研究报告 Research Report

14 Feb 2023

禾赛科技 Hesai Tech (HSAI US)

首次覆盖：中国激光雷达第一股，合理市值达 51 亿美金

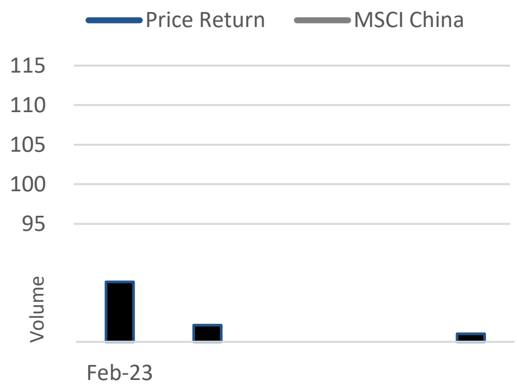
First Listed China LiDAR Company with a Target Market Cap Reaching $5.1B: Initiation

观点聚焦 Investment Focus

首次覆盖优于大市 Initiate with OUTPERFORM

评级	优于大市 OUTPERFORM
现价	US$22.43
目标价	US$40.30
市值	US$2.82bn
日交易额 (3 个月均值)	US$107.05mn
发行股票数目	95.50mn
自由流通股 (%)	-
1 年股价最高最低值	US$22.43-US$21.05

注：现价 US$22.43 为 2023 年 2 月 13 日收盘价



资料来源： Factset

	1mth	3mth	12mth
绝对值			
绝对值（美元）			
相对 MSCI China			

(Rmb mn)	Dec-21A	Dec-22E	Dec-23E	Dec-24E
营业收入	721	1,088	1,686	2,774
(+/-)	73%	51%	55%	65%
净利润	-2456	-772	-264	-115
(+/-)	n.m.	n.m.	n.m.	n.m.
全面摊薄 EPS (Rmb)	-23.39	-6.68	-2.10	-0.91
毛利率	53.0%	38.0%	34.8%	34.6%
净资产收益率	-120.9%	-27.7%	-8.4%	-3.4%
市盈率	n.m.	n.m.	n.m.	n.m.

资料来源：公司信息, HTI

(Please see APPENDIX 1 for English summary)

- **IPO 融资 1.9 亿美元，最新估值 28.2 亿美元。**2 月 9 日晚，禾赛科技以 19 美元/股的发行价登陆纳斯达克，共计发行 1000 万股美国存托凭证（ADS），募资 1.9 亿美元，成为"中国激光雷达第一股"。公司最新总市值为 28.2 亿美元，超越海外龙头 Luminar（市值 22.3 亿美元，均基于 2 月 13 日收盘价）登顶美股激光雷达公司市值榜首。成立于 2014 年，公司创业早期以激光气体遥测系统起家，2016 年将研发重心转向激光雷达，聚焦无人驾驶和乘用车 ADAS 应用并逐渐向服务机器人领域拓展，产品覆盖短中长距机械式和车规级半固态式激光雷达，截至 22 年底累计交付超 10 万台，自动驾驶激光雷达市场全球份额第一（据沙利文数据，21 年市占率达 60%）。公司已完成 9 轮融资，累计募集资金约 6 亿美元，投资方包括百度、小米、美团、博世、高瓴、光速中国、启明创投、真格基金等海内外知名公司/机构。上市后创始人团队及核心成员持股 25.1%，拥有 76.2%的投票权。
- **ADAS 注入新增长动能，我们预期 23-24 年交付量可达 20/60 万颗。**据 Yole 预测，全球汽车 ADAS 激光雷达市场将在未来 5 年迎来飞速增长，市场规模将从 21 年的 3800 万美元增至 27 年的 20 亿美元，21-27 年 CAGR 达 94%，成为激光雷达行业最大的应用领域。公司 90%以上收入来自 LiDAR 硬件产品销售，包括应用于无人驾驶领域的的 Pandar 系列和 QT 系列，应用于乘用车 ADAS 的 AT128，以及针对服务机器人市场开发的 XT 系列。随着车规级拳头产品 AT128 于 22 年 7 月开启规模交付，公司 ADAS 收入占比快速攀升，全年收入占比达 22%。据招股书披露，公司目前已斩获 10 家主流主机厂累计数百万台定点，包括理想、赛力斯、长安、小米、上汽飞凡、集度、高合、路特斯等。随着客户新车型陆续量产以及年产 120 万台的上海新制造工厂于年中投入运营，AT128 交付量将更上一个台阶，为公司注入全新增长动能。我们预估 22-24 年公司 ADAS 激光雷达出货量将达 6.2/20/60 万台，对应收入 2.4/7.0/16.2 亿元，22-25 年 CAGR 为 117%，占整体收入比例为 22%/42%/58%。
- **目标市值 51 亿美元，首次覆盖给予"优于大市"评级。**由于激光雷达公司均尚未盈利，市场主要关注营收增速和在手车企订单情况，并采用 PS 法进行估值。我们合理预计公司 22-24 年收入分别为 10.9/16.9/27.7 亿元，参考美股激光雷达龙头 Luminar 23 年 PS＝19.1X，我们给予公司 23 年 21.0X PS 估值，以反映公司在自动驾驶领域的显著领先优势以及 ADAS 产品出货量随下游客户重要车型发布进入爆发式增长，对应目标市值 51 亿美元（汇率 7.0）和目标价 40.3 美元/股，首次覆盖给予"优于大市"评级。
- **风险提示：**1）激光雷达行业渗透不及预期；2）过度竞争；3）激光雷达技术路线出现重大革新的风险。

张晓飞 Xiaofei Zhang
xf.zhang@htisec.com

蒲得宇 Jeff Pu, CFA
jeff.dy.pu@htisec.com

张幸 Olivia Zhang
olivia.x.zhang@htisec.com

目录

盈利预测 & 估值

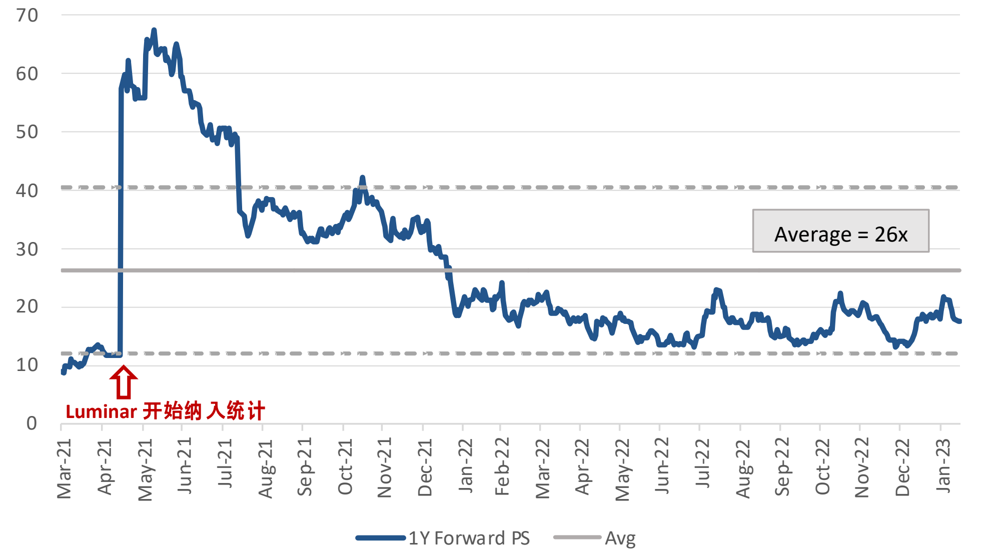
目标市值 51 亿美元，首次覆盖给予"优于大市"评级。由于激光雷达公司均尚未盈利，市场主要关注营收增速和在手车企订单情况，并采用 PS 法进行估值。我们合理预计公司 22-24 年收入分别为 10.9/16.9/27.7 亿元，参考美股激光雷达行业历史平均 1Y Forward PS = 26.3X 以及海外龙头 Luminar 23 年 PS = 19.1X，我们给予公司 23 年 21.0X PS 估值，以反映公司营收随 ADAS 放量进入高速增长通道，对应目标市值 51 亿美元（汇率 7.0）和目标价 40.3 美元/股，首次覆盖给予"优于大市"评级。

图1 美股激光雷达估值表

公司	市值 ($mn)	营收 ($mn)				净利润(亏损) ($mn)				1Y Forward PS		
		2020	2021	2022	2023E	2020	2021	2022	2023E	2022	2023	2024
Velodyne	355	95	62	40	60	(150)	(212)	(137)	(102)	7.5x	5.0x	2.4x
Luminar	2779	14	32	42	117	(362)	(238)	(311)	(264)	53.2x	19.1x	6.4x
Aeva	417	5	9	7	19	(26)	(102)	(122)	(141)	50.7x	18.8x	3.1x
Ouster	338	n.m.	34	46	105	n.m.	(94)	(118)	(106)	5.5x	2.4x	1.0x
Innoviz	766	(9)	5	7	30	(99)	(159)	(123)	(129)	88.2x	20.5x	4.5x
									行业平均估值:	**41.0x**	**13.2x**	**3.5x**

资料来源：Bloomberg，HTI（数据截至 2023 年 2 月 13 日）

图2 美股激光雷达公司平均 1Y Forward PS 估值



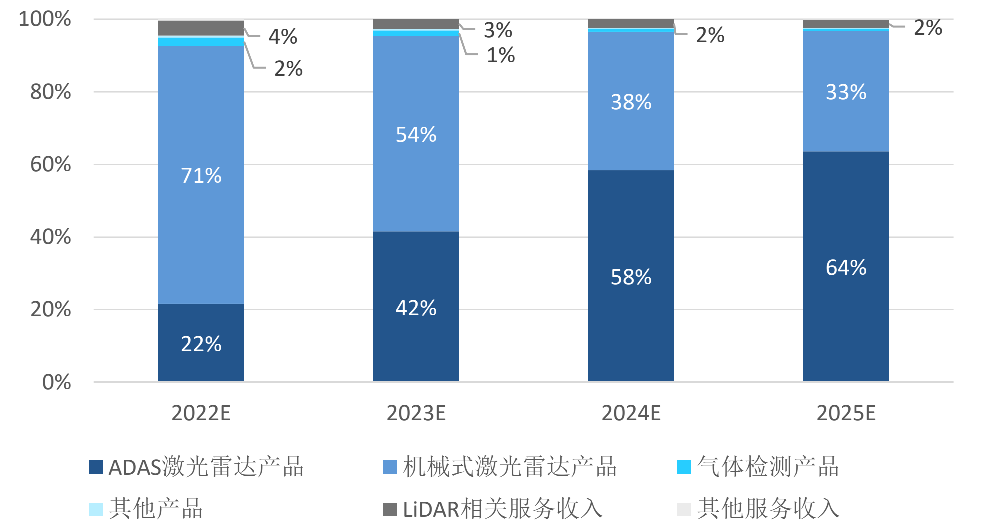
资料来源：Bloomberg，HTI（行业估值选取以下公司简单平均：Velodyne, Luminar, Aeva, Ouster, Innoviz）

