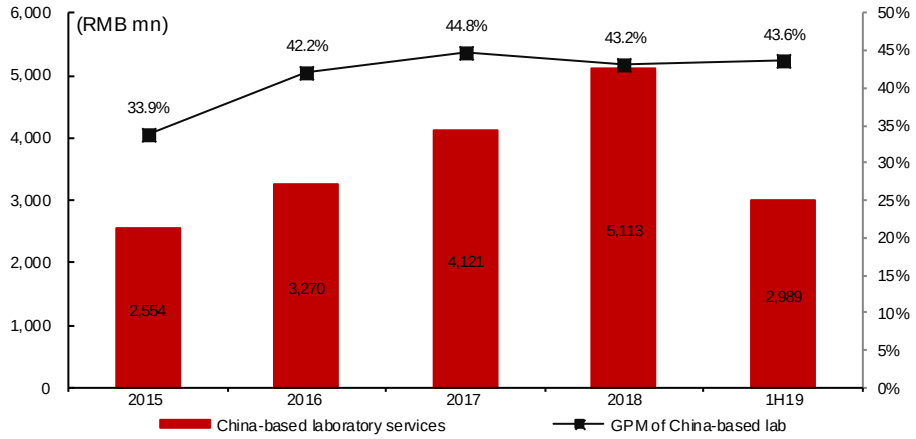
Source: Company data, CMBIS

Pre-clinical CRO business continues solid growth

Strong platform providing China-based laboratory services

WuXi AppTec has one of the largest and most experienced small molecule chemical drug R&D teams globally, along with a comprehensive testing platform. In 1H19, China-based laboratory services recorded 24% YoY revenue growth to RMB2.99bn, contributing 52% of WuXi AppTec's total revenue. Gross margin of China-based laboratory services remained stable at 43.6% in 1H19 vs 43.2% in 2018.

Figure 105: WuXi AppTec's China-based laboratory services revenue



Source: Company data, CMBIS

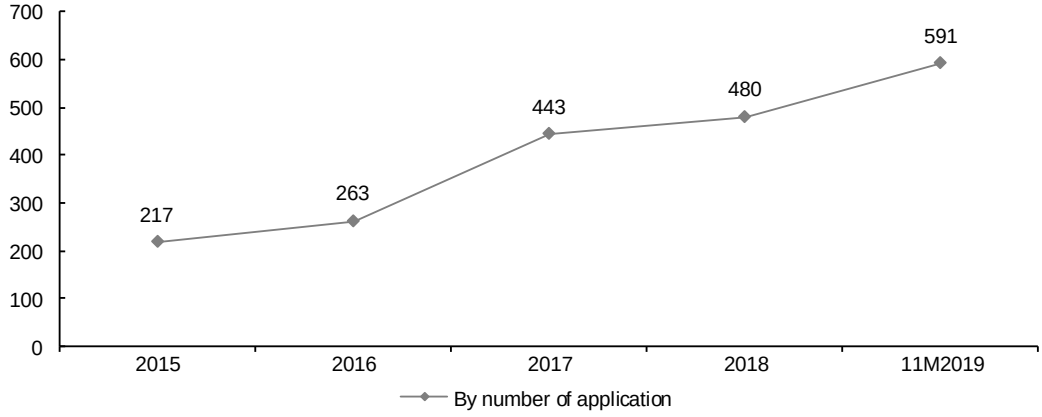
China-based laboratory services mainly contain small-molecule drug discovery and laboratory testing services. For drug discovery services, the Company provide services covering major steps of the drug discovery process, beginning from target to hit, hit to lead and lead optimization. For laboratory testing services, the Company provides services including analytical chemistry, DMPK/ADME, toxicology and bioanalytical testing for small molecules. In addition, the Company fully leverages the advantage of the platform and combine the technical experience, program management and regulatory expertise to facilitate submission of the customers' IND package.

WuXi AppTec has built a DNA-encoded library (DEL) with approximately 90bn compounds, enabling a growing number of customers globally to discover innovative small molecule drugs. DEL allows for the large-scale synthesis and screening of collections of small molecule compounds. This technology accelerates target validation and hit identification, and allows the customers to shorten the drug discovery process.

Potential milestone/royalty income drives margin growth

WuXi AppTec benefits from the increasing demand in drug outsourcing demand in China. Thanks to policy tailwinds for innovative drugs, Chinese pharmaceutical companies are investing heavily in innovative drug R&D during recent years. We notice a significant rise in innovative drugs IND applications to the NMPA. NMPA received 480 innovative drug IND applications in 2018 vs more than 590 applications in the first 11 months of 2019.

Figure 106: More innovative drugs IND applications to NMPA



Source: Insight, CMBIS

WuXi AppTec provides integrated drug discovery and R&D services to Chinese customers which span from early stage drug discovery to completion of IND filings with NMPA. These projects have success-based agreements with a milestone and/or royalty fee. Under the milestone fee structure, WuXi AppTec can receive 1) a fee for each pre-set milestone reached, 2) a fee upon out-licensing of the drug by the customer. The royalty fee is typically a single digit percentage of the sales revenue of the corresponding drug, if successfully launched.

As of end-2018, WuXi AppTec has 123 integrated projects ongoing. We expect WuXi AppTec to add 20-30 integrated projects every year. Potential milestone and royalty income will largely lift the margin of the Company. As at Sep 30, 2019, WuXi AppTec has in total assisted Chinese customers in submitting 71 new-chemical entities IND filings and obtained 54 CTAs from NMPA. As a result, we expect meaningful milestone and royalty income from these integrated projects in coming years.

One successful case of the integrated projects is Chai Tai Tianqing (CTTQ)'s TQ-A3334 tablet, a TLR-7 agonist indicated to treat HBV. In 2016, CTTQ granted Johnson & Johnson (JNJ US) exclusive rights to develop, manufacture and sell this drug outside of China. CTTQ is expected to receive a licensing fee of up to US$253mn. WuXi AppTec is entitled to receive from CTTQ a portion of the licensing fee as milestone payment. The Company received RMB32.8mn and RMB16.8mn milestone payment from CTTQ in 2016 and 2018, respectively.

Enhancing capabilites of laboratory testing services

Drug discovery is a traditional business of WuXi AppTec. As of 2017, drug discovery services accounted for 78% of the revenue from China-based laboratory services while the remaining 22% revenue are from drug testing services such as DMPK/ADME, bioanalytical services, toxicology, etc. WuXi AppTec's laboratory testing services is still small in scale, implying significant potential for revenue expansion.

In 2019, three of WuXi AppTec Laboratory Testing Division (LTD)'s facilities, including Drug Safety Testing, Bioanalytical Services and Medical Device Testing, completed regulatory inspections from the US FDA, OECD, and CNAS (China National Accreditation Service for Conformity Assessment), all with excellent results.

In Nov 2019, the Company's LTD has expanded the Suzhou safety assessment facility by increasing toxicology capacity by 80% to meet global customers' preclinical testing needs. With the expansion, the toxicology facility will cover an area of 580,000 square feet and execute full-service preclinical and clinical stage safety assessments for biologic and small molecule drugs.

With expanding capacity, we expect income from laboratory testing services to grow fast.

CDMO/CMO business to keep strong momentum

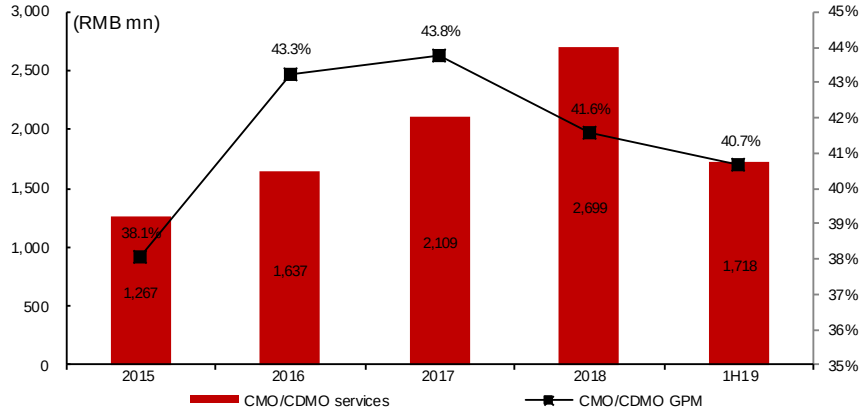
Fast expanding facilities in small molecule APIs and drug product solutions

WuXi AppTec operates CDMO/CMO business through its subsidiary Shanghai SynTheAll Pharmaceutical (WuXi STA, 合全药业) which is currently 90.69% owned by WuXi AppTec. WuXi STA was privatized from New OTC Market (新三板) in Jun 2019.

Thanks to implementation of “Follow the Project, Follow the Molecule” strategy, WuXi AppTec seeks opportunities for new projects from clinical stage to commercialization stage, facilitating a sustainable and rapid growth of revenue from CDMO/CMO services.

In 1H19, revenue of CDMO/CMO services grew strongly by 42% YoY to RMB1.7bn, accounting for 29% of the Company’s total revenue. As of Sep 30, 2019, the Company’s small molecule CDMO/CMO pipeline has grown to more than 900 active projects, including 40 projects in Phase III and 17 projects in commercial manufacturing. Key commercial stage projects include ibrutinib, niraparib, roxadustat, fruquintinib, danoprevir, etc.

Figure 107: WuXi AppTec’s CDMO/CMO revenue



Source: Company data, CMBIS

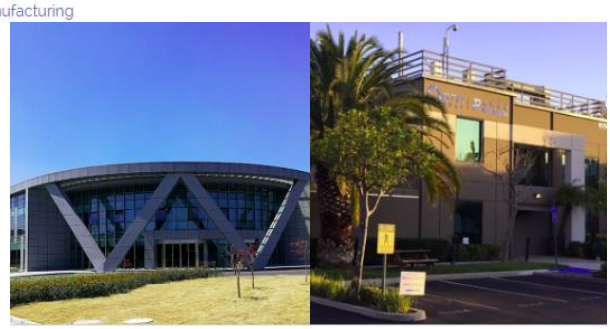
WuXi STA provides fully integrated small molecule API and drug product solutions to customers. WuXi STA has facilities in Shanghai (Waigaoqiao, Jinshan), Changzhou, Wuxi and San Diego.

Figure 108: WuXi STA’s facilities

Shanghai Waigaoqiao Site
API R&D, Drug Product R&D and Manufacturing

Shanghai Jinshan Site
API Manufacturing

Changzhou Jiangsu Site
API Integrated R&D and Manufacturing



Wuxi City Jiangsu Site
Drug Product Manufacturing

San Diego CA Site
API R&D and Manufacturing

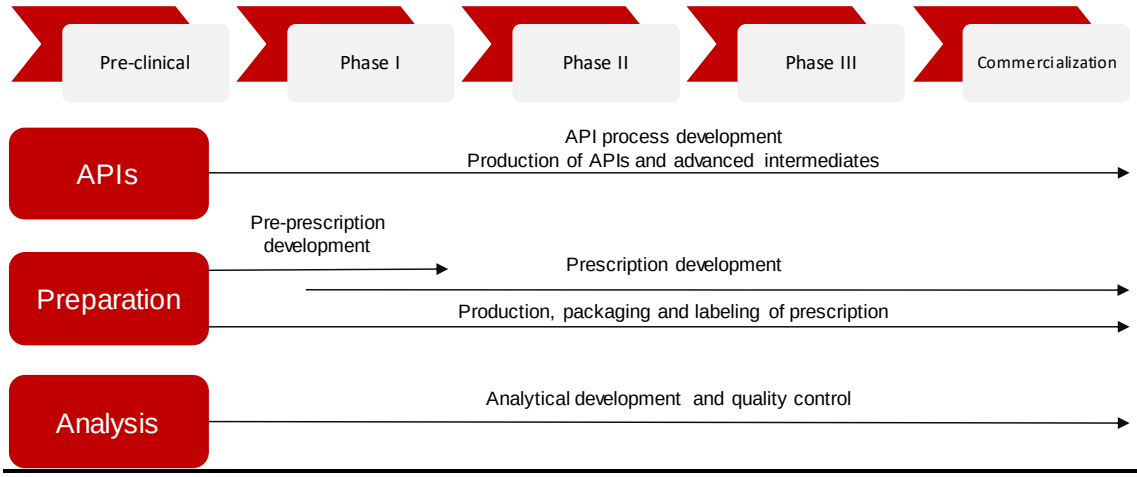
Source: Company data, CMBIS

As for API CDMO facilities, WuXi STA has over 1,000m³ reactor volume as of end-2018, meeting manufacturing demand from clinical phase to commercial phase. The Changzhou facility with over 1,700,000 square feet has established a variety of new technology platforms such as spray dried dispersion, continuous processing (flow chemistry), oligonucleotides and peptides. The Company has started construction of a new API process R&D center next to the current Jinshan site, adding 30,000 square meters of laboratories. In 2019, WuXi STA also initiated the third phase construction of a Changzhou API process development and manufacturing facility, which covers an additional 35 acres.

WuXi STA's drug product capabilities are also improving fast. In 2017, WuXi STA acquired the Pharmaceutical Development Services (PDS) division from the parent company, WuXi AppTec. The PDS division offers pre-formulation development, formulation development, as well as Clinical Trial Material (CTM) manufacturing, packaging and labeling of oral solid dosage forms including tablets, capsules, sachets and oral solutions/suspensions. PDS also established various enabling technology platforms for low soluble drugs including spray dried dispersion, hot melt extrusion, micro or nano suspension and liquid-filled hard gelatin capsules. After the merger, WuXi STA can provide fully integrated small molecule API and drug product solutions services. In 2018, two new commercial drug product facilities - in Shanghai and Wuxi - have commenced operation.

WuXi STA continued to expand its biocatalysis services. Its 500 litre biocatalysis bioreactor in API manufacturing facility in Jinshan began operation in 1H19. Meanwhile, the Company has expanded its oligonucleotide and polypeptide CDMO capabilities. In early 2019, the Company's oligonucleotide and polypeptide cGMP pilot facility began operation and completed the first cGMP campaign for clinical usage material in 1H19. The commercial manufacturing oligonucleotide and polypeptide platforms are under construction and may begin operation by the end of 2019 and the first half of 2020, respectively.

Figure 109: CDMO/CMO services provided by WuXi STA



Source: Company data, CMBIS

Strategic cooperation with customers to secure orders

Currently, majority of growth in CDMO business was driven by overseas orders. We highlight that Tesaro's niraparib (a PARP inhibitor) has contributed significant income for the CDMO business. Sales of niraparib were £64mn in 3Q19, up 12% QoQ.

In May 2016, the State Council issued the pilot program of MAH, which adopts a management model that separates drug marketing authorization from production authorization. Drug marketing authorization holders can produce drugs themselves or entrust the production of drugs to any manufacturer meeting GMP conditions. Under this system, drugs can be manufactured without extensive fixed-asset investments. The implementation of MAH system will drive the growth of the CDMO/CMO industry.

As of Jun 30, 2019, WuXi STA has 11 projects under China's Marketing Authorization Holder ("MAH") pilot program. In Jun 2018, Ascletis's innovative drug danoprevir received approval from NMPA. With this approval, WuXi STA became the first CDMO to support the launch of innovative drugs in China since the implementation of MAH pilot program. In Sep 2018, Hutchison MediPharma (HMP) received approval of fruquintinib from the NMPA which is the second innovative drug approval in China supported by WuXi STA under the MAH scheme.

In order to better secure the orders from start-up biotech companies, WuXi STA has established strategic cooperation with many China-based biotech companies, such as Impact Therapeutics (英派药业), Dizal Pharmaceutical (迪哲医药), Beta Pharma (倍而达药业), Ark Biosciences (爱科百发), Antengene Corporation (德琪医药), etc. WuXi STA usually provides "end-to-end" CMC support for new drug development from preclinical to commercial – for both API and finished dosage forms for these strategic partners. There's also higher chance for WuXi STA to further provide MAH services for these strategic partners.

Clinical research services expand with strong demand

WuXi AppTec offers clinical research services mainly through two wholly-owned subsidiaries, Medkey (上海津石, providing SMO services) and Shanghai AppTec CDS (康德弘毅, providing CDS services).

Clinical development services (CDS) include project planning, clinical operation, monitoring and management of phase I-IV clinical trials, outcomes research, etc. Site management organization (SMO) services contain project management and clinical site management services.

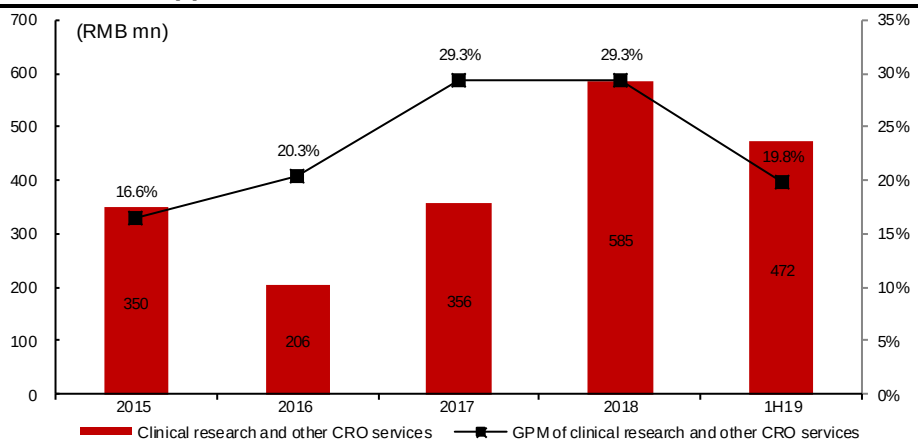
The Company's SMO team has more than 2,200 clinical research coordinators distributed in more than 120 cities throughout China by Jun 30, 2019 vs 1,800 staff by end-2018. WuXi AppTec now provides SMO services in more than 900 hospitals in China.

By Jun 30, 2019, WuXi AppTec's CDS team has more than 850 employees vs 750 employees by end-2018. In Apr 2019, WuXi AppTec appointed Dr. Frederick H. Hausheer as the Chief Medical Officer. With his extensive clinical experience in both the U.S. and China, Dr. Frederick H. Hausheer will improve the Company's capabilities in design of medical and clinical development programs.

WuXi AppTec has been consistently strengthening its clinical development capabilities globally. In Jul 2018, WuXi AppTec acquired ResearchPoint Global (RPG), a US-based contract clinical research organization, and expanded its clinical research business to the US. In May 2019, WuXi AppTec acquired Pharmapace, Inc., a clinical research services company with expertise of providing high quality biometrics services, which further strengthened the Company's expertise in clinical research services. We think WuXi AppTec will grow its clinical research business globally and we see large potential for business expansion in overseas countries.

Thanks to active acquisitions, fast expanding team size and improving clinical capabilities, WuXi AppTec has experienced phenomenal growth in its clinical research services during recent years. In 1H19, WuXi AppTec's revenue from clinical research and other CRO services rallied by 104% YoY to RMB472mn, contributing 8.0% of the Company's total revenue. Excluding impact from acquisitions, the organic growth in clinical research and other CRO services revenue was as high as 68% YoY in 1H19. The gross margin decline in 1H19 was mainly due to additional amortization costs from the acquisitions of RPG and Pharmapace.

