



EQUITIES D.E.L.T.A.H

Digital Transformation, Energy Transition, Lifestyle, Technology, **Automation & Mobility**, Health

China industrial automation

May 2023



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Executive summary – China industrial automation

Import substitution players: Inovance, Estun, LHDS, Shuanghuan Driveline & OPT

High-end localization suppliers: Hanbell & Sinoseal

NEV related players: Shuanghuan Driveline, Sanhua & OPT

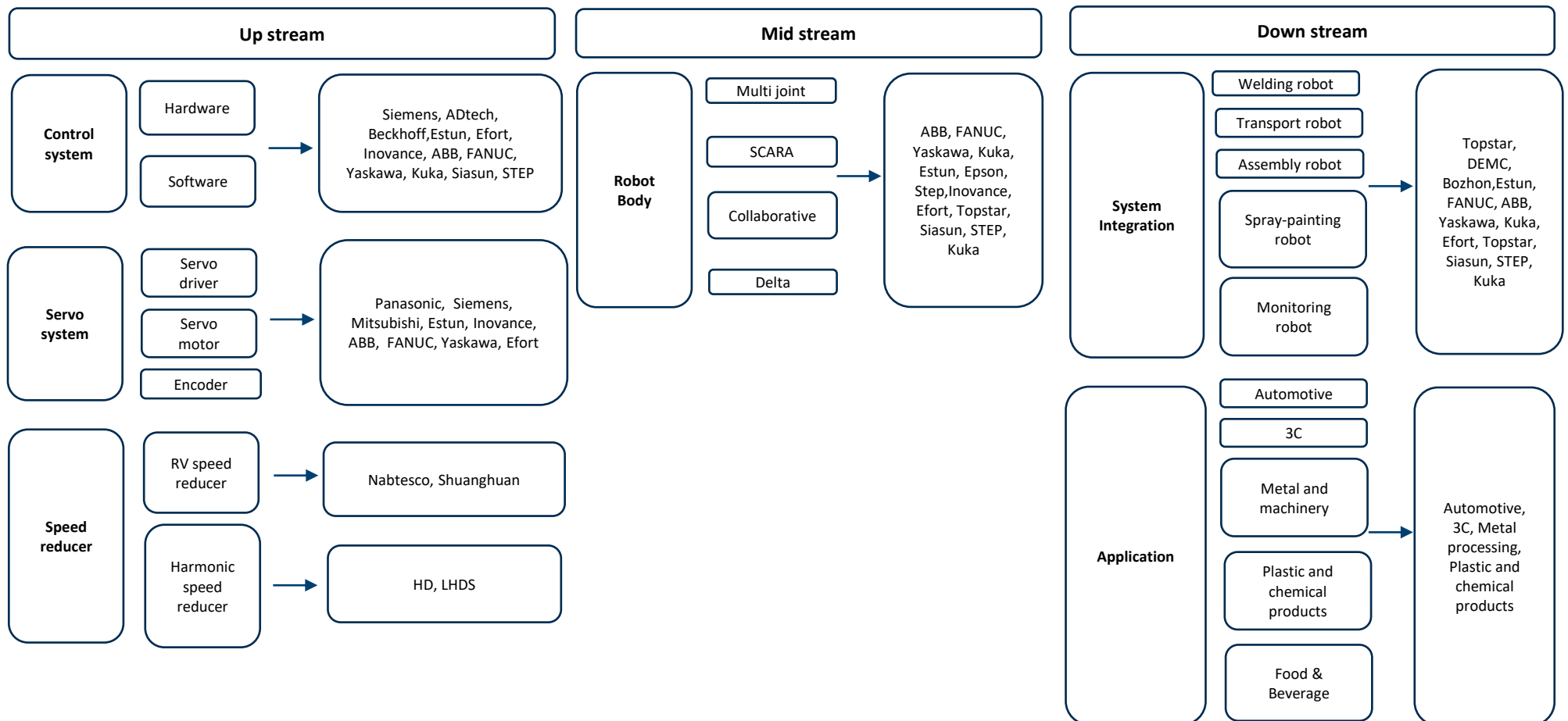
Company	Ticker	Rec	TP (Rmb)	Theme	Investment thesis
Inovance	300124 CH	OP	98.80	Import substitution	China's Siemens with market share gains in each subsegment in industrial automation & industrial robot
Estun	002747 CH	OP	34.20	Import substitution	Largest domestic industrial-robot manufacturer with integrated supply-chain coverage
LHDS	688017 CH	UP	98.90	Import substitution	Largest domestic harmonic speed reducer supplier
Shuanghuan Driveline	002472 CH	OP	38.20	Import substitution NEV related	Strong growth on NEV and industrial-robot demand
OPT	688686 CH	OP	206.40	Import substitution NEV related	China's Keyence with integrated machine-vision supply-chain coverage
Hanbell	002158 CH	OP	41.50	High-end localization	High-end vacuum pump manufacturer with market-share gains in PV and semiconductor industry
Sinoseal	300470 CH	OP	60.80	High-end localization	High-end mechanical seal localization player
Sanhua	002050 CH	OP	36.30	NEV related	Global leader in NEV thermal management system supplier
CTI	300012 CH	OP	26.10	Market share gain	Largest domestic third-party TIC institution supplier

Industrial robots-Estun, Inovance, LHDS, Shuanghuan

The supply chain of industrial robots

The industrial robot supply-chain includes upstream core components, the industrial robot body, and downstream system integration.

Upstream components, especially speed reducers, have highest entry barriers

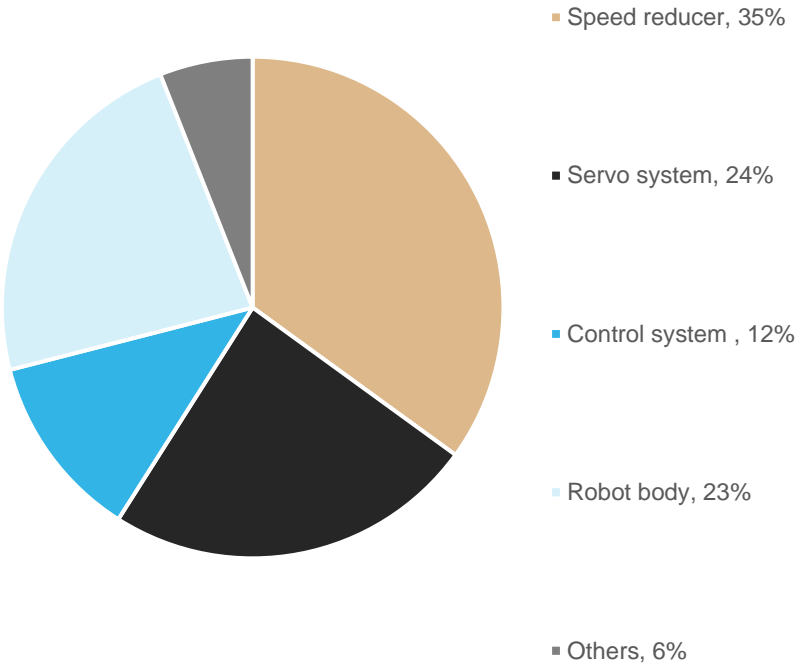


Industrial robot-Estun, Inovance, LHDS & Shuanghuan

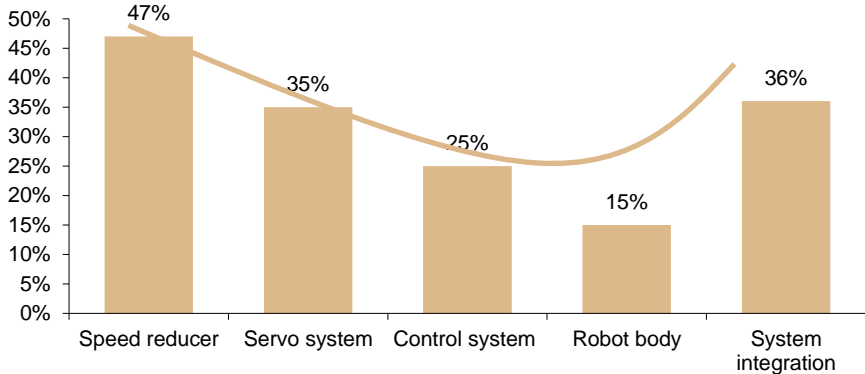
Upstream and downstream enjoy higher profit margins than midstream

Speed reducer component has highest GPM and lowest localization rate

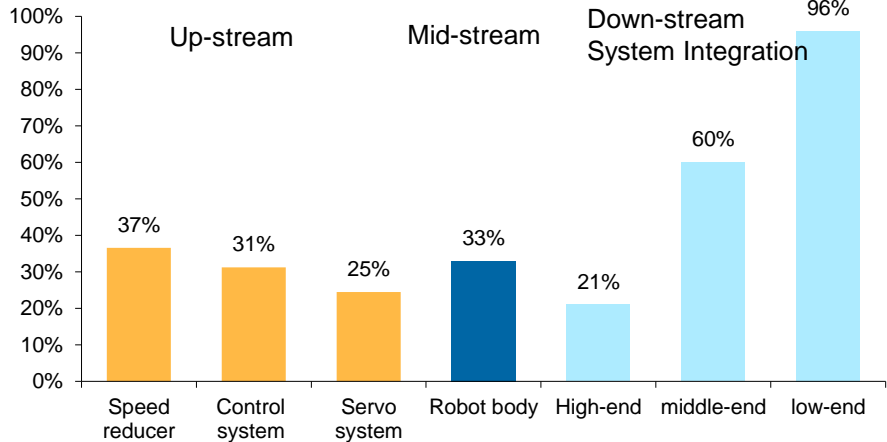
Industrial robot cost breakdown as of 2020



GPM across the industrial robot supply chain as at 2020



Localization rate of industrial robot supply chain as at 2021



Source: Leadleo Research Institute, Macquarie Research, May 2023

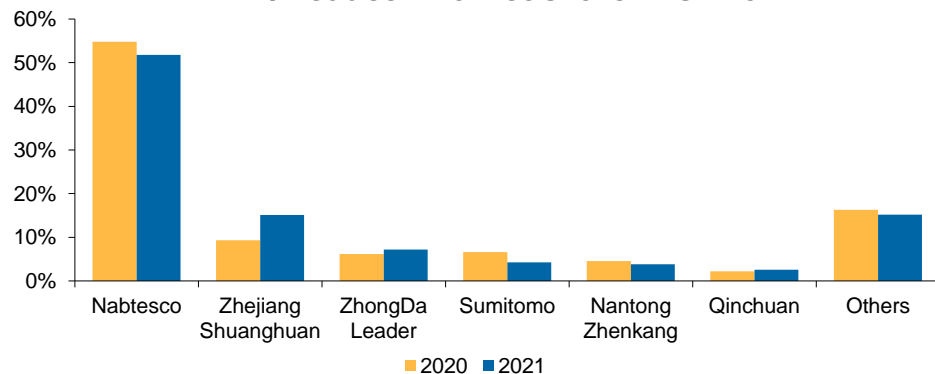
Upstream is best positioned-LHDS & Shuanghuan

RV (rotary vector) vs. harmonic speed reducer

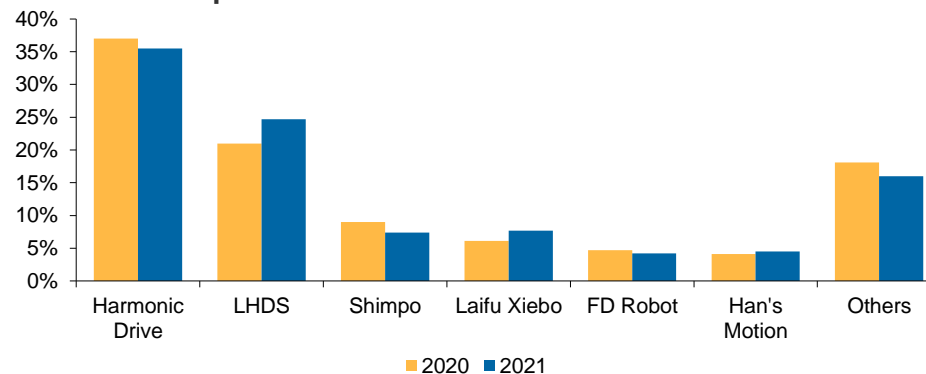
Upstream includes three core components - controlling systems, servo systems and speed harmonic speed reducers

Product	RV reducer	Harmonic reducer
Producer	Nabtesco, Zhejiang Shuanghuan	HD, LHDS
Technical characteristics	The transmission is achieved by multi-stage reduction (the front stage of the planetary gear reducer and the back stage of the cycloidal-pin wheel reducer), which consists of more components.	The motion is transmitted through the elastic deformation of the flex spline, which is mainly composed of three core components: the flex spline, the circular spline and the wave generator. Compared with RV and other precision reducers, the material, size and weight of the harmonic reducer are largely reduced.
Product performance	Large size, high load capacity and high stiffness.	Small size, high transmission ratio and high precision.
Application scenarios	Generally used in multi-joint robots where heavy loads are placed on the base, arm, shoulder, etc.	Generally used in small arm, wrist or hand of the robot.
Terminal market	Heavy-load robots with RV reducers are commonly used in the automotive, transportation, and port industries.	Robots with load of <=30 kg with harmonic reducers are commonly used in the 3C, semiconductor, F&B, injection molding, molding, and medical industries.
Price range	RMB 5,000-8,000/unit.	RMB 1,500-5,000/unit.