图3 公司收入预测（亿元）

	2019	2020	2021	21Q1-Q3	22Q1-Q3	2022E	2023E	2024E	2025E
总收入（亿元)	**3.5**	**4.2**	**7.2**	**4.6**	**7.9**	**10.9**	**16.9**	**27.7**	**37.7**
YoY		*19%*	*73%*		*73%*	*51%*	*55%*	*65%*	*36%*
毛利	2.4	2.4	3.8	2.4	3.5	4.1	5.9	9.6	13.7
毛利率	70%	57%	53%	53%	44%	38%	35%	35%	36%
激光雷达产品收入	**3.3**	**3.5**	**6.9**	**4.3**	**7.3**	**10.1**	**16.1**	**26.8**	**36.5**
YoY		*5%*	*98%*		*67%*	*47%*	*60%*	*66%*	*36%*
总销量(万台)	0.3	0.4	1.4	0.8	3.2	8.0	22.4	63.1	104.0
Blended ASP (元)	113,126	82,397	48,952	54,231	22,426	12,542	7,185	4,242	3,511
ASP YoY		*-27%*	*-41%*		*-59%*	*-74%*	*-43%*	*-41%*	*-17%*
毛利	2.3	2.0	3.6	2.3	3.0	3.6	5.3	8.9	12.8
毛利率	72%	59%	52%	53%	42%	36%	33%	33%	35%
ADAS激光雷达销量(万台)	0.0	0.0	0.0	0.0	2.0	6.2	20.0	60.0	100.0
ASP (元)					3,800	3,800	3,500	2,700	2,400
ADAS激光雷达产品收入	**0.0**	**0.0**	**0.0**	**0.0**	**0.8**	**2.4**	**7.0**	**16.2**	**24.0**
YoY							*197%*	*131%*	*48%*
收入占比%	*0%*	*0%*	*0%*	*0%*	*10%*	*22%*	*42%*	*58%*	*64%*
毛利					(0)	(0)	1	4	7
毛利率					(20%)	(5%)	15%	25%	30%
机械式激光雷达销量(万台)	0.3	0.4	1.4	0.8	1.2	1.8	2.4	3.1	4.0
ASP (元)	113,126	82,397	48,952	54,231	52,468	42,000	38,000	34,000	31,000
机械式激光雷达收入	**3.3**	**3.5**	**6.9**	**4.3**	**6.5**	**7.7**	**9.1**	**10.6**	**12.5**
YoY		*5%*	*98%*		*50%*	*13%*	*18%*	*16%*	*19%*
收入占比%	*94%*	*83%*	*95%*	*94%*	*82%*	*71%*	*54%*	*38%*	*33%*
毛利	2.3	2.0	3.6	2.3	3.2	3.7	4.3	4.9	5.6
毛利率	72%	59%	52%	53%	49%	48%	47%	46%	45%
气体检测产品	**0.20**	**0.69**	**0.20**	**0.14**	**0.17**	**0.24**	**0.17**	**0.22**	**0.31**
YoY		*251%*	*-72%*		*27%*	*25%*	*25%*	*25%*	*25%*
收入占比%	*0%*	*60%*	*-10%*	*0%*	*3%*	*2%*	*1%*	*1%*	*1%*
毛利	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2
毛利率	50%	50%	50%	50%	50%	50%	50%	50%	50%
其他产品	**0.00**	**0.01**	**0.01**	**0.01**	**0.05**	**0.06**	**0.06**	**0.06**	**0.06**
收入占比%	*0%*	*0%*	*0%*	*0%*	*1%*	*1%*	*0%*	*0%*	*0%*
毛利	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
毛利率	50%	50%	50%	50%	50%	50%	50%	50%	50%
LiDAR相关服务收入	**0.00**	**0.00**	**0.14**	**0.11**	**0.41**	**0.45**	**0.50**	**0.65**	**0.80**
收入占比%	*0%*	*0%*	*2%*	*2%*	*5%*	*4%*	*3%*	*2%*	*2%*
毛利	0.0	0.0	0.1	0.1	0.3	0.4	0.4	0.5	0.6
毛利率	80%	80%	80%	80%	80%	80%	80%	80%	80%
其他服务收入	**0.00**	**0.00**	**0.01**	**0.00**	**0.04**	**0.05**	**0.05**	**0.05**	**0.05**
收入占比%	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
毛利	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
毛利率	80%	80%	80%	80%	80%	80%	80%	80%	80%

资料来源：公司招股书，HTI 预测（蓝色字体代表 HTI 预测值，其余为公司披露或公式计算所得）

图4 公司收入结构



资料来源：公司招股书，HTI 预测

图5 公司分季度盈利预测（百万人民币）

	1Q22	2Q22	3Q22	4Q22E	2022E	2022E	2023E
营业收入	248	211	334	295	1,088	1,686	2,774
营业成本	122	112	210	230	674	1,099	1,814
毛利润	126	99	124	65	414	587	961
营业费用	169	196	229	207	800	1,003	1,190
其他营业收入	1	3	3	9	15	15	15
营业利润	(42)	(94)	(102)	(133)	(371)	(401)	(214)
其他收入	17	25	31	26	99	137	100
利润总额	(25)	(70)	(71)	(107)	(272)	(264)	(115)
所得税	(0)	(0)	(0)	0	0	0	0
非经常性收益	0	0	0	0	0	0	0
净利润	(25)	(70)	(71)	(107)	(272)	(264)	(115)
少数股东损益	149	149	149	54	500	0	0
归母净利润	(174)	(218)	(219)	(161)	(772)	(264)	(115)

资料来源：Wind，HTI 预测

激光雷达行业

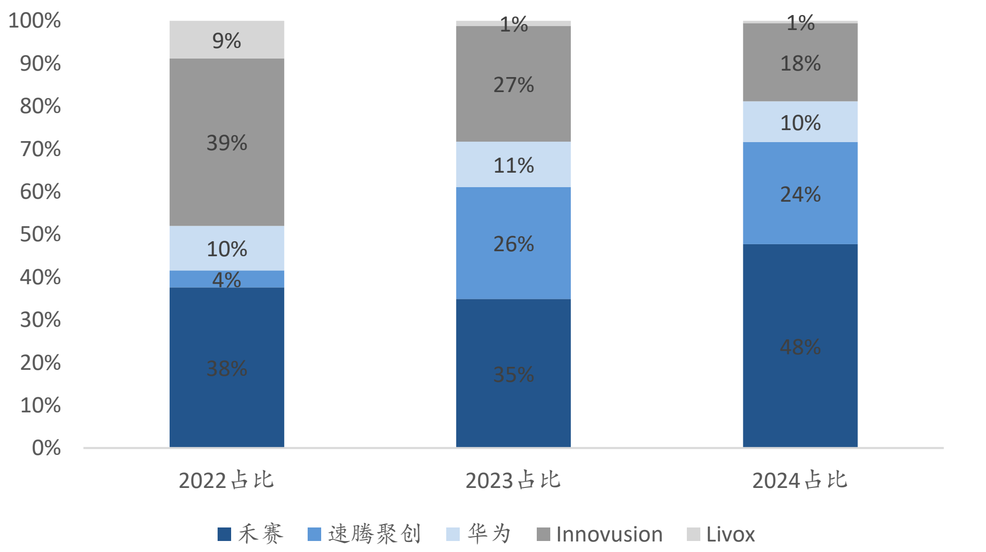
我们预计 23-24 年中国乘用车 ADAS 激光雷达出货将达 57/126 万颗。据 Yole 预测，全球汽车 ADAS 激光雷达市场将在未来 5 年迎来飞速增长，市场规模将从 21 年的 3800 万美元增至 27 年的 20 亿美元，21-27 年 CAGR 达 94%。伴随着国内新能源车渗透率快速提升以及电动智能化行业强势崛起，我国已成为 ADAS 激光雷达最大应用市场，占全球超 50%。综合我们自下而上的车型统计、自上而下的渗透率分析以及供应链调研，我们预估 22-24 年中国市场乘用车 ADAS 激光雷达出货量分别为 12/57/126 万颗，禾赛、速腾聚创、图达通 CR3 份额分别为 81%/88%/90%，竞争格局维持稳定。

图6 中国乘用车 ADAS 激光雷达出货量

	2022	2023E	2024E	23-24 年主要增量车型
禾赛	4.7	20.0	60.0	理想 L9/L8/L7 及其将于 23H2 推出的纯电车型、小米第一款车将于 24 年推出、赛力斯和长安的新车型等
速腾聚创	0.5	15.0	30.0	小鹏 G9 及其 23 年新车型、BYD 将于 23Q2 陆续推出 3-4 款激光雷达车型、极氪将于 23H1 推出激光雷达车型等
华为	1.3	6.1	12.0	长安阿维塔、极狐、哪吒等，以及与华为合作的新车企
Innovusion	4.9	15.5	23.0	蔚来全系 NT2.0 平台车型以及即将推出的 NT3.0 系列
Livox	1.1	0.7	0.7	小鹏 P5
Total	**12**	**57**	**126**	

资料来源：各公司官网，HTI 预测

图7 中国乘用车 ADAS 激光雷达市场竞争格局（按出货量统计）

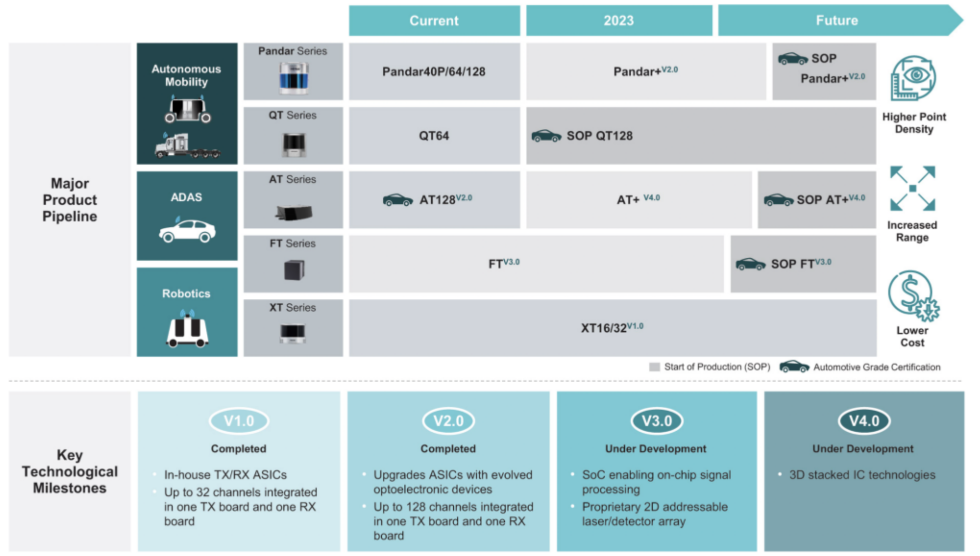


资料来源：各公司官网，HTI 预测

公司简介 & 产品介绍

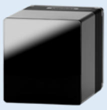
禾赛科技（Hesai Tech）成立于 2014 年，创业早期以激光气体遥测系统起家，2016 将研发重心转向激光雷达，聚焦无人驾驶和乘用车 ADAS 应用并逐渐向服务机器人领域拓展。目前，公司已形成完备的产品线，包括应用于无人驾驶领域（Autonomous Mobility）的 Pandar 系列和 QT 系列，应用于乘用车 ADAS 的 AT128 和 FT120，以及针对服务机器人（Robotics）开发的 XT 系列。公司的主打车规级半固态产品 AT128 面向前装乘用车 ADAS 市场，已斩获 10 家主流主机厂累计数百万台定点，包括理想、赛力斯、长安、小米、上汽飞凡、集度、高合、路特斯等，22 年合计交付约 6.2 万台。随着客户新车型陆续量产以及年产 120 万台的上海新制造工厂于年中投入运营，AT128 交付量将更上一个台阶，为公司注入全新增长动能。