Figure 110: WuXi AppTec's clinical research and other CRO services revenue



Source: Company data, CMBIS

Cell & gene therapy will be the next growth engine

WuXi AppTec provides cell and gene therapy CDMO services in its facilities in the US and China. Its cell and gene therapies services cover process and analytical development from early to late phase to commercialization of cell and gene therapies and other therapies, including oncolytic viruses and CRISPR-edited cells. As of Sep 30, 2019, WuXi AppTec provides CDMO services for 33 clinical stage cell and gene therapies projects, including 24 projects in Phase I and 9 projects in Phase II/III.

WuXi AppTec is building capabilities in cell and gene therapies to support the evolving demands in this field. In Nov 2018, WuXi AppTec started the construction of its new 95,000 square foot building for cell and gene therapies services in the US. In 1H19, the Company's cell and gene therapies CDMO/CMO facility in Wuxi city began operation, providing services to customers in China. In Aug 2019, WuXi AppTec entered into strategic cooperation with GenSail Biotech (锦斯生物) to co-promote virus vector CDMO business. GenSail Biotech has expertise in engineering and developing a wide range of recombinant viruses, including adenoviruses, herpes simplex virus, Vesicular Stomatitis Virus (VSV), etc.

Cell and gene therapies are emerging fields in the global pharmaceutical market. In 2017, the FDA approved the first two CAR T-cell therapies in the US - Novartis' Kymriah and Kite/Gilead's Yescarta. Then in Dec 2017, Spark Therapeutics became the first company to ever have a gene therapy for a genetic disease approved by the FDA.

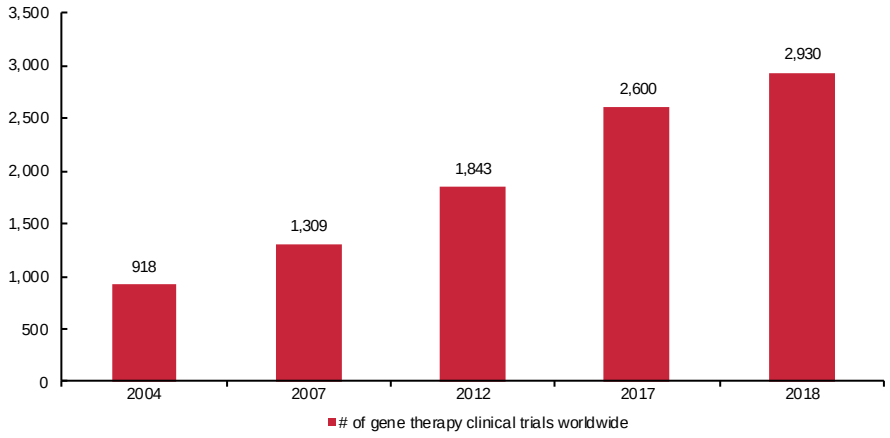
Figure 111: Approved gene therapy products worldwide

Trade name	Time of approval	Approved authority	Approved indication	Manufacturer
Gendicine	2003/10	NMPA	Head and neck squamous cell carcinoma	Shenzhen SiBiono GeneTech
Glybera	2012/11	EMA	Lipoprotein lipase deficiency	uniQure
Strimvelis	2016/06	EMA	Adenosine deaminase deficiency	GlaxoSmithKline
Kymriah	2017/08	FDA	Acute lymphoblastic leukaemia	Novartis Pharmaceuticals
Yescarta	2017/10	FDA	B-cell lymphoma	Kite Pharma (Gilead)
Luxtuma	2017/12	FDA	Retinal dytrophy (biallelic RPE65 mutation)	Spark Therapeutics

Source: Journal of Gene Medicine, CMBIS

We notice that the number of clinical trials of gene therapies are growing fast worldwide. According to The Journal of Gene Medicine, as of end-2018, there're around 2,930 gene therapy clinical trials have been completed, up 13% YoY.

Figure 112: Number of gene therapy clinical trials worldwide

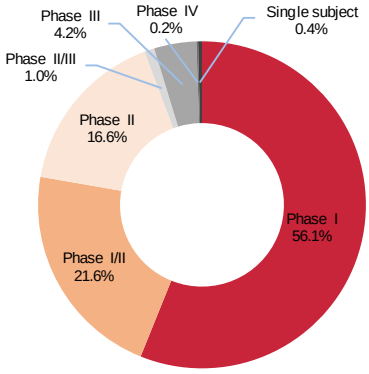


Source: Journal of Gene Medicine, CMBIS

The majority of gene therapy trials are still in phase I and phase I/II, indicating that the CDMO demand will further increase when these trials progress into late phase. As of 2018, among the total 2,930 trials, 56% are phase I trials and 22% are phase I/II trials.

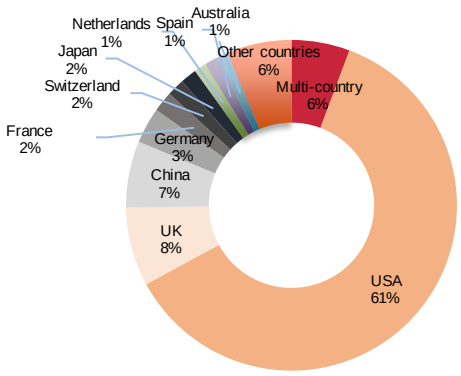
US and China have significant number of gene therapy clinical trials, accounting for 61% and 7% of total number of trials worldwide, respectively. With facilities located in the US and China, WuXi AppTec is well positioned to support the robust cell and gene therapies CDMO demand in these two countries.

Figure 113: Phase breakdown of gene therapy clinical trials worldwide in 2018



Source: Journal of Gene Medicine, CMBIS

Figure 114: Geographic distribution of gene therapy clinical trials in 2018



Source: Journal of Gene Medicine, CMBIS

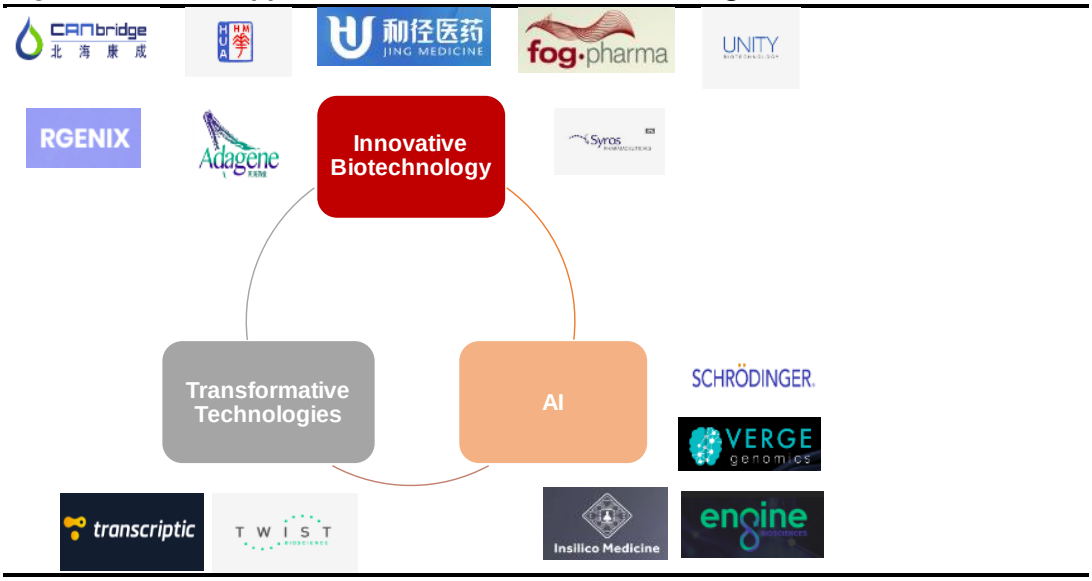
Global CDMOs are expanding their capabilities in gene and cell therapies via acquisitions. Given the rising demand for viral vectors, two big acquisitions happened in 2019 – Thermo Fisher's US$1.7bn purchase of Brammer Bio and Catalent's US$1.2bn deal to buy Paragon Bioservices.

Frost and Sullivan forecasts that the global cell and gene therapies CDMO/CMO market size was approximately US$1.5bn in 2018 and will grow to US$3.6bn by 2022E, implying a 24.5% CAGR between 2018 and 2022E. Meanwhile, F&S estimates that cell and gene therapies CDMO/CMO market size in China will reach around US$500mn by 2022E.

Investment in new technologies

In order to maintain the leading position in drug discovery and development services, WuXi AppTec has consistently invested in innovative technologies to stay at the forefront of the industry. WuXi AppTec's investments mainly focus on new technologies, covering areas such as innovative biotechnology, AI and transformative technologies.

Figure 115: WuXi AppTec's investments in new technologies



Source: Company data, CMBIS

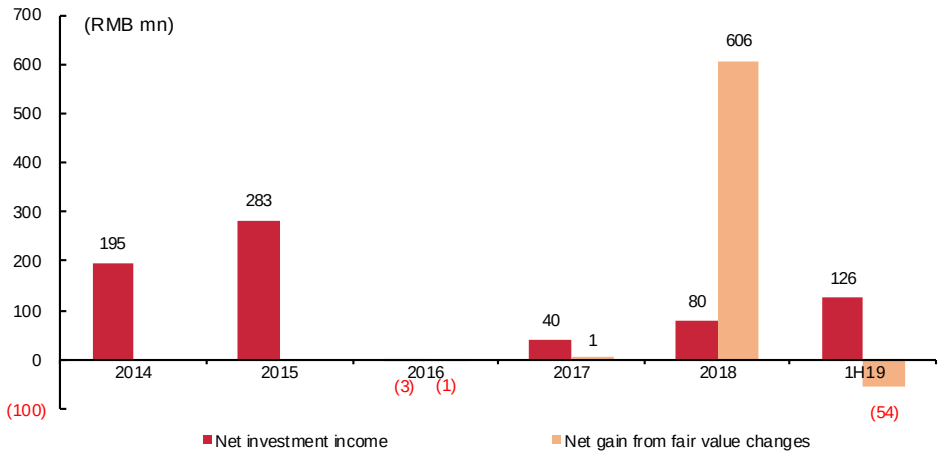
WuXi AppTec have established joint ventures and made selective investments in a wide variety of companies within the healthcare ecosystem. WuXi AppTec primarily invests in 1) companies that fit into and support the Company's existing value chain, 2) cutting edge technologies that will advance the healthcare industry, 3) strategic long-term investments and 4) venture capital funds.

As at Jun 30, 2019, WuXi AppTec maintained a diversified investment portfolio with 61 companies and funds (excluding investments in joint ventures and associates). As of Jun 30, 2019, WuXi AppTec has RMB2,516mn non-current portion of financial assets at fair value through profit or loss (FVTPL) which includes listed equity securities, unlisted equity investments and unlisted fund investments. Balance of top five investments amounted to RMB1,353mn, including Hua Medicine (华领医药), Jinxin Fertility (锦欣生殖), Unity Biotechnology, Adagene (天演药业) and CANbridge Pharmaceuticals (北海康成).

Moreover, as at Jun 30, 2019, WuXi AppTec had RMB787mn long-term equity investment in joint ventures and associates, mainly CW Data (中电药明), Jing Medicine Technology (和径医药科技), PICA Health (云鹊医), Clarity Medical (清晰医疗), and investments through WuXi Healthcare Ventures II L.P.

WuXi AppTec recognizes investment income/loss from JV and associates and gain/loss from fair value changes of its investment portfolio. The overall investment gain is volatile but contributes significant positive gains over the long term.

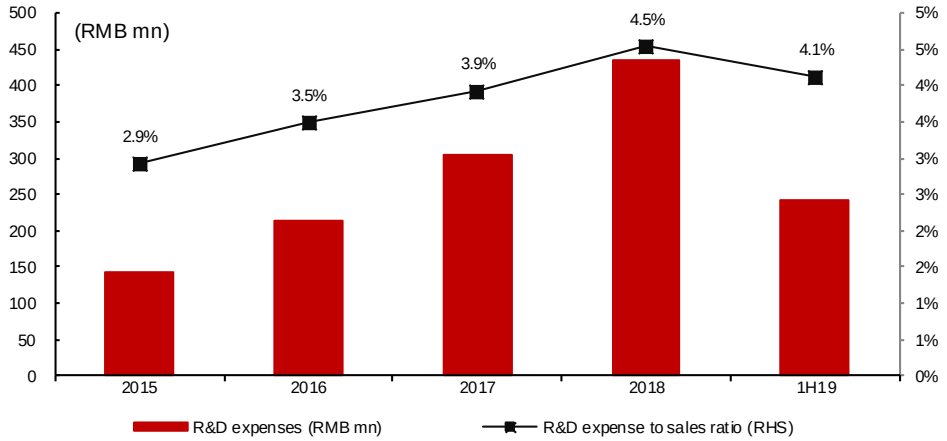
Figure 116: WuXi AppTec's net investment income and net gain from fair value changes



Source: Company data, CMBIS

In addition to investments in a variety of companies with new technologies, WuXi AppTec has also consistently invested in R&D. In 1H19, the Company's R&D expenses reach RMB244mn, up 37% YoY. The expenses mainly incurred in the establishment of DNA-encoded chemical library ("DEL"), synthetic chemical AI/machine learning, research on mechanism of new drugs, establishment of animal models, R&D activities such as the research on new synthesis process and R&D projects of new products and new technology platforms (including oligonucleotides, peptides and asymmetric synthesis catalytic enzymes).

Figure 117: WuXi AppTec's R&D expenses keep rising



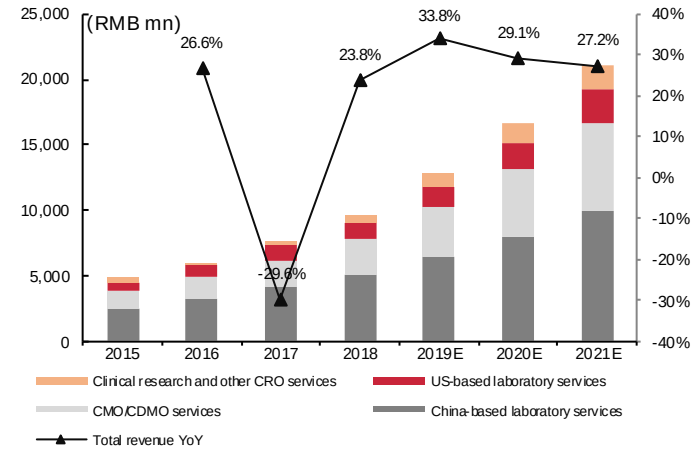
Source: Company data, CMBIS

Solid financial performance

Expect revenue to grow at 30.0% CAGR in 2019-21E

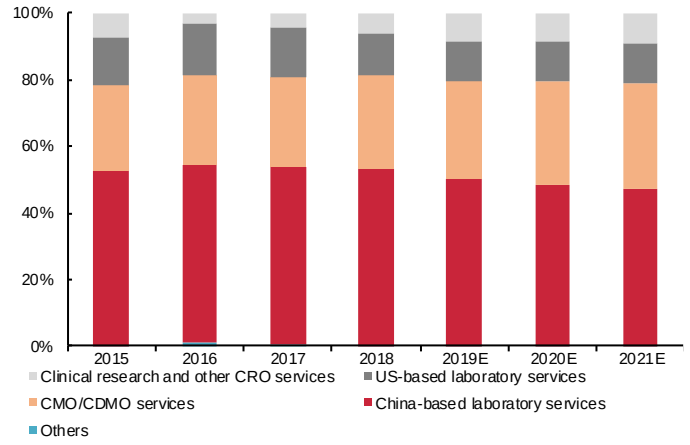
We estimate total revenue to grow at 33.8%/ 29.1% 27.2% in FY19E/20E/21E. Income from China-based laboratory/ CDMO/ US-based laboratory/ Clinical research and other CRO services will deliver 24.8%/35.9%/28.0%/47.7% sales CAGR in FY19-21E, driven by 1) solid growth from China-based laboratory, 2) market share gain in overseas market and 3) capacity enhancement in laboratory testing, API CDMO and cell & gene therapy CDMO.

Figure 118: Revenue growth estimates



Source: Company data, CMBIS estimates

Figure 119: Revenue breakdown (2015A-2021E)



Source: Company data, CMBIS estimates

Figure 120: WuXi AppTec's revenue forecasts

RMB (mn)	2015	2016	2017	2018	2019E	2020E	2021E
China-based laboratory services	2,554	3,270	4,121	5,113	6,414	8,018	9,942
YoY		*28.0%*	*26.0%*	*24.1%*	*25.4%*	*25.0%*	*24.0%*
CMO/CDMO services	1,267	1,637	2,109	2,699	3,803	5,134	6,777
YoY		*29.2%*	*28.8%*	*28.0%*	*40.9%*	*35.0%*	*32.0%*
US-based laboratory services	704	935	1,135	1,204	1,565	2,004	2,525
YoY		*32.9%*	*21.3%*	*6.1%*	*30.0%*	*28.0%*	*26.0%*
Clinical research and other CRO services	350	206	356	585	1,073	1,449	1,883
YoY		*-41.1%*	*72.6%*	*64.2%*	*83.5%*	*35.0%*	*30.0%*
Others	9	68	45	13	12	12	12
YoY		*680.8%*	*-33.5%*	*-72.1%*	*-3.7%*	*0.0%*	*0.0%*
Total revenue	**4,883**	**6,116**	**7,765**	**9,614**	**12,868**	**16,616**	**21,139**
Total revenue YoY		***26.6%***	***-29.6%***	***23.8%***	***33.8%***	***29.1%***	***27.2%***

Source: Company data, CMBIS estimates

Expect adjusted non-IFRS NP to grow at 29.9% CAGR

We estimate total net profit to change -5.7%/ 33.2%/ 26.5% YoY in FY19E/20E/21E and adjusted non-IFRS net profit (excluding non-recurring gains or losses and stock-incentive costs) to grow at 32.9%/ 29.1%/ 27.7% YoY in FY19E/20E/21E. We expect GPM margin to be 38.6%/ 38.7%/ 39.1% in FY19E/20E/21E. The slight GPM decline in FY19 was owing to the ramp up of low-margin clinical CRO services and additional intangible asset amortization from acquisitions. We assume operating expense ratios to stay stable onwards.