RV reducer market share in China



Harmonic speed reducer market share in China as of 2021



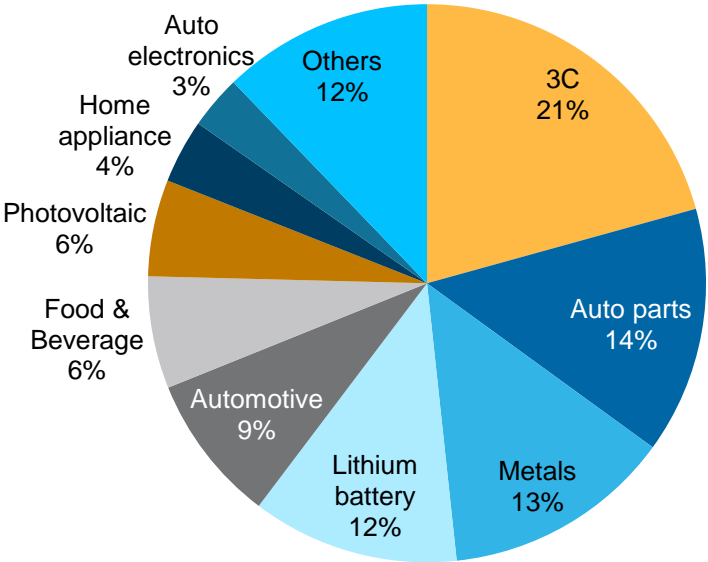
Source: Huaon, Leadleo Research Institute, Macquarie Research, May 2023

Industrial robot-Estun, Inovance, LHDS & Shuanghuan

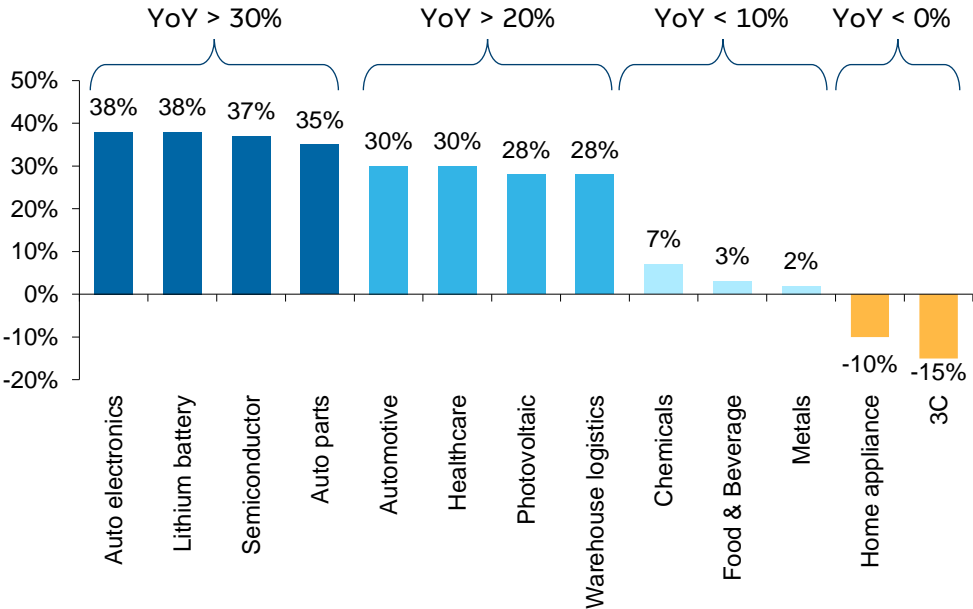
Future demand trends - strong demand from emerging industries

We believe downstream application from the lithium battery, PV, and F&B industries will continue to see faster growth than the automotive industry

China industrial robot downstream application as of 2022



China industrial robot downstream application as of 2022 YoY



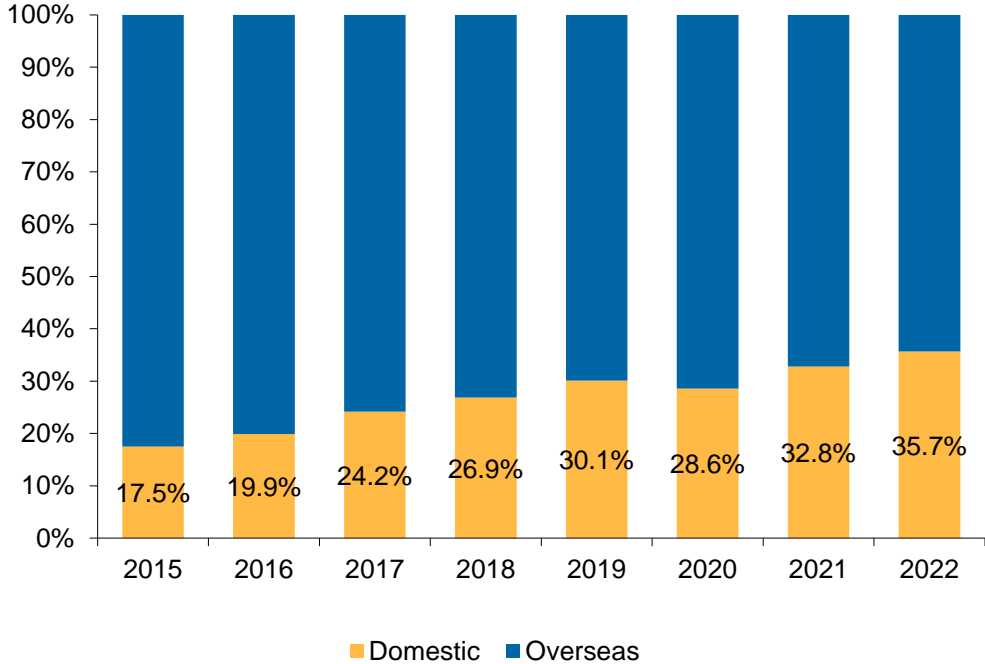
Source: MIR, IFR, May 2023

Industrial robot-Estun, Inovance, LHDS & Shuanghuan

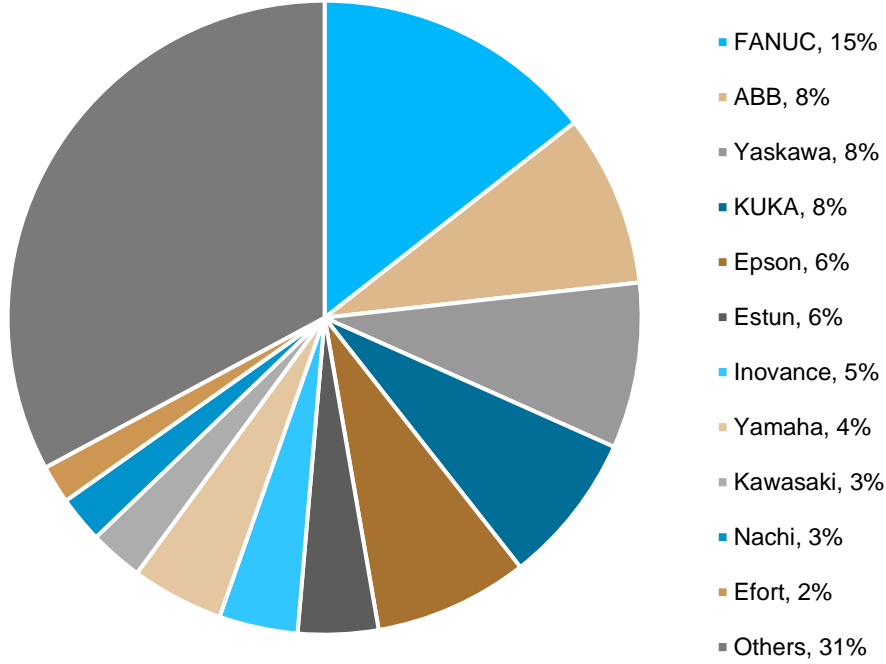
Localization rate & market share (%) of industrial robots in China

Historically, international manufacturing brands have held a monopoly in the industrial robot market, but market share of Chinese makers has gradually improved.

China industrial robot body manufacturers' localization rate



Market share analysis of robot body manufacturers in China as of 2022



Source: MIR, Leadleo Research Institute, Macquarie Research, May 2023

Industrial robot-Estun, Inovance, LHDS & Shuanghuan

Four types of industrial robots based on mechanical structure

Multi-joint robots are mostly heavy-load robots, while the remaining types of robots are mostly light-load robots

Category of robots



Multi-joint robot



SCARA robot



Collaborative robot



DELTA robot

No. of harmonic speed reducer consumed

3.5

3

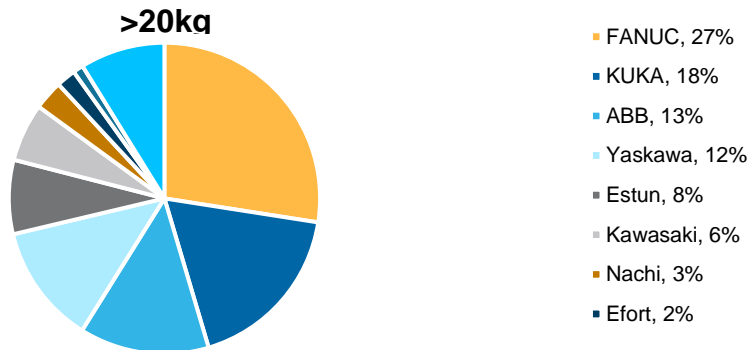
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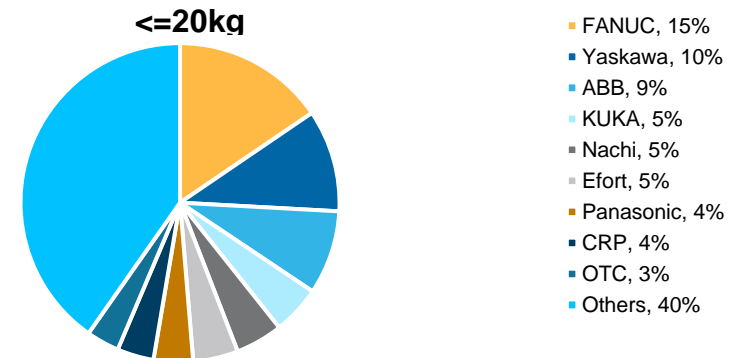
Source: Macquarie Research, May 2023

Estun: the leading robot manufacturer to compete w/ big 4

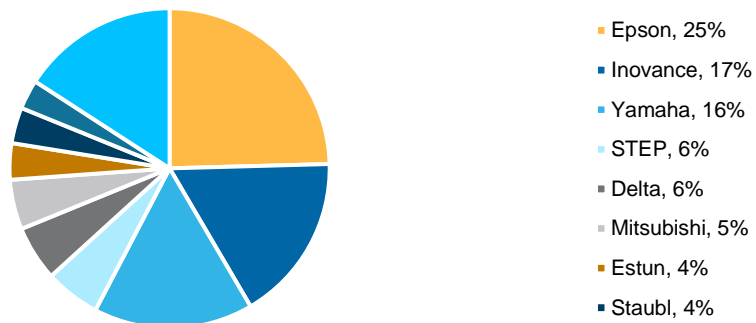
Market share of 6-axis industrial robot by weight in 2022 in China - heavy duty



Market share of 6-axis industrial robot in 2022 in China - light duty



Market share of SCARA robots in China in 2022



Market share of collaborative robots in China in 2022

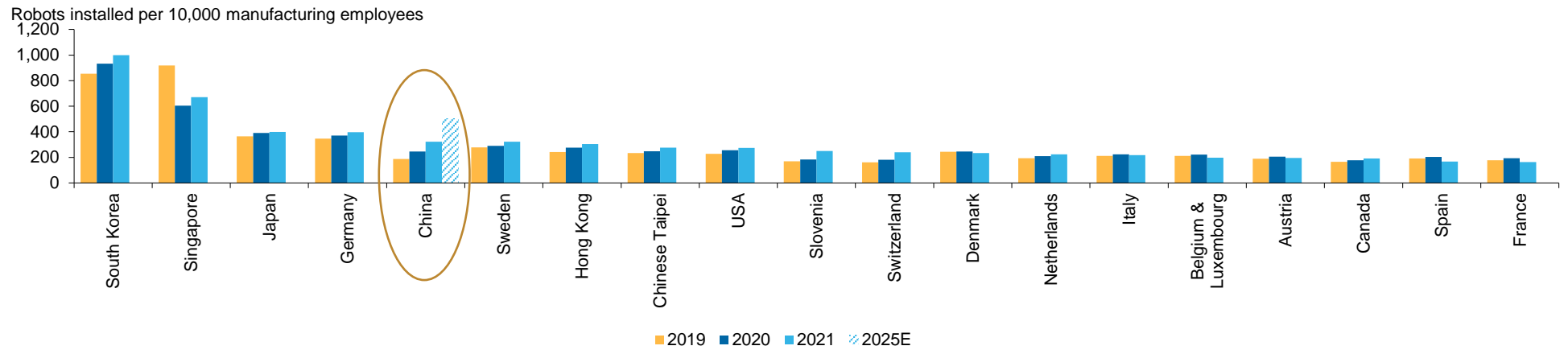


Source: MIR, Macquarie Research, May 2023

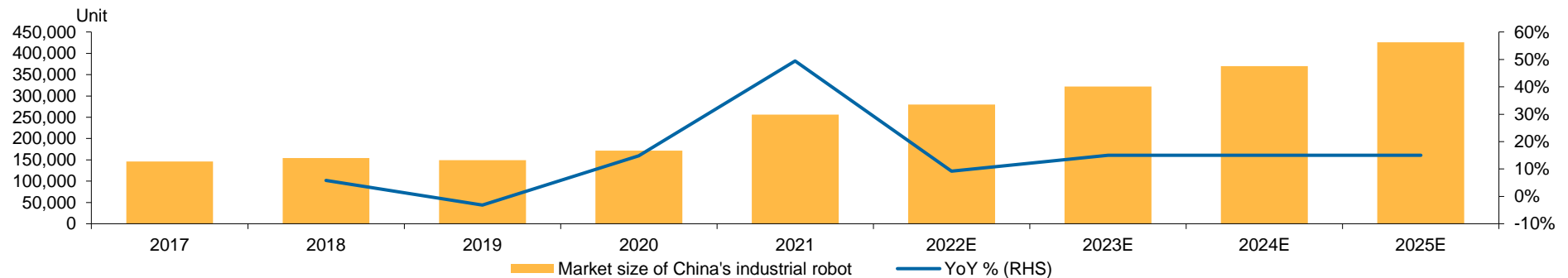
Industrial robots in 14th FYP

As per China's 14th Five-Year Plan, regarding robot-industry development, industrial robot density should double in 2025 from 246 units in 2020, and the market size of robot industry is set to grow at least 20% p.a. until 2025