图8 公司各产品系列迭代规划图



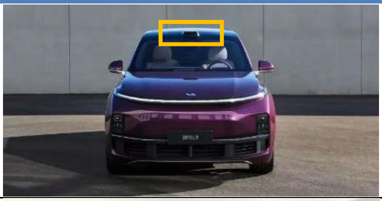
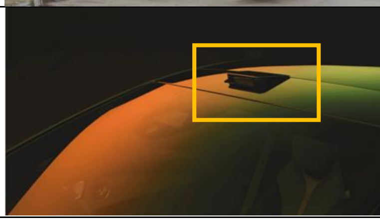
资料来源：公司招股书，HTI

图9 公司传感器硬件产品介绍

类型	系列	简要介绍	技术参数
机械式	Pandar40M 	• 定位：40 线中距机械式激光雷达 • 发布时间：2020/1	探测距离：120m (10%反射率) 视场角：360° x 40° 点频：0.72M pts/s (单回波模式下) 精度：Up to ±2cm
	Pandar40P 	• 定位：40 线长距机械式激光雷达 • 发布时间：2018/4	探测距离：200m (10%反射率) 视场角：360° x 40° 点频：0.72M pts/s (单回波模式下) 精度：Up to ±2cm
	Pandar64 	• 定位：64 线长距机械式激光雷达 • 发布时间：2019/1	探测距离：200m (10%反射率) 视场角：360° x 40° 点频：1.15M pts/s (单回波模式下) 精度：Up to ±2cm
	Pandar128 	• 定位：128 线高分辨率机械式激光雷达 • 发布时间：2020/9	探测距离：200m (10%反射率) 视场角：360° x 40° 点频：3.46M pts/s (单回波模式下) 精度：Up to ±2cm
	QT64 	• 定位：64 线近距补盲激光雷达 • 发布时间：2020/1	探测距离：30m (20%反射率) 视场角：360° x 104° 点频：0.38M pts/s (单回波模式下) 精度：±3cm
	QT128 	• 定位：128 线超广角近距补盲激光雷达 • 发布时间：2022/1（计划于 23Q1 量产）	探测距离：20m (10%反射率) 视场角：360° x 105° 点频：0.86M pts/s (单回波模式下) 精度：±3cm
	XT32 	• 定位：32 线中距机械式激光雷达 • 发布时间：2020/10（首次搭载自研收发芯片）	探测距离：50m/80m (10%反射率) 视场角：360° x 31° 点频：0.64M pts/s (单回波模式下) 精度：±1cm
半固态转镜式	AT128 	• 定位：128 线车规级半固态激光雷达 • 发布时间：2021/8	探测距离：200m (10%反射率) 视场角：120° x 25° 分辨率：0.1° x 0.2° 点频：1.54M pts/s (单回波模式下) 精度：Up to ±2cm
全固态 Flash	FT120 	• 定位：车规级纯固态超广角近距补盲雷达 • 发布时间：2022/1（计划于 23 年量产）	探测距离：30m (10%反射率) 视场角：100° x 75° 分辨率：0.6° x 0.6° 点频：0.19M pts/s (单回波模式下) 精度：Up to ±5cm

资料来源：公司官网，HTI（只含目前公司官网公开的产品）

图10 已公布的搭载 AT128 激光雷达重点车型盘点（更多新车型将于 23-24 年亮相）

车型	量产时间	数量	部署形式
理想 L9	22Q3	1 颗：位于车顶 （理想 L8/L7 搭载方案一致）	
高合 HiPhi Z	2022	1 颗：位于车顶	
集度汽车	2023	2 颗：车前盖上	
路特斯 Eletre	2023	共 4 颗，其中速腾聚创 M1 两颗位于两侧的前轮拱（伸缩式设计），**禾赛 AT128 两颗位于车顶前后方（可翻转设计）作主探测器**	

资料来源：公司官网，HTI

图11 公司累计融资约 6 亿美元

轮次	时间	金额	参与方
天使轮	2015 年 1 月	数百万美元	PreAngel、远瞻资本、大米创投
A 轮	2017 年 5 月	1.1 亿人民币	高达投资、将门创投、磐谷创投、远瞻资本
B 轮	2018 年 5 月	2.5 亿人民币	高达投资、远瞻资本、磐谷创投、光速中国、百度战略投资部、真格基金、将门创投
战略融资	2019 年 6 月	未披露	博世
战略融资	2019 年 9 月	未披露	苏州启元、交银国际
C 轮	2020 年 1 月	1.73 亿美元	博世、安森美半导体、光速中国、启元投资、启明创投、德同资本
战略融资	2020 年 7 月	未披露	斐君资本
D 轮	2021 年 6 月	超 3 亿美元	小米集团、高瓴创投、美团、中信产业基金、光速中国、启明创投、CPE
D+轮	2021 年 11 月	7000 万美元	小米集团

资料来源：公司官网，HTI

图12 管理层背景

首席科学家 孙恺

本科毕业于上海交通大学机械与动力工程学院，博士毕业于斯坦福大学，博士研究方向为：利用激光器和新型探测技术搭建超快、高灵敏度、适用于极端恶劣条件的分子测量系统，应用于化学反应动力学的研究，期间在知名期刊上发布多篇论文。回国创业前曾在斯坦福大学任研究助理。

CEO 李一帆

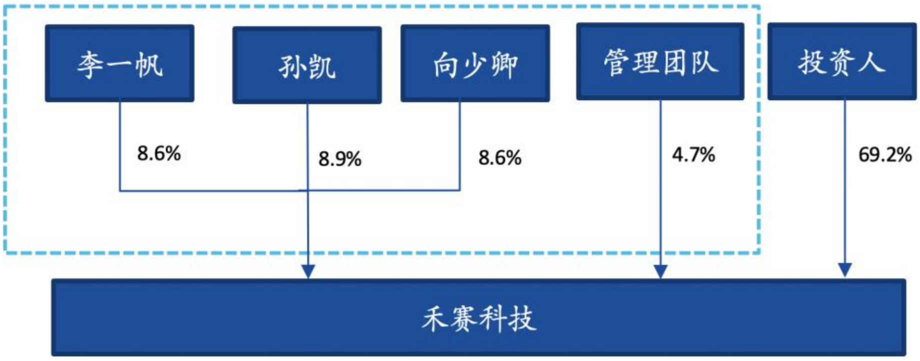
本科毕业于清华大学，博士毕业于美国伊利诺伊香槟分校机械工程系，曾任美国西部数据集团首席工程师。李一帆在机器人、运动控制、传感器及先进制造领域拥有100余项专利，曾入选《世界经济论坛》“2021届全球青年领袖”、荣获德国“红点设计奖”等。

CTO 向少卿

本科毕业于清华大学，硕士毕业于斯坦福大学，获得电子工程和机械工程双学位。毕业后任职于苹果公司美国总部负责电路系统设计，参与了多代iPhone的原型设计，技术开发以及海外生产线的架设。曾任职于三星全球总部研究中心，负责下一代消费产品概念研发。