Figure 121: WuXi AppTec's net profit forecasts

RMB (mn)	2015	2016	2017	2018	2019E	2020E	2021E
Revenue	4,883	6,116	7,765	9,614	12,868	16,616	21,139
YoY		*25.2%*	*27.0%*	*23.8%*	*33.8%*	*29.1%*	*27.2%*
Cost of goods sold	(3,196)	(3,623)	(4,517)	(5,821)	(7,904)	(10,183)	(12,883)
% of revenue		*-59.2%*	*-58.2%*	*-60.5%*	*-61.4%*	*-61.3%*	*-60.9%*
Gross profit	1,687	2,493	3,248	3,793	4,964	6,433	8,256
GPM	*34.55%*	*40.76%*	*41.83%*	*39.45%*	*38.58%*	*38.71%*	*39.05%*
Business taxes	(9)	(15)	(26)	(29)	(34)	(44)	(55)
% of revenue		*-0.2%*	*-0.3%*	*-0.3%*	*-0.3%*	*-0.3%*	*-0.3%*
Selling expenses	(186)	(200)	(292)	(338)	(456)	(590)	(750)
% of revenue		*-3.3%*	*-3.8%*	*-3.5%*	*-3.5%*	*-3.6%*	*-3.6%*
Administrative expenses	(987)	(1,037)	(964)	(1,131)	(1,549)	(2,091)	(2,766)
% of revenue		*-17.0%*	*-12.4%*	*-11.8%*	*-12.0%*	*-12.6%*	*-13.1%*
R&D expenses			(306)	(437)	(592)	(731)	(888)
% of revenue			*-3.9%*	*-4.5%*	*-4.6%*	*-4.4%*	*-4.2%*
Finance cost	12	84	(184)	(56)	(51)	(64)	(64)
% of revenue	*0.3%*	*1.4%*	*-2.4%*	*-0.6%*	*-0.4%*	*-0.4%*	*-0.3%*
Asset impairment losses	(31)	(31)	(141)	(2)	1	-	-
% of revenue	*-0.6%*	*-0.5%*	*-1.8%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Credit impairment losses	-	-	-	(11)	(1)	-	-
% of revenue	*0.0%*	*0.0%*	*0.0%*	*-0.1%*	*0.0%*	*0.0%*	*0.0%*
Other income			101	107	139	140	140
% of revenue			*1.3%*	*1.1%*	*1.1%*	*0.8%*	*0.7%*
Net investment income	283	(3)	40	80	176	180	180
% of revenue	*5.8%*	*0.0%*	*0.5%*	*0.8%*	*1.4%*	*1.1%*	*0.9%*
Net gain from fair value changes	-	(1)	1	606	(24)	212	306
% of revenue	*0.0%*	*0.0%*	*0.0%*	*6.3%*	*-0.2%*	*1.3%*	*1.4%*
Asset disposal gains (losses)	2	(5)	(18)	1	2	-	-
% of revenue	*0.0%*	*-0.1%*	*-0.2%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Operating profit	772	1,285	1,461	2,585	2,573	3,445	4,358
OPM	*15.8%*	*21.0%*	*18.8%*	*26.9%*	*20.0%*	*20.7%*	*20.6%*
Non-operating income & expenses	30	98	132	(4)	(6)	-	-
% of revenue	*0.6%*	*1.6%*	*1.7%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Total profit	801	1,382	1,593	2,581	2,568	3,445	4,358
PBTM	*16.4%*	*22.6%*	*20.5%*	*26.8%*	*20.0%*	*20.7%*	*20.6%*
Income tax expense	(118)	(261)	(296)	(247)	(344)	(482)	(610)
Income tax rate	*-14.7%*	*-18.9%*	*-18.6%*	*-9.6%*	*-13.4%*	*-14.0%*	*-14.0%*
Net profit	684	1,121	1,297	2,334	2,224	2,962	3,748
Minority interests	(335)	(146)	(70)	(73)	(93)	(124)	(157)
Net profit to shareholders	349	975	1,227	2,261	2,131	2,839	3,591
NPM	*7.1%*	*15.9%*	*15.8%*	*23.5%*	*16.6%*	*17.1%*	*17.0%*
YoY		*179.4%*	*25.9%*	*84.2%*	*-5.7%*	*33.2%*	*26.5%*
Adjusted net profit (non-IFRS)	180	878	1,413	1,742	2,314	2,987	3,815
Adjusted NPM	*3.7%*	*14.4%*	*18.2%*	*18.1%*	*18.0%*	*18.0%*	*18.0%*
YoY		*389.1%*	*60.9%*	*23.2%*	*32.9%*	*29.1%*	*27.7%*

Source: Company data, CMBIS estimates
Note: Adjusted net profit excluded non-recurring items according to IFRS accounting principle.

Valuation

Initiate BUY with TP HK$114.73 (25.67% Upside)

We derived our 12-month TP from SOTP valuation methodology and our TP of HK$114.73 is based on 45x FY21E PE of core CRO/CDMO business and 2x PB multiple valuation of investment business. We assigned 45x FY21E P/E to CRO/CDMO business, given WuXi AppTec's 29.9% growth CAGR in Adjusted non-IFRS net profit in FY19-21E, the Company's TOP 1 position in China CRO/CDMO market and expanding market share in global CRO/CDMO sector. Our target price of HK$114.73 indicates 52x FY21E PE.

We also did a valuation cross check with DCF model. We derived value per share of HK$116.64 based on assumptions of WACC of 9.98% and terminal growth rate of 4%.

Figure 122: WuXi AppTec–SOTP valuation

SOTP valuation	2021E
Attributable non-IFRS net profit (RMB mn, 2021E)	3,815
PE multiple of core business (2021E)	45.0
Valuation of CRO/CDMO business (RMB mn)	**171,679**
Fair value of other non-current financial assets (RMB mn)	8,109
PB multiple of investment business (2021E)	2.0
Valuation of investment business (RMB mn)	**16,218**
SOTP valuation (RMB mn)	**187,898**
# of shares	1,637,704,965
Target price (RMB per share)	**114.73**

Source: Company data, CMBIS estimates

Figure 123: Peers' valuation

Company	Ticker	Rating	Mkt Cap (US$ mn)	Net profit YoY FY19E	Net profit YoY FY20E	Net profit YoY FY21E	P/E (x) FY19E	P/E (x) FY20E	P/B (x) FY19E	P/B (x) FY20E	ROE (%) FY19E	ROE (%) FY20E
H-share												
WuXi AppTec	2359 HK	Buy	21,110	-5.7%	33.2%	26.5%	63.8	53.4	42.2	7.5	6.7	11.0
WuXi Biologics	2269 HK	Buy	15,260	54.3%	42.8%	46.8%	109.3	76.5	52.1	11.9	10.3	11.5
Pharmaron	3759 HK	NR	5,096	45.1%	36.4%	33.5%	48.9	35.9	26.8	9.0	7.4	17.9
Frontage	1521 HK	NR	1,078	92.4%	39.0%	32.3%	48.8	31.6	23.3	4.1	3.6	14.1
VIVA Biotech	1873 HK	NR	873	60.1%	87.4%	46.6%	44.6	23.7	16.2	3.2	3.0	11.7
	Average			**49.3%**	**47.8%**	**37.1%**	**63.1**	**44.2**	**32.1**	**7.1**	**6.2**	**13.2**
A-share												
WuXi AppTec	603259 CH	Buy	21,110	-5.7%	33.2%	26.5%	70.2	52.7	7.4	6.6	11.0	13.1
Tigermed	300347 CH	Buy	6,874	46.2%	38.5%	39.2%	70.0	50.6	11.7	10.3	14.71	18.41
Pharmaron	300759 CH	NR	5,096	45.1%	36.4%	33.5%	61.1	44.8	11.2	9.2	17.9	20.1
Joinn Lab	603127 CH	NR	1,401	41.8%	38.9%	36.1%	64.2	46.2	12.6	10.5	19.6	22.4
Asymchem Lab	002821 CH	NR	938	32.8%	32.2%	32.2%	51.9	39.3	9.7	8.0	18.9	20.4
	Average			**32.0%**	**35.8%**	**33.5%**	**63.5**	**46.7**	**10.5**	**8.9**	**16.4**	**18.9**

Source: Bloomberg, CMBIS estimates, as at Dec 12, 2019.

Figure 124: WuXi AppTec's DCF valuation

DCF Valuation (in Rmb mn)	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	2,637	2,619	3,509	4,422	5,970	8,000	10,639	14,044	18,398	23,917
Tax rate	9.58%	13.39%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%
EBIT*(1-tax rate)	2,385	2,268	3,017	3,803	5,134	6,880	9,150	12,078	15,822	20,569
+ D&A	501	613	758	826	950	1,083	1,224	1,371	1,522	1,674
- Change in working capital	(837)	(431)	(748)	(917)	(1,054)	(1,202)	(1,358)	(1,521)	(1,689)	(1,858)
- Capx	(2,249)	(1,800)	(1,500)	(1,000)	(1,150)	(1,311)	(1,481)	(1,659)	(1,842)	(2,026)
FCFF	**(201)**	**650**	**1,527**	**2,713**	**3,880**	**5,450**	**7,534**	**10,269**	**13,814**	**18,359**
Terminal value										**319,508**
% change		-423.99%	134.80%	77.62%	43.04%	40.46%	38.25%	36.29%	34.52%	32.91%

Terminal growth rate	**4.00%**
WACC	**9.98%**
Cost of Equity	12.43%
Cost of Debt	5.00%
Equity Beta	0.82
Risk Free Rate	3.00%
Market Risk Premium	11.50%
Target Debt to Asset ratio	30.00%
Effective Corporate Tax Rate	15.00%
Terminal value	149,313
Total PV	185,754
Net debt	(5,265)
Equity value	191,019
# of shares (mn)	1,637,704,965
DCF per share (in RMB)	**116.64**

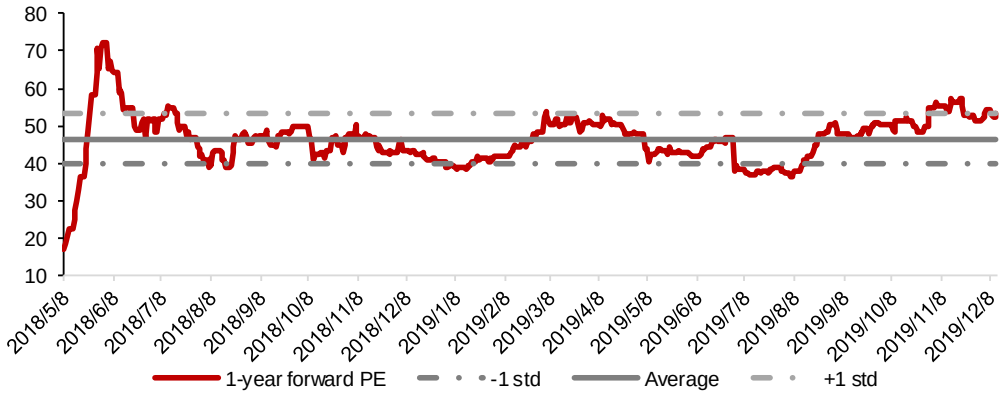
Source: Company data, CMBIS estimates

Figure 125: Sensitivity analysis

		Terminal growth rate				
		3.00%	**3.50%**	**4.00%**	**4.50%**	**5.00%**
Equity beta	**0.62**	140.57	152.80	167.83	186.76	211.30
	0.72	119.15	127.81	138.16	150.71	166.28
	0.82	102.82	109.19	**116.64**	125.44	136.01
	0.92	89.99	94.82	100.36	106.79	114.33
	10.20	5.51	5.51	5.51	5.51	5.51

Source: Company data, CMBIS estimates

Figure 126: Historical 1-year forward PE ratio of WuXi AppTec



Source: Company data, CMBIS

Financial Summary

Income statement

YE Dec 31 (RMB mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Revenue	**7,765**	**9,614**	**12,868**	**16,616**	**21,139**
China-based laboratory services	4,121	5,113	6,414	8,018	9,942
CMO/CDMO services	2,109	2,699	3,803	5,134	6,777
US-based laboratory services	1,135	1,204	1,565	2,004	2,525
Clinical research and other CRO services	356	585	1,073	1,449	1,883
Others	45	13	12	12	12
Cost of sales	(4,517)	(5,821)	(7,904)	(10,183)	(12,883)
Gross profit	**3,248**	**3,793**	**4,964**	**6,433**	**8,256**
Business taxes	(26)	(29)	(34)	(44)	(55)
Selling & distribution expenses	(292)	(338)	(456)	(590)	(750)
Administrative expenses	(964)	(1,131)	(1,549)	(2,091)	(2,766)
R&D expenses	(306)	(437)	(592)	(731)	(888)
Operating profit	**1,662**	**1,859**	**2,333**	**2,977**	**3,796**
Finance costs, net	(184)	(56)	(51)	(64)	(64)
Investment gains	40	80	176	180	180
Net gain from fair value changes	1	606	(24)	212	306
Other gains	75	92	135	140	140
Pre-tax profit	**1,593**	**2,581**	**2,568**	**3,445**	**4,358**
Income tax	(296)	(247)	(344)	(482)	(610)
Minority interests	(70)	(73)	(93)	(124)	(157)
Net profit	**1,227**	**2,261**	**2,131**	**2,839**	**3,591**

Cash flow summary

YE Dec 31 (Rmb mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Total net profit	**1,297**	**2,334**	**2,224**	**2,962**	**3,748**
Depreciation and amortization	478	650	762	907	976
Change in working capital	(46)	(837)	(431)	(748)	(917)
Investment loss (gain)	(23)	(676)	(154)	(392)	(486)
Other operating activities	87	170	51	64	64
Net cash from operating activities	**1,794**	**1,640**	**2,452**	**2,794**	**3,384**
Capex	(1,363)	(2,249)	(1,800)	(1,500)	(1,000)
Acquisition of subsidiaries	(851)	(124)	-	-	-
Other investing activities	1,090	(2,904)	(2,000)	(1,500)	(1,500)
Net cash from investing activities	**(1,124)**	**(5,277)**	**(3,800)**	**(3,000)**	**(2,500)**
Net proceeds from shares issued	31	9,252	400	400	400
Net borrowings	1,135	(1,518)	2,000	-	-
Acquisition of non-controlling interests					
Dividends and interests paid	(59)	(103)	(691)	(916)	(1,141)
Other financing activities	(1,782)	(647)	-	-	-
Net cash from financing activities	**(674)**	**6,984**	**1,709**	**(516)**	**(741)**
FX changes	(36)	(56)	-	-	-
Net change in cash	(5)	3,348	362	(722)	143
Cash at the beginning of the year	2,507	2,466	5,761	6,122	5,400
Cash at the end of the year	**2,466**	**5,758**	**6,122**	**5,400**	**5,543**

Balance sheet

YE Dec 31 (Rmb mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Non-current assets	**7,114**	**10,861**	**14,053**	**16,538**	**18,548**
Fixed asset	2,834	3,491	4,680	5,423	5,596
Intangible assets	426	626	583	539	495
Financial assets	683	2,079	4,231	6,123	8,109
Goodwill	958	1,144	1,144	1,144	1,144
Other non-current assets	2,213	3,520	3,414	3,309	3,203
Current assets	**5,467**	**11,807**	**12,698**	**12,868**	**14,098**
Cash	2,472	5,761	6,122	5,400	5,543
Inventories	727	952	1,083	1,367	1,694
Trade and bills receivables	1,597	1,997	2,397	3,005	3,764
Prepayments, deposits and other receivables	78	168	168	168	168
Other current assets	593	2,929	2,929	2,929	2,929
Current liabilities	**4,619**	**3,762**	**3,861**	**4,005**	**4,175**
Borrowings	1,318	120	120	120	120
Trade and other payables	333	399	498	642	812
Other current liabilities	2,968	3,243	3,243	3,243	3,243
Non-current liabilities	**1,223**	**740**	**2,740**	**2,740**	**2,740**
Borrowings	300	15	15	15	15
Other non-current liabilities	923	725	2,725	2,725	2,725
Total net assets	**6,738**	**18,165**	**20,150**	**22,661**	**25,731**
Minority interest	**396**	**477**	**570**	**694**	**851**
Shareholders' equity	**6,342**	**17,688**	**19,580**	**21,967**	**24,881**

Key ratios

YE Dec 31	FY17A	FY18A	FY19E	FY20E	FY21E
Sales mix (%)					
China-based laboratory services	53	53	50	48	47
CMO/CDMO services	27	28	30	31	32
US-based laboratory services	15	13	12	12	12
Clinical research and other CRO services	5	6	8	9	9
Others	1	0	0	0	0
Profit & loss ratios (%)					
Gross margin	42	39	39	39	39
EBITDA margin	29	34	26	27	26
Pre-tax margin	21	27	20	21	21
Net margin	16	24	17	17	17
Effective tax rate	19	10	13	14	14
Balance sheet ratios					
Current ratio (x)	1	3	3	3	3
Trade receivables turnover days	70	68	68	66	65
Trade payables turnover days	26	23	23	23	23
Net debt to total equity ratio (%)	Net cash	Net cash	Net cash	Net cash	Net cash
Returns (%)					
ROE	19	13	11	13	15
ROA	10	10	8	10	11
Per share					
EPS (RMB)	1.31	2.23	1.30	1.73	2.19
DPS (RMB)	0.00	0.06	0.39	0.52	0.66
BVPS (RMB)	7.19	17.92	12.30	13.84	15.71

Source: Company data, CMBIS estimates

WuXi Biologics (2269 HK)

Fast growing demand in biologicals outsourcing

Initiate at BUY. WuXi Biologics provides vertically integrated biological Contract Research Organization (CRO) and biological Contract Development Manufacturing Organization (CDMO) services, including drug discovery, development and manufacturing services. As of 2018, WuXi Biologics is one of the top 4 biological CRO companies worldwide with 3.2% market share. Our DCF-based TP of HK$106.18 implies 60x FY21E P/E.

- **Large potential for market share gain.** We expect WuXi Biologics to gain market share from global competitors thanks to the Company's advanced technology platforms in cell line development, bispecific antibody development, ADC development, OMT technology, perfusion manufacturing, etc. Benefiting from cheap labor costs and rich talent pool in China, WuXi Biologics provides high quality services with competitive costs to its customers. WuXi Biologics' fast expanding manufacturing facility enables the Company to meet the growing demand in biological CDMO worldwide.
- **Strong backlog growth supported by "follow the molecule" strategy.** WuXi Biologics tries to retain an early stage project to late stage and even commercialization to maximize revenue from a single project. As each project progresses from early stage of development to late stage and even commercialization, revenue from single project also increases. As of Jun 30, 2019, WuXi Biologics works on a total of 224 integrated projects, including 106 projects in pre-clinical development stage, 102 projects in early-phase (phase I and II) clinical development, 15 projects in late-phase (phase III) development and 1 project in commercial manufacturing.
- **Milestone and royalty fees contribute additional high-margin income.** WuXi Biologics can charge extra milestone fees or royalty fees from certain projects to share further upside from these projects. WuXi Biologics recorded US$2,894mn milestone fee backlog as of Jun 30, 2019. Nevertheless, due to the lengthy process for drug development, the milestone fee backlog may be realized in a prolonged time period.
- WuXi Biologics' backlogs surged from US$1,478m by end-2017 to US$4,630m by Jun 30, 2019. The management expects to realize US$850m revenue out of the total US$4,630m backlog within the next three years. We expect WuXi Biologics' adjusted net profit to grow by 53.9%/44.6%/46.7% YoY in FY19E/20E/21E, respectively, and attributable net profit to increase 54.4%/42.8%/46.8% YoY in FY19E/20E/21E.