Industrial robot density by region



Market size of Industrial robot manufacturing in China

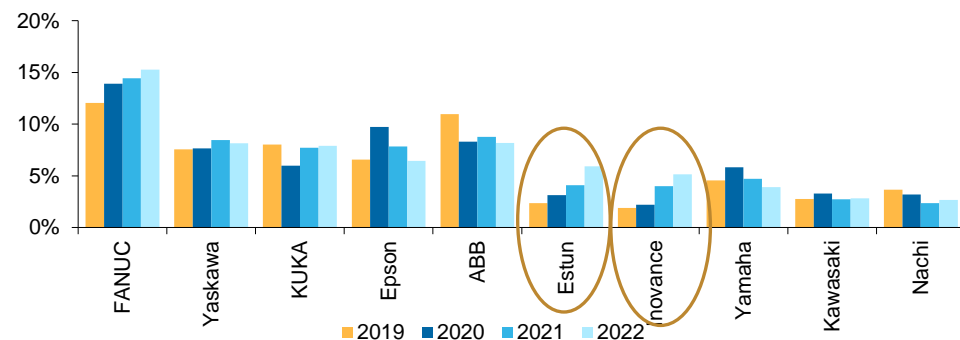


Source: MIR, Macquarie Research, May 2023

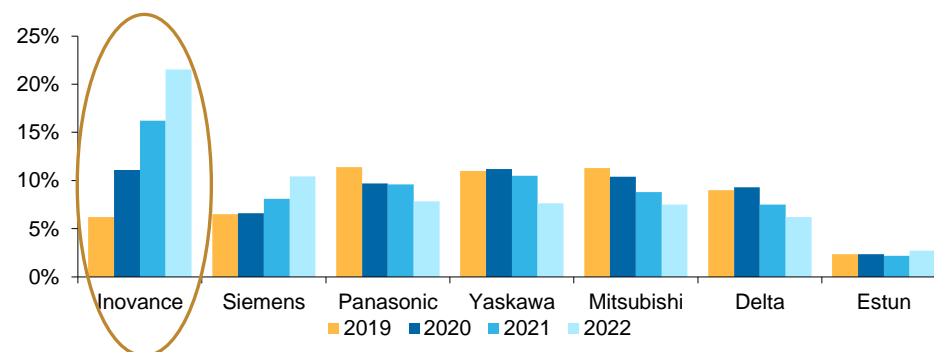
Inovance-China's future Siemens

Market-share gains on import substitution

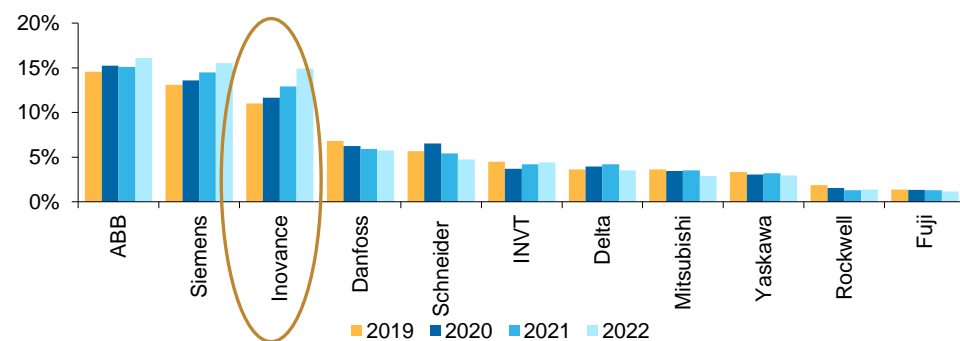
Market share of industrial robot in China



Market share of servo systems in China



Market share of inverters in China



Market share of small PLCs in China



Source: MIR, Macquarie Research, May 2023

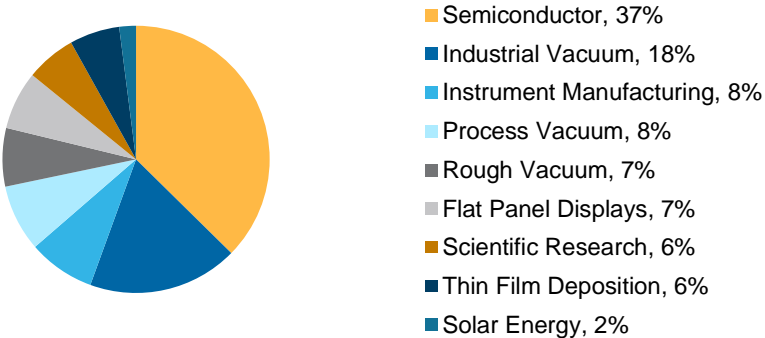
Hanbell: Growth catalysts in vacuum-pump segment

The global vacuum-pump market is highly concentrated, with the top-three suppliers - Atlas, Ebara, and Pfeiffer. Hanbell has dominant market in PV vacuum pump but very small position in semiconductor vacuum-pump industry.

Global market share of vacuum pumps in 2019



Global vacuum pumps: downstream application industries in 2019



Vacuum pump in semiconductor application

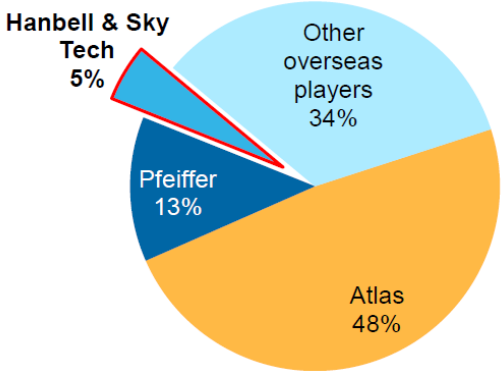
Cleaning

Semi-harsh process

Harsh process



Global market share of semiconductor vacuum pump in 2021



Source: Huaon, Macquarie Research, May 2023

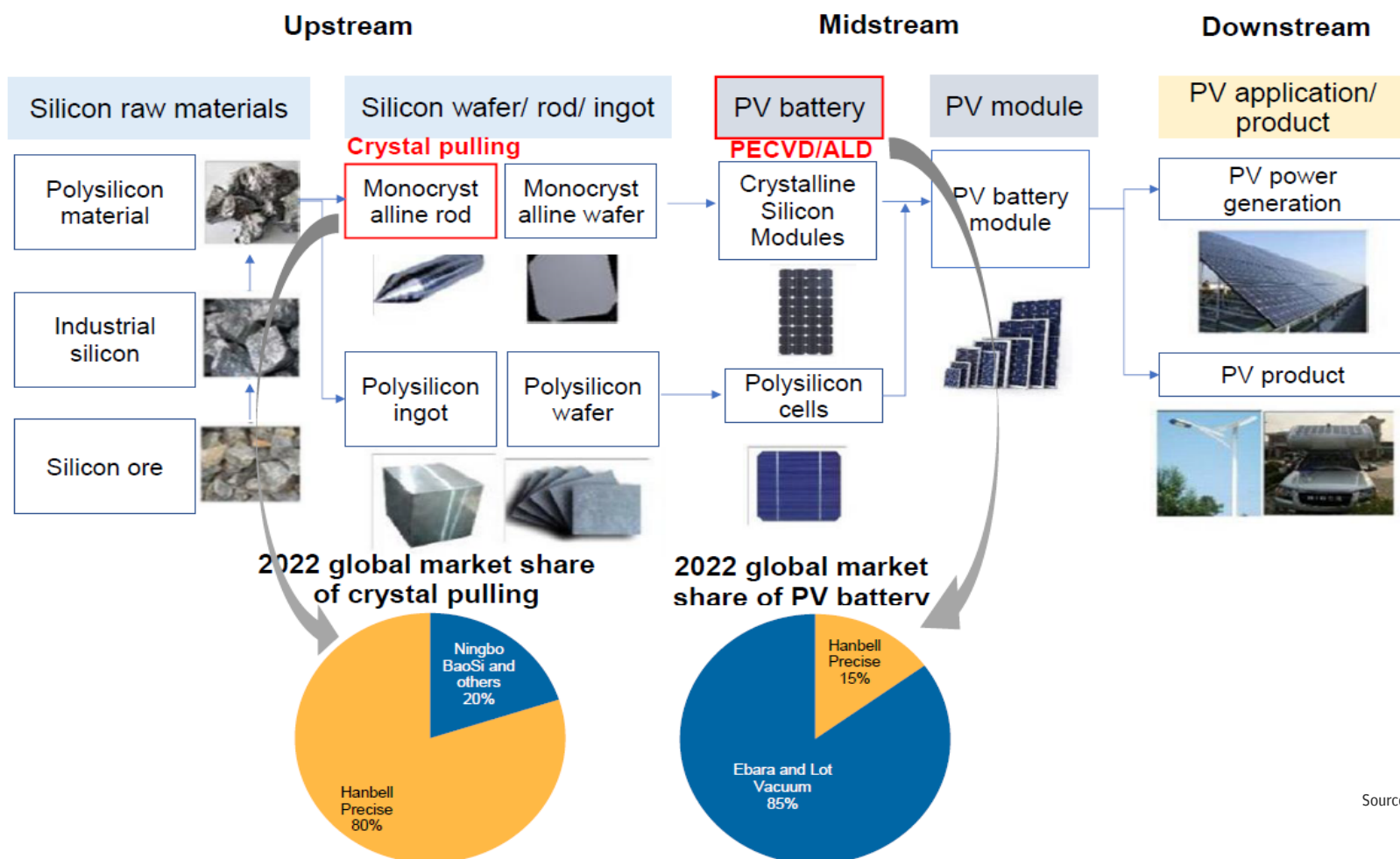
Hanbell: Growth catalysts in vacuum-pump segment

Leading in PV crystal pulling, and catching up in PV battery cell

In 2023, Hanbell will switch its focus to PV battery-cell vacuum pumps from PV crystal, pulling on faster capacity growth.

Hanbell set to gain market share in the PV battery cell industry on the back of its competitive advantages.

Vacuum pumps in PV applications



Source: Company data, Macquarie Research, May 2023

Hanbell: Growth catalysts in vacuum pump segment

Vacuum pump segment to become the company's growth engine

Our forecast for vacuum pumps in the PV industry: Our base case assumes the total market size of vacuum pumps used in the PV industry will reach Rmb1,540m in 2025E, representing a 7.2% revenue CAGR over 2021-25E.

Base case	2020	2021	2022E	2023E	2024E	2025E	Bull case	2020	2021	2022E	2023E	2024E	2025E
Global Installations Capacity: Solar PV (GW)	130	170	200	225	250	270	Global Installations Capacity: Solar PV (GW)	130	170	225	270	300	330
YoY % (RHS)	13.0%	30.8%	17.6%	12.5%	11.1%	8.0%	YoY % (RHS)	13.0%	30.8%	32.4%	20.0%	11.1%	10.0%
New capacity (GW)	15	40	30	25	25	20	New capacity (GW)	15	40	55	45	30	30
Inventory capacity (GW)	144	163	213	250	281	313	Inventory capacity (GW)	144	163	213	281	338	375
Inventory renewal	48	54	71	83	94	104	Inventory renewal	48	54	71	94	113	125
Equipment demand (GW)	63	94	101	108	119	124	Equipment demand (GW)	63	94	126	139	143	155
Value per GW, RMB m	12.4	12.4	12.4	12.4	12.4	12.4	Value per GW, RMB m	12.4	12.4	12.4	12.4	12.4	12.4
Total market size, RMB m	780	1,168	1,250	1,343	1,473	1,540	Total market size, RMB m	780	1,168	1,560	1,721	1,767	1,922
YoY %	18.3%	49.7%	7.1%	7.4%	9.6%	4.6%	YoY %	18.3%	49.7%	33.6%	10.3%	2.7%	8.8%

Our base case forecast for vacuum pumps in the semiconductor industry: We expect market size of semiconductor vacuum pumps to reach Rmb31,953m in 2022E and Rmb38,965m in 2025E, representing a 6.8% revenue CAGR over 2022E-25E.

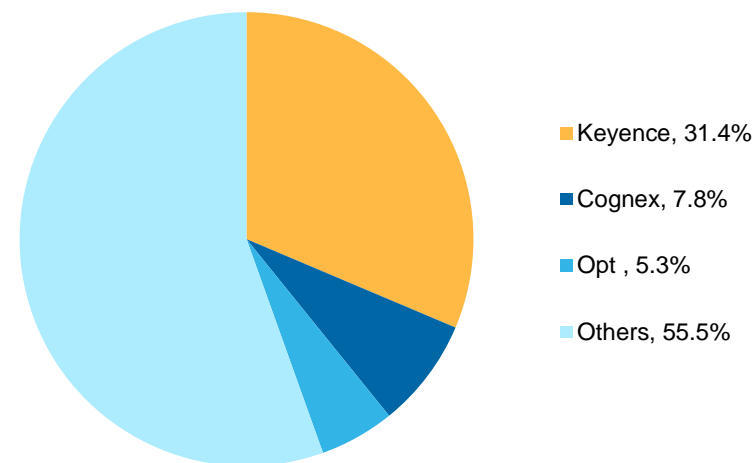
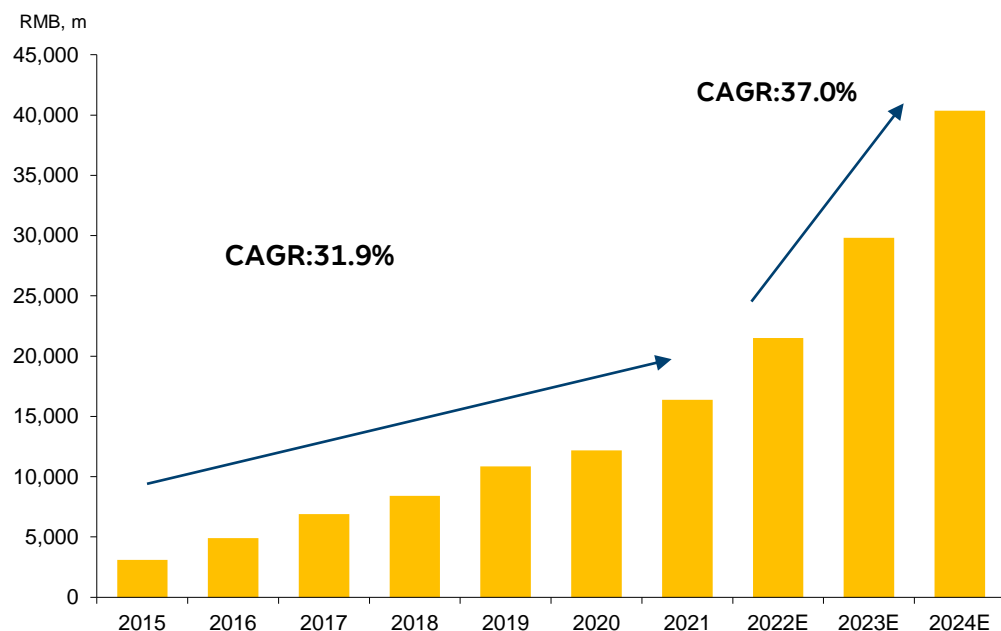
	2020	2021	2022E	2023E	2024E	2025E
Incremental market						
Wafer production capacity, thousand /month	610	840	940	950	1,000	1,000
YoY % (RHS)		37.7%	11.9%	1.1%	5.3%	0.0%
Vacuum pump production capacity, thousand /month	571	571	571	571	571	571
No. of vacuum pump	34,794	48,251	53,589	54,286	57,143	57,143
Price of vacuum pump, RMB	120,000	120,000	120,000	120,000	120,000	120,000
Market size, RMB m	4,175	5,790	6,431	6,514	6,857	6,857
Existing market						
Wafer production capacity, thousand /month	9,930	10,780	11,720	12,670	13,670	14,670
YoY % (RHS)		8.6%	8.7%	8.1%	7.9%	7.3%
Vacuum pump production capacity, thousand /month	571	571	571	571	571	571
No. of vacuum pump renewal	113,523	123,175	133,893	144,800	156,229	167,657
Price of vacuum pump, RMB	120,000	120,000	120,000	120,000	120,000	120,000
Market size, RMB m	13,623	14,781	16,067	17,376	18,747	20,119
Total market size of vacuum pump, RMB m	17,798	20,571	22,498	23,890	25,605	26,976
Repair & Maintenance market size of vacuum pump, RMB bn	N.A.	8,709	9,455	10,279	11,112	11,989
Total, RMB bn	17,798	29,280	31,953	34,169	36,717	38,965
YoY %		42%	42%	43%	43%	44%