资料来源：公司官网， HTI

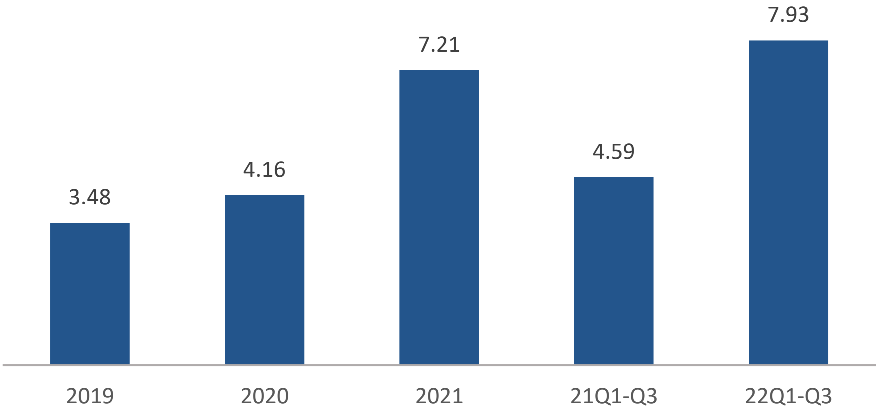
图13 IPO 前公司股权结构（简图）



资料来源：公司招股书，HTI

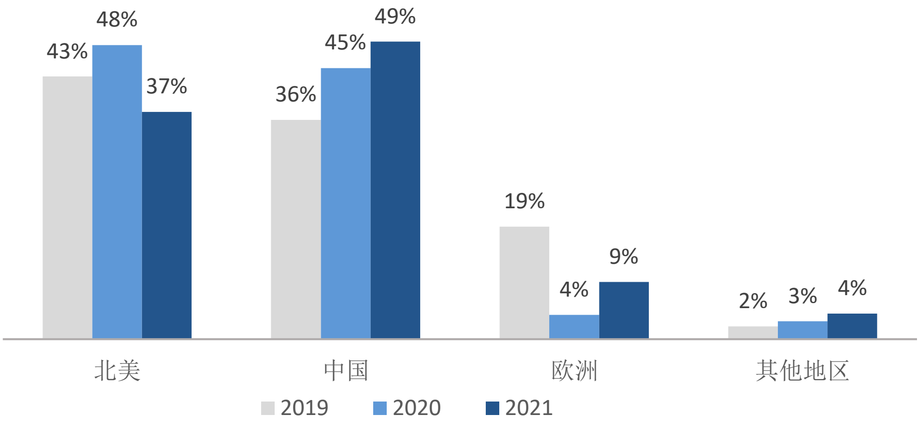
公司财务数据

图14 公司收入情况（亿元）



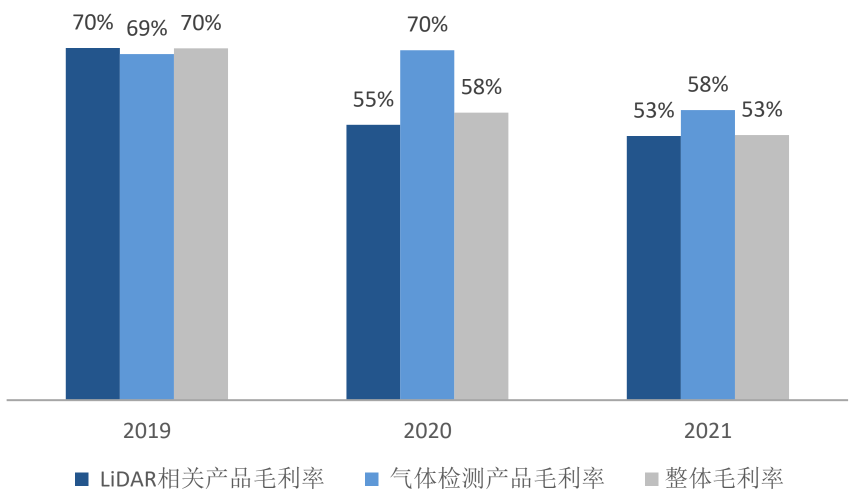
资料来源：公司招股书，HTI

图15 中国区销售占比持续提高



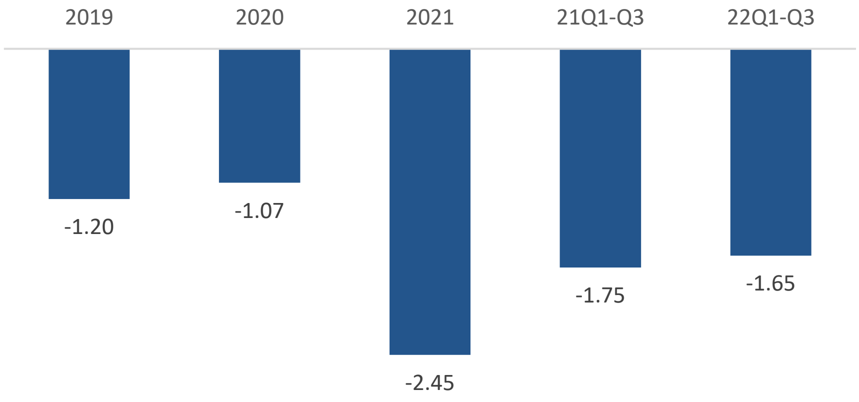
资料来源：公司招股书，HTI

图16 公司整体毛利率随产品 ASP 下降而下滑



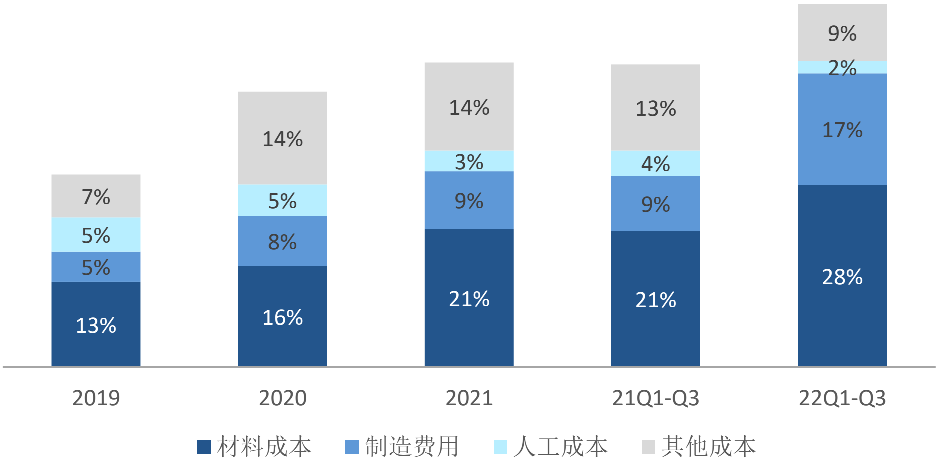
资料来源：公司招股书，HTI

图17 公司历年净亏损（亿元）



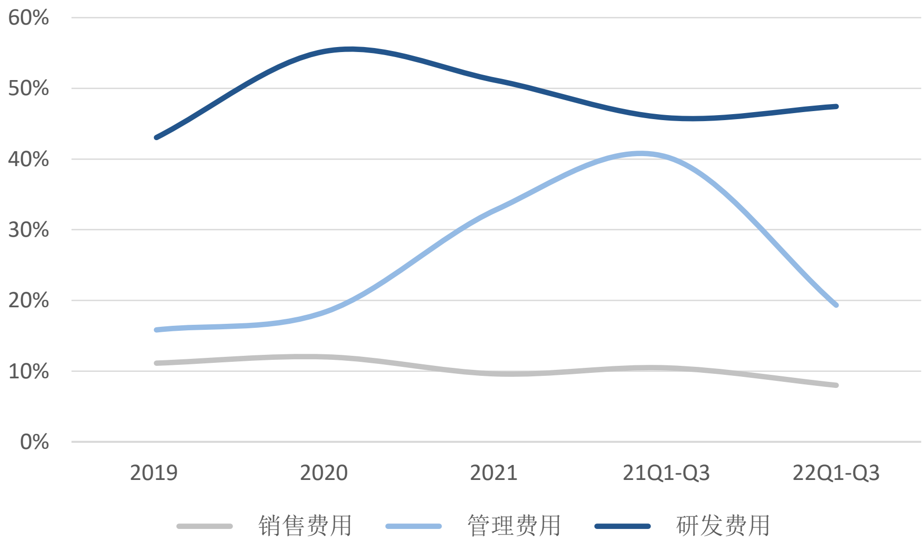
资料来源：公司招股书，HTI

图18 公司成本结构（各项成本/收入）



资料来源：公司招股书，HTI

图19 公司各项费用率统计



资料来源：公司招股书，HTI

风险提示： 1）新能源车渗透不及预期；2）8”投产不及预期。

财务报告分析和预测

Key Ratios	Dec-20A	Dec-21A	Dec-22E	Dec-23E	Dec-24E
Valuation Measures					
Growth*					
Revenue growth	19%	73%	51%	55%	65%
Operating profit growth	n.m.	n.m.	n.m.	n.m.	n.m.
Net profit growth	n.m.	n.m.	n.m.	n.m.	n.m.
Margins					
Gross margin	57%	53%	38%	35%	35%
EBITDA margin	(26)%	(35)%	(27)%	(19)%	(3)%
Operating margin	(25)%	(37)%	(34)%	(24)%	(8)%
Net profit margin	(26)%	(341)%	(71)%	(16)%	(4)%
Returns					
ROE	(10)%	(121)%	(28)%	(8)%	(3)%
ROA	(8)%	(93)%	(20)%	(5)%	(2)%
Stability					
Gross debt/equity	0.2x	0.3x	0.4x	0.5x	0.9x
Cash Flow Interest Coverage	n.m.	n.m.	n.m.	n.m.	6x
Current Ratio	7.3x	3.9x	2.8x	3.1x	2.6x
Quick Ratio	6.4x	3.5x	2.3x	2.7x	2.2x
Net debt to equity	Net cash	Net cash	Net cash	Net cash	Net cash

Note: "n.m." means related ratio is not meaningful for non-profitable years.*

Profit & Loss (Rmb mn)	Dec-20A	Dec-21A	Dec-22E	Dec-23E	Dec-24E
Total revenue	416	721	1,088	1,686	2,774
Cost of sales	177	339	674	1,099	1,814
Gross profit	**239**	**382**	**414**	**587**	**961**
Total operating expenses	341	647	785	988	1,175
Operating profit	**(102)**	**(265)**	**(371)**	**(401)**	**(214)**
Net other Non-op. income (Loss)	(27)	(13)	28	0	0
Net interest income (expense)	21	33	71	137	100
Pre-tax profit	**(107)**	**(246)**	**(272)**	**(264)**	**(115)**
Extraordinaries, net of taxes	0	0	0	0	0
Taxation & Minority interest	0	(2,210)	(500)	0	0
Net income to ord equity	**(107)**	**(2,456)**	**(772)**	**(264)**	**(115)**

Balance sheet (Rmb mn)	Dec-20A	Dec-21A	Dec-22E	Dec-23E	Dec-24E
Total cash and equivalents	896	2,792	2,317	3,543	3,803
Inventories	150	376	544	675	832
Accounts receivable	123	236	223	428	646
Other current assets	41	89	120	143	166
Total current assets	**1,209**	**3,493**	**3,203**	**4,789**	**5,448**
Net fixed assets	64	322	583	881	1,182
Intangible assets	14	20	26	31	32
Others	25	118	122	126	130
Total non-current assets	**103**	**459**	**731**	**1,038**	**1,344**
Total assets	**1,312**	**3,952**	**3,934**	**5,828**	**6,792**
Short-term borrowings	0	0	0	0	0
Accounts payable	55	77	216	352	580
Other current liabilities	111	815	928	1,193	1,541
Total current liabilities	**167**	**892**	**1,144**	**1,545**	**2,122**
Long-term debt	0	0	0	500	1,000
Other liabilities	8	10	12	15	17
Total non-current liabililties	**8**	**10**	**12**	**515**	**1,017**
Total liabilities	**175**	**903**	**1,157**	**2,060**	**3,138**
Paid-in capital	1,194	0	0	0	0
Retained earnings	(57)	(2,491)	(3,263)	(3,527)	(3,642)
Capital adjustment	0	5,541	6,041	7,295	7,295
Shareholders' equity	**1,137**	**3,050**	**2,778**	**3,768**	**3,654**
Total liabilities & shareholders' equity	**1,312**	**3,952**	**3,934**	**5,828**	**6,792**

Cash Flow (Rmb mn)	Dec-20A	Dec-21A	Dec-22E	Dec-23E	Dec-24E
Net profit	(107)	(245)	(272)	(264)	(115)
Depreciation & amortisation	19	28	52	84	125
Chang in working capital	(297)	(89)	62	38	174
Others	33	77	65	72	77
Cash flow from operations	**(352)**	**(228)**	**(92)**	**(71)**	**262**
Cash flow from investing activities	**179**	**(1,980)**	**717**	**(94)**	**(803)**
Cash flow from financing activities	**317**	**2,401**	**(63)**	**1,685**	**425**
Total cash generated	**144**	**193**	**561**	**1,521**	**(116)**
Free cash flow	**(418)**	**(448)**	**(397)**	**(442)**	**(149)**

来源：Bloomberg，HTI 预测

APPENDIX 1

Summary

- **Hesai Tech raised $190mn in its IPO, with its newest market cap reaching $2.82bn.** On Feb 9, Hesai Technology listed on Nasdaq at an issuance price of US$19 per share, issued a total of 10mn American Depositary Receipts (ADS), and raised US$190mn, becoming the "first Chinese LiDAR stock ". The company's latest total market value reached $2.82bn, surpassing the overseas leader Luminar (market value of $2.23bn, both based on the closing price on February 13) and topping the market value list of US stock lidar companies. Founded in 2014, the company started with a laser gas telemetry system in the early days of its business. In 2016, it shifted its business focus to LiDAR, focusing on autonomous driving and ADAS applications and gradually expanding to the field of robotics. Its product offering covers short, medium, and long-distance mechanical LiDAR and auto-grade semi-solid-state LiDAR, with a cumulative delivery of more than 100K units by the end of 2022, with a market share of 60% in AD market.
- **ADAS to become the next growth driver for Hesai; we expect its overall ADAS LiDAR shipments in China to reach 200K/600K units in 2023/2024, respectively.** According to Yole's prediction, the global automotive ADAS LiDAR market will usher in rapid growth in the next five years, and the market size will increase from US$38mn in 2021 to US$2bn in 2027, with a CAGR of 94%, becoming the largest application field in the radar industry. More than 90% of the company's revenue comes from the sales of LiDAR hardware products, including the Pandar series and QT series used in the autonomous driving, the AT128 used in passenger car ADAS, and the XT series developed for the service robot market. With the large-scale delivery of AT128, the leading auto-grade product, in July 22, the proportion of the company's ADAS revenue has risen rapidly, accounting for 22% of the annual revenue.
- **Target market cap is $5.1bn, initiate with an “Outperform” rating.** Since none of LiDAR companies is yet profitable, the market mainly focuses on revenue growth and orders from existing car OEMs and uses the PS ratio for relative valuation. We reasonably predict that the company's revenue in 22-24 will be 1.09/1.69/2.77bn, respectively. Considering Luminar’s 2023 PS = 19.1X, we assign the company a 21.0X 2023 PS ratio to reflect: 1) the company’s leading position in the field of autonomous driving and, 2) the shipment of ADAS products has entered an explosive trend with the release of important car models of downstream customers, corresponding to a target market cap of US$5.1bn (USD/RMB exchange rate: 7.0) and a TP of US$40.3 per share.
- **Risks:** 1) Underperformance of Auto LiDAR business; 2) Over-competition; 3) Major technology change in LiDAR sector.