Earnings Summary

(YE 31 Dec)	FY17A	FY18A	FY19E	FY20E	FY21E
Revenue (RMB mn)	1,619	2,534	3,800	5,576	8,157
Revenue YoY growth (%)	63.68	56.56	49.93	46.73	46.30
Net income (RMB mn)	253	631	973	1,390	2,041
EPS (RMB)	0.24	0.52	0.75	1.08	1.58
EPS YoY growth (%)	60.70	121.48	44.52	42.84	46.81
P/E (x)	349.83	157.95	109.29	76.52	52.12
P/B (x)	21.96	12.46	11.86	10.27	8.58
Yield (%)	0.00	0.00	0.00	0.00	0.00
ROE (%)	11.76	10.49	11.48	14.39	17.94
Net gearing (%)	Net cash	Net cash	Net cash	4.32	10.25

Source: Company data, CMBIS estimates

BUY (Initiation)

Target Price	HK$106.18
Current Price	HK$92.45
Up/Downside	+15%

China Healthcare Sector

Jill WU, CFA
Tel: (852) 3900 0842
Email: jillwu@cmbi.com.hk

Amy GE
Tel: (852) 3761 8778
Email: amyge@cmbi.com.hk

Stock Data

Mkt Cap (HK$ mn)	119,578
Avg 3 mths t/o (HK$ mn)	420.15
52w High/Low (HK$)	97.35/ 44.50
Total Issued Shares (mn)	1,293

Source: Bloomberg

Shareholding Structure

Management	40.46%
JPMorgan	5.65%
Citigroup	5.01%
Free float	48.88%

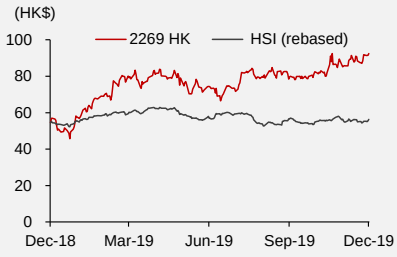
Source: HKEx

Share Performance

	Absolute	Relative
1-mth	6.0%	7.1%
3-mth	16.7%	18.9%
6-mth	23.1%	28.3%

Source: Bloomberg

12-mth Price Performance

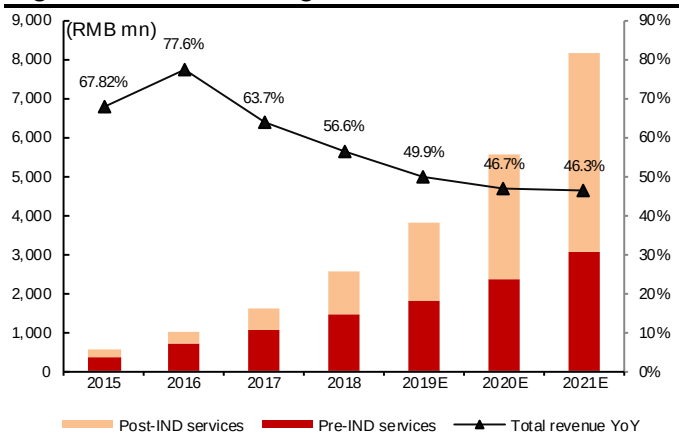


Source: Bloomberg

Auditor: Deloitte Touche Tohmatsu

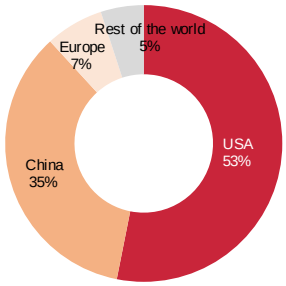
Focus Charts

Figure 127: WuXi Biologics' revenue trend



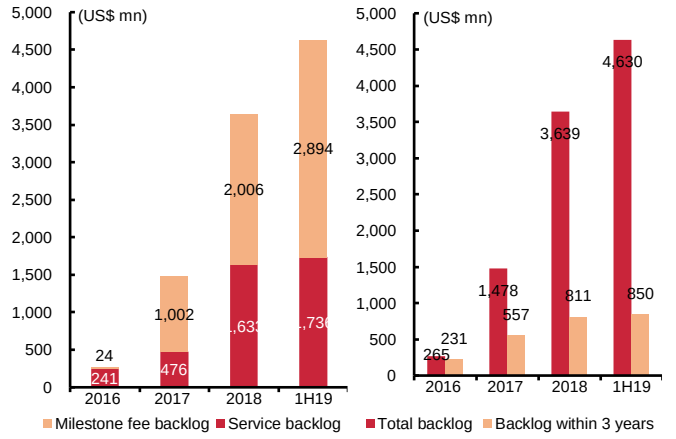
Source: Company data, CMBIS estimates

Figure 128: Revenue split by geography (1H19A)



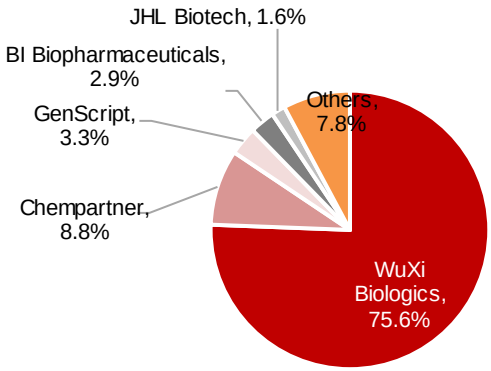
Source: Company data, CMBIS

Figure 129: Phenomenal growth in backlogs (2016-1H19)



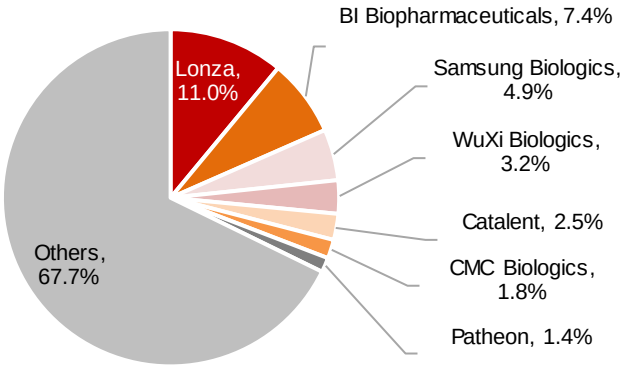
Source: Company data, CMBIS

Figure 130: China biologics CRO/CDMO market split by 2018 revenue



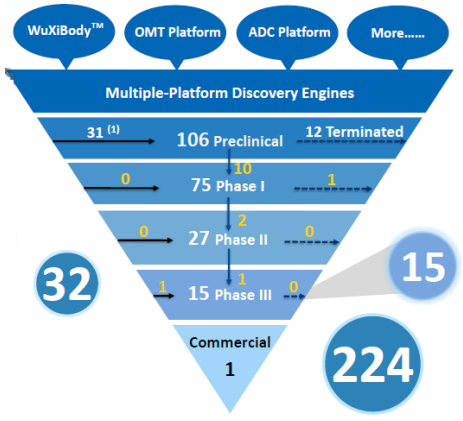
Source: Contract Pharma, BioPharm International, Fierce Pharma, Company data, CMBIS

Figure 131: Global biologics CRO/CDMO market split by 2018 revenue



Source: Contract Pharma, BioPharm International, Fierce Pharma, Company data, CMBIS

Figure 132: WuXi Biologics' growing pipeline projects (1H19)



Source: Company data, CMBIS

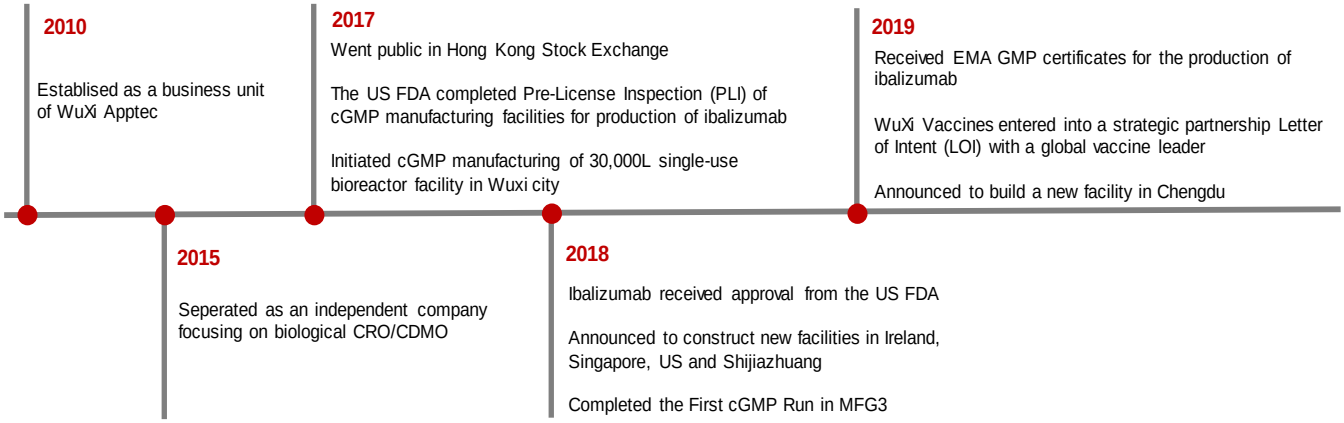
Global leading biological CRO/CDMO in China

Strong global presence

WuXi Biologics was established in 2010 as one of WuXi AppTec's business units. WuXi Biologics was separated as an independent company in 2015 and went public on the Hong Kong Stock Exchange (HKEX) in 2017.

The Company provides vertically integrated biological Contract Research Organization (CRO) and biological Contract Development Manufacturing Organization (CDMO) services, including drug discovery, development and manufacturing services.

Figure 133: Fast development in past 9 years

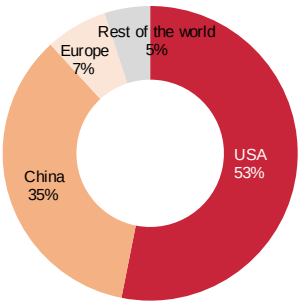


Source: Company data, CMBIS

As the first biologics company in China passing both US FDA and EMA GMP inspections, WuXi Biologics competes with global CRO/CDMO players. As of 2018, WuXi Biologics has grown into a top 4 biological CRO company in the world with 3.2% market share.

Geographically, WuXi Biologics generates majority of its income from US and China. In 1H19, the company received 53% of revenue from North America, 35% from China, 7% from Europe and 5% from rest of the world.

Figure 134: WuXi Biologics revenue split by geography (1H19A)



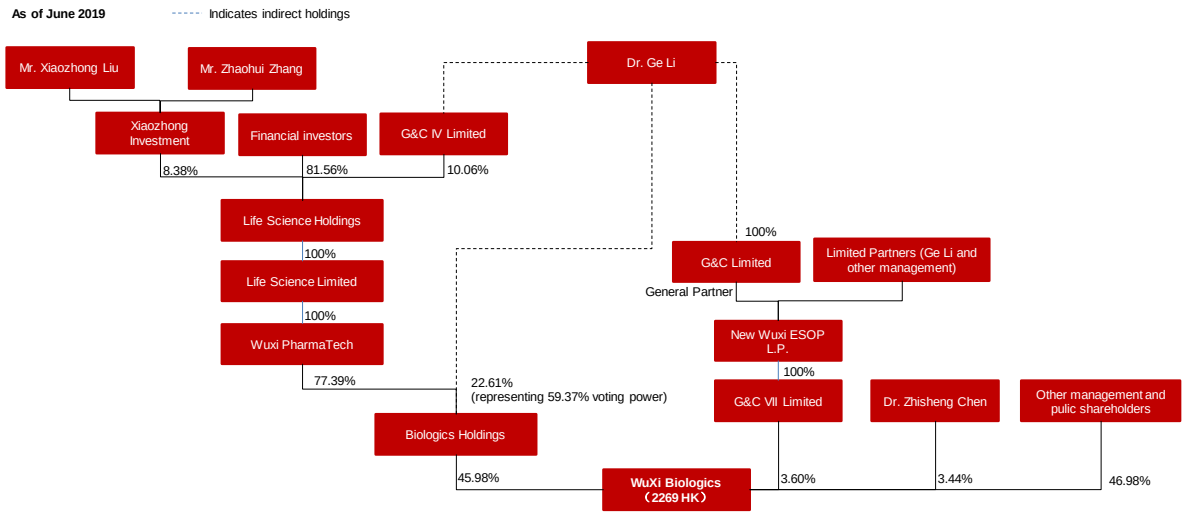
Source: Company data, CMBIS

WuXi Biologics is planning to build new capacities in China, Ireland, Singapore and the US. As of end-2018, WuXi Biologics is operating biopharmaceutical production capacity of 42,000 liters and its capacity is expected to expand to 52,000 liters by end-2019E, 112,000 liters by end-2020E and reach 280,000 liters by 2022E. We expect WuXi Biologics to grow into a large-scale biological CRO/ CDMO company with strong global presence in coming years.

Benefit from the "WuXi Ecosystem"

Dr. Ge Li is the founder and largest shareholder of WuXi Biologics. As of 30 Jun, 2019, Dr. Ge Li controlled the majority voting power of WuXi Biologics given the 46% shares held by Biologics Holdings and 3.6% shares held by G&C VII Limited. Dr. Ge Li is also the founder and Chairman of WuXi Apptec which is a sister company of WuXi Biologics mainly focusing on CRO and CDMO of chemical drugs and gene and cell therapies.

Figure 135: Shareholding structure of WuXi Biologics (as of Jun 30, 2019)



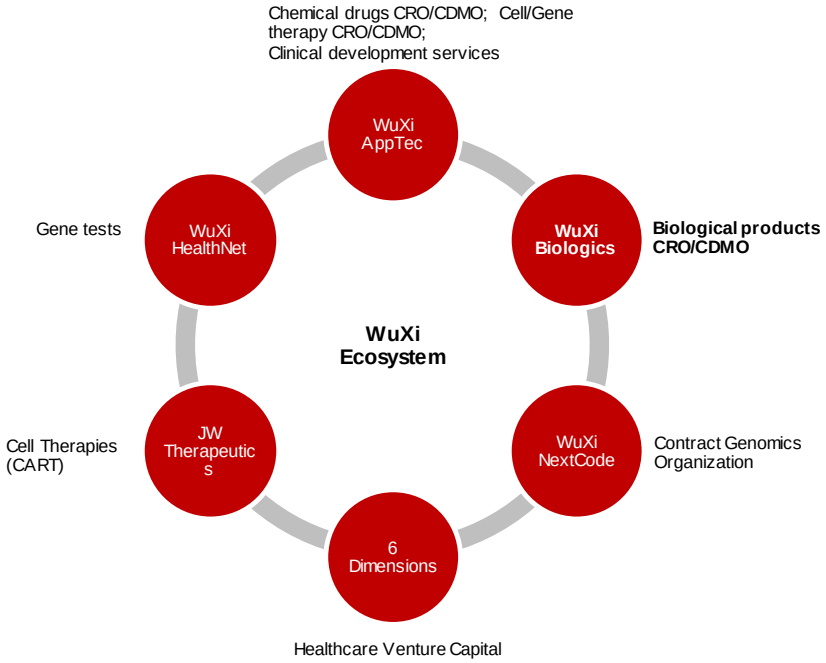
Source: Company data, Bloomberg, CMBIS

Dr. Ge Li's family also owns or controls various business within healthcare industry, including WuXi AppTec, WuXi NextCode, 6 Dimensions, WuXi HealthNet, JW Therapeutics, etc. His business covers a wide range of areas such as venture capital, cell therapies, gene tests, contract genomics organization, chemical drugs CRO/CDMO, cell/gene therapy CRO/CDMO, clinical development services, biologicals CRO/CDMO, etc. We see Dr. Ge Li has built an ecosystem within healthcare industry. We name it as "WuXi Ecosystem".

We highlight that 6 Dimensions as a venture capital focused on healthcare industry. 6 Dimensions currently has over RMB10bn assets under management and has invested in and cultivated a portfolio of 80 companies. We expect synergies between 6 Dimensions and WuXi Biologics because biotech companies invested by 6 Dimensions could potentially purchase services from WuXi Biologics.

We also see synergies between WuXi AppTec and WuXi Biologics. For instance, WuXi AppTec and WuXi Biologics could provide comprehensive one-stop services for one customer including small molecule R&D/manufacturing, biologicals R&D/manufacturing, clinical development, etc. Both companies are able to enhance customer attractiveness through cross-sell.

Figure 136: WuXi Biologics benefits from "WuXi Ecosystem"



Source: Company data, CMBIS

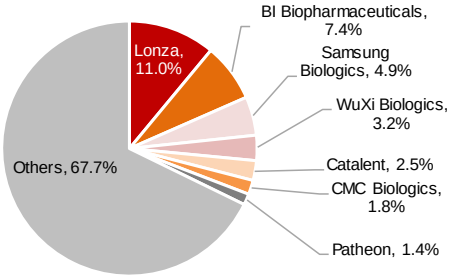
Market share gain thanks to "follow-the-molecule" strategy

Fragmented biologics outsourcing market

The global biologics outsourcing market is very fragmented. Lonza is the largest player in the world with 11% market share in 2018, followed by BI Biopharmaceuticals with 7.4% market share, Samsung Biologics with 4.9% market share and WuXi Biologics with 3.2% market share. On the other hand, WuXi Biologics has dominant place in Chinese biologics outsourcing market, occupying 75.6% market share in 2018.

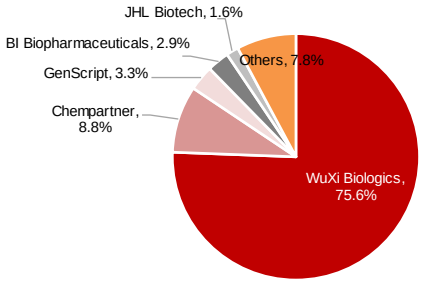
We expect WuXi Biologics to gain market share from global competitors thanks to the Company's advanced technology platforms in cell line development, bispecific antibody development, ADC development, OMT technology, perfusion manufacturing, etc. In addition, benefiting from cheap labor costs and rich talent pool in China, WuXi Biologics can provide high quality services with competitive costs to its customers. WuXi Biologics' fast expanding manufacturing facility also enables the Company to meet the growing demand in biological CDMO worldwide.

Figure 137: Market share of global biologics outsourcing market by revenue (2018)



Source: Contract Pharma, BioPharm International, Fierce Pharma, Company data, CMBIS

Figure 138: Market share of China biologics outsourcing market by revenue (2018)



Source: Contract Pharma, BioPharm International, Fierce Pharma, Company data, CMBIS

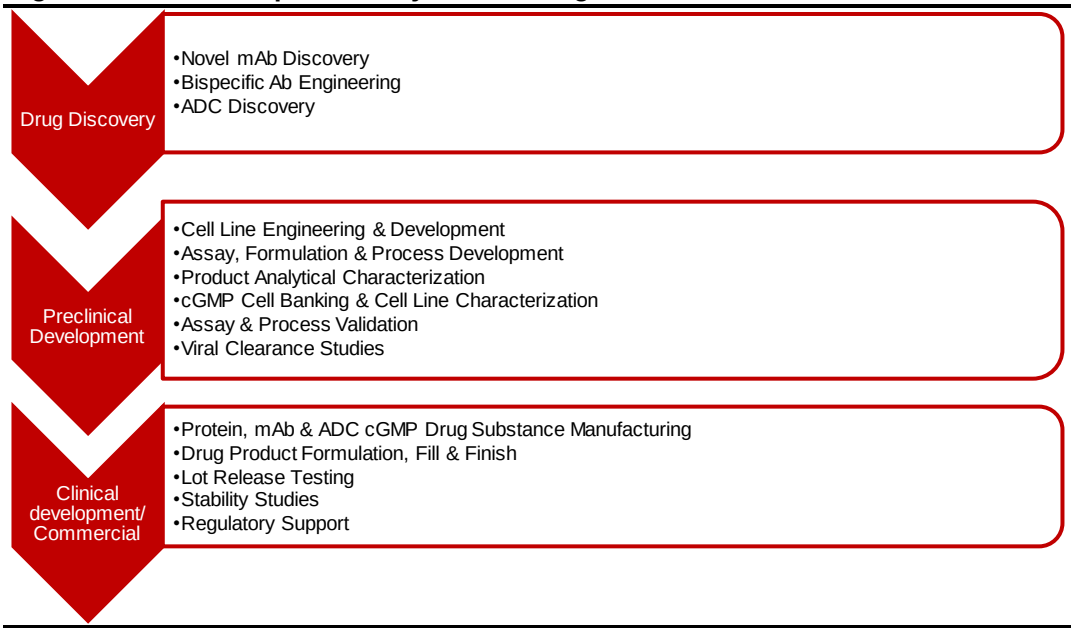
End-to-end services ehance customer stickiness

Due to the lengthy and costly technology transfer process for biological products, WuXi Biologics enjoys high customers' stickiness. Frost & Sullivan (F&S) estimates that, for a clinical or commercial stage project, it would typically take at least around 2 years for a customer to complete the technology transfer process, with costs ranging from US$5m to US$50m.