OPT: largest domestic integrated machine vision supplier

Company	Product and Business Scope				
	Self-owned products				Solutions
	Light source and light controller	Lens	Camera	Vision control system	
Keyence	✓	✓	✓	✓	Overall Solution
Cognex			✓	✓	Overall Solution
Hikrobot		✓	✓	✓	Overall Solution
DHC			✓	✓	Overall Solution
CCS	✓				
Moritex	✓	✓			Optical Solution
Stemmer Imaging AG				✓	Hardware & overall solution
OPT	✓	✓	No mass production yet	✓	Hardware & overall solution

Market size of China machine vision industry in 2015-2024E

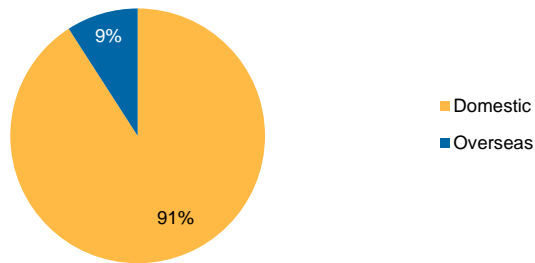
Market share of China's machine vision industry in 2021



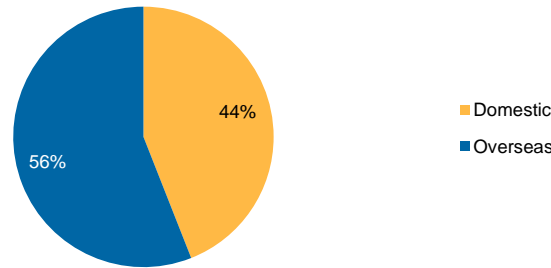
Source: Company data, May 2023

OPT: largest domestic integrated machine vision supplier

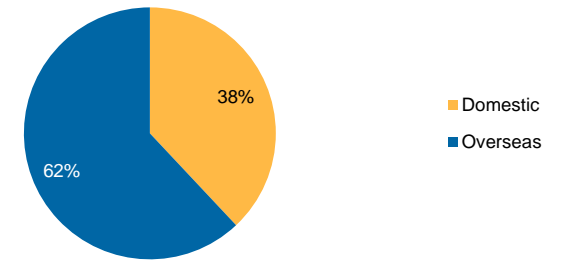
Revenue breakdown by geographic areas for OPT in 2021



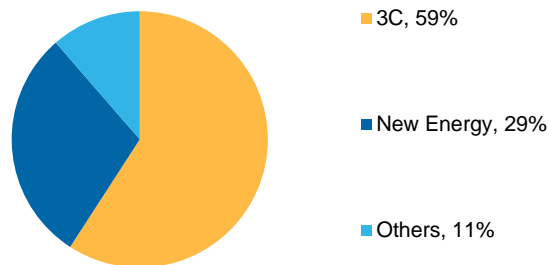
Revenue breakdown by geographic areas for Keyence in 2021



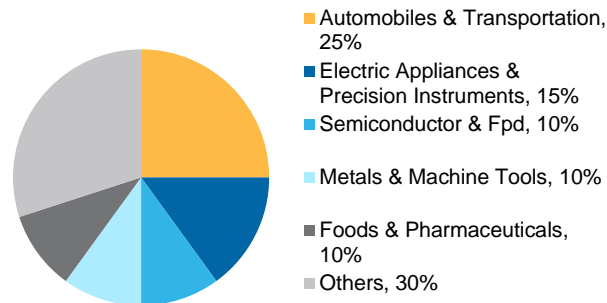
Revenue breakdown by geographic areas for Cognex in 2021



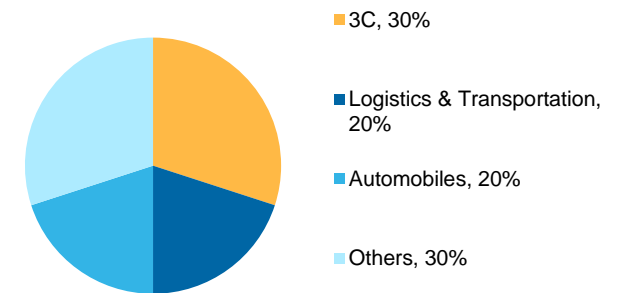
Revenue breakdown by downstream application industries for OPT in 2021



Revenue breakdown by downstream application industries for Keyence in 2021



Revenue breakdown by downstream application industries for Cognex in 2021

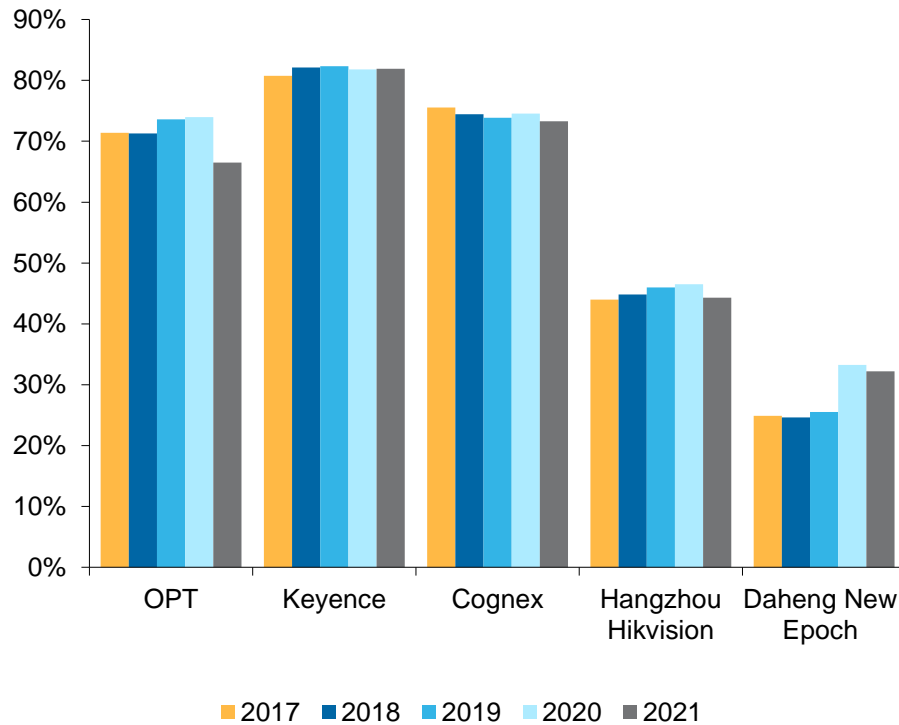


Source: Company data, May 2023

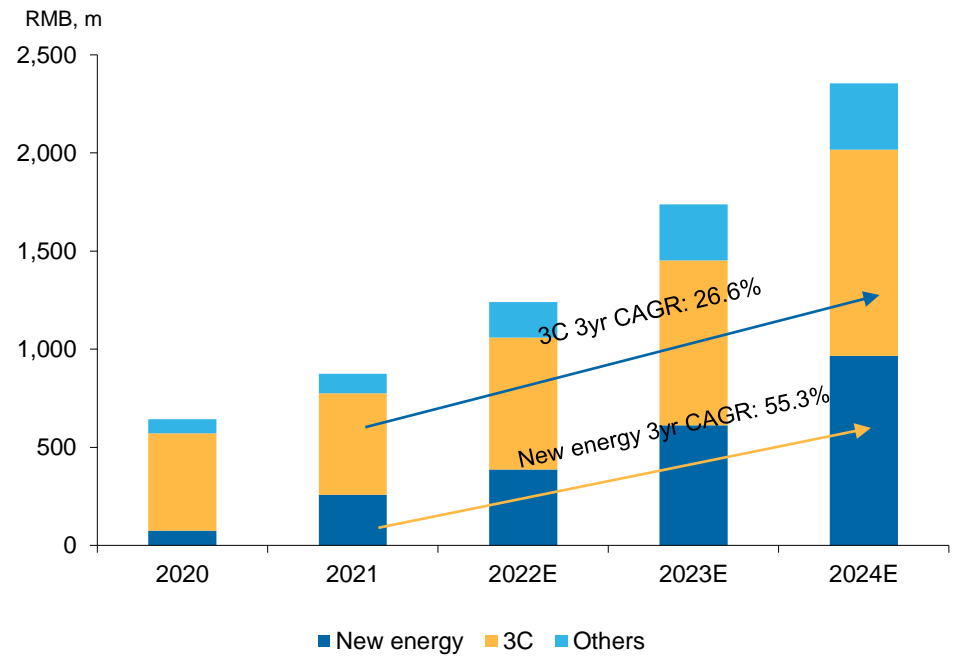
OPT: largest domestic integrated machine vision supplier

OPT enjoys higher GPM than its domestic peers due to the difference of business structure. Compared with its international peers, OPT's GPM is slightly lower, mainly because they have more advantages in technology and pricing power, provide standard products with diversified downstream application users.

GPM comparison for OPT & peers in 2017-21



OPT's revenue breakdown by segment in 2020-24E



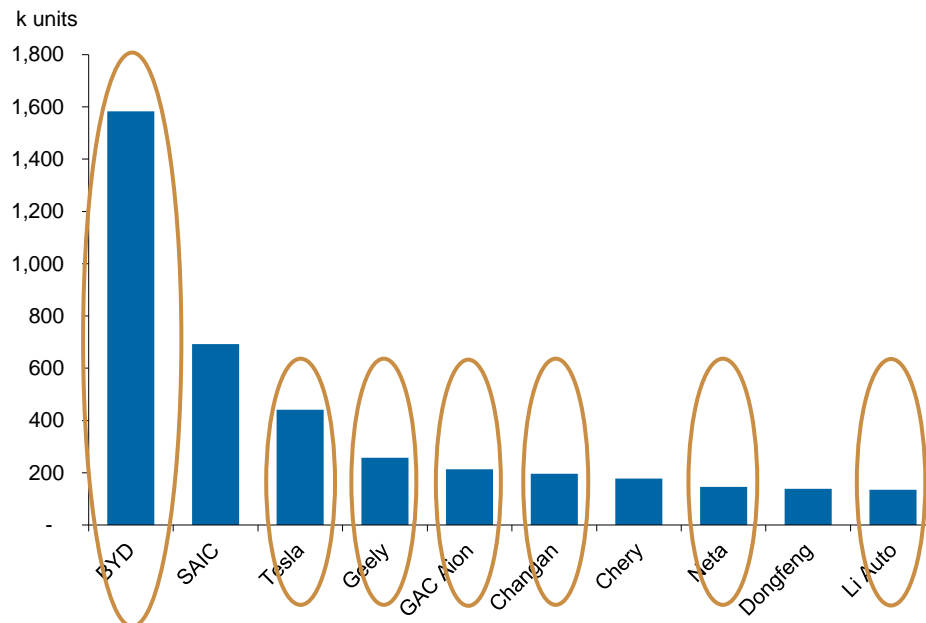
Source: Company data, Macquarie Research, May 2023

Shuanghuan Driveline-NEV and industrial robot-driven growth play

In cooperation with high-quality customers such as BorgWarner, BYD, SAIC, Schaeffler, and Inovance, Shuanghuan has covered a variety of new energy vehicles.

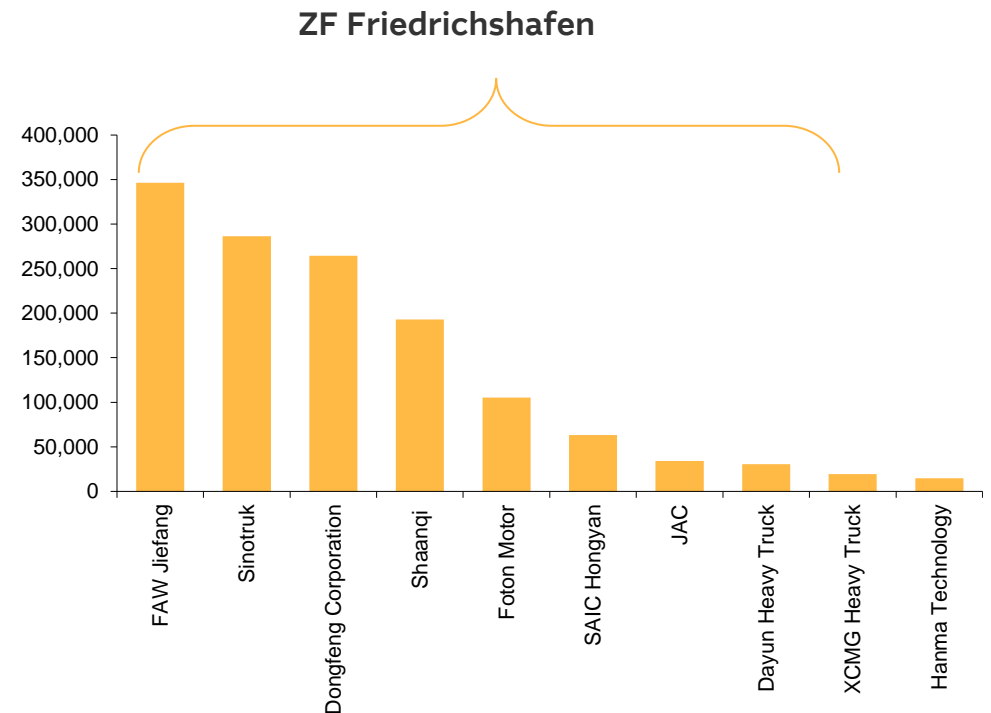
In terms of AMT among heavy-duty trucks, Shuanghuan is the exclusive supplier of ZF in the Asia Pacific region. With the popularization of AMT gearbox in the heavy truck market, the company's market share has also steadily improved

The best sellers of NEVs in China in 2022 - 7/10 transmission gear products are provided by Shuanghuan



Source: CAAM, May 2023

The best sellers of heavy-duty trucks in China



Shuanghuan Driveline-NEV and industrial robot-driven growth play

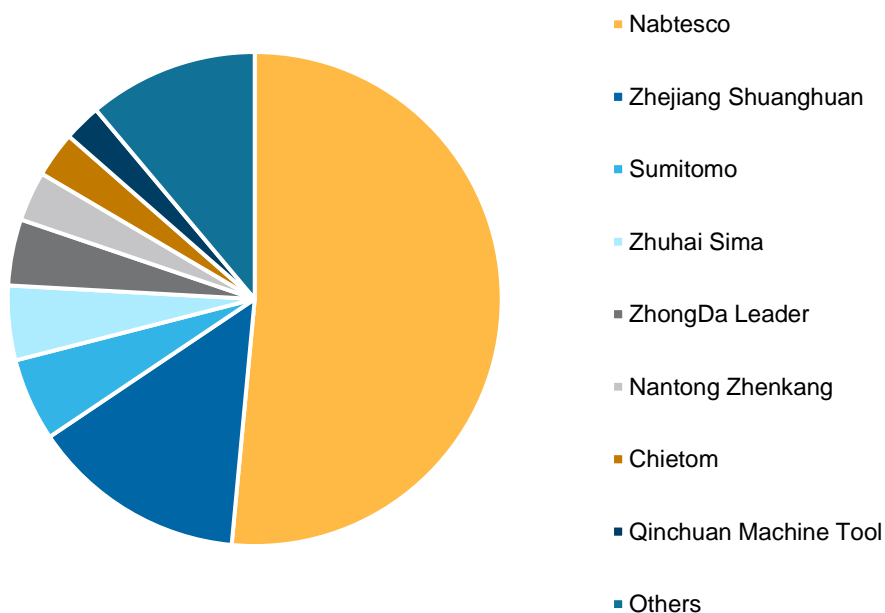
We estimate the automatic transmission gear market size for traditional vehicles, BEVs, PHEVs, and heavy-duty vehicles will see CAGRs of 9.8%, 24.7%, 45.7%, and 64.5% in 2021-2025E.