附录 APPENDIX

重要信息披露

本研究报告由海通国际分销，海通国际是由海通国际研究有限公司(HTIRL)，Haitong Securities India Private Limited (HSIPL)，Haitong International Japan K.K. (HTIJKK)和海通国际证券有限公司(HTISCL)的证券研究团队所组成的全球品牌，海通国际证券集团(HTISG)各成员分别在其许可的司法管辖区内从事证券活动。

IMPORTANT DISCLOSURES

This research report is distributed by Haitong International, a global brand name for the equity research teams of Haitong International Research Limited (“HTIRL”), Haitong Securities India Private Limited (“HSIPL”), Haitong International Japan K.K. (“HTIJKK”), Haitong International Securities Company Limited (“HTISCL”), and any other members within the Haitong International Securities Group of Companies (“HTISG”), each authorized to engage in securities activities in its respective jurisdiction.

HTIRL 分析师认证 Analyst Certification:

我，张晓飞，在此保证（i）本研究报告中的意见准确反映了我们对本研究中提及的任何或所有目标公司或上市公司的个人观点，并且（ii）我的报酬中没有任何部分与本研究报告中表达的具体建议或观点直接或间接相关；及就此报告中所讨论目标公司的证券，我们（包括我们的家属）在其中均不持有任何财务利益。I, Xiaofei Zhang, certify that (i) the views expressed in this research report accurately reflect my personal views about any or all of the subject companies or issuers referred to in this research and (ii) no part of my compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report; and that I (including members of my household) have no financial interest in the security or securities of the subject companies discussed.

我，蒲得宇，在此保证（i）本研究报告中的意见准确反映了我们对本研究中提及的任何或所有目标公司或上市公司的个人观点，并且（ii）我的报酬中没有任何部分与本研究报告中表达的具体建议或观点直接或间接相关；及就此报告中所讨论目标公司的证券，我们（包括我们的家属）在其中均不持有任何财务利益。I, Jeff Pu, certify that (i) the views expressed in this research report accurately reflect my personal views about any or all of the subject companies or issuers referred to in this research and (ii) no part of my compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report; and that I (including members of my household) have no financial interest in the security or securities of the subject companies discussed.

我，张幸，在此保证（i）本研究报告中的意见准确反映了我们对本研究中提及的任何或所有目标公司或上市公司的个人观点，并且（ii）我的报酬中没有任何部分与本研究报告中表达的具体建议或观点直接或间接相关；及就此报告中所讨论目标公司的证券，我们（包括我们的家属）在其中均不持有任何财务利益。I, Olivia Zhang, certify that (i) the views expressed in this research report accurately reflect my personal views about any or all of the subject companies or issuers referred to in this research and (ii) no part of my compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report; and that I (including members of my household) have no financial interest in the security or securities of the subject companies discussed.

利益冲突披露 Conflict of Interest Disclosures

海通国际及其某些关联公司可从事投资银行业务和/或对本研究中的特定股票或公司进行做市或持有自营头寸。就本研究报告而言，以下是有关该等关系的披露事项（以下披露不能保证及时无遗漏，如需了解及时全面信息，请发邮件至 ERD-Disclosure@htisec.com）

HTI and some of its affiliates may engage in investment banking and / or serve as a market maker or hold proprietary trading positions of certain stocks or companies in this research report. As far as this research report is concerned, the following are the disclosure matters related to such relationship (As the following disclosure does not ensure timeliness and completeness, please send an email to ERD-Disclosure@htisec.com if timely and comprehensive information is needed).

海通证券股份有限公司和/或其子公司（统称“海通”）在过去 12 个月内参与了 002594.CH 的投资银行项目。投资银行项目包括：1、海通担任上市前辅导机构、保荐人或主承销商的首次公开发行项目；2、海通作为保荐人、主承销商或财务顾问的股权或债务再融资项目；3、海通作为主经纪商的新三板上市、目标配售和并购项目。

Haitong Securities Co., Ltd. and/or its subsidiaries (collectively, the "Haitong") have a role in investment banking projects of 002594.CH within the past 12 months. The investment banking projects include 1. IPO projects in which Haitong acted as pre-listing tutor, sponsor, or lead-underwriter; 2. equity or debt refinancing projects of 002594.CH for which Haitong acted as sponsor, lead-underwriter or financial advisor; 3. listing by introduction in the new three board, target placement, M&A projects in which Haitong acted as lead-brokerage firm.

002594.CH 目前或过去 12 个月内是海通的投资银行业务客户。

002594.CH is/was an investment bank clients of Haitong currently or within the past 12 months.

交银国际信托有限公司,交银国际信托有限公司－交银国信·交银理财 1 号单一资金信托,交银国际信托有限公司－交银国信·聚通稳健 1 号集合资金信托计划,交银国际信托有限公司－武汉农商行组合投资单一资金信托,交银国际证券有限公司,交银国际信托有限公司,交银国际信托有限公司－武汉农商行组合投资单一资金信托 及 600104.CH 目前或过去 12 个月内是海通的客户。海通向客户提供非投资银行业务的证券相关业务服务。

交银国际信托有限公司,交银国际信托有限公司－交银国信·交银理财 1 号单一资金信托,交银国际信托有限公司－交银国信·聚通稳健 1 号集合资金信托计划,交银国际信托有限公司－武汉农商行组合投资单一资金信托,交银国际证券有限公司,交银国际信托有限公司,交银国际信托有限公司－武汉农商行组合投资单一资金信托 and 600104.CH are/were a client of Haitong currently or within the past 12 months. The client has been provided for non-investment-banking securities-related services.

江西一诺新材料有限公司目前或过去 12 个月内是海通的客户。海通向客户提供非证券业务服务。

江西一诺新材料有限公司 is/was a client of Haitong currently or within the past 12 months. The client has been provided for non-securities services.

海通在过去 12 个月中获得对 002594.CH 提供投资银行服务的报酬。

Haitong received in the past 12 months compensation for investment banking services provided to 002594.CH.

海通预计将（或者有意向）在未来三个月内从 002594.CH 获得投资银行服务报酬。
Haitong expects to receive, or intends to seek, compensation for investment banking services in the next three months from 002594.CH.

海通在过去的 12 个月中从交银国际信托有限公司,交银国际信托有限公司－交银国信·交银理财 1 号单一资金信托,交银国际信托有限公司－交银国信·聚通稳健 1 号集合资金信托计划,交银国际信托有限公司－武汉农商行组合投资单一资金信托,交银国际证券有限公司,上海汽车集团金控管理有限公司 及 江西一诺新材料有限公司获得除投资银行服务以外之产品或服务的报酬。
Haitong has received compensation in the past 12 months for products or services other than investment banking from 交银国际信托有限公司,交银国际信托有限公司－交银国信·交银理财 1 号单一资金信托,交银国际信托有限公司－交银国信·聚通稳健 1 号集合资金信托计划,交银国际信托有限公司－武汉农商行组合投资单一资金信托,交银国际证券有限公司,上海汽车集团金控管理有限公司 and 江西一诺新材料有限公司.

海通担任 002594.CH 有关证券的做市商或流通量提供者。
Haitong acts as a market maker or liquidity provider in the securities of 002594.CH.

评级定义（从 2020 年 7 月 1 日开始执行）：
海通国际（以下简称“HTI”）采用相对评级系统来为投资者推荐我们覆盖的公司：优于大市、中性或弱于大市。投资者应仔细阅读 HTI 的评级定义。并且 HTI 发布分析师观点的完整信息，投资者应仔细阅读全文而非仅看评级。在任何情况下，分析师的评级和研究都不能作为投资建议。投资者的买卖股票的决策应基于各自情况（比如投资者的现有持仓）以及其他因素。

分析师股票评级

优于大市，未来 12-18 个月内预期相对基准指数涨幅在 10%以上，基准定义如下

中性，未来 12-18 个月内预期相对基准指数变化不大，基准定义如下。根据 FINRA/NYSE 的评级分布规则，我们会将中性评级划入持有这一类别。

弱于大市，未来 12-18 个月内预期相对基准指数跌幅在 10%以上，基准定义如下

各地股票基准指数：日本 – TOPIX, 韩国 – KOSPI, 台湾 – TAIEX, 印度 – Nifty100, 美国 – SP500; 其他所有中国概念股 – MSCI China.

Ratings Definitions (from 1 Jul 2020):
Haitong International uses a relative rating system using Outperform, Neutral, or Underperform for recommending the stocks we cover to investors. Investors should carefully read the definitions of all ratings used in Haitong International Research. In addition, since Haitong International Research contains more complete information concerning the analyst's views, investors should carefully read Haitong International Research, in its entirety, and not infer the contents from the rating alone. In any case, ratings (or research) should not be used or relied upon as investment advice. An investor's decision to buy or sell a stock should depend on individual circumstances (such as the investor's existing holdings) and other considerations.