WuXi Biologics provides a wide breadth of services, covering the whole industry chain. Its end-to-end capabilities contain drug discovery, clinical manufacturing and commercial manufacturing services.

End-to-end services could potentially help customers to 1) shorten overall time from drug discovery to commercialization, 2) reduce costs and risks of technology transferring between different outsourcing organizations.

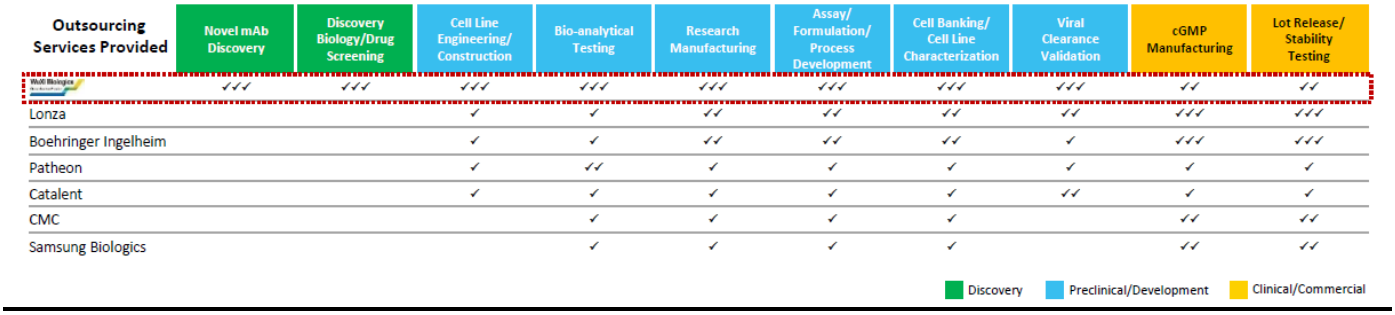
Figure 139: Services provided by WuXi Biologics



Source: Company data, CMBIS

Compared with other major biologics outsourcing service providers in the global market, WuXi Biologics offers fully-integrated services covering drug discovery, preclinical, clinical and commercial stages of biological drugs.

Figure 140: WuXi Biologics can provide fully-integrated biologics outsourcing services



Source: Company data, CMBIS

Strong backlog growth thanks to "follow-the-molecule" strategy

WuXi Biologics adopts a unique business model in the industry, named as "follow-the-molecule" strategy. It means that the company tries to retain an early stage project to late stage and even commercialization to maximize revenue from a single project.

WuXi Biologics can provide integrated services from drug discovery to commercial manufacturing. As each project progresses from early stage of development to late stage and even commercialization, revenue from single project also increases.

Figure 141: Revenue from each project increases with its stages

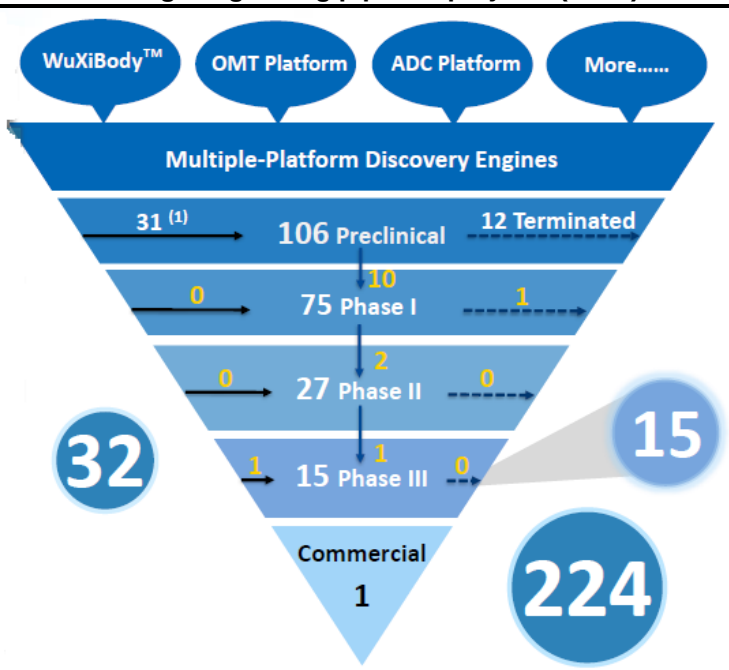
Biologics development process	Typical duration	Typical Revenue	On-going integrated project numbers (as of 31 Jun, 2019)
Pre-IND			
Drug discovery	2 years	US$1.5-2.5mn (Milestone fee ranges from US$10-100mn; Royalty fee ranges from 3-5%)	NA
Pre-clinical development	2 years	US$4-6mn	106
Post-IND			
Early-phase (Phase I & II) clinical development	3 years	US$4-6mn	75 Phase I; 27 Phase II
Late-phase (Phase III) clinical development	3-5 years	US$20-50mn	15
Commercial manufacturing	Annually	US$50-100mn annually	1

Source: Company data, CMBIS

WuXi Biologics continuously adds new projects to its pipeline thanks to the Company's advanced technology platforms in cell line development, bispecific antibody development, ADC development, OMT technology, perfusion manufacturing, etc. Moreover, WuXi Biologics' fast expanding manufacturing facility also enables the Company to meet the growing demand in biological CDMO worldwide.

WuXi Biologics efficiently promoted its projects into later stage and continuously added new projects into its pipeline. In 1H19, WuXi Biologics added 32 molecules into the pipeline. During the period, 10 pre-clinical projects progressed to clinical stage while 12 pre-clinical projects are terminated and additional 31 new pre-clinical projects were added to the pipeline. The Company also won 1 Phase III clinical stage project from competitors in 1H19.

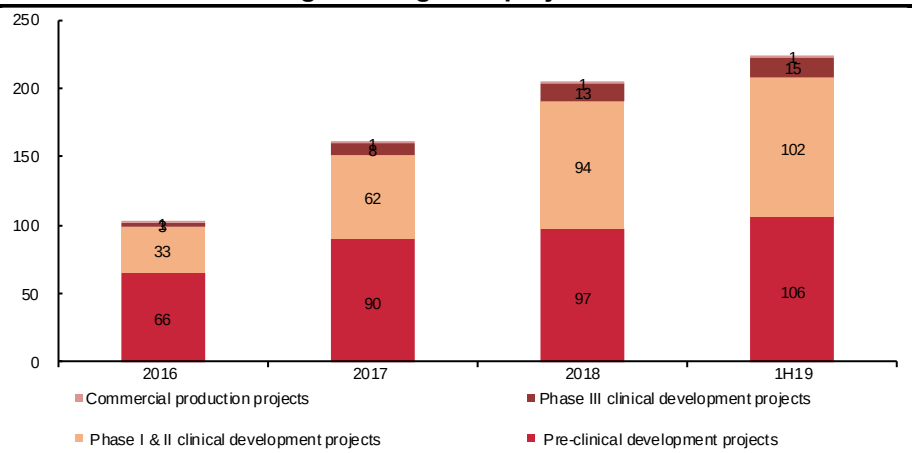
Figure 142: WuXi Biologics' growing pipeline projects (1H19)



Source: Company data, CMBIS

Thanks to "follow-the-molecule" strategy, the Company sees increasing number of integrated projects. As of Jun 30, 2019, WuXi Biologics worked on a total of 224 integrated projects, including 106 projects in pre-clinical development stage, 102 projects in early-phase (phase I and II) clinical development, 15 projects in late-phase (phase III) development and 1 project in commercial manufacturing.

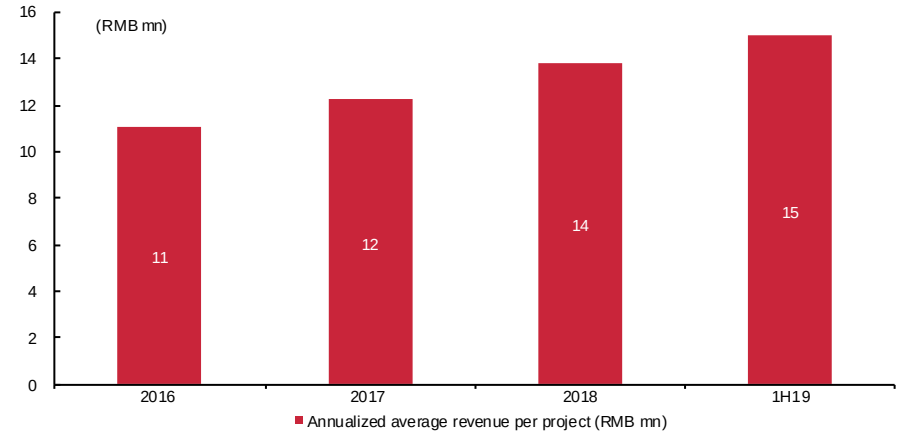
Figure 143: No. of WuXi Biologics' integrated projects increases fast



Source: Company data, CMBIS

As later-stage projects usually generate higher income than early-stage projects, we expect WuXi Biologics' revenue to grow faster than its number of projects. We've noticed this trend in past years as WuXi Biologics average income per project has increased from RMB11mn in 2016 to RMB15mn in 1H19.

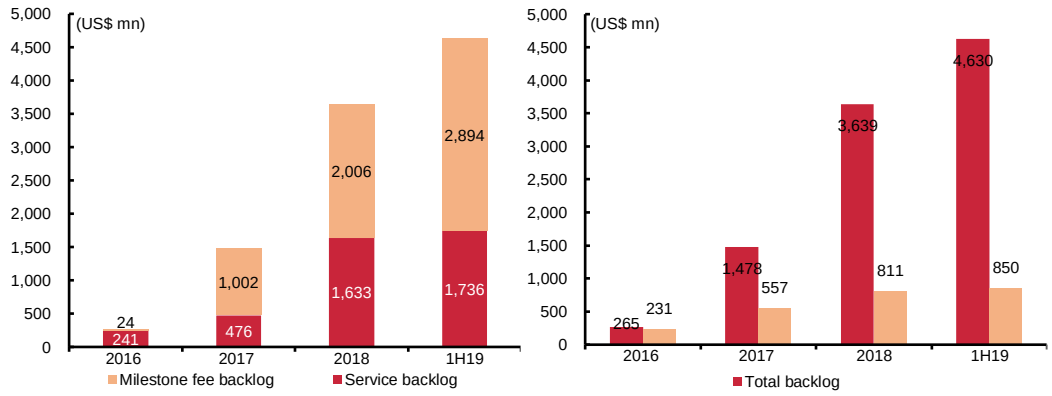
Figure 144: WuXi Biologics' average income per project is increasing



Source: Company data, CMBIS

WuXi Biologics' backlogs experienced phenomenal growth during recent years, surging from US$1,478m by end-2017 to US$4,630m by Jun 30, 2019. The management expects to realize US$850m revenue out of the total US$4,630m backlog within the next three years.

Figure 145: Phenomenal growth in WuXi Biologics' backlogs



Source: Company data, CMBIS

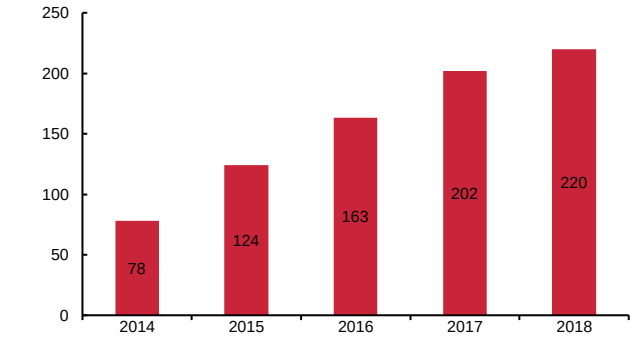
We expect WuXi Biologics to maintain the strong backlog growth momentum thanks to its strong capability of winning new projects and high efficiency in promoting existing projects to later stage.

Long-tail customers diversify revenue sources

Most of WuXi Biologics' customers are small to mid-sized biotech companies. Company's customer number rose significantly from 78 in 2014 to 220 in 2018. Increasing number of customers bring more sources of revenue for WuXi Biologics.

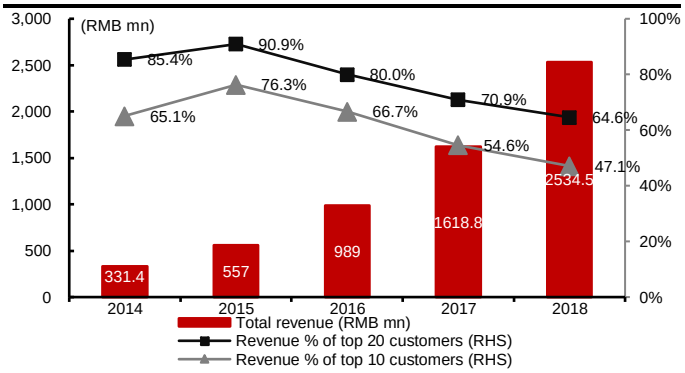
Thanks to the increasing customer pool, the Company has more diversified revenue sources which drives income growth and also offsets risks from single large customer. Thus, percentage of revenue from top 20 customers has decreased from 85% in 2014 to 65% in 2018.

Figure 146: WuXi Biologics experienced increasing customer number



Source: Company data, CMBIS

Figure 147: WuXi Biologics enjoy diversified income sources



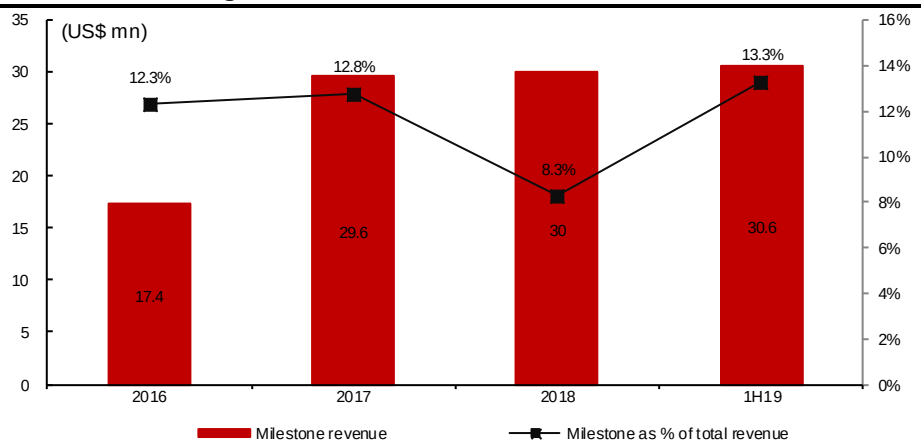
Source: Company data, CMBIS

Potential milestone and royalty income to further enhance profit

WuXi Biologics can even charge extra milestone fees or royalty fees from certain projects which can enable the company to share further upside from these projects. The Company usually can receive RMB0.5mn-50mn milestone fee for each milestone reached. Nevertheless, there's uncertainly in timeline and value of milestone fees because this depends on the success of the projects. For royalty fees, WuXi Biologics can typically receive up to 8% of sales revenue of the relevant biological products for 5-15 years. Similarly, royalty fees also rely on the success and sales performance of the product.

Milestone and royalty income are very high margin because limited expense is associated with such income. Yet, they depend on the progress and success of relevant projects. WuXi Biologics recognized US$30.6mn milestone revenue in 1H19 and US$30mn in 2018. The Company recorded US$2,894mn milestone fee backlog as of Jun 30, 2019. Nevertheless, due to the lengthy process for drug development, the milestone fee backlog may be realized during a prolonged time period such as around 10 years.

Figure 148: WuXi Biologics' milestone revenue



Source: Company data, CMBIS

As of end-2018, 40 out of the total 205 projects can potentially generate milestone and royalty income; among the 13 phase III projects, WuXi Biologics is entitled to receive royalty fees from 3 projects when the products are launched to the market. Most of WuXi Biologics' late-stage pipelines are novel molecules, indicating promising market value after commercialization.

Figure 149: WuXi Biologics' late-stage projects

Drug Candidate	Target	Type (mab, fusion protein, others)	Type (biosimilar, novel, others)	Indication	Region	Client
AT-GAA (ATB200/AT2221)	GAA	recombinant protein	Novel	Pompe disease	US/EU/AUS	Amicus
TSR-042 (dostarlimab)	PD-1	mab	Novel	Cancer	US/EU	Tesaro
GLS-010 (AB122)	PD-1	mAb	Novel	Cancer	CHN	Gloria
AB122 (GLS-010)	PD-1	mAb	Novel	Cancer	US/AUS	Arcus Biosciences
CS1001	PD-L1	mAb	Novel	Cancer	US/CHN	CStone Pharmaceuticals
TSR-022	TIM-3	mAb	Novel	Cancer	US/EU	Tesaro
TSR-033	LAG-3	mAb	Novel	Cancer	US/EU	Tesaro
M281	FcRn	mAb	Novel	Autoimmune	US/EU/JP	Momenta
IMP321	IMP321	fusion protein	Novel	Breast Cancer	EU/CHN/AUS	Prima
LY01008	VEGF	mAb	Biosimilar	Cancer	CHN	Luye Pharma
M710 (aflibercept)	VEGF	Fusion protein	Biosimilar	Wet AMD	US/EU/JP	Momenta
IFX-1	Anti-inflammatory factor	mAb	Novel	Inflammation	US/EU	InflaRx
INBRX-109	Dr5 fusion	fusion protein	Novel	Cancer	US	Inhibrx LLC
ARX788	HER2	ADC	Novel	Cancer	CHN	Zhejiang Medicine

Source: Company data, CMBIS

One project that contributed significant milestone backlog is GLS-010, an anti-PD-1 mAb. In Aug 2017, WuXi Biologics and its Chinese partner Harbin Gloria Pharmaceuticals (002437 CH) announced that an exclusive license to GLS-010 has been granted to Arcus Biosciences (RCUS US). Arcus will pay aggregate milestones of up to US$816mn, if the product will be successfully commercialized. Arcus will pay tiered royalties that range from the high single-digits to low double-digits on net sales of GLS-010. WuXi Biologics also will be the exclusive manufacturer for GLS-010.