Automatic transmission gear market size for traditional vehicles, PHEVs, BEVs, and heavy-duty trucks, 2016-2025E

Automatic transmission for vehicles	2016	2017	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	21-25E CAGR
Sales volume of Auto, units '000	28,028	28,879	28,081	25,769	25,311	26,100	27,500	28,000	29,000	30,000	
Penetration % (RHS)	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	
Sales volume of automatic transmission, units '000	14,014	15,883	16,848	16,750	17,718	19,580	22,000	23,800	26,100	28,500	
Market size, RMB m	21,021	23,825	25,272	25,125	26,577	29,370	33,000	35,700	39,150	42,750	9.8%
YoY growth % (RHS)		13.3%	6.1%	-0.6%	5.8%	10.5%	12.4%	8.2%	9.7%	9.2%	
Auto - PV	2016	2017	2018	2019	2020	2021E	2022E	2023E	2024E	2025E	
Sales volume of BEV, units '000	259	470	790	824	949	2,723	3,312	4,202	5,342	6,577	
Sales volume of PHEV, units '000	79	111	265	226	256	596	1,170	1,695	2,189	2,686	
BEV market size, RMB m	130	235	395	412	475	1,362	1,656	2,101	2,671	3,289	24.7%
YoY growth % (RHS)		81.2%	68.1%	4.3%	15.2%	186.9%	21.6%	26.9%	27.1%	23.1%	
PHEV market size, RMB m	8	11	27	23	26	60	117	170	219	269	45.7%
YoY growth % (RHS)		40.5%	138.7%	-14.7%	13.3%	132.8%	96.3%	44.9%	29.1%	22.7%	
Total PV market size, RMB m	138	246	422	435	500	1,421	1,773	2,271	2,890	3,557	
YoY growth % (RHS)		78.9%	71.3%	3.1%	15.1%	184.2%	24.8%	28.1%	27.3%	23.1%	
Heavy duty truck	2016	2017	2018	2019	2020	2021	2022E	2023E	2024E	2025E	
Sales volume, units '000	728	1,112	1,138	1,174	1,617	1,393	1,533	1,686	1,855	2,040	
Penetration rate of AMT for heavy-duty truck						10%	20%	30%	40%	50%	
Market size, RMB m						557	1,226	2,023	2,967	4,080	64.5%

Shuanghuan Driveline: NEV and industrial robot-driven growth play

Market share of RV speed reducers in China (2021)



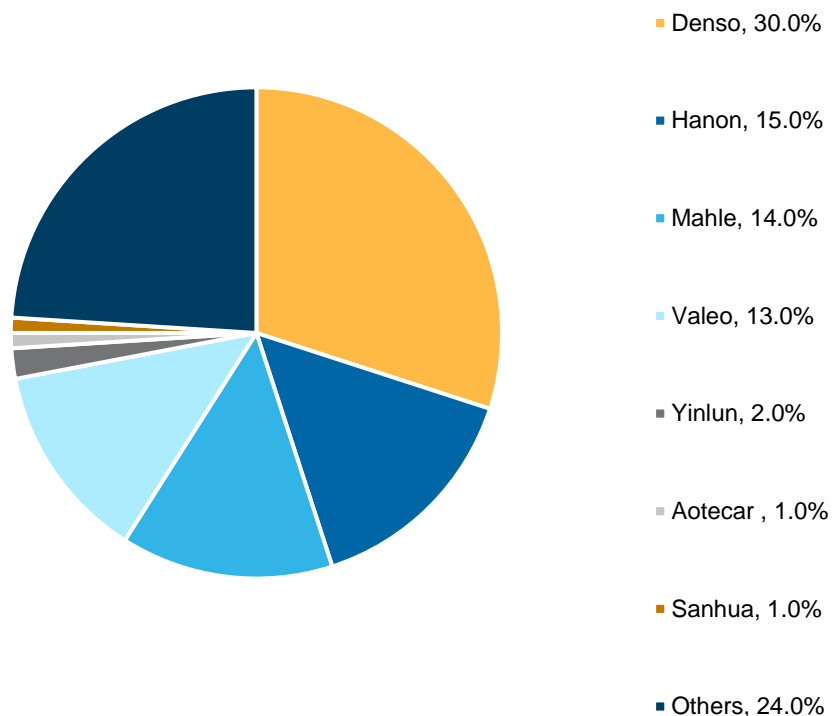
Our valuation for Shuanghuan's RV speed reducer

RMB m	2023E	2024E
Valuation for RV speed reducer		
Revenue from RV reducer (RMB m)	189	255
<i>NPM %</i>	<i>40%</i>	<i>40%</i>
Net profit from RV speed reducer (RMB m)	76	102
No. of shares outstanding	778	778
EPS from RV speed reducer (RMB)	0.10	0.13
Total EPS (RMB)	0.98	1.21
PER	40x	30x
Implied valuation (RMB/share)	3.89	3.94
Our current estimates		
<i>NPM %</i>	<i>7%</i>	<i>9%</i>
Net profit from RV speed reducer (RMB m)	14	22
EPS from RV speed reducer (RMB)	0.02	0.03
PER	38x	
Implied current valuation (RMB/share)	0.68	

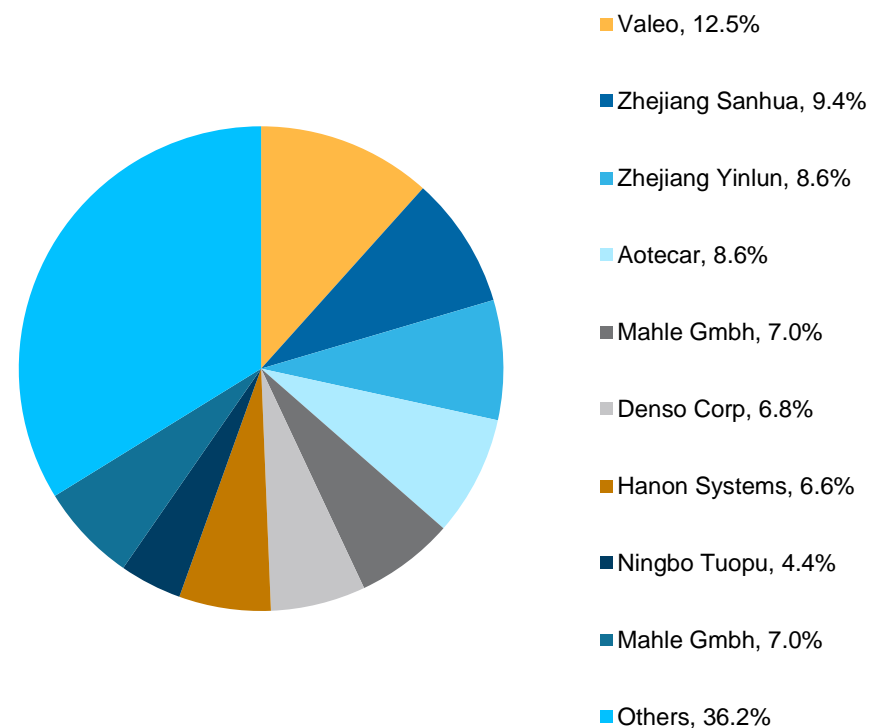
Source: Company data, May 2023

Sanhua: Small components, big strategic shift

Global market share of automotive thermal management system in 2021 (based on revenue)

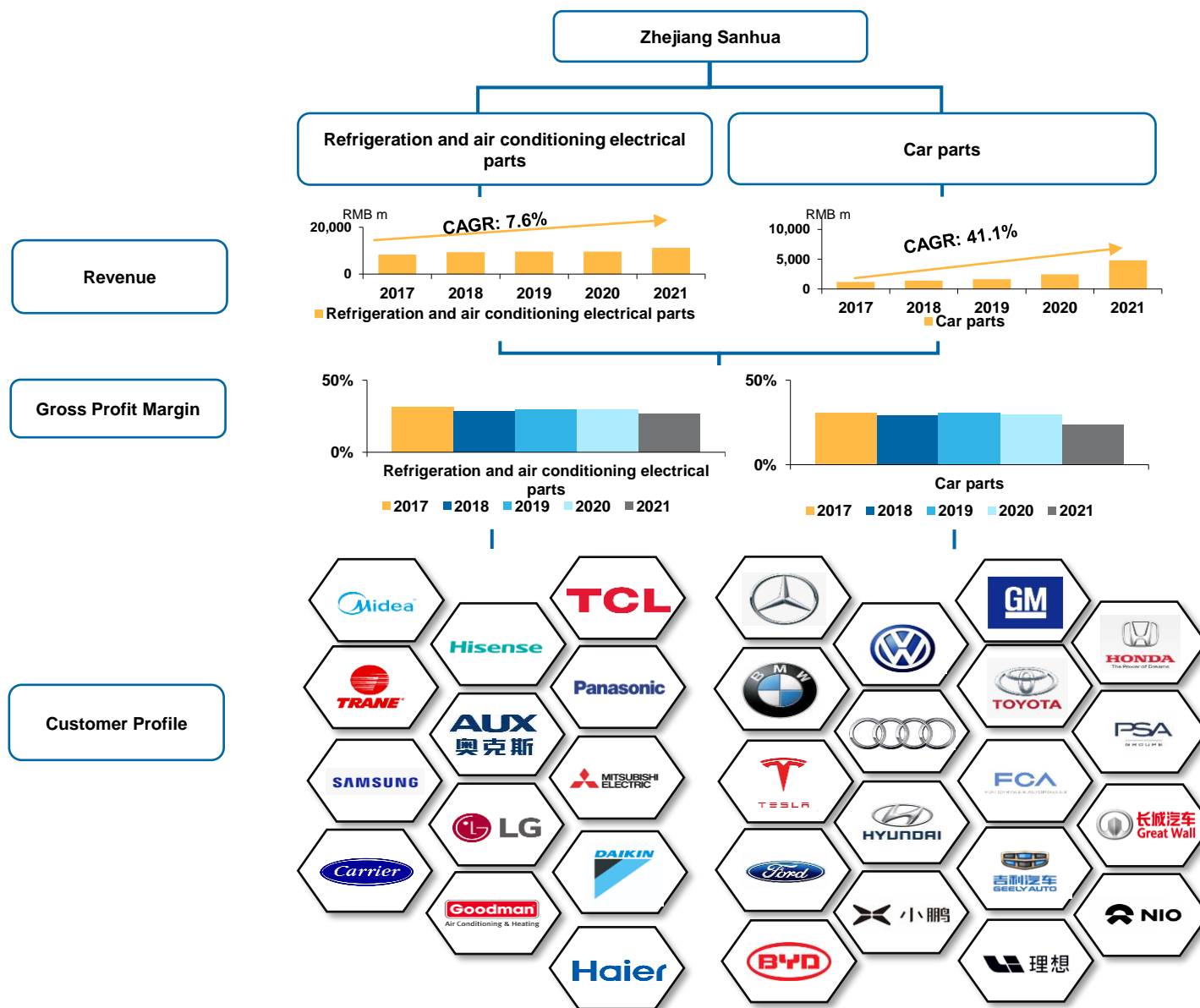


Domestic market share of NEV thermal management system in 2021 (based on revenue)



Source: Huaon, Macquarie Research, May 2023

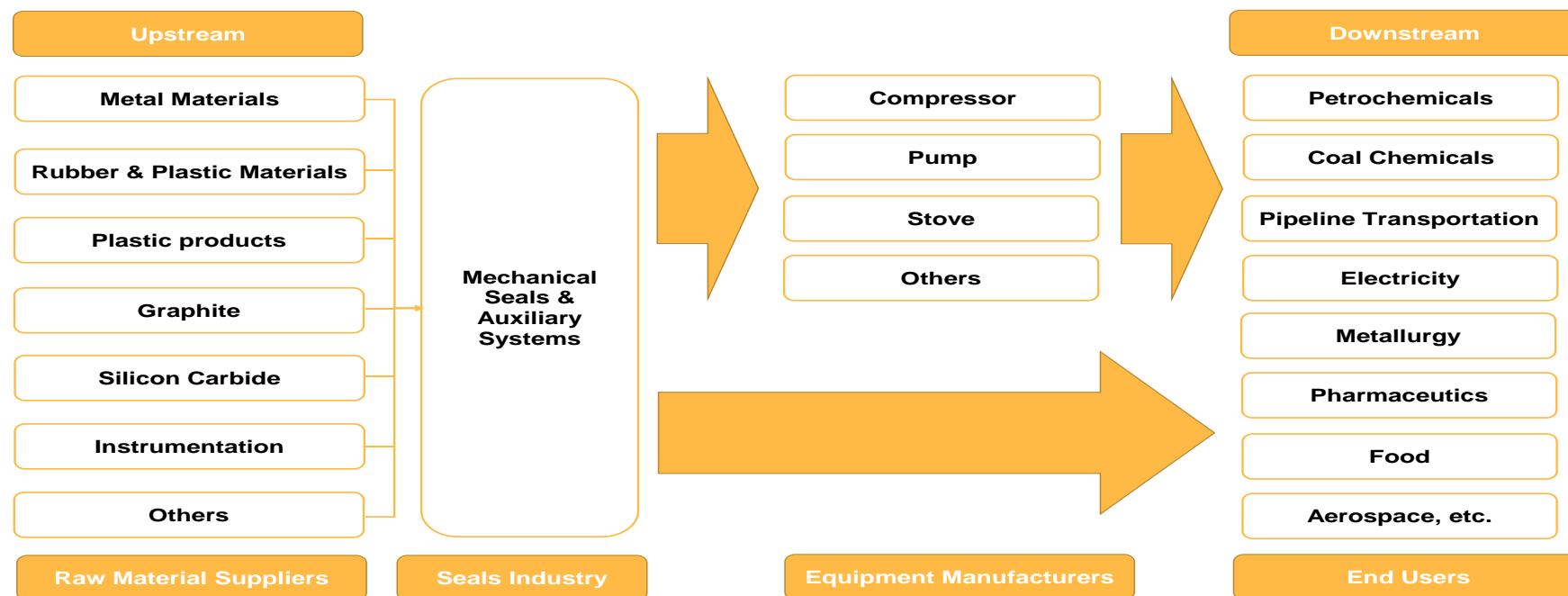
Sanhua: Small components, big strategic shift



Source: Company data, Macquarie Research, May 2023

Sinoseal: Play on localization in mechanical seals

Sinoseal is a local SOE enterprise. Sichuan Chuanji Investment, a wholly owned subsidiary of Sichuan Machinery Research and Design Institute, is its actual controller, with 22.1% of its total shares.