Analyst Stock Ratings

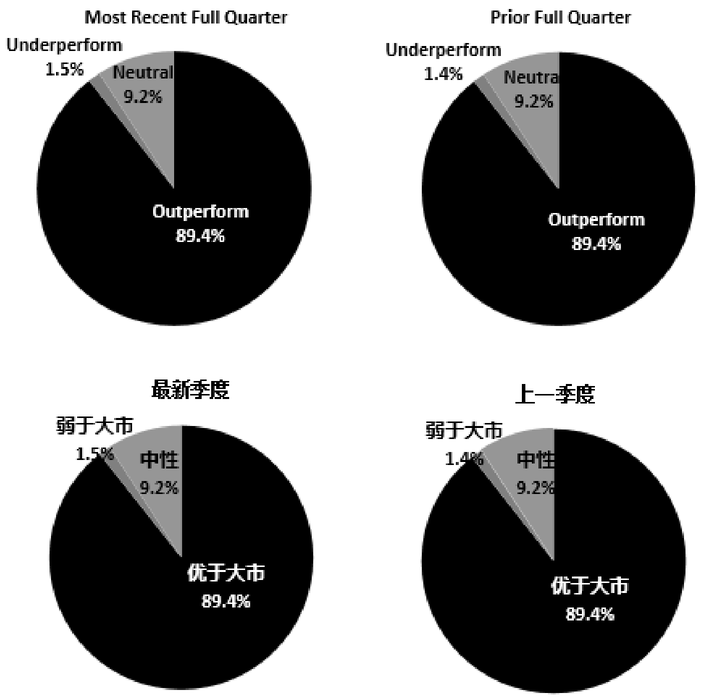
Outperform: The stock's total return over the next 12-18 months is expected to exceed the return of its relevant broad market benchmark, as indicated below.

Neutral: The stock's total return over the next 12-18 months is expected to be in line with the return of its relevant broad market benchmark, as indicated below. For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category.

Underperform: The stock's total return over the next 12-18 months is expected to be below the return of its relevant broad market benchmark, as indicated below.

Benchmarks for each stock's listed region are as follows: Japan – TOPIX, Korea – KOSPI, Taiwan – TAIEX, India – Nifty100, US – SP500; for all other China-concept stocks – MSCI China.

评级分布 Rating Distribution



截至 2022 年 12 月 31 日海通国际股票研究评级分布

	优于大市	**中性** (持有)	**弱于大市**
海通国际股票研究覆盖率	89.4%	9.2%	1.5%
投资银行客户*	5.2%	7.3%	8.3%

*在每个评级类别里投资银行客户所占的百分比。

上述分布中的买入，中性和卖出分别对应我们当前优于大市，中性和落后大市评级。

只有根据 FINRA/NYSE 的评级分布规则，我们才将中性评级划入持有这一类别。请注意在上表中不包含非评级的股票。

此前的评级系统定义（直至 2020 年 6 月 30 日）：

买入，未来 12-18 个月内预期相对基准指数涨幅在 10%以上，基准定义如下

中性，未来 12-18 个月内预期相对基准指数变化不大，基准定义如下。根据 FINRA/NYSE 的评级分布规则，我们会将中性评级划入持有这一类别。

卖出，未来 12-18 个月内预期相对基准指数跌幅在 10%以上，基准定义如下

各地股票基准指数：日本 – TOPIX, 韩国 – KOSPI, 台湾 – TAIEX, 印度 – Nifty100; 其他所有中国概念股 – MSCI China.

Haitong International Equity Research Ratings Distribution, as of Dec 31, 2022

	Outperform	**Neutral** (hold)	**Underperform**
HTI Equity Research Coverage	89.4%	9.2%	1.5%
IB clients*	5.2%	7.3%	8.3%

*Percentage of investment banking clients in each rating category.

BUY, Neutral, and SELL in the above distribution correspond to our current ratings of Outperform, Neutral, and Underperform.

For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category. Please note that stocks with an NR designation are not included in the table above.

Previous rating system definitions (until 30 Jun 2020):

BUY: The stock's total return over the next 12-18 months is expected to exceed the return of its relevant broad market benchmark, as indicated below.

NEUTRAL: The stock's total return over the next 12-18 months is expected to be in line with the return of its relevant broad market benchmark, as indicated below. For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category.

SELL: The stock's total return over the next 12-18 months is expected to be below the return of its relevant broad market benchmark, as indicated below.

Benchmarks for each stock's listed region are as follows: Japan – TOPIX, Korea – KOSPI, Taiwan – TAIEX, India – Nifty100; for all other China-concept stocks – MSCI China.

海通国际非评级研究：海通国际发布计量、筛选或短篇报告，并在报告中根据估值和其他指标对股票进行排名，或者基于可能的估值倍数提出建议价格。这种排名或建议价格并非为了进行股票评级、提出目标价格或进行基本面估值，而仅供参考使用。

Haitong International Non-Rated Research: Haitong International publishes quantitative, screening or short reports which may rank stocks according to valuation and other metrics or may suggest prices based on possible valuation multiples. Such rankings or suggested prices do not purport to be stock ratings or target prices or fundamental values and are for information only.

海通国际 A 股覆盖：海通国际可能会就沪港通及深港通的中国 A 股进行覆盖及评级。海通证券（600837.CH），海通国际于上海的母公司，也会于中国发布中国 A 股的研究报告。但是，海通国际使用与海通证券不同的评级系统，所以海通国际与海通证券的中国 A 股评级可能有所不同。

Haitong International Coverage of A-Shares: Haitong International may cover and rate A-Shares that are subject to the Hong Kong Stock Connect scheme with Shanghai and Shenzhen. Haitong Securities (HS; 600837 CH), the ultimate parent company of HTISG based in Shanghai, covers and publishes research on these same A-Shares for distribution in mainland China. However, the rating system employed by HS differs from that used by HTI and as a result there may be a difference in the HTI and HS ratings for the same A-share stocks.

海通国际优质 100 A 股（Q100）指数：海通国际 Q100 指数是一个包括 100 支由海通证券覆盖的优质中国 A 股的计量产品。这些股票是通过基于质量的筛选过程，并结合对海通证券 A 股团队自下而上的研究。海通国际每季对 Q100 指数成分作出复审。

Haitong International Quality 100 A-share (Q100) Index: HTI's Q100 Index is a quant product that consists of 100 of the highest-quality A-shares under coverage at HS in Shanghai. These stocks are carefully selected through a quality-based screening process in combination with a review of the HS A-share team's bottom-up research. The Q100 constituent companies are reviewed quarterly.

MSCI ESG 评级免责声明条款：尽管海通国际的信息供货商（包括但不限于 MSCI ESG Research LLC 及其联属公司（「ESG 方」）从其认为可靠的来源获取信息（「信息」），ESG 方均不担保或保证此处任何数据的原创性，准确性和/或完整性，并明确表示不作出任何明示或默示的担保，包括可商售性和针对特定目的的适用性。该信息只能供阁下内部使用，不得以任何形式复制或重新传播，并不得用作任何金融工具、产品或指数的基础或组成部分。此外，信息本质上不能用于判断购买或出售何种证券，或何时购买或出售该证券。即使已被告知可能造成的损害，ESG 方均不承担与此处任何资料有关的任何错误或遗漏所引起的任何责任，也不对任何直接、间接、特殊、惩罚性、附带性或任何其他损害赔偿（包括利润损失）承担任何责任。

MSCI ESG Disclaimer: Although Haitong International's information providers, including without limitation, MSCI ESG Research LLC and its affiliates (the "ESG Parties"), obtain information (the "Information") from sources they consider reliable, none of the ESG Parties warrants or guarantees the originality, accuracy and/or completeness, of any data herein and expressly disclaim all express or implied warranties, including those of merchantability and fitness for a particular purpose. The Information may only be used for your internal use, may not be reproduced or redisseminated in any form and may not be used as a basis for, or a component of, any financial instruments or products or indices. Further, none of the Information can in and of itself be used to determine which securities to buy or sell or when to buy or sell them. None of the ESG Parties shall have any liability for any errors or omissions in connection with any data herein, or any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages.

盟浪义利（FIN-ESG）数据通免责声明条款： 在使用盟浪义利（FIN-ESG）数据之前，请务必仔细阅读本条款并同意本声明：

第一条 义利（FIN-ESG）数据系由盟浪可持续数字科技有限责任公司（以下简称"本公司"）基于合法取得的公开信息评估而成，本公司对信息的准确性及完整性不作任何保证。对公司

述的评估结果造成的任何直接或间接损失负责。

第二条 盟浪并不因收到此评估数据而将收件人视为客户，收件人使用此数据时应根据自身实际情况作出自我独立判断。本数据所载内容反映的是盟浪在最初发布本数据日期当日的判断，盟浪有权在不发出通知的情况下更新、修订与发出其他与本数据所载内容不一致或有不同结论的数据。除非另行说明，本数据（如财务业绩数据等）仅代表过往表现，过往的业绩表现不作为日后回报的预测。

第三条 本数据版权归本公司所有，本公司依法保留各项权利。未经本公司事先书面许可授权，任何个人或机构不得将本数据中的评估结果用于任何营利性目的，不得对本数据进行修改、复制、编译、汇编、再次编辑、改编、删减、缩写、节选、发行、出租、展览、表演、放映、广播、信息网络传播、摄制、增加图标及说明等，否则因此给盟浪或其他第三方造成损失的，由用户承担相应的赔偿责任，盟浪不承担责任。

第四条 如本免责声明未约定，而盟浪网站平台载明的其他协议内容（如《盟浪网站用户注册协议》《盟浪网用户服务（含认证）协议》《盟浪网隐私政策》等）有约定的，则按其他协议的约定执行；若本免责声明与其他协议约定存在冲突或不一致的，则以本免责声明约定为准。

SusallWave FIN-ESG Data Service Disclaimer: Please read these terms and conditions below carefully and confirm your agreement and acceptance with these terms before using SusallWave FIN-ESG Data Service.

1. FIN-ESG Data is produced by SusallWave Digital Technology Co., Ltd. (In short, SusallWave)'s assessment based on legal publicly accessible information. SusallWave shall not be responsible for any accuracy and completeness of the information. The assessment result is for reference only. It is not for any investment advice for any individual or institution and not for basis of purchasing, selling or holding any relative financial products. We will not be liable for any direct or indirect loss of any individual or institution as a result of using SusallWave FIN-ESG Data.

2. SusallWave do not consider recipients as customers for receiving these data. When using the data, recipients shall make your own independent judgment according to your practical individual status. The contents of the data reflect the judgment of us only on the release day. We have right to update and amend the data and release other data that contains inconsistent contents or different conclusions without notification. Unless expressly stated, the data (e.g., financial performance data) represents past performance only and the past performance cannot be viewed as the prediction of future return.

3. The copyright of this data belongs to SusallWave, and we reserve all rights in accordance with the law. Without the prior written permission of our company, none of individual or institution can use these data for any profitable purpose. Besides, none of individual or institution can take actions such as amendment, replication, translation, compilation, re-editing, adaption, deletion, abbreviation, excerpts, issuance, rent, exhibition, performance, projection, broadcast, information network transmission, shooting, adding icons and instructions. If any loss of SusallWave or any third-party is caused by those actions, users shall bear the corresponding compensation liability. SusallWave shall not be responsible for any loss.

4. If any term is not contained in this disclaimer but written in other agreements on our website (e.g. *User Registration Protocol of SusallWave Website, User Service (including authentication) Agreement of SusallWave Website, Privacy Policy of Susallwave Website*), it should be executed according to other agreements. If there is any difference between this disclaim and other agreements, this disclaimer shall be applied.