CDMO to become a major growth pillar

Lock up CDMO orders

WuXi Biologics provides CDMO services for both clinical stage projects and commercial stage projects. WuXi Biologics is first biologics company in China passing both US FDA and EMA GMP inspections, indicating the Company's strong competitiveness in biological CDMO industry. In Mar 2018, TaiMed Biologics' Trogarzo (ibalizumab) received approval from US FDA, becoming the first commercial stage project for WuXi Biologics.

WuXi Biologics has 224 integrated projects as of Jun 30, 2019 while 15 out of the 224 projects in late-phase (phase III) development. As the pipeline projects progress to later phase, WuXi Biologics will have more income from CDMO services, in our view.

Figure 150: WuXi Biologics' potential CDMO projects

Drug Candidate	Target	Type (mab, fusion protein, others)	Type (biosimilar, novel, others)	Indication	Region	Client	Expected time of approval	Notes
TSR-042 (dostarlimab)	PD-1	mab	Novel	Cancer	US/EU	Tesaro	2020E	Exclusive CDMO service provider
AT-GAA (ATB200/AT2221)	GAA	recombinant protein	Novel	Pompe disease	US/EU/ AUS	Amicus	2021E	Exclusive CDMO service provider
CS1001	PD-L1	mAb	Novel	Cancer	US/CHN	CStone Pharma	2021E	
GLS-010 (AB122)	PD-1	mAb	Novel	Cancer	CHN	Gloria	2022E	Exclusive CDMO service provider
AB122 (GLS-010)	PD-1	mAb	Novel	Cancer	US/AUS	Arcus Biosciences	2022E	Exclusive CDMO service provider
ARX788	HER2	ADC	Novel	Cancer	CHN	Zhejiang Medicine	NA	

Source: Company data, CMBIS

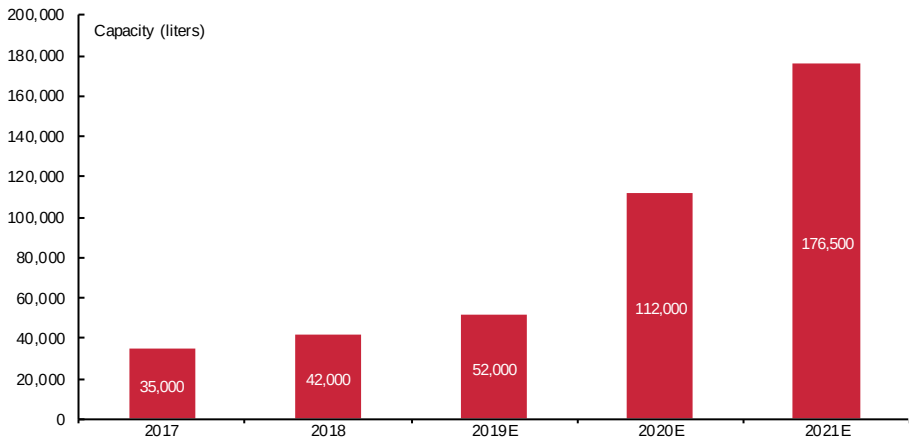
In Feb 2019, WuXi Biologics entered into an exclusive commercial manufacturing partnership with Amicus Therapeutics (FOLD US). WuXi Biologics will be the exclusive commercial drug substance manufacturing partner and key commercial drug product supplier of Amicus' ATB200.

Amicus' AT-GAA is a combination therapy of ATB200 (large molecule, human recombinant GAA enzyme) and AT2221 (small molecule). AT-GAA has received breakthrough therapy designation in late-onset Pompe disease (LOPD) from the US FDA. Pompe disease is an inherited Lysosomal Storage Disorder (LSD) caused by a deficiency of the enzyme acid alpha-glucosidase (GAA) with around 5,000-10,000 patients diagnosed worldwide. AT-GAA is now conducting phase III trial. We expect the product to receive approval from the US FDA by 2021E. Enzyme replacement therapy (ERT) is the only effective treatment for Pompe disease. The global Pompe ERT sales was around US$900mn in 2018. As a novel ERT, AT-GAA may reach above US$500mn global peak sales, in our view.

Global Dual Sourcing within WuXi Biologics

WuXi Biologics is now operating biopharmaceutical production capacity of 42,000 liters and is planning to build new capacities in China, Ireland, Singapore and US. We expect WuXi Biologics' operating capacity to increase to 176,500L by end-2021E, expanding more than 3 times within the next three years. The Company aims to expand its capacity to 280,000L beyond 2022E.

Figure 151: WuXi Biologics' capacity will expand fast



Source: Company data, CMBIS

The management expects to invest EUR350mn to build 54,000L capacity in Ireland, US$80mn to build 4,500L capacity in Singapore and US$60mn to construct 4,500L capacity in US.

Figure 152: WuXi Biologics' manufacturing sites construction plan

Manufacutring facility	Location	Designed capacity	Date of operation	(Expected) total capex	(Expected) Capex per liter capacity (US$ / L)
MFG1	Wuxi, China	5000L	2012	US$70mn	14,000
MFG2	Wuxi, China	30,000L	Dec 2017	US$150mn	5,000
MFG3	Shanghai, China	7000L	Jul 2018	US$70mn	10,000
MFG4	Wuxi, China	10,000L	Jul 2019	US$50mn	5,000
MFG5	Wuxi, China	60,000L	2020E	NA	NA
MFG6	Dundalk, Ireland	6,000L	2021E	Expected EUR350mn (MFG6&7)	5,696
MFG7	Dundalk, Ireland	48,000L	2021E		
MFG8	Shijiazhuang, China	48,000L	2021E	Expected RMB1.6bn	4,847
MFG9	Wuxi, China	6,000L	2022E	NA	NA
MFG10	Singapore	4,500L	2021E	Expected S$80mn	13,124
MFG11	Worcester, US	4,500L	2022E	Expected US$60mn	13,333
MFG12	Chengdu, China	48,000L	NA	NA	NA

Source: Company data, CMBIS

Through establishing a global supply network, WuXi Biologics attempts to implement a "global dual sourcing" strategy, indicating that the Company will provide CDMO services for each biological product at two sites across its global commercial supply network in China, EU and US. This helps to mitigate uncertainties about supply stability of single production facility and minimize the intra-company technology transfer risks of using different suppliers.

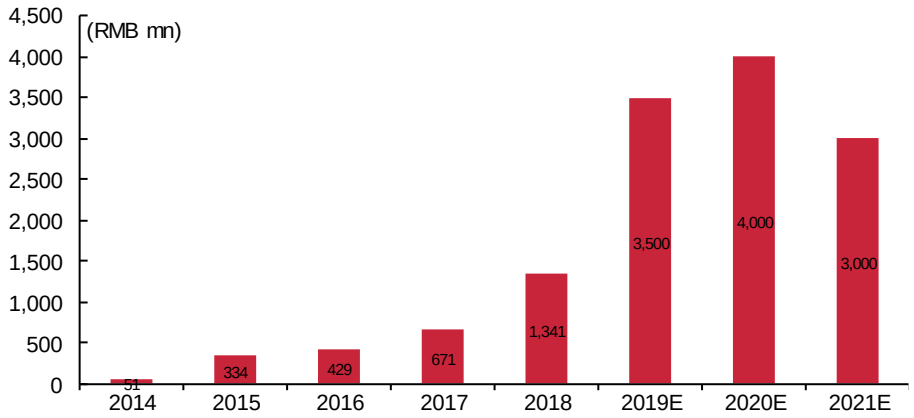
WuXi Biologics will produce ATB200 at two sites across its global commercial supply network. This indicates the Company attracts sizable CDMO orders by adopting its "global dual sourcing" strategy.

Figure 153: WuXi Biologics' global capacity network expansion plan

Source: Company data, CMBIS

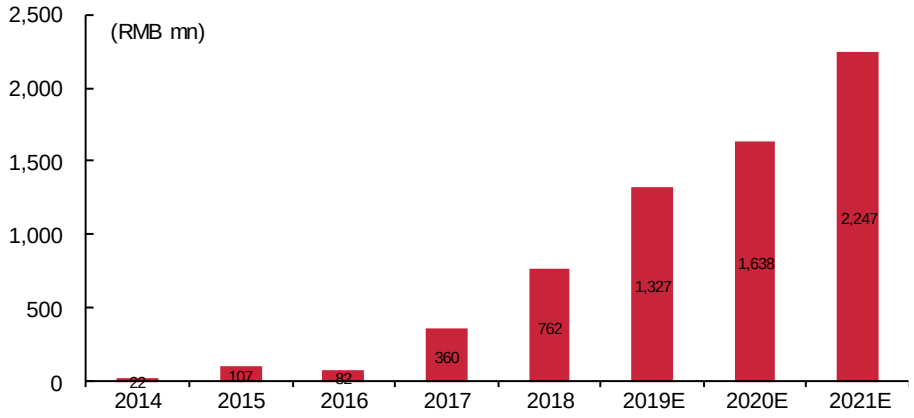
WuXi Biologics is committed to heavy capex for the next three years because of its aggressive capacity expansion plan. We forecast the Company's capex to reach RMB3.5bn in 2019E, RMB4.0bn in 2020E and RMB3.0bn in 2021E. As of Jun 30, 2019, WuXi Biologics had RMB3.0bn net cash on hand. We think the Company will fund its capex through self-owned capital and bank borrowings.

Figure 154: WuXi Biologics is committed to heavy capex



Source: Company data, CMBIS

Figure 155: WuXi Biologics' operating cash flows

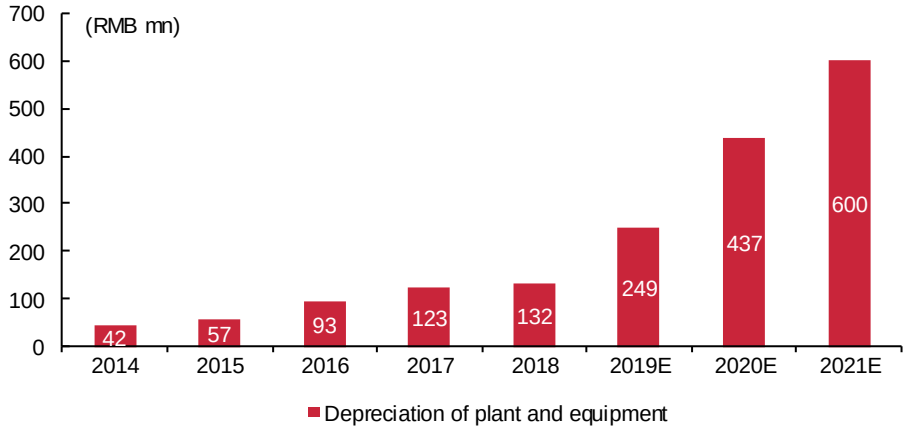


Source: Company data, CMBIS

New capacities to be filled up fast

The CDMO business is quite asset heavy. As the Company is aggressively expanding capacities, depreciation cost will rise significantly in future years. The plant and equipment are depreciated using straight-line method over 10 years. We forecast the company's depreciation cost to gradually rise from RMB132mn in 2018 to RMB600mn in 2021E.

Figure 156: WuXi Biologics' depreciation costs (net)



Source: Company data, CMBIS

Nevertheless, we think the Company's new facilities will be filled up fast, offsetting the increase in depreciation costs. As of Jun 30, 2019, WuXi Biologics had rich project pipelines with 224 integrated projects. As these projects develop into later phase, they will contribute larger CDMO orders. The Company's capacity expansion plan is also based on future CDMO demand. Hence, we expect the new facilities to ramp up fast since operation.

Past experiences also show that WuXi Biologics' new facility has ramped up fast. Utilization rate of MFG2 was around 30% during its first year of operation in 2018 and may climb to 60% in 2019E. MFG3 commenced operation in Jul 2018 and realized around 20% utilization rate in 2018 and may reach 70% utilization rate in 2019E. MFG4 commenced operation in Jul 2019 and may deliver around 40% utilization rate in 2019E with half-year of operation. WuXi Biologics aims to have its MFG5 ready in 2H20E, adding another 60,000L of capacity.

Figure 157: WuXi Biologics' capacity ramps up fast

	MFG2	MFG3	MFG4
Capacity	30,000L	7,000L	10,000L
Date of operation	Dec 2017	Jul 2018	Jul 2019
1st year utilization	~30%	~20% (6 month)	Target 40% (6 month)
2nd year utilization	Target 60%	Target 70%	Target 70%

Source: Company data, CMBIS

State-of-the-art technology strengthens competitveness

WuXi Biologics has accumulated state-of-the-art technologies in many areas, including large-scale disposable bioreactor manufacturing, "WuXiBody" bispecific antibody technology platform, "WuXia" cell line development platform, "WuXiUP" perfusion manufacturing technology, etc.

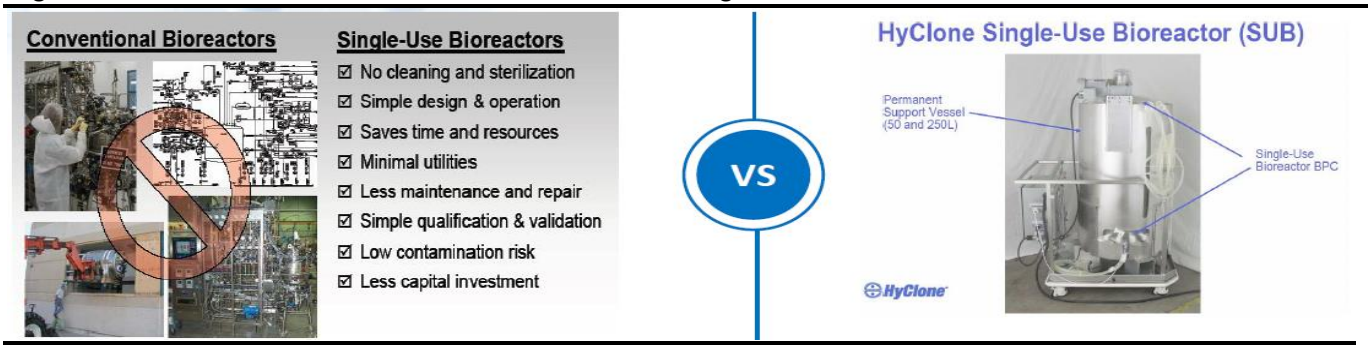
First mover in disposable bioreactor manufacturing

Disposable bioreactors are more efficient and cost effective for manufacturing personalized biologic drugs than traditional stainless steel bioreactors. WuXi Biologics adopts disposable bioreactor manufacturing in all of its facilities, becoming the largest user of disposable bioreactors globally.

Traditionally proteins are manufactured in stainless steel vessels. To ensure that cells are not contaminated and the product is pure, these vessels need to be cleaned thoroughly, steam sterilized and maintained at sterile conditions, which significantly increases the complexity of the manufacturing facilities and the operating costs. Disposable bioreactors are pre-radiated plastic bags as the production vessel in a stainless holder, which simplifies the manufacturing process with no requirement for cleaning and sterilization.

Compared to a facility with traditional stainless steel bioreactors, a facility using disposable bioreactors can be built 12-18 months faster with 30-50% less investment, and can produce 5-15% more batches of products with higher success rate, according to F&S.

Figure 158: Traditional stainless steel bioreactors vs single-use bioreactors



Source: Company data, CMBIS

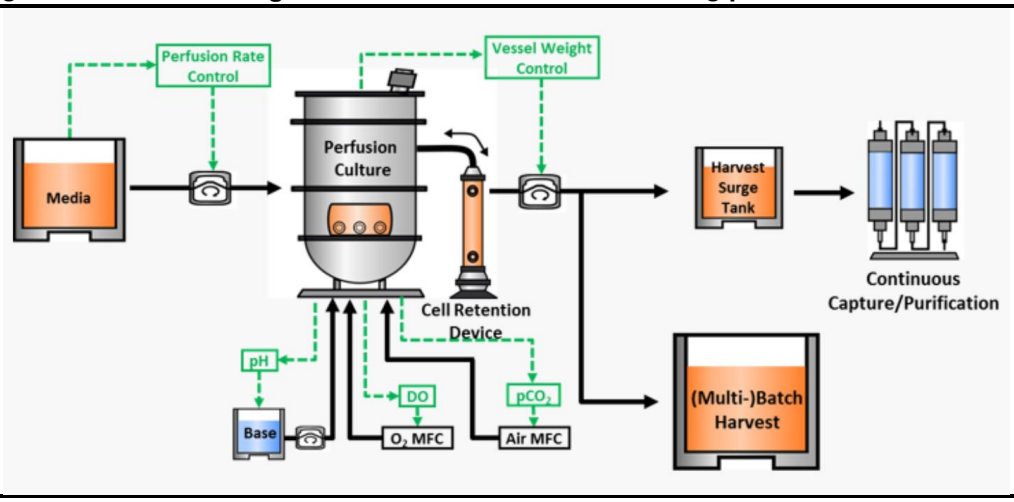
At the moment, the largest scale of single-use bioreactor is 2,000L. WuXi Biologics installed 4,000L single-use bioreactor in its MFG4 in WuXi which will commence operation in Jul 2019. The 4,000L single-use bioreactor is sourced from ABEC, an US based company biopharmaceutical manufacturing equipment provider. With larger size of bioreactor, WuXi Biologics will further reduce its production cost, making the Company more competitive in the global biologics CDMO industry.

"WuXiUP" perfusion manufacturing will significantly lower costs

In Nov 2017, WuXi Biologics and Pall Corporation established a joint laboratory to develop full continuous processing for the manufacturing of monoclonal antibodies. Continuous manufacturing, also named as perfusion manufacturing, aims to significantly reduce biological drugs' manufacturing costs.

Compared with traditional fed-batch manufacturing, continuous manufacturing 1) achieves roughly same production cell culture timelines with 5-10 times yield with high cell concentrations, viability and better or comparable product quality profiles; 2) requires smaller size of manufacturing facilities leading to lower production costs.

Figure 159: WuXi Biologics' continuous bio-manufacturing platform



Source: Company data, CMBIS

In Dec 2018, WuXi Biologics announced that it has achieved a breakthrough in cell culture productivity for an Fc-fusion protein. The cell culture has a productivity of 2.5g/L/day and 51g/L bioreactor volume in a proprietary 20-day continuous cell culture process. This is more than 10 times productivity of 3-5g/L of traditional fed-batch process. This technology is being scaled up to GMP production. If the perfusion technology becomes mature, we think the mAb manufacturing cost can be reduced to US$30/g or even below.

WuXiBody platform brings meaningful new projects

WuXiBody platform enables almost any monoclonal antibody (mAb) sequence pair to be assembled into the bispecific construct and its unique structural flexibility makes the platform convenient to build various formats with different valency (e.g., 2, 3 or 4 binding sites). Based on novel engineering, WuXiBody platform can expedite the drug development process by 6-18 months and significantly reduce cost-of-goods.