Overall middle-to-high-end mechanical seal demand in China

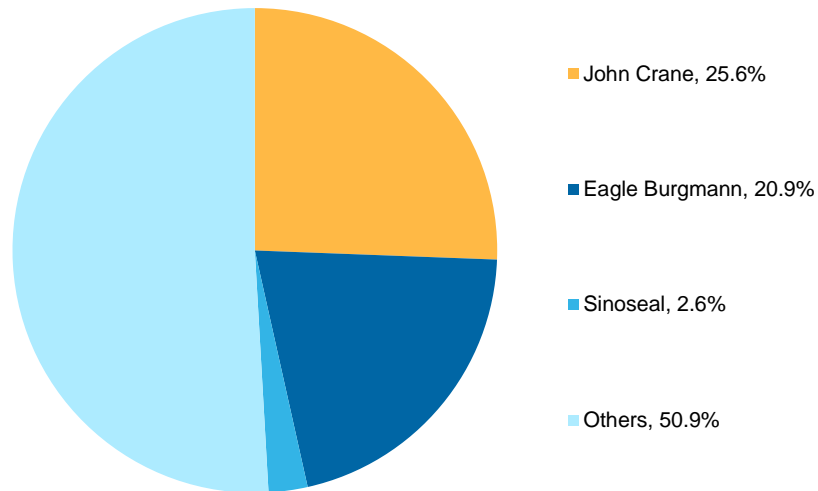
RMB bn	2020	2025E	CAGR
Petrochemicals	2.46	3.11	4.8%
Coal Chemicals	0.57	0.77	6.2%
Power	2.08	2.78	6.0%
Metallurgy	0.60	0.60	0.0%
Total	5.71	7.26	4.9%

Source: Company data, Macquarie Research, May 2023

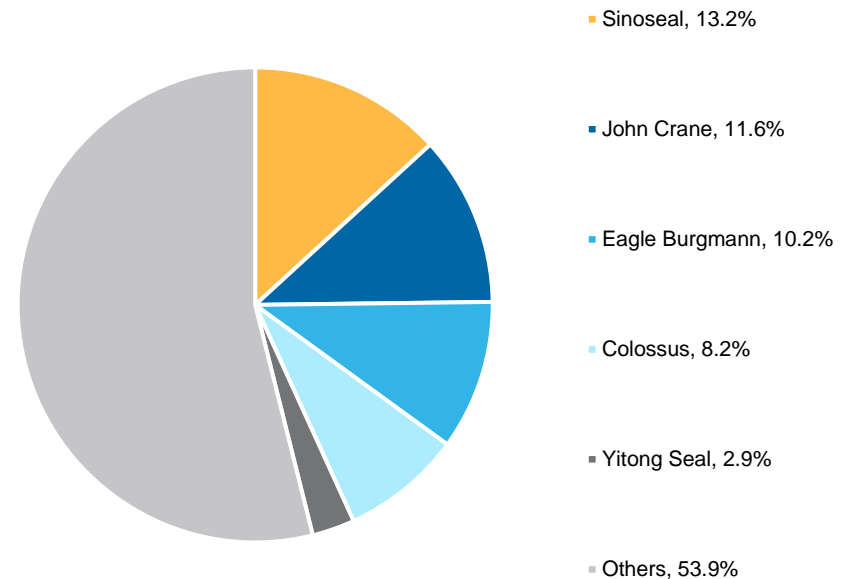
Sinoseal: Play on localization in mechanical seals

Sinoseal surpassed global peers (John Crane, EagleBurgmann, and Flowserve) in 2017 to become the largest mechanical seal manufacturer in China, with 13.2% market share in 2020.

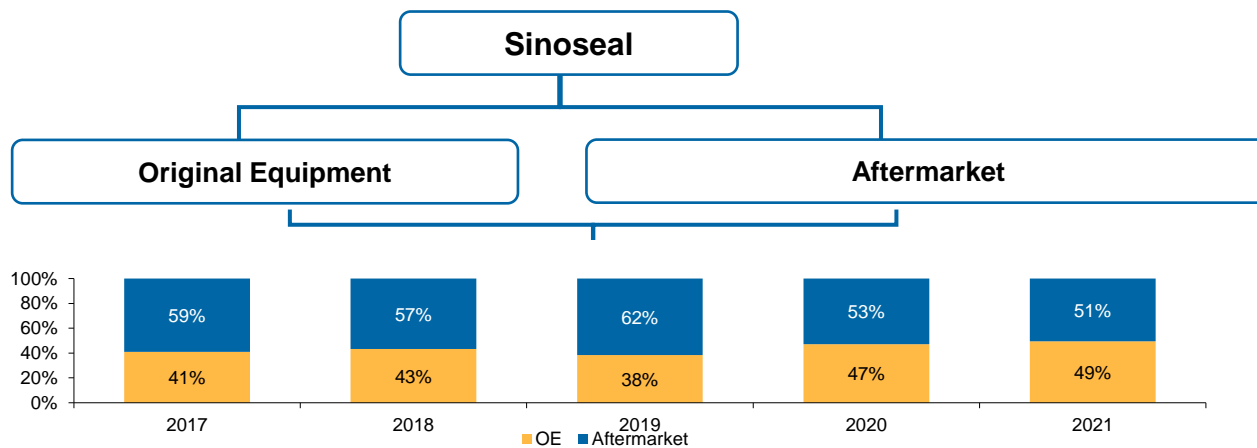
Global market share in mechanical seal industry, 2019



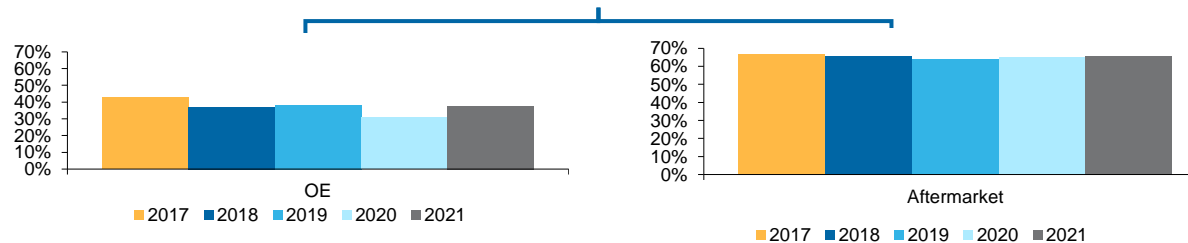
Domestic mkt share in mechanical seal industry, 2020



Sinoseal: Play on localization in mechanical seals



Revenue Mix



Gross Profit Margin

Customer Profile



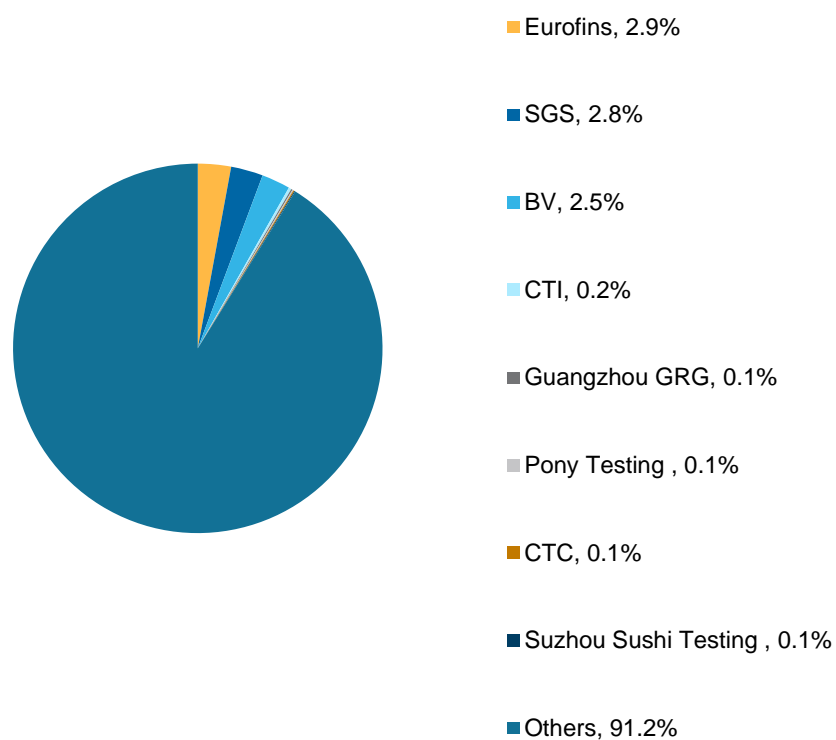
Source: Company data, Macquarie Research, May 2023

CTI: Fragmented industry with resilient growth

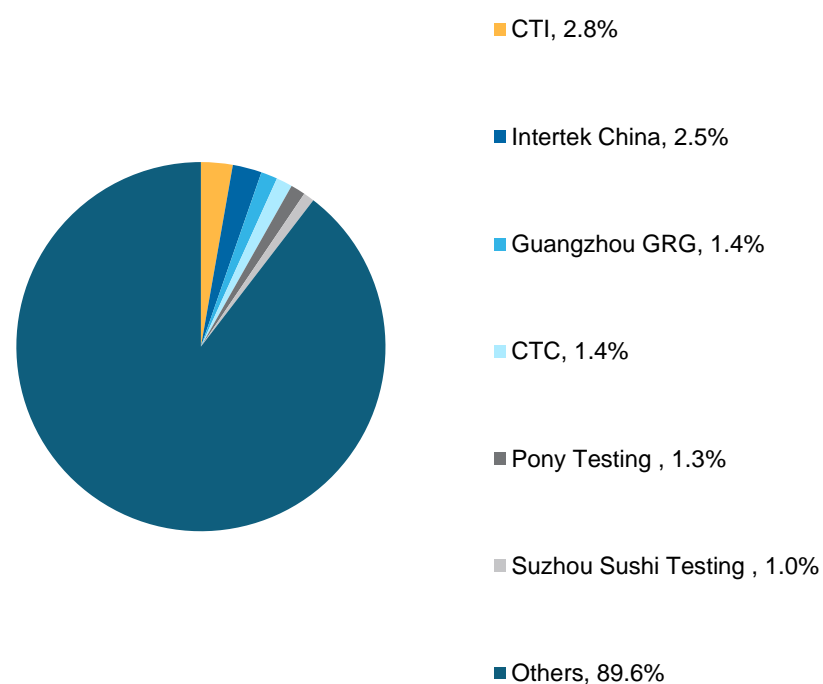
CTI and Pony Testing accounts for 2.8%/1.3% market share of TIC industry.

CTI and Pony Testing have comprehensive business qualifications and enjoy strong brand and credibility.

The global market share of TIC industry in 2020



Third-party TIC industry market share based on 2021 revenue in China

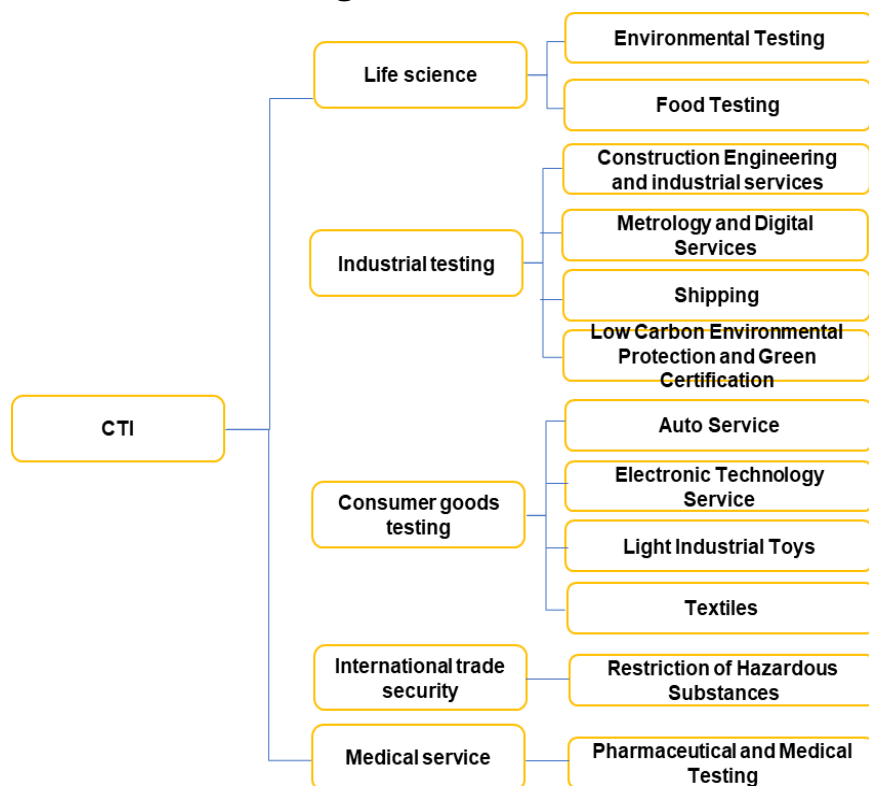


Source: Company data, May 2023

CTI: Fragmented industry with resilient growth

CTI is our top pick in the TIC sector as the largest domestic third-party TIC institution with a diversified business portfolio. Pony Testing is the fourth-largest domestic third-party TIC institution with national service coverage.