重要免责声明：

非印度证券的研究报告： 本报告由海通国际证券集团有限公司（"HTISGL"）的全资附属公司海通国际研究有限公司（"HTIRL"）发行，该公司是根据香港证券及期货条例（第 571 章）持有第 4 类受规管活动（就证券提供意见）的持牌法团。该研究报告在 HTISGL 的全资附属公司 Haitong International (Japan) K.K.（"HTIJKK"）的协助下发行，HTIJKK 是由日本关东财务局监管为投资顾问。

印度证券的研究报告： 本报告由从事证券交易、投资银行及证券分析及受 Securities and Exchange Board of India（"SEBI"）监管的 Haitong Securities India Private Limited（"HTSIPL"）所发行，包括制作及发布涵盖 BSE Limited（"BSE"）和 National Stock Exchange of India Limited（"NSE"）上市公司（统称为「印度交易所」）的研究报告。HTSIPL 于 2016 年 12 月 22 日被收购并成为海通国际证券集团有限公司（"HTISG"）的一部分。

所有研究报告均以海通国际为名作为全球品牌，经许可由海通国际证券股份有限公司及/或海通国际证券集团的其他成员在其司法管辖区发布。

本文件所载信息和观点已被编译或源自可靠来源，但 HTIRL、HTISCL 或任何其他属于海通国际证券集团有限公司（"HTISG"）的成员对其准确性、完整性和正确性不做任何明示或暗示的声明或保证。本文件中所有观点均截至本报告日期，如有更改，恕不另行通知。本文件仅供参考使用。文件中提及的任何公司或其股票的说明并非意图展示完整的内容，本文件并非/不应被解释为对证券买卖的明示或暗示地出价或征价。在某些司法管辖区，本文件中提及的证券可能无法进行买卖。如果投资产品以投资者本国货币以外的币种进行计价，则汇率变化可能会对投资产生不利影响。过去的表现并不一定代表将来的结果。某些特定交易，包括设计金融衍生工具的，有产生重大风险的可能性，因此并不适合所有的投资者。您还应认识到本文件中的建议并非为您量身定制。分析师并未考虑到您自身的财务情况，如您的财务状况和风险偏好。因此您必须自行分析并在适用的情况下咨询自己的法律、税收、会计、金融和其他方面的专业顾问，以期在投资之前评估该项建议是否适合于您。若由于使用本文件所载的材料而产生任何直接或间接的损失，HTISG 及其董事、雇员或代理人对此均不承担任何责任。

除对本文内容承担责任的分析师除外，HTISG 及我们的关联公司、高级管理人员、董事和雇员，均可不时作为主事人就本文件所述的任何证券或衍生品持有长仓或短仓以及进行买卖。HTISG 的销售员、交易员和其他专业人士均可向 HTISG 的相关客户和公司提供与本文件所述意见相反的口头或书面市场评论意见或交易策略。HTISG 可做出与本文件所述建议或意见不一致的投资决策。但 HTIRL 没有义务来确保本文件的收件人了解到该等交易决定、思路或建议。

请访问海通国际网站 www.equities.htisec.com，查阅更多有关海通国际为预防和避免利益冲突设立的组织和行政安排的内容信息。

非美国分析师披露信息： 本项研究首页上列明的海通国际分析师并未在 FINRA 进行注册或者取得相应的资格，并且不受美国 FINRA 有关与本项研究目标公司进行沟通、公开露面和自营

证券交易的第 2241 条规则之限制。

IMPORTANT DISCLAIMER

For research reports on non-Indian securities: The research report is issued by Haitong International Research Limited ("HTIRL"), a wholly owned subsidiary of Haitong International Securities Group Limited ("HTISGL") and a licensed corporation to carry on Type 4 regulated activity (advising on securities) for the purpose of the Securities and Futures Ordinance (Cap. 571) of Hong Kong, with the assistance of Haitong International (Japan) K.K. ("HTIJKK"), a wholly owned subsidiary of HTISGL and which is regulated as an Investment Adviser by the Kanto Finance Bureau of Japan.

For research reports on Indian securities: The research report is issued by Haitong Securities India Private Limited ("HSIPL"), an Indian company and a Securities and Exchange Board of India ("SEBI") registered Stock Broker, Merchant Banker and Research Analyst that, inter alia, produces and distributes research reports covering listed entities on the BSE Limited ("BSE") and the National Stock Exchange of India Limited ("NSE") (collectively referred to as "Indian Exchanges"). HSIPL was acquired and became part of the Haitong International Securities Group of Companies ("HTISG") on 22 December 2016.

All the research reports are globally branded under the name Haitong International and approved for distribution by Haitong International Securities Company Limited ("HTISCL") and/or any other members within HTISG in their respective jurisdictions.

The information and opinions contained in this research report have been compiled or arrived at from sources believed to be reliable and in good faith but no representation or warranty, express or implied, is made by HTIRL, HTISCL, HSIPL, HTIJKK or any other members within HTISG from which this research report may be received, as to their accuracy, completeness or correctness. All opinions expressed herein are as of the date of this research report and are subject to change without notice. This research report is for information purpose only. Descriptions of any companies or their securities mentioned herein are not intended to be complete and this research report is not, and should not be construed expressly or impliedly as, an offer to buy or sell securities. The securities referred to in this research report may not be eligible for purchase or sale in some jurisdictions. If an investment product is denominated in a currency other than an investor's home currency, a change in exchange rates may adversely affect the investment. Past performance is not necessarily indicative of future results. Certain transactions, including those involving derivatives, give rise to substantial risk and are not suitable for all investors. You should also bear in mind that recommendations in this research report are not tailor-made for you. The analyst has not taken into account your unique financial circumstances, such as your financial situation and risk appetite. You must, therefore, analyze and should, where applicable, consult your own legal, tax, accounting, financial and other professional advisers to evaluate whether the recommendations suits you before investment. Neither HTISG nor any of its directors, employees or agents accepts any liability whatsoever for any direct or consequential loss arising from any use of the materials contained in this research report.

HTISG and our affiliates, officers, directors, and employees, excluding the analysts responsible for the content of this document, will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research report. Sales, traders, and other professionals of HTISG may provide oral or written market commentary or trading strategies to the relevant clients and the companies within HTISG that reflect opinions that are contrary to the opinions expressed in this research report. HTISG may make investment decisions that are inconsistent with the recommendations or views expressed in this research report. HTI is under no obligation to ensure that such other trading decisions, ideas or recommendations are brought to the attention of any recipient of this research report.

Please refer to HTI's website www.equities.htisec.com for further information on HTI's organizational and administrative arrangements set up for the prevention and avoidance of conflicts of interest with respect to Research.

Non U.S. Analyst Disclosure: The HTI analyst(s) listed on the cover of this Research is (are) not registered or qualified as a research analyst with FINRA and are not subject to U.S. FINRA Rule 2241 restrictions on communications with companies that are the subject of the Research; public appearances; and trading securities by a research analyst.

分发和地区通知:

除非下文另有规定，否则任何希望讨论本报告或者就本项研究中讨论的任何证券进行任何交易的收件人均应联系其所在国家或地区的海通国际销售人员。

香港投资者的通知事项: 海通国际证券股份有限公司("HTISCL")负责分发该研究报告，HTISCL 是在香港有权实施第 1 类受规管活动（从事证券交易）的持牌公司。该研究报告并不构成《证券及期货条例》（香港法例第 571 章）（以下简称"SFO"）所界定的要约邀请，证券要约或公众要约。本研究报告仅提供给 SFO 所界定的"专业投资者"。本研究报告未经过证券及期货事务监察委员会的审查。您不应仅根据本研究报告中所载的信息做出投资决定。本研究报告的收件人就研究报告中产生或与之相关的任何事宜请联系 HTISCL 销售人员。

美国投资者的通知事项: 本研究报告由 HTIRL，HSIPL 或 HTIJKK 编写。 HTIRL，HSIPL，HTIJKK 以及任何非 HTISG 美国联营公司，均未在美国注册，因此不受美国关于研究报告编制和研究分析人员独立性规定的约束。本研究报告提供给依照 1934 年"美国证券交易法"第 15a-6 条规定的豁免注册的「美国主要机构投资者」（"Major U.S. Institutional Investor"）和「机构投资者」（"U.S. Institutional Investors"）。在向美国机构投资者分发研究报告时，Haitong International Securities (USA) Inc.（"HTI USA"）将对报告的内容负责。任何收到本研究报告的美国投资者，希望根据本研究报告提供的信息进行任何证券或相关金融工具买卖的交易，只能通过 HTI USA。HTI USA 位于 340 Madison Avenue, 12th Floor, New York, NY 10173，电话（212）351-6050。 HTI USA 是在美国于 U.S. Securities and Exchange Commission（"SEC"）注册的经纪商，也是 Financial Industry Regulatory Authority, Inc.（"FINRA"）的成员。 HTIUSA 不负责编写本研究报告，也不负责其中包含的分析。在任何情况下，收到本研究报告的任何美国投资者，不得直接与分析师直接联系，也不得通过 HSIPL，HTIRL 或 HTIJKK 直接进行买卖证券或相关金融工具的交易。本研究报告中出现的 HSIPL，HTIRL 或 HTIJKK 分析师没有注册或具备 FINRA 的研究分析师资格，因此可能不受 FINRA 第 2241 条规定的与目标公司的交流，公开露面和分析师账户持有的交易证券等限制。投资本研究报告中讨论的任何非美国证券或相关金融工具（包括 ADR）可能存在一定风险。非美国发行的证券可能没有注册，或不受美国法规的约束。有关非美国证券或相关金融工具的信息可能有限制。外国公司可能不受审计和汇报的标准以及与美国境内生效相符的监管要求。本研究报告中以美元以外的其他货币计价的任何证券或相关金融工具的投资或收益的价值受汇率波动的影响，可能对该等证券或相关金融工具的价值或收入产生正面或负面影响。美国收件人的所有问询请联系：

Haitong International Securities (USA) Inc.
340 Madison Avenue, 12th Floor
New York, NY 10173
联系人电话：(212) 351 6050

DISTRIBUTION AND REGIONAL NOTICES

Except as otherwise indicated below, any Recipient wishing to discuss this research report or effect any transaction in any security discussed in HTI's research should contact the Haitong International salesperson in their own country or region.

Notice to Hong Kong investors: The research report is distributed by Haitong International Securities Company Limited ("HTISCL"), which is a licensed corporation to carry on Type 1 regulated activity (dealing in securities) in Hong Kong. This research report does not constitute a solicitation or an offer of securities or an invitation to the public within the meaning of the SFO. This research report is only to be circulated to "Professional Investors" as defined in the SFO. This research report has not been reviewed by the Securities and Futures Commission. You should not make investment decisions solely on the basis of the information contained in this research report. Recipients of this research report are to contact HTISCL salespersons in respect of any matters arising from, or in connection with, the research report.