Figure 160: Advantages of WuXiBody platform

WuXiBody Development/CMC Advantages	WuXiBody Bispecific Engineering Advantages
• Save 6-18 months of development time • Reduces manufacturing costs by as much as 90% • High protein expression in CHO cells (5-16g/L) • No aggrefation issues • Can be used in both fed-batch and concentrated fed-batch production • Very stable: >2 weeks in serum at 37℃ • No solubility issues: >30mg/ml	• Compatible with almost any mAb sequence • Available in both symmetric and asymmetrical formats • Accomodate different valency formats (bi, tri and tetra) based on project needs and biology • Same purification schemes as mAbs • In vivo half-life similar to mAbs • Expected low immunogenicity (utilizes natural sequence without complicated engineering)

Source: Company data, CMBIS

The Company launched WuXiBody platform in Aug 2018. As of Jun 30, 2019, a total of 15 integrated projects utilize WuXiBody platform while 3 projects have entered into pre-clinical phase and 12 projects are at discovery phase. As these projects progress, they will contribute more to the company's revenue. For most of these bispecific antibody projects, WuXi Biologics is entitled to receive milestone fees and royalty fees.

Figure 161: Several projects utilizing WuXiBody platform

Date	Customer	Contract details
2019-02-26	ABL Bio (298380 KS)	ABL Bio has rights to use WuXi Biologics' proprietary discovery platforms, including WuXiBody and CD3 platform, to research, develop and commercialize multiple bispecific antibodies, as well as rights to develop new bispecific antibodies targeting novel immune check point receptor. WuXi Biologics will receive an upfront payment as well as development, regulatory and commercial milestone payments of about $220 million, and will be entitled to royalties based on global sales of these programs.
2019-01-02	CTTQ (subsidiary of Sino Biopharm, 1177 HK)	CTTQ has rights to use WuXi Biologics' WuXiBody platform, to research, develop and commercialize a bispecific antibody.
2018-12-25	Anke Bio (300009 CH)	Anke Bio has rights to use WuXi Biologics' WuXiBody platform, to research, develop and commercialize a bispecific antibody.
2018-12-19	AC Immnue (ACIU US)	Through this collaboration, AC Immune would have priority access to WuXi Biologics' proprietary platforms, including the bispecific antibody platform WuXiBody and WuXiUP continuous manufacturing platform.
2018-12-11	Oxford BioTherapeutics	OBT will research, develop and commercialize five novel bispecific antibodies for the treatment of several cancer types using WuXi Biologics' proprietary WuXiBody Platform.WuXi Biologics will receive an upfront payment as well as potential development, regulatory and commercial milestone payments up to $450 million, and will be entitled to royalties based on global sales of these bispecific antibodies.
2018-12-10	Brii Biosciences	Brii Bio has the access to WuXi Biologics' entire antibody platform capabilities including the WuXiBody technology to discover novel bispecific antibodies. WuXi Biologics will also be the exclusive development and manufacturing partner of any novel bispecific antibodies discovered from the WuXiBody Platform.
2018-09-26	I-Mab Biopharma	I-Mab has rights to use the proprietary WuXiBody Platform to research, develop and commercialize three bispecific antibodies generated from I-MAB's proprietary pipeline. WuXi Biologics will receive an upfront payment as well as development, regulatory and commercial milestone payments, and will be entitled to royalties based on global sales of these bispecific antibodies

Source: Company data, CMBIS

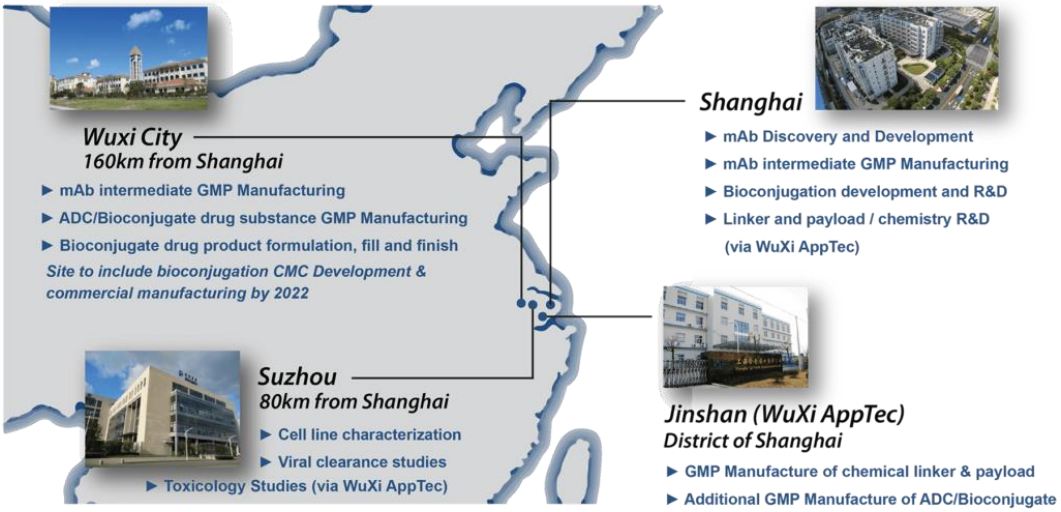
ADC platform is attractive to customers

Antibody-Drug Conjugates (ADCs) are complex molecules composed of an antibody linked to a biologically active cytotoxic drug and are becoming emerging treatments of targeted tumor therapy.

As of 30 Jun, 2019, WuXi Biologics had 25 ADC projects vs 19 by end-2018. In Oct 2019, WuXi Biologics' new biologics conjugate solution center (DP3) commenced GMP operation. Meanwhile, WuXi Biologics entered into strategic cooperation with China's Zhejiang Medicine Company (ZMC) to provide CDMO services for an ADC drug, ARX788. Starting from 2013, WuXi Biologics has provided full CMC support for ARX788 from cell-line optimization to ADC conjugation to fill/finish and release.

WuXi Biologics greatly simplifies ADC and other bioconjugate drug development by providing CMC development, all preclinical activities and the entire supply chain in one centralized region nearby Shanghai.

Figure 162: WuXi Biologics' centralized facilities



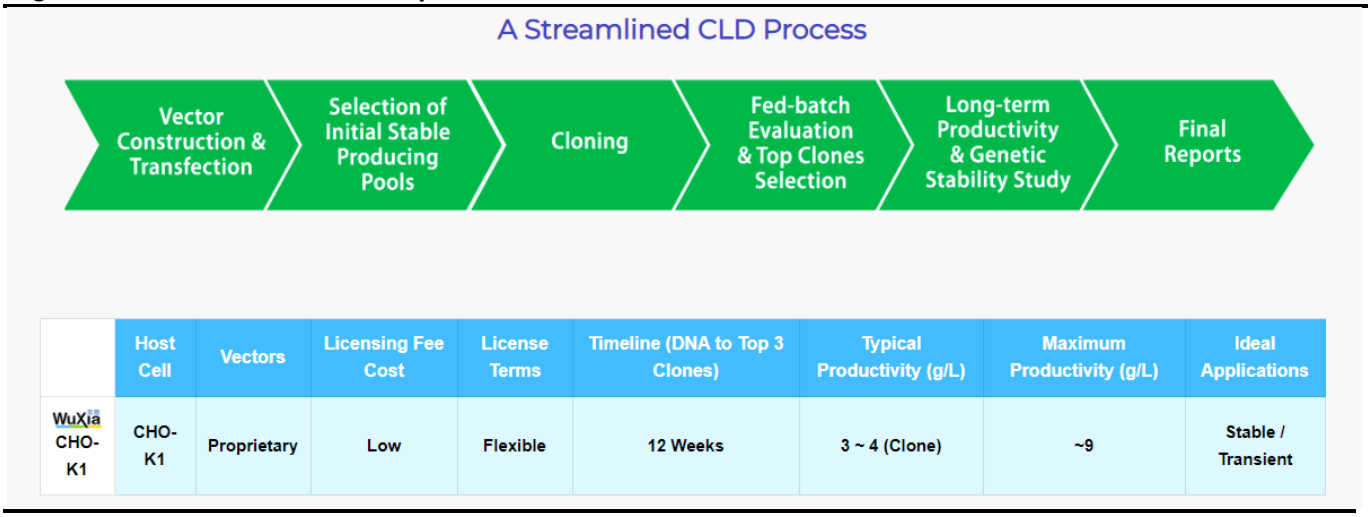
Source: Company data, CMBIS

"WuXia" cell line development platform

WuXia is a cell culture process platform which enables the Company to efficiently develop high-quality cell lines. Cell line engineering and development is a core technology as the productivity of a cell line determines the cost of manufacturing and the quality of a cell line is directly related to the quality of relevant biologics.

WuXi Biologics offers comprehensive mammalian cell line development (CLD) capabilities for a wide variety of antibody and protein therapeutics. The program typically starts with client-provided DNA or protein sequences and ends with the delivery of high-yielding, well-characterized, stable, single clones.

Figure 163: WuXia CHO-K1 CLD platform features



	Host Cell	Vectors	Licensing Fee Cost	License Terms	Timeline (DNA to Top 3 Clones)	Typical Productivity (g/L)	Maximum Productivity (g/L)	Ideal Applications
WuXia CHO-K1	CHO-K1	Proprietary	Low	Flexible	12 Weeks	3 ~ 4 (Clone)	~9	Stable / Transient

Source: Company data, CMBIS

Vaccine business offers new growth potential

Strategic partnership with a global vaccine leader

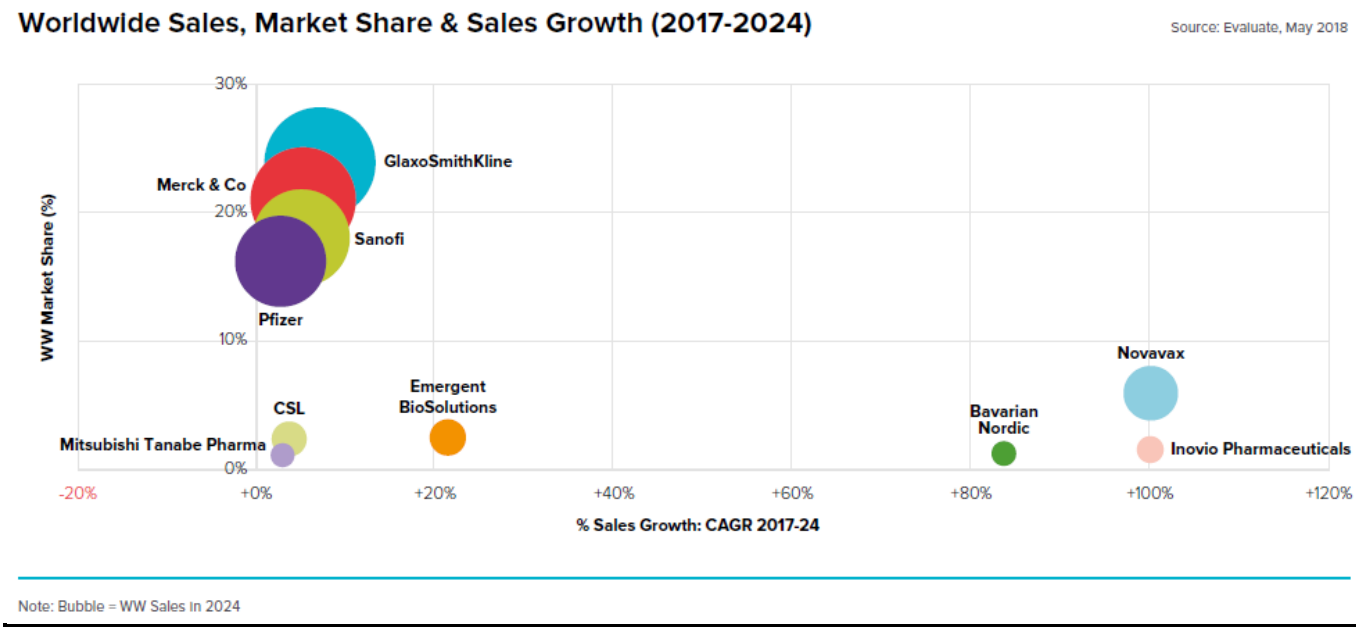
In Jul 2018, WuXi Biologics and Shanghai Hile Bio-Technology (603718 SH) established a joint venture, WuXi Vaccines, which is 70% owned by WuXi Biologics and 30% owned by Shanghai Hile. Shanghai Hile has more than 30 years of experiences in manufacturing animal vaccines. WuXi Vaccines will primarily provide human vaccine CDMO and CRO services covering the discovery, development and manufacturing of human vaccines.

Shortly after establishment, in May 2019, WuXi Biologics entered into a strategic partnership Letter of Intent (LOI) with a global vaccine leader. Under the LOI, WuXi Vaccines will build an integrated vaccine manufacturing facility including drug substance manufacturing (DS), drug product manufacturing (DP) as well as Quality Control labs (QC).

In Nov 2019, WuXi Vaccines announced to invest US$240mn to build a new vaccine manufacturing facility in Ireland. This facility will exclusively manufacture a vaccine follows the 20-year manufacturing LOI signed with the global vaccine leader. The value of the 20-year manufacturing contract is estimated to be more than US$3bn. We expect revenue contribution from this project to start from 2023E, depending on the timing of FDA approval of this vaccine product and timeline of facility construction in Ireland.

According to “EvaluatePharma: World Preview 2018, Outlook to 2024”, the global vaccine market reached US$27.7bn in 2017 and will grow at a 7.1% CAGR to US$44.6bn by 2024E, while vaccines’ market share in the global drug market will increase from 3.4% in 2017 to 3.6% in 2024E. The top 4 vaccine companies in the global market include GlaxoSmithKline, Merck & Co, Sanofi and Pfizer. WuXi Biologics will share the growth opportunity of the global vaccine market by tapping into vaccine CDMO and CRO market.

Figure 164: Worldwide vaccine market (2017-2024E)



Source: EvaluatePharma, CMBIS

China may deregulate its vaccine market

Vaccine production involves long and complex process, indicating difficulties in quality control. After the scandal of Changsheng Bio-Technology (002680 CH) happened in 2018, the Chinese government has been very cautious in vaccine regulation.

In Jun 2019, the NPC Standing Committee passed the new vaccine law. According to the revised vaccine law, the vaccine marketing authorization holder (MAH) should have the capability of vaccine manufacturing, if not, the vaccine products should be delegated to other qualified manufacturers. This indicates that Chinese government allows vaccine production outsourcing. Yet, implementation of the law still depends on further detailed regulatory policies. We believe the government will remain very stringent in vaccine quality regulation.

Best efforts to mitigate risks from trade war

Trade tensions caused uncertainties of the business

Due to trade tensions between China and US, WuXi Biologics face potential risks from rising tariffs, sourcing of equipment and raw materials, customer orders, etc. Nevertheless, we don't see meaningful impact in the foreseeable future.

Rising tariff should be offset by increasing income

WuXi Biologics received 51% of the total revenue from US clients in 2018. Although the US government has raised tariff on Chinese goods, biological products are mostly safe from tariff rise.

China fought back and raised tariff for US goods as well. WuXi Biologics purchased equipment and raw materials from US, such as single-use bioreactors, filters, reagents, etc. The purchase costs will increase due to tariff rise. However, we think WuXi Biologics is able to pass a proportion of the additional costs to its clients. In addition, we think the fast-growing revenue will more than offset the increase in costs.

Global dual sourcing to mitigate risks

As of 2016, top 5 suppliers accounted for 67.6% of the Company's total purchases. Most of the Company's suppliers are multi-national companies with business operations in many countries. Thus, we think the Company could continue to purchase from these suppliers from their ex-US branches.

Besides, WuXi Biologics also has dual sourcing plan for its major raw materials and equipment. In case the US government bans US companies to sell such products to Chinese companies, WuXi Biologics can purchase raw materials from other European or Chinese suppliers, in our view.

Figure 165: WuXi Biologics' top 5 suppliers (2016)

Supplier	Purchase amount (RMB mn, 2016)	% of total purchases (2016)
General Electric International Operation	76.3	27.0%
Merck Millipore	46.6	16.5%
Thermo Fisher	41.8	14.8%
Satrorius Stedim Biotech GmbH	20.1	7.1%
Sigma-Aldrich	6.3	2.2%
Total	**191.1**	**67.6%**

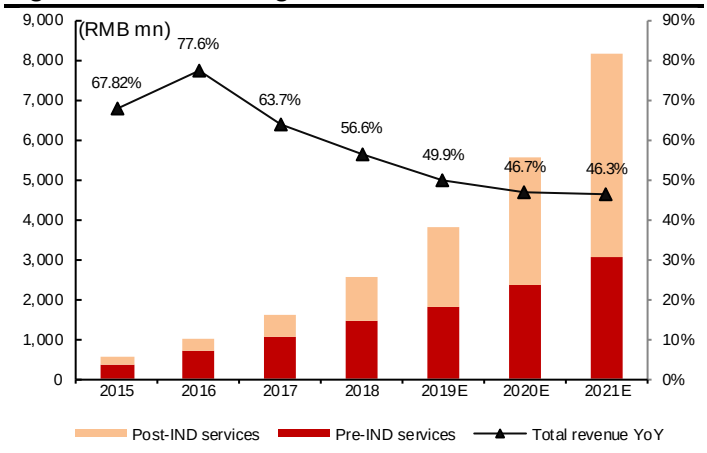
Source: Company data, CMBIS

Strong earning growth momentum

Expect revenue/adjusted non-IFRS NP to grow at 47.6%/48.4% CAGR in FY19-21E

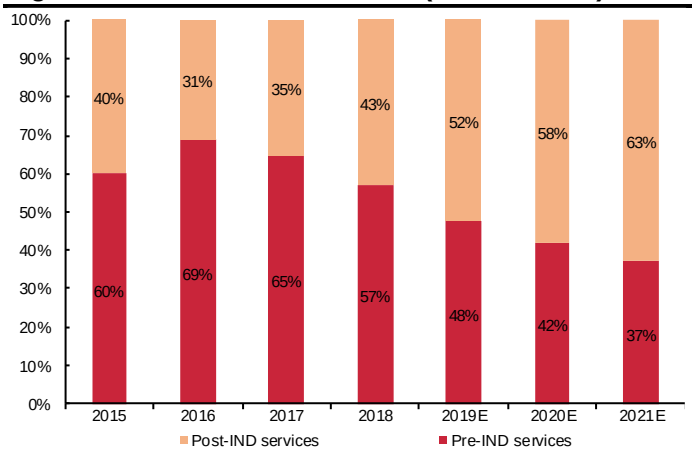
We estimate income from pre-IND services/ post-IND services will grow at 27.9%/67.8% CAGR FY19-21E, supported by 1) abundant backlogs thanks to "follow-the-molecule" strategy, 2) potential milestone and royalty income, and 3) strong demand from CDMO business and 4) the Company's fast expanding capacity. We estimate total revenue to grow at 49.9%/ 46.7%/ 46.3% in FY19E/20E/21E.

Figure 166: Revenue growth estimates



Source: Company data, CMBIS estimates

Figure 167: Revenue breakdown (2015A-2021E)



Source: Company data, CMBIS estimates

We estimate total net profit will grow at 54.4%/ 42.8%/ 46.8% YoY in FY19E/20E/21E, respectively, and adjusted non-IFRS net profit (excluding share-based compensation, listing expenses, FX gain/loss, etc.) will grow at 53.9%/ 44.6%/ 46.7% YoY in FY19E/20E/21E, respectively.