CTI's main business segments



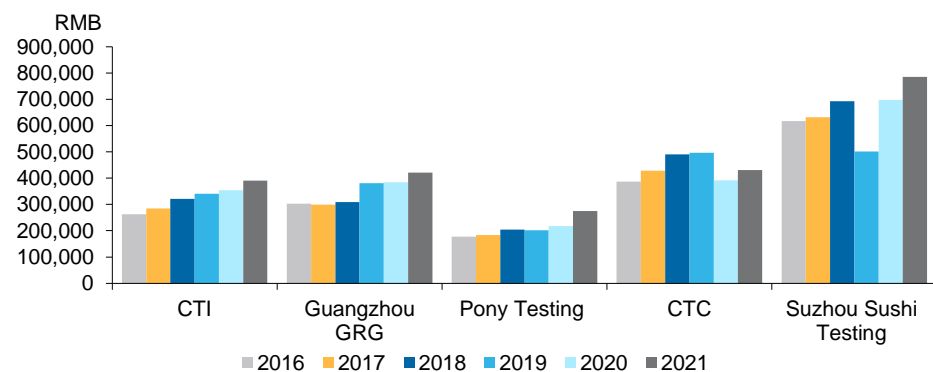
Pony Testing's main business segments



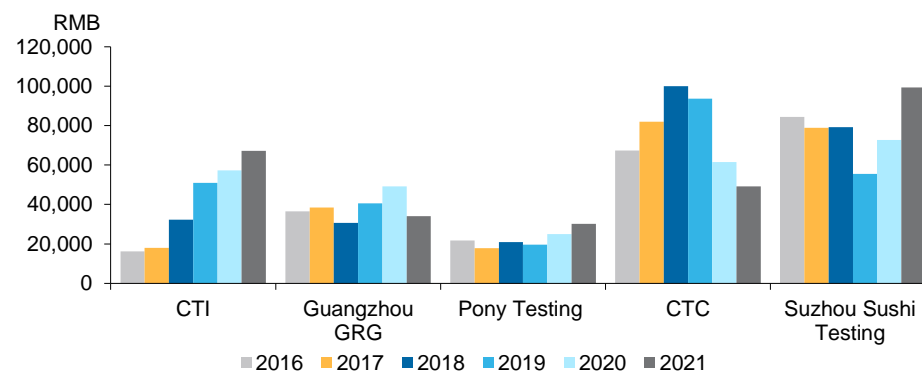
CTI: Fragmented industry with resilient growth

China has become one of the world's fastest-growing TIC markets driven by increasing demand for regulation of new materials, products, hi-tech equipment, and systems and processes across industries

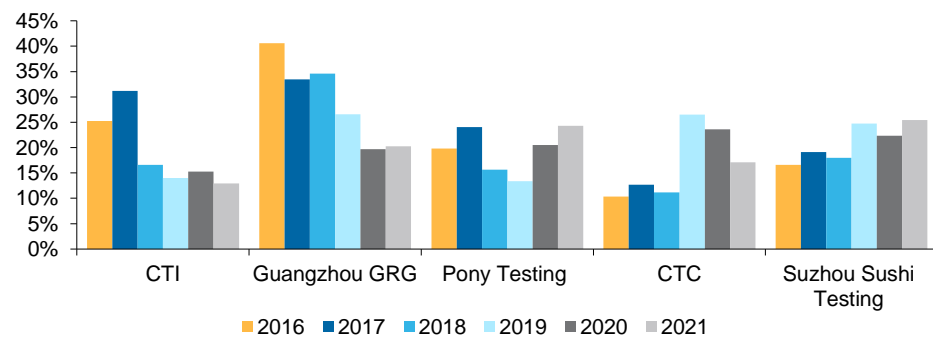
Revenue per capita



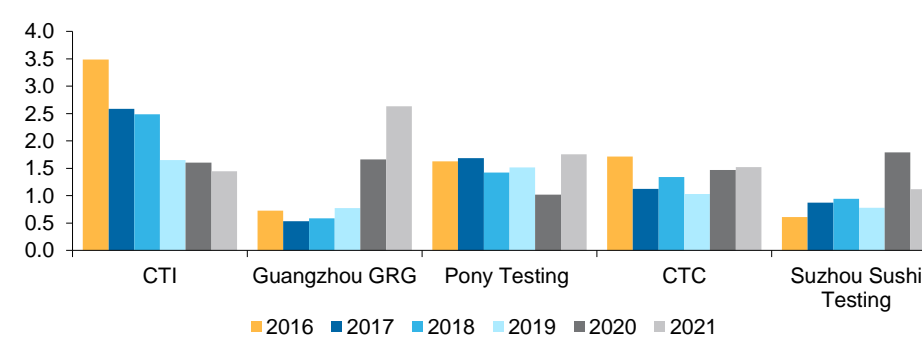
Net profit per capita



TIC industry's CAPEX vs. revenue



Operating cash flow vs. net profit



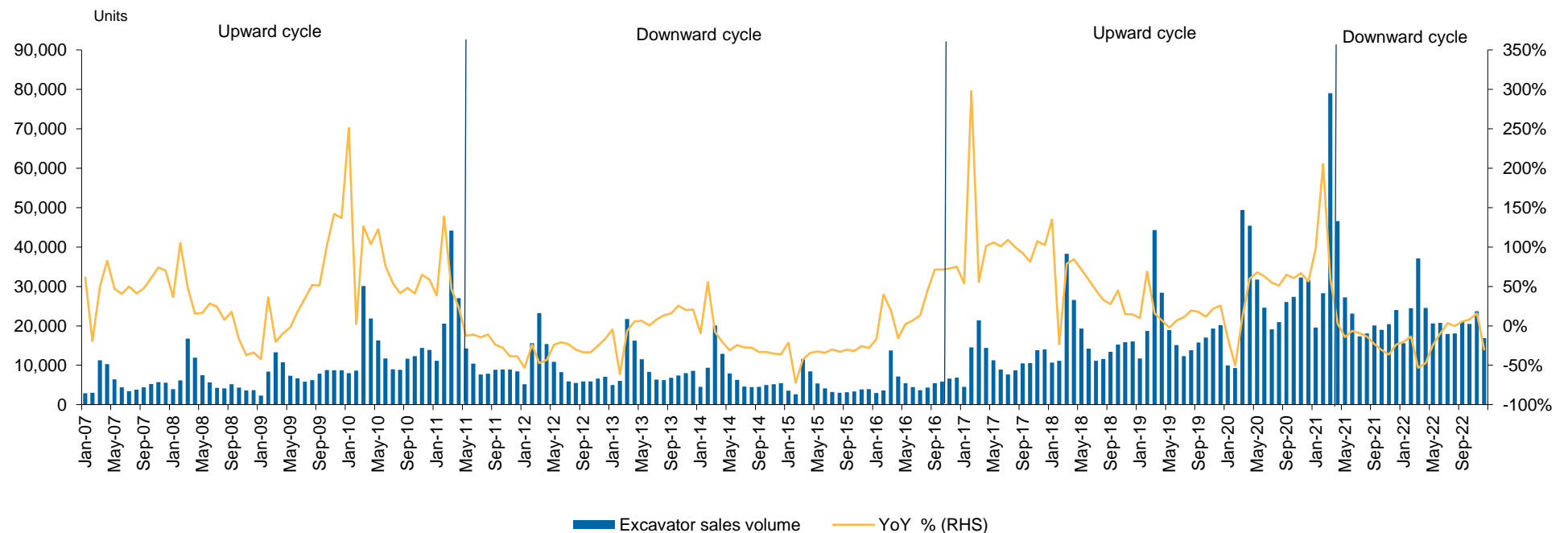
Source: Company data, May 2023

Construction engineering: downcycle set to continue in 2023

With the current replacement cycle approaching an end, engineering equipment demand in China has entered a down cycle that won't end anytime soon.

The downward cycle will impact manufacturers and hydraulic parts suppliers.

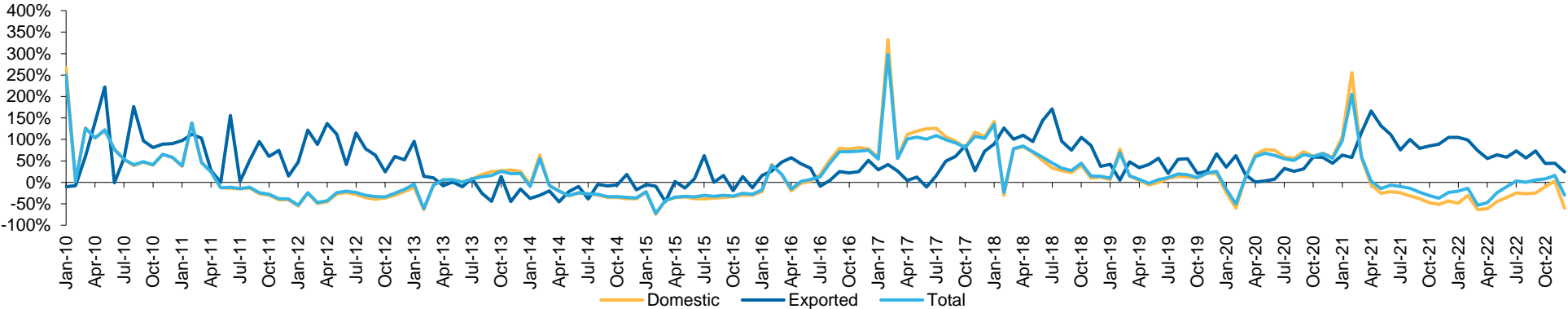
Monthly sales volume of excavators in China



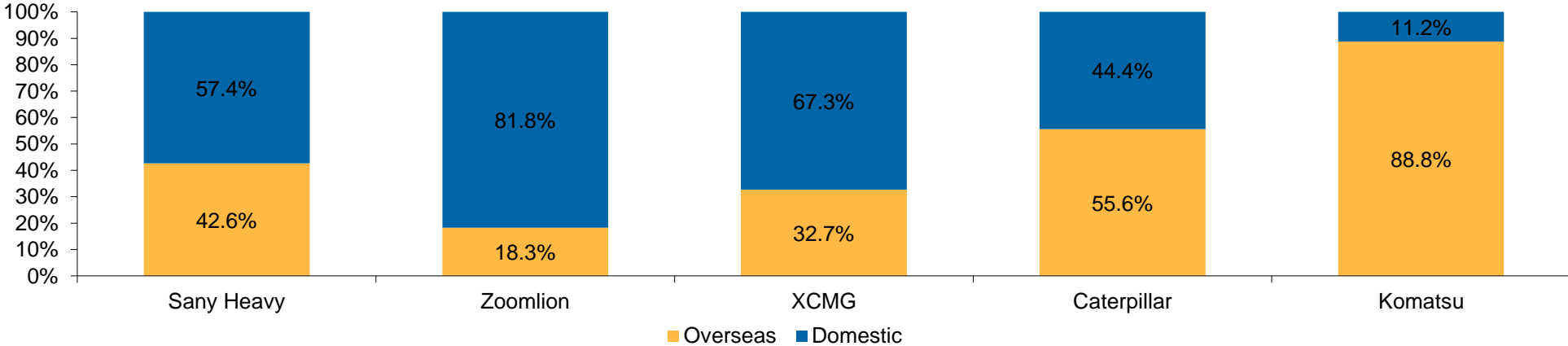
Construction engineering: downcycle set to continue in 2023

Compared with global construction engineering manufacturers, most domestic construction engineering manufacturers have very limited revenue exposure to foreign markets, and thus are beholden more to the domestic demand downcycle.

Monthly sales volume of excavators: domestic and export sales



Revenue contribution from overseas market (1H22)