Notice to U.S. investors: As described above, this research report was prepared by HTIRL, HSIPL or HTIJKK. Neither HTIRL, HSIPL, HTIJKK, nor any of the non U.S. HTISG affiliates is registered in the United States and, therefore, is not subject to U.S. rules regarding the preparation of research reports and the independence of research analysts. This research report is provided for distribution to "major U.S. institutional investors" and "U.S. institutional investors" in reliance on the exemption from registration provided by Rule 15a-6 of the U.S. Securities Exchange Act of 1934, as amended. When distributing research reports to "U.S. institutional investors," HTI USA will accept the responsibilities for the content of the reports. Any U.S. recipient of this research report wishing to effect any transaction to buy or sell securities or related financial instruments based on the information provided in this research report should do so only through Haitong International Securities (USA) Inc. ("HTI USA"), located at 340 Madison Avenue, 12th Floor, New York, NY 10173, USA; telephone (212) 351 6050. HTI USA is a broker-dealer registered in the U.S. with the U.S. Securities and Exchange Commission (the "SEC") and a member of the Financial Industry Regulatory Authority, Inc. ("FINRA"). HTI USA is not responsible for the preparation of this research report nor for the analysis contained therein. Under no circumstances should any U.S. recipient of this research report contact the analyst directly or effect any transaction to buy or sell securities or related financial instruments directly through HSIPL, HTIRL or HTIJKK. The HSIPL, HTIRL or HTIJKK analyst(s) whose name appears in this research report is not registered or qualified as a research analyst with FINRA and, therefore, may not be subject to FINRA Rule 2241 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. Investing in any non-U.S. securities or related financial instruments (including ADRs) discussed in this research report may present certain risks. The securities of non-U.S. issuers may not be registered with, or be subject to U.S. regulations. Information on such non-U.S. securities or related financial instruments may be limited. Foreign companies may not be subject to audit and reporting standards and regulatory requirements comparable to those in effect within the U.S. The value of any investment or income from any securities or related financial instruments discussed in this research report denominated in a currency other than U.S. dollars is subject to exchange rate fluctuations that may have a positive or adverse effect on the value of or income from such securities or related financial instruments. All inquiries by U.S. recipients should be directed to:

Haitong International Securities (USA) Inc.
340 Madison Avenue, 12th Floor
New York, NY 10173
Attn: Sales Desk at (212) 351 6050

中华人民共和国的通知事项：在中华人民共和国（下称"中国"，就本报告目的而言，不包括香港特别行政区、澳门特别行政区和台湾）只有根据适用的中国法律法规而收到该材料的人员方可使用该材料。并且根据相关法律法规，该材料中的信息并不构成"在中国从事生产、经营活动"。本文件在中国并不构成相关证券的公共发售或认购。无论根据法律规定或其他任何规定，在取得中国政府所有的批准或许可之前，任何法人或自然人均不得直接或间接地购买本材料中的任何证券或任何实益权益。接收本文件的人员须遵守上述限制性规定。

加拿大投资者的通知事项：在任何情况下该等材料均不得被解释为在任何加拿大的司法管辖区内出售证券的要约或认购证券的要约邀请。本材料中所述证券在加拿大的任何要约或出售行为均只能在豁免向有关加拿大证券监管机构提交招股说明书的前提下由 Haitong International Securities (USA) Inc.（"HTI USA"）予以实施，该公司是一家根据 National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations（"NI 31-103"）的规定得到「国际交易商豁免」（"International Dealer Exemption"）的交易商，位于艾伯塔省、不列颠哥伦比亚省、安大略省和魁北克省。在加拿大，该等材料在任何情况下均不得被解释为任何证券的招股说明书、发行备忘录、广告或公开发行。加拿大的任何证券委员会或类似的监管机构均未审查或以任何方式批准该等材料、其中所载的信息或所述证券的优点，任何与此相反的声明即属违法。在收到该等材料时，每个加拿大的收件人均将被视为属于 National Instrument 45-106 Prospectus Exemptions 第 1.1 节或者 Securities Act (Ontario)第 73.3(1)节所规定的「认可投资者」（"Accredited Investor"），或者在适用情况下 National Instrument 31-103 第 1.1 节所规定的「许可投资者」（"Permitted Investor"）。

新加坡投资者的通知事项：本研究报告由 Haitong International Securities (Singapore) Pte Ltd（"HTISSPL"）[公司注册编号 201311400G] 于新加坡提供。HTISSPL 是符合《财务顾问法》（第 110 章）（"FAA"）定义的豁免财务顾问，可（a）提供关于证券，集体投资计划的部分，交易所衍生品合约和场外衍生品合约的建议（b）发行或公布有关证券、交易所衍生品合约和场外衍生品合约的研究分析或研究报告。本研究报告仅提供给符合《证券及期货法》（第 289 章）第 4A 条项下规定的机构投资者。对于因本研究报告而产生的或与之相关的任何问题，本研究报告的收件人应通过以下信息与 HTISSPL 联系：

Haitong International Securities (Singapore) Pte. Ltd

50 Raffles Place, #33-03 Singapore Land Tower, Singapore 048623

电话: (65) 6536 1920

日本投资者的通知事项：本研究报告由海通国际证券有限公司所发布，旨在分发给从事投资管理的金融服务提供商或注册金融机构（根据日本金融机构和交易法（"FIEL"））第 61（1）条，第 17-11（1）条的执行及相关条款）。

英国及欧盟投资者的通知事项：本报告由从事投资顾问的 Haitong International Securities Company Limited 所发布，本报告只面向有投资相关经验的专业客户发布。任何投资或与本报告相关的投资行为只面对此类专业客户。没有投资经验或相关投资经验的客户不得依赖本报告。Haitong International Securities Company Limited 的分支机构的净长期或短期金融权益可能超过本研究报告中提及的实体已发行股本总额的 0.5%。特别提醒有些英文报告有可能此前已经通过中文或其它语言完成发布。

澳大利亚投资者的通知事项：Haitong International Securities (Singapore) Pte Ltd, Haitong International Securities Company Limited 和 Haitong International Securities (UK) Limited 分别根据澳大利亚证券和投资委员会（以下简称"ASIC"）公司（废除及过度性）文书第 2016/396 号规章在澳大利亚分发本项研究，该等规章免除了根据 2001 年《公司法》在澳大利亚为批发客户提供金融服务时海通国际需持有澳大利亚金融服务许可的要求。ASIC 的规章副本可在以下网站获取：www.legislation.gov.au。海通国际提供的金融服务受外国法律法规规定的管制，该等法律与在澳大利亚所适用的法律存在差异。

印度投资者的通知事项：本报告由从事证券交易、投资银行及证券分析及受 Securities and Exchange Board of India（"SEBI"）监管的 Haitong Securities India Private Limited（"HTSIPL"）所发布，包括制作及发布涵盖 BSE Limited（"BSE"）和 National Stock Exchange of India Limited（"NSE"）（统称为「印度交易所」）研究报告。

版权所有：海通国际证券集团有限公司 2019 年。保留所有权利。

People's Republic of China (PRC): In the PRC, the research report is directed for the sole use of those who receive the research report in accordance with the applicable PRC laws and regulations. Further, the information on the research report does not constitute "production and business activities in the PRC" under relevant PRC laws. This research report does not constitute a public offer of the security, whether by sale or subscription, in the PRC. Further, no legal or natural persons of the PRC may directly or indirectly purchase any of the security or any beneficial interest therein without obtaining all prior PRC government approvals or licenses that are required, whether statutorily or otherwise. Persons who come into possession of this research are required to observe these restrictions.

Notice to Canadian Investors: Under no circumstances is this research report to be construed as an offer to sell securities or as a solicitation of an offer to buy securities in any jurisdiction of Canada. Any offer or sale of the securities described herein in Canada will be made only under an exemption from the requirements to file a prospectus with the relevant Canadian securities regulators and only by Haitong International Securities (USA) Inc., a dealer relying on the "international dealer exemption" under National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations ("NI 31-103") in Alberta, British Columbia, Ontario and Quebec. This research report is not, and under no circumstances should be construed as, a prospectus, an offering memorandum, an advertisement or a public offering of any securities in Canada. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed upon this research report, the information contained herein or the merits of the securities described herein and any representation to the contrary is an offence. Upon receipt of this research report, each Canadian recipient will be deemed to have represented that the investor is an "accredited investor" as such term is defined in section 1.1 of National Instrument 45-106 Prospectus Exemptions or, in Ontario, in section 73.3(1) of the Securities Act (Ontario), as applicable, and a "permitted client" as such term is defined in section 1.1 of NI 31-103, respectively.

Notice to Singapore investors: This research report is provided in Singapore by or through Haitong International Securities (Singapore) Pte Ltd ("HTISSPL") [Co Reg No 201311400G. HTISSPL is an Exempt Financial Adviser under the Financial Advisers Act (Cap. 110) ("FAA") to (a) advise on securities, units in a collective investment scheme, exchange-traded derivatives contracts and over-the-counter derivatives contracts and (b) issue or promulgate research analyses or research reports on securities, exchange-traded derivatives contracts and over-the-counter derivatives contracts. This research report is only provided to institutional investors, within the meaning of Section 4A of the Securities and Futures Act (Cap. 289). Recipients of this research report are to contact HTISSPL via the details below in respect of any matters arising from, or in connection with, the research report:

Haitong International Securities (Singapore) Pte. Ltd.

10 Collyer Quay, #19-01 - #19-05 Ocean Financial Centre, Singapore 049315

Telephone: (65) 6536 1920

Notice to Japanese investors: This research report is distributed by Haitong International Securities Company Limited and intended to be distributed to Financial Services Providers or Registered Financial Institutions engaged in investment management (as defined in the Japan Financial Instruments and Exchange Act ("FIEL") Art. 61(1), Order for Enforcement of FIEL Art. 17-11(1), and related articles).

Notice to UK and European Union investors: This research report is distributed by Haitong International Securities Company Limited. This research is directed at persons having professional experience in matters relating to investments. Any investment or investment activity to which this research relates is available only to such persons or will be engaged in only with such persons. Persons who do not have professional experience in matters relating to investments should not rely on this research. Haitong International Securities Company Limited's affiliates may have a net long or short financial interest in excess of 0.5% of the total issued share capital of the entities mentioned in this research report. Please be aware that any report in English may have been published previously in Chinese or another language.

Notice to Australian investors: The research report is distributed in Australia by Haitong International Securities (Singapore) Pte Ltd, Haitong International Securities Company Limited, and Haitong International Securities (UK) Limited in reliance on ASIC Corporations (Repeal and Transitional) Instrument 2016/396, which exempts those HTISG entities from the requirement to hold an Australian financial services license under the Corporations Act 2001 in respect of the financial services it provides to wholesale clients in Australia. A copy of the ASIC Class Orders may be obtained at the following website, www.legislation.gov.au. Financial services provided by Haitong International Securities (Singapore) Pte Ltd, Haitong International Securities Company Limited, and Haitong International Securities (UK) Limited are regulated under foreign laws and regulatory requirements, which are different from the laws applying in Australia.

Notice to Indian investors: The research report is distributed by Haitong Securities India Private Limited ("HSIPL"), an Indian company and a Securities and Exchange Board of India ("SEBI") registered Stock Broker, Merchant Banker and Research Analyst that, inter alia, produces and distributes research reports covering listed entities on the BSE Limited ("BSE") and the National Stock Exchange of India Limited ("NSE") (collectively referred to as "Indian Exchanges").

This research report is intended for the recipients only and may not be reproduced or redistributed without the written consent of an authorized signatory of HTISG.

http://equities.htisec.com/x/legal.html