Figure 168: P&L forecasts

RMB (mn)	2015	2016	2017	2018	2019E	2020E	2021E
Revenue	557	989	1,619	2,535	3,800	5,576	8,157
YoY	*67.8%*	*77.6%*	*63.7%*	*56.6%*	*49.9%*	*46.7%*	*46.3%*
COGS	(376)	(600)	(958)	(1,517)	(2,186)	(3,178)	(4,609)
% of revenue	*-67.6%*	*-60.7%*	*-59.2%*	*-59.8%*	*-57.5%*	*-57.0%*	*-56.5%*
Gross profit	181	389	661	1,018	1,614	2,398	3,548
GPM	*32.4%*	*39.3%*	*40.8%*	*40.2%*	*42.5%*	*43.0%*	*43.5%*
Other income	7	8	35	194	183	180	180
% of revenue	*1.2%*	*0.8%*	*2.1%*	*7.7%*	*4.8%*	*3.2%*	*2.2%*
Selling expenses	(13)	(15)	(28)	(42)	(62)	(86)	(122)
% of revenue	*-2.4%*	*-1.5%*	*-1.7%*	*-1.7%*	*-1.6%*	*-1.6%*	*-1.5%*
Administrative expenses	(72)	(95)	(134)	(228)	(354)	(489)	(686)
% of revenue	*-13.0%*	*-9.6%*	*-8.3%*	*-9.0%*	*-9.3%*	*-8.8%*	*-8.4%*
R&D expenses	(40)	(53)	(74)	(169)	(252)	(335)	(449)
% of revenue	*-7.1%*	*-5.4%*	*-4.6%*	*-6.7%*	*-6.6%*	*-6.0%*	*-5.5%*
Finance cost	(3)	(24)	(36)	-	(5)	(25)	(70)
% of revenue	*-0.5%*	*-2.4%*	*-2.2%*	*0.0%*	*-0.1%*	*-0.4%*	*-0.9%*
Profit before tax	60	177	407	773	1,125	1,642	2,402
PBT margin	*10.7%*	*17.9%*	*25.2%*	*30.5%*	*29.6%*	*29.5%*	*29.4%*
Income tax expense	(21)	(35)	(51)	(107)	(162)	(232)	(341)
Income tax rate	*5.6%*	*5.8%*	*5.3%*	*7.1%*	*7.4%*	*7.3%*	*7.4%*
Total net profit	45	141	253	630	973	1,390	2,041
Profit attributable to shareholders	45	141	253	631	973	1,390	2,041
NP margin	*8.0%*	*14.3%*	*15.6%*	*24.9%*	*25.6%*	*24.9%*	*25.0%*
YoY		*217.0%*	*79.0%*	*149.6%*	*54.4%*	*42.8%*	*46.8%*
Adjusted net profit (non-IFRS)	71	221	433	752	1,156	1,672	2,454
Adjusted NPM	*12.8%*	*22.3%*	*26.7%*	*29.7%*	*30.4%*	*30.0%*	*30.1%*
YoY		*209.0%*	*96.3%*	*73.6%*	*53.9%*	*44.6%*	*46.7%*

Source: Company data, CMBIS estimates

Valuation

Initiate BUY with TP HK$106.18 (15% Upside)

We use DCF methodology to do value WuXi Biologics, given the substantial backlog on hand and the strong cash flow going forwards. We derived our TP of HK$106.18 based on 8-year DCF model (WACC:10.22%, terminal growth rate:5%), representing 60x FY21E P/E and 51x adjusted non-IFRS FY21E PE. We assume 5% terminal growth rate because of the globally fast-growing R&D spending in biological products and surging demand in biological CDMO.

Figure 169: WuXi Biologics' DCF model

DCF Valuation (in Rmb mn)	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	659	1,081	1,587	2,392	3,348	4,621	6,284	8,421	11,115	14,450
Tax rate	14.54%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%
EBIT*(1-tax rate)	563	926	1,360	2,050	2,869	3,960	5,385	7,216	9,526	12,383
+ D&A	146	249	437	600	733	879	1,037	1,203	1,372	1,536
- Change in working capital	(246)	107	(214)	(464)	(567)	(680)	(802)	(931)	(1,061)	(1,188)
- Capx	(1,341)	(3,500)	(4,000)	(3,000)	(2,100)	(1,680)	(1,512)	(1,361)	(1,225)	(1,102)
FCFF	**(877)**	**(2,217)**	**(2,417)**	**(814)**	**935**	**2,479**	**4,108**	**6,128**	**8,612**	**11,629**
Terminal value										**234,035**
% change in FCFF		152.84%	9.00%	-66.31%	-214.88%	165.01%	65.73%	49.16%	40.53%	35.04%

Terminal growth rate	**5.00%**
WACC	**10.22%**
Cost of Equity	12.20%
Cost of Debt	5.00%
Equity Beta	0.85
Risk Free Rate	3.00%
Market Risk Premium	11.50%
Target Debt to Asset ratio	30.00%
Effective Corporate Tax Rate	15.00%
Terminal value	107,467
Total PV	122,626
Net debt	448
Equity value	122,178
# of shares	1,292,861,321
DCF per share (in Rmb)	94.50
DCF per share (in HK$)	**106.18**

Source: Company data, CMBIS

Figure 170: Sensitivity analysis of DCF model

		Terminal growth rate				
		4.00%	**4.50%**	**5.00%**	**5.50%**	**6.00%**
	0.65	132.13	147.11	166.24	191.53	226.52
	0.75	108.08	118.20	130.62	146.22	166.38
	0.85	90.41	97.61	**106.18**	116.57	129.43
Equity beta	**0.95**	76.94	82.25	88.43	95.74	104.50
	1.05	66.35	70.38	75.00	80.35	86.62

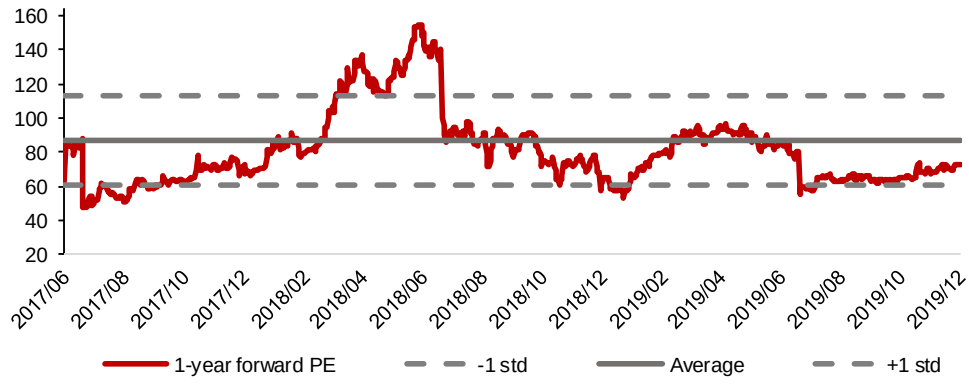
Source: Company data, CMBIS

Figure 171: Peers' valuation

Company	Ticker	Rating	Mkt Cap (US$ mn)	Net profit YoY FY19E	Net profit YoY FY20E	Net profit YoY FY21E	P/E (x) FY19E	P/E (x) FY20E	P/B (x) FY19E	P/B (x) FY20E	ROE (%) FY19E	ROE (%) FY20E
H-share												
WuXi AppTec	2359 HK	NR	21,110	-5.7%	33.2%	26.5%	63.8	53.4	42.2	7.5	6.7	11.0
WuXi Biologics	2269 HK	Buy	15,260	54.3%	42.8%	46.8%	109.3	76.5	52.1	11.9	10.3	11.5
Pharmaron	3759 HK	NR	5,096	45.1%	36.4%	33.5%	48.9	35.9	26.8	9.0	7.4	17.9
Frontage	1521 HK	NR	1,078	92.4%	39.0%	32.3%	48.8	31.6	23.3	4.1	3.6	14.1
VIVA Biotech	1873 HK	NR	873	60.1%	87.4%	46.6%	44.6	23.7	16.2	3.2	3.0	11.7
	Average			**49.3%**	**47.8%**	**37.1%**	**63.1**	**44.2**	**32.1**	**7.1**	**6.2**	**13.2**
A-share												
WuXi AppTec	603259 CH	Buy	21,110	-5.7%	33.2%	26.5%	70.2	52.7	70.2	52.7	11.0	13.1
Tigermed	300347 CH	Buy	6,874	46.2%	38.5%	39.2%	70.0	50.6	70.0	50.6	14.71	18.41
Pharmaron	300759 CH	NR	5,096	45.1%	36.4%	33.5%	61.1	44.8	61.1	44.8	17.9	20.1
Joinn Lab	603127 CH	NR	1,401	41.8%	38.9%	36.1%	64.2	46.2	64.2	46.2	19.6	22.4
Asymchem Lab	002821 CH	NR	938	32.8%	32.2%	32.2%	51.9	39.3	51.9	39.3	18.9	20.4
	Average			**32.0%**	**35.8%**	**33.5%**	**63.5**	**46.7**	**63.5**	**46.7**	**16.4**	**18.9**

Source: Bloomberg, CMBIS estimates, as at Dec 12, 2019.

Figure 172: Historical 1-year PE ratio of WuXi Biologics



Source: Company data, CMBIS

Financial Summary

Income statement

YE Dec 31 (RMB mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Revenue	**1,619**	**2,534**	**3,800**	**5,576**	**8,157**
Pre-IND services	1,049	1,451	1,809	2,351	3,035
Post-IND services	570	1,084	1,991	3,225	5,122
Cost of sales	(958)	(1,517)	(2,186)	(3,178)	(4,609)
Gross profit	**661**	**1,018**	**1,614**	**2,398**	**3,548**
Other income	35	194	183	180	180
Selling expenses	(28)	(42)	(62)	(86)	(122)
Admin expenses	(134)	(228)	(354)	(489)	(686)
R&D expenses	(74)	(169)	(252)	(335)	(449)
Operating profit	**459**	**773**	**1,129**	**1,667**	**2,472**
Finance costs, net	(36)	0	(5)	(25)	(70)
Other gains and losses	(90)	21	30	0	0
Impairment losses, net of reversal	(14)	(56)	(19)	(20)	(20)
Pre-tax profit	**304**	**738**	**1,136**	**1,622**	**2,382**
Income tax	(51)	(107)	(162)	(232)	(341)
Minority interests	0	0	0	0	0
Net profit to shareholders	**253**	**631**	**973**	**1,390**	**2,041**

Cash flow summary

YE Dec 31 (Rmb mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Profit before tax	**304**	**738**	**1,136**	**1,622**	**2,382**
Depreciation and amortization	123	146	249	437	600
Change in working capital	(149)	(246)	107	(214)	(464)
Share-based payment expense	65	128	0	0	0
Other operating activities	18	(5)	(165)	(207)	(271)
Operating cash flow	**360**	**762**	**1,327**	**1,638**	**2,247**
Capex	(671)	(1,341)	(3,500)	(4,000)	(3,000)
Acquisition of subsidiaries	0	(333)	0	0	0
Other investing activities	(1,543)	1,258	7	0	0
Investing cash flow	**(2,213)**	**(416)**	**(3,493)**	**(4,000)**	**(3,000)**
Net proceeds from shares issued	3,573	3,206	0	0	0
Bank borrowing	(892)	0	0	1,000	800
Acquisition of non-controlling interests					
Dividends and interests paid	(36)	0	(5)	(25)	(70)
Other financing activities	(415)	1	0	0	0
Financing cash flow	**2,229**	**3,207**	**(5)**	**975**	**730**
FX changes	(42)	28	0	0	0
Net change in cash	335	3,581	(2,171)	(1,387)	(23)
Cash at the beginning	169	504	4,084	1,914	527
Cash at the end	**504**	**4,084**	**1,914**	**527**	**504**

Balance sheet

YE Dec 31 (Rmb mn)	FY17A	FY18A	FY19E	FY20E	FY21E
Non-current assets	**1,816**	**3,648**	**6,899**	**10,462**	**12,862**
Fixed asset	1,780	2,904	6,155	9,718	12,118
Intangible assets	0	332	332	332	332
Equity instruments at fair value	0	137	137	137	137
Financial assets at fair value	0	56	56	56	56
Other non-current assets	35	220	220	220	220
Current assets	**3,033**	**5,745**	**3,834**	**3,150**	**4,297**
Cash	504	4,084	1,914	527	504
Inventories	136	227	240	348	505
Trade and bills receivables	614	1,067	1,249	1,680	2,458
Financial assets designated as at fair value	0	295	359	522	758
Other current assets	1,780	72	72	72	72
Current liabilities	**798**	**1,319**	**1,685**	**2,174**	**2,880**
Borrowings	0	0	0	0	0
Trade and other payables	785	712	1,078	1,567	2,273
Other current liabilities	13	607	607	607	607
Non-current liabilities	**27**	**80**	**80**	**1,080**	**1,880**
Borrowings	0	0	0	1,000	1,800
Other non-current liabilities	27	80	80	80	80
Total net assets	**4,024**	**7,994**	**8,968**	**10,358**	**12,399**
Minority interest	0	0	0	0	0
Shareholders' equity	**4,024**	**7,994**	**8,967**	**10,357**	**12,398**

Key ratios

YE Dec 31	FY17A	FY18A	FY19E	FY20E	FY21E
Sales mix (%)					
Pre-IND services	65	57	48	42	37
Post-IND services	35	43	52	58	63
Total	100	100	100	100	100
Profit & loss ratios (%)					
Gross margin	41	40	42	43	44
EBITDA margin	28	38	35	36	37
Pre-tax margin	19	29	30	29	29
Net margin	16	25	26	25	25
Effective tax rate	17	15	14	14	14
Balance sheet ratios					
Current ratio (x)	4	4	2	1	1
Trade turnover days	117	121	120	110	110
Trade turnover days	256	180	180	180	180
Net debt to equity ratio (%)	Net cash	Net cash	Net cash	4	10
Returns (%)					
ROE	12	10	11	14	18
ROA	7	9	10	11	13
Per share					
EPS (RMB)	0.24	0.52	0.75	1.08	1.58
DPS (RMB)	0.00	0.00	0.00	0.00	0.00
BVPS (RMB)	3.75	6.60	6.94	8.01	9.59

Source: Company data, CMBIS estimates

Disclosures & Disclaimers

Analyst Certification

The research analyst who is primary responsible for the content of this research report, in whole or in part, certifies that with respect to the securities or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about the subject securities or issuer; and (2) no part of his or her compensation was, is, or will be, directly or indirectly, related to the specific views expressed by that analyst in this report.

Besides, the analyst confirms that neither the analyst nor his/her associates (as defined in the code of conduct issued by The Hong Kong Securities and Futures Commission) (1) have dealt in or traded in the stock(s) covered in this research report within 30 calendar days prior to the date of issue of this report; (2) will deal in or trade in the stock(s) covered in this research report 3 business days after the date of issue of this report; (3) serve as an officer of any of the Hong Kong listed companies covered in this report; and (4) have any financial interests in the Hong Kong listed companies covered in this report.

CMBIS Ratings

BUY	: Stock with potential return of over 15% over next 12 months
HOLD	: Stock with potential return of +15% to -10% over next 12 months
SELL	: Stock with potential loss of over 10% over next 12 months
NOT RATED	: Stock is not rated by CMBIS
OUTPERFORM	: Industry expected to outperform the relevant broad market benchmark over next 12 months
MARKET-PERFORM	: Industry expected to perform in-line with the relevant broad market benchmark over next 12 months
UNDERPERFORM	: Industry expected to underperform the relevant broad market benchmark over next 12 months

CMB International Securities Limited

Address: 45/F, Champion Tower, 3 Garden Road, Hong Kong, Tel: (852) 3900 0888 Fax: (852) 3900 0800

CMB International Securities Limited ("CMBIS") is a wholly owned subsidiary of CMB International Capital Corporation Limited (a wholly owned subsidiary of China Merchants Bank)

Important Disclosures

There are risks involved in transacting in any securities. The information contained in this report may not be suitable for the purposes of all investors. CMBIS does not provide individually tailored investment advice. This report has been prepared without regard to the individual investment objectives, financial position or special requirements. Past performance has no indication of future performance, and actual events may differ materially from that which is contained in the report. The value of, and returns from, any investments are uncertain and are not guaranteed and may fluctuate as a result of their dependence on the performance of underlying assets or other variable market factors. CMBIS recommends that investors should independently evaluate particular investments and strategies, and encourages investors to consult with a professional financial advisor in order to make their own investment decisions.

This report or any information contained herein, have been prepared by the CMBIS, solely for the purpose of supplying information to the clients of CMBIS and/or its affiliate(s) to whom it is distributed. This report is not and should not be construed as an offer or solicitation to buy or sell any security or any interest in securities or enter into any transaction. Neither CMBIS nor any of its affiliates, shareholders, agents, consultants, directors, officers or employees shall be liable for any loss, damage or expense whatsoever, whether direct or consequential, incurred in relying on the information contained in this report. Anyone making use of the information contained in this report does so entirely at their own risk.

The information and contents contained in this report are based on the analyses and interpretations of information believed to be publicly available and reliable. CMBIS has exerted every effort in its capacity to ensure, but not to guarantee, their accuracy, completeness, timeliness or correctness. CMBIS provides the information, advices and forecasts on an "AS IS" basis. The information and contents are subject to change without notice. CMBIS may issue other publications having information and/ or conclusions different from this report. These publications reflect different assumption, point-of-view and analytical methods when compiling. CMBIS may make investment decisions or take proprietary positions that are inconsistent with the recommendations or views in this report.

CMBIS may have a position, make markets or act as principal or engage in transactions in securities of companies referred to in this report for itself and/or on behalf of its clients from time to time. Investors should assume that CMBIS does or seeks to have investment banking or other business relationships with the companies in this report. As a result, recipients should be aware that CMBIS may have a conflict of interest that could affect the objectivity of this report and CMBIS will not assume any responsibility in respect thereof. This report is for the use of intended recipients only and this publication, may not be reproduced, reprinted, sold, redistributed or published in whole or in part for any purpose without prior written consent of CMBIS.

Additional information on recommended securities is available upon request.

For recipients of this document in the United Kingdom

This report has been provided only to persons (I)falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (as amended from time to time)("The Order") or (II) are persons falling within Article 49(2) (a) to (d) ("High Net Worth Companies, Unincorporated Associations, etc.,) of the Order, and may not be provided to any other person without the prior written consent of CMBIS.

For recipients of this document in the United States

This report is intended for distribution in the United States to "major US institutional investors", as defined in Rule 15a-6 under the US, Securities Exchange Act of 1934, and may not be furnished to any other person in the United States. Each major US, institutional investor that receives a copy of this research report by its acceptance hereof represents and agrees that it shall not distribute or provide this research report to any other person.

For recipients of this document in Singapore

This report is distributed in Singapore by CMBI (Singapore) Pte. Limited (CMBISG) (Company Regn. No. 201731928D), an Exempt Financial Adviser as defined in the Financial Advisers Act (Cap. 110) of Singapore and regulated by the Monetary Authority of Singapore. CMBISG may distribute reports produced by its respective foreign entities, affiliates or other foreign research houses pursuant to an arrangement under Regulation 32C of the Financial Advisers Regulations. Where the report is distributed in Singapore to a person who is not an Accredited Investor, Expert Investor or an Institutional Investor, as defined in the Securities and Futures Act (Cap. 289) of Singapore, CMBISG accepts legal responsibility for the contents of the report to such persons only to the extent required by law. Singapore recipients should contact CMBISG at +65 6350 4400 for matters arising from, or in connection with the report.