Source: Company data, Macquarie Research, May 2023

China automation-sector peer-valuation comparisons

BBG Ticker	Company	Rating	Current Price (LC)	Price Target (LC)	Upside/Downside (%)	12m TSR (%)	Market Cap (US\$, m)	P/E (x)			P/B (x)			ROE (%)			EV/EBITDA (x)			EPS CAGR (%)	
								2022E	2023E	2024E	2022E	2023E	2024E	2022E	2023E	2024E	2022E	2023E	2024E		
Automation																					
300124 CH	Shenzhen Inovance Technolo-A	Outperform	58.76	98.80	68.1	68.8	22,624	35.9	31.9	26.8	7.8	6.6	5.6	24.2	22.6	22.6	38.9	28.3	23.3	15.9	
002747 CH	Estun Automation Co Ltd-A	Outperform	23.85	34.20	43.4	43.6	3,000	124.6	73.7	45.4	6.8	6.2	5.5	5.6	8.8	12.8	56.6	54.2	34.9	65.7	
688017 CH	Leader Harmonious Drive Sy-A	Underperform	116.52	98.90	-15.1	-15.1	2,843	102.4	92.4	70.7	10.1	9.2	8.2	8.2	10.5	12.2	108.3	83.2	61.9	20.4	
300024 CH	Siasun Robot & Automation-A	NR	11.15	NR	N/A	N/A	3,123	N/A	116.0	73.3	5.2	5.0	4.7	1.1	4.2	6.5	N/A	N/A	156.8	N/A	
002158 CH	Shanghai Hanbell Precise -A	Outperform	23.33	41.50	77.9	80.3	1,806	19.3	16.2	13.5	4.1	3.5	3.0	22.7	23.1	23.7	14.6	11.0	8.8	19.6	
002371 CH	Naura Technology Group Co-A	NR	334.52	NR	N/A	N/A	24,652	75.9	56.6	42.4	8.8	7.7	6.7	12.0	14.0	16.0	59.7	46.1	35.4	33.8	
300316 CH	Zhejiang Jingsheng Mechani-A	NR	68.42	NR	N/A	N/A	12,694	30.6	21.0	17.0	8.8	6.1	4.7	31.9	31.7	29.4	26.5	17.6	14.3	34.1	
300751 CH	Suzhou Maxwell Technologie-A	NR	274.87	NR	N/A	N/A	6,588	49.4	31.5	20.3	6.7	5.8	4.7	14.1	18.9	23.9	47.9	29.3	18.5	56.0	
300724 CH	Sc New Energy Tec-A	NR	102.80	NR	N/A	N/A	5,331	36.2	26.5	21.0	5.1	4.3	3.6	14.7	17.1	18.6	29.7	20.1	15.0	31.4	
603915 CH	Jiangsu Guomao Reducer Co -A	NR	19.43	NR	N/A	N/A	1,836	27.2	21.2	16.6	3.5	3.0	2.6	13.5	15.4	16.9	20.8	16.4	11.9	28.2	
688686 CH	Opt Machine Vision Tech Co-A	Outperform	147.39	206.40	40.0	40.9	2,604	61.4	41.9	32.1	8.6	5.9	5.2	12.3	14.7	17.1	76.6	39.6	30.2	38.2	
002415 CH	Hangzhou Hikvision Digital-A	Neutral	36.06	26.80	-25.7	-24.5	48,870	25.1	21.5	18.4	4.9	4.2	3.6	20.3	20.8	20.9	20.4	16.1	13.1	16.9	
600480 CH	Lingyun Industrial Corp-A	NR	7.49	NR	N/A	N/A	1,012	23.3	18.1	15.0	1.4	1.0	1.0	4.7	6.0	7.1	5.9	5.9	5.4	24.4	
002472 CH	Zhejiang Shuanghuan Drivel-A	Outperform	23.34	38.20	63.7	64.1	2,873	32.9	23.8	18.3	2.7	2.6	2.3	9.5	11.2	13.5	15.8	12.7	10.5	34.0	
002050 CH	Zhejiang Sanhua Intelligen-A	Outperform	23.29	36.30	55.9	56.9	12,104	32.5	28.0	22.7	6.5	5.4	4.6	21.4	21.1	22.0	25.3	19.0	15.4	19.7	
601689 CH	Ningbo Tuopu Group Co Ltd-A	NR	50.60	NR	N/A	N/A	7,954	31.4	23.4	17.3	4.5	3.8	3.2	14.7	16.9	19.1	21.8	15.8	12.1	34.8	
601799 CH	Changzhou Xingyu Automotiv-A	NR	109.45	NR	N/A	N/A	4,391	26.3	24.0	18.2	3.5	3.2	2.8	13.4	13.0	15.1	18.9	17.4	13.6	20.4	
002434 CH	Zhejiang Wanliyang Co Ltd-A	NR	8.47	NR	N/A	N/A	1,666	30.2	21.9	15.7	2.0	1.9	1.7	6.7	8.7	11.0	16.6	15.8	12.4	39.0	
300258 CH	Jiangsu Pacific Precision -A	NR	9.76	NR	N/A	N/A	660	18.6	14.7	11.5	1.4	1.3	1.2	7.4	8.7	10.4	9.2	7.5	6.3	27.6	
002765 CH	Landai Technology Group Co-A	NR	6.94	NR	N/A	N/A	643	17.0	13.1	9.9	1.7	1.6	1.4	10.5	12.3	14.4	10.0	8.9	7.1	31.3	
300470 CH	Sinoseal Holding Co Ltd-A	Outperform	43.90	60.80	38.5	39.7	1,323	29.3	25.3	21.7	3.8	3.4	3.0	13.3	13.9	14.9	22.8	19.6	16.3	16.2	
000887 CH	Anhui Zhongding Sealing Pa-A	NR	11.68	NR	N/A	N/A	2,300	14.6	11.8	9.5	1.5	1.4	1.2	10.8	11.2	12.0	9.0	7.7	6.5	24.0	
603308 CH	Anhui Yingliu Electromecha-A	NR	19.81	NR	N/A	N/A	1,770	26.6	25.1	19.0	2.8	2.7	2.4	9.8	10.1	12.1	18.3	22.2	19.2	18.4	
603915 CH	Jiangsu Guomao Reducer Co -A	NR	19.43	NR	N/A	N/A	1,836	27.2	21.2	16.6	3.5	3.0	2.6	13.5	15.4	16.9	20.8	16.4	11.9	28.2	
300718 CH	Zhejiang Changsheng Sliding	NR	16.96	NR	N/A	N/A	730	26.9	22.0	17.2	3.5	3.4	3.0	12.7	14.3	16.0	17.7	15.8	12.8	25.1	
603699 CH	Neway Valve Suzhou Co Ltd-A	NR	14.04	NR	N/A	N/A	1,444	21.6	16.4	13.1	3.0	2.6	2.2	14.1	15.7	16.5	16.2	11.6	9.6	28.1	
002438 CH	Jiangsu Shentong Valve Co-A	NR	12.38	NR	N/A	N/A	869	20.2	15.6	12.2	2.1	1.9	1.6	10.4	11.7	13.1	14.1	11.2	8.9	28.5	
Average								37.2	31.7	23.5	4.6	4.0	3.4	13.1	14.5	16.1	28.6	21.9	21.9	29.2	

*BBG pricing as of May 5, 2023

Source: Bloomberg, Macquarie Research, May 2023

China automation-sector peer-valuation comparisons

BBG Ticker	Company	Rating	Current Price (LC)	Price Target (LC)	Upside/Downside (%)	12m TSR (%)	Market Cap (US\$, m)	P/E (x)			P/B (x)			ROE (%)			EV/EBITDA (x)			EPS CAGR (%)
								2022E	2023E	2024E	2022E	2023E	2024E	2022E	2023E	2024E	2022E	2023E	2024E	22-24E
Service Robot																				
603486 CH	Ecovacs Robotics Co Ltd-A	Outperform	69.04	101.70	47.3	48.1	5,720	23.3	19.2	13.6	6.0	4.9	3.7	29.5	28.2	31.0	17.3	13.8	9.3	31.0
688169 CH	Beijing Roborock Technolog-A	Neutral	311.80	321.00	3.0	3.6	4,228	23.6	23.1	19.4	2.2	2.7	2.4	13.1	12.5	13.2	13.1	15.7	12.8	10.3
603666 CH	Yijiahe Technology Co Ltd-A	Underperform	39.66	21.40	-46.0	-45.7	1,194	N/A	46.3	38.0	3.4	3.2	3.0	-3.9	7.2	8.1	-105.1	36.0	28.8	N/A
000651 CH	Gree Electric Appliances I-A	Outperform	35.15	47.00	33.7	39.4	28,648	8.2	7.4	6.8	2.0	1.8	1.5	24.5	26.0	24.3	4.2	3.8	2.9	9.7
600690 CH	Haier Smart Home Co Ltd-A	Outperform	22.60	37.00	63.7	66.9	29,829	15.5	13.7	12.1	2.3	2.0	1.8	17.0	17.1	17.4	8.3	6.9	5.8	13.4
000333 CH	Midea Group Co Ltd-A	Outperform	55.33	91.00	64.5	68.0	56,229	13.2	12.1	11.0	2.7	2.4	2.1	22.1	21.8	21.2	10.9	9.3	7.9	9.7
1810 HK	Xiaomi Corp-Class B	Underperform	11.16	9.77	-12.5	-12.5	35,527	29.4	26.0	19.8	1.7	1.6	1.4	1.8	7.8	8.9	26.8	30.6	19.2	21.8
1691 HK	Js Global Lifestyle Co Ltd	Underperform	6.92	5.50	-20.5	-20.5	3,081	9.1	7.2	6.6	1.6	1.3	1.1	17.7	20.1	18.0	5.8	3.9	3.1	17.5
603195 CH	Gongniu Group Co Ltd-A	NR	148.20	NR	N/A	N/A	12,921	28.4	24.1	20.8	7.2	6.1	5.1	25.3	25.2	24.8	20.3	17.2	14.8	16.8
002032 CH	Zhejiang Supor Co Ltd -A	NR	51.50	NR	N/A	N/A	5,980	20.1	18.1	16.4	5.1	5.2	4.6	25.1	28.5	28.2	15.4	14.0	12.6	10.8
603355 CH	Kingclean Electric Co Ltd-A	NR	27.09	NR	N/A	N/A	2,065	15.1	14.0	12.0	3.9	3.4	2.9	28.3	25.3	24.4	11.1	9.7	8.4	12.0
000921 CH	Hisense Home Appliances G-A	NR	24.79	NR	N/A	N/A	4,134	24.4	18.3	15.5	2.9	2.6	2.3	12.4	13.9	15.5	9.5	7.9	6.8	25.7
002242 CH	Joyoung Co Ltd -A	NR	16.28	NR	N/A	N/A	1,767	17.4	16.3	14.2	2.8	3.3	3.0	16.2	20.3	21.5	16.1	14.6	12.7	10.7
002959 CH	Bear Electric Appliance Co-A	NR	84.42	NR	N/A	N/A	1,912	35.4	27.1	23.2	5.7	4.8	4.2	16.0	17.9	18.0	21.6	17.6	15.2	23.5
2148 HK	Vesync Co Ltd	NR	3.06	NR	N/A	N/A	498	12.2	9.7	7.6	1.4	1.5	1.3	11.6	15.4	17.5	8.6	6.8	5.2	26.5
300853 CH	Hangzhou Shenhao Technolog-A	NR	32.16	NR	N/A	N/A	711	38.2	20.6	15.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	56.3
Average								20.9	18.9	15.8	3.4	3.1	2.7	17.1	19.1	19.5	5.6	13.9	11.0	19.7
TIC																				
300012 CH	Centre Testing Intl Group-A	Outperform	19.01	26.10	37.3	37.8	4,630	34.8	27.5	21.9	5.6	4.7	3.9	17.6	18.6	19.6	22.9	18.5	14.5	26.1
300887 CH	Pony Testing International-A	Outperform	35.48	51.70	45.7	46.8	1,474	30.7	28.7	20.6	2.9	2.8	2.5	11.5	9.8	12.7	14.2	16.0	12.2	22.1
002967 CH	Guangzhou Grg Metrology & -A	NR	22.66	NR	N/A	N/A	1,837	51.7	37.2	27.4	3.5	3.3	3.0	6.7	8.8	10.9	22.2	18.3	14.6	37.3
603060 CH	China Testing & Certificat-A	NR	11.82	NR	N/A	N/A	1,252	32.5	25.8	20.7	4.7	4.1	3.5	15.0	16.6	17.8	18.0	14.8	11.9	25.2
300416 CH	Suzhou Sushi Testing Group-A	NR	28.60	NR	N/A	N/A	1,559	38.9	29.5	22.2	5.2	4.4	3.7	13.9	15.0	16.9	20.4	17.2	13.4	32.3
Average								37.7	29.8	22.6	4.4	3.9	3.3	13.0	13.8	15.6	19.5	17.0	13.3	28.6
Construction																				
603338 CH	Zhejiang Dingli Machinery -A	Outperform	49.15	87.10	77.2	78.4	3,602	19.8	17.5	14.1	3.5	3.0	2.6	19.3	18.6	19.7	17.1	12.4	9.3	18.5
601100 CH	Jiangsu Hengli Hydraulic C-A	Neutral	58.94	53.40	-9.4	-8.0	11,438	32.9	27.7	22.1	6.1	5.3	4.5	21.5	20.4	22.1	27.2	18.9	14.6	22.0
600031 CH	Sany Heavy Industry Co Ltd-A	Neutral	16.24	18.10	11.5	12.8	19,947	32.1	21.6	18.4	2.1	2.0	1.8	6.6	9.4	10.2	29.4	19.5	16.2	32.2
002050 CH	Zhejiang Sanhua Intelligen-A	Outperform	23.29	36.30	55.9	56.9	12,104	32.5	28.0	22.7	6.5	5.4	4.6	21.4	21.1	22.0	25.3	19.0	15.4	19.7
002884 CH	Guangdong Lingxiao Pump In-A	NR	15.36	NR	N/A	N/A	804	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
603956 CH	Wpg Shanghai Smart Water P-A	NR	7.98	NR	N/A	N/A	603	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3339 HK	Lonking Holdings Ltd	NR	1.39	NR	N/A	N/A	785	12.1	8.2	7.0	0.6	0.5	0.5	5.0	6.6	7.4	5.0	4.3	3.9	30.9
000528 CH	Guangxi Liugong Machinery-A	NR	7.62	NR	N/A	N/A	2,180	16.3	13.4	11.4	0.9	0.9	0.8	5.9	6.7	7.5	14.0	11.7	11.0	19.9
000157 CH	Zoomlion Heavy Industry S-A	NR	6.48	NR	N/A	N/A	7,693	21.2	16.2	12.7	1.0	1.0	0.9	4.6	6.1	7.4	18.2	14.3	12.2	29.3
000425 CH	Xcmg Construction Machin-A	NR	6.86	NR	N/A	N/A	10,996	12.4	10.5	9.3	1.3	1.2	1.1	10.5	10.6	11.5	16.6	15.3	14.4	15.3
Average								22.4	17.9	14.7	2.7	2.4	2.1	11.8	12.4	13.5	19.1	14.4	12.1	23.5

*BBG pricing as of May 5, 2023

Source: Bloomberg, Macquarie Research, May 2023

Important Disclosures:

<p>Recommendation definitions</p> <p>Macquarie – Asia and USA Outperform – expected return >10% Neutral – expected return from -10% to +10% Underperform – expected return <-10%</p> <p>Macquarie – Australia/New Zealand Outperform – expected return >10% Neutral – expected return from 0% to 10% Underperform – expected return <0%</p> <p>Note: expected return is reflective of a Medium Volatility stock and should be assumed to adjust proportionately with volatility risk</p>	<p>Volatility index definition*</p> <p>This is calculated from the volatility of historic price movements.</p> <p>Very high–highest risk – Stock should be expected to move up or down 60-100% in a year – investors should be aware this stock is highly speculative.</p> <p>High – stock should be expected to move up or down at least 40-60% in a year – investors should be aware this stock could be speculative.</p> <p>Medium – stock should be expected to move up or down at least 30-40% in a year.</p> <p>Low–medium – stock should be expected to move up or down at least 25-30% in a year.</p> <p>Low – stock should be expected to move up or down at least 15-25% in a year. * Applicable to select stocks in Asia/Australia/NZ</p> <p>Recommendation – 12 months Note: Quant recommendations may differ from Fundamental Analyst recommendations</p>	<p>Financial definitions</p> <p>All "Adjusted" data items have had the following adjustments made: Added back: goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests</p> <p>EPS = adjusted net profit / efpowa* ROA = adjusted ebit / average total assets ROA Banks/Insurance = adjusted net profit / average total assets ROE = adjusted net profit / average shareholders funds Gross cashflow = adjusted net profit + depreciation *equivalent fully paid ordinary weighted average number of shares</p> <p>All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).</p>
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Recommendation proportions – For quarter ending 31 March 2023

	AU/NZ	Asia	USA	
Outperform	56.13%	64.77%	64.49%	(for global coverage by Macquarie, 2.51% of stocks followed are investment banking clients)
Neutral	37.74%	23.98%	32.71%	(for global coverage by Macquarie, 1.83% of stocks followed are investment banking clients)
Underperform	6.13%	11.26%	2.80%	(for global coverage by Macquarie, 0.00% of stocks followed are investment banking clients)

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