

中国电子半导体 China (A-share) Technology Semiconductor

莱宝高科 MED 电子纸及面板级玻璃封装载板样品发布，新业务蓄势待发 Laibao Hi-Tech MED E-Paper and Glass PLP Samples Released, Awaiting Ramp up

赵方舟 Eugene Zhao

eugene.fz.zhao@htisec.com

蒲得宇 Jeff Pu, CFA

jeff.dy.pu@htisec.com

荆子淇 Michelle Jing

michelle.zq.jing@htisec.com

Evan Lee

evan.ny.lee@htisec.com

热点速评 Flash Analysis

(Please see APPENDIX 1 for English summary)

事件

我们与其他投资者于 11 月 18 日一同调研了位于深圳的莱宝高科 (002106 CH)，参观了公司 MED 电子纸及面板级玻璃封装载板两项新业务的最新产品，投资者普遍反馈积极，认为公司新产品竞争力优秀，未来发展空间广阔。

点评

公司简介: 公司当前主要业务是电容式触控屏及 TFT-LCD 面板/导电玻璃/彩色滤光片等。根据公司 2023 年报，电容式触控屏占收入 92.3%。当前公司基于传统业务积累的经验、技术和设备展开新业务投资和转型，开展了 **MED 电子纸** 和 **面板级玻璃封装载板** 两项新业务并已生产出样品展出。

MED 电子纸应用前景广阔，产品力优异: 2022 年建立中尺寸 MED 模组的中试线，已制作出多款样品正在进行客户验证推广使用。公司预计项目量产后年均营收可达 91.6 亿元。MED 样品在色彩饱和度上显著优于当前行业主流的电子纸产品，未来在电子书等产品的应用前景广阔。

面板级玻璃封装载板: 玻璃基板由于更好的稳定性、导热性、平整度及通孔密度等，有望代替目前主流有机载板（如 ABF 载板），成为 CPU/GPU 的先进封装载板材料。根据 Yole 预测，FOPLP（扇出型面板级封装）市场规模可从 2023 年 USD50m 增长到 2028 年 USD250m，CAGR 达 38%。公司基于 2.5 代 TFT-LCD 面板线和采购必要设备，已经自主/合作设计并制作出多款玻璃封装载板的测试样品，其中包括可应用于 Mini/MicroLED 显示的玻璃封装载板（MIP）以及可与 CPU/GPU 等芯片配套的具有 TGV 的面板级玻璃封装载板（PLP）。量产后有望广泛运用于 AI GPU 的先进封装。

估值: 公司公告 2024 年前 3 季度收入为 RMB44.14 亿元，同比+4.5%，净利润 3.09 亿元，同比+2%。目前公司股价对应约 1.5x 2024 PB，处于面板同业合理估值水平，如京东方（000725 CH）1.3x 2024 PB，维信诺（002387 CH）2.3x 2024 PB。另外公司股价对应约 21x 2024 PE，对比电子纸同业如元太（8069 TT）40x 2024 PE 估值水平较低。我们认为公司当前新业务进展顺利，产品竞争力优异，未来新产品放量后盈利和估值水平或将显著提升，估值或可高于同业水平。

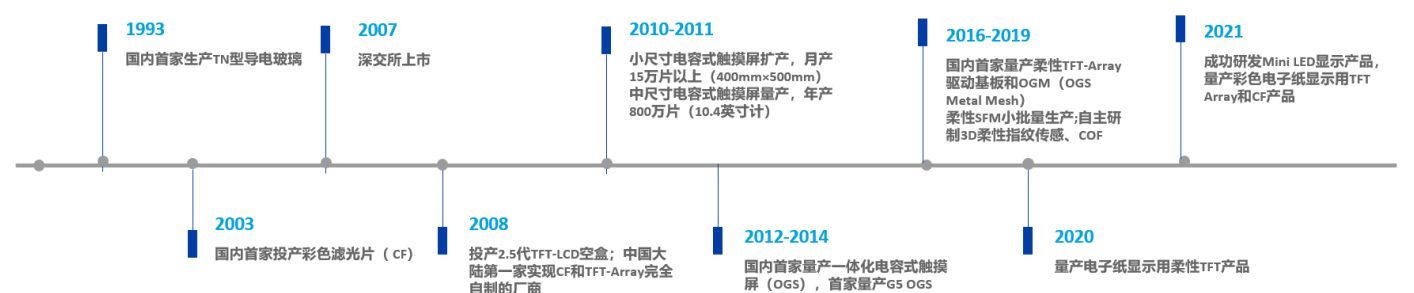
风险

1) 新产品研发进展不及预期。2) 客户推广验证情况不及预期。3) 市场竞争激烈。

公司简介:

深圳莱宝高科技股份有限公司成立于1992年7月21日，是专业研发和生产平板显示上游材料及触控器件的龙头厂商，2007年1月12日在深圳证券交易所上市（002106）。公司主导产品包括中小尺寸（10英寸以下为主）平板显示器件用ITO导电玻璃、彩色滤光片（CF）、TFT-LCD面板和电容式触摸屏（目前以中大尺寸产品为主，10-27英寸）。此外，公司2023年已实现多款中尺寸彩色微电腔电子纸显示器件（MED）的样品制造，并开始在整机品牌客户验证推广销售。另外公司也完成了面板级玻璃封装载板的样品制造，业务未来发展空间广阔。

图1 公司发展历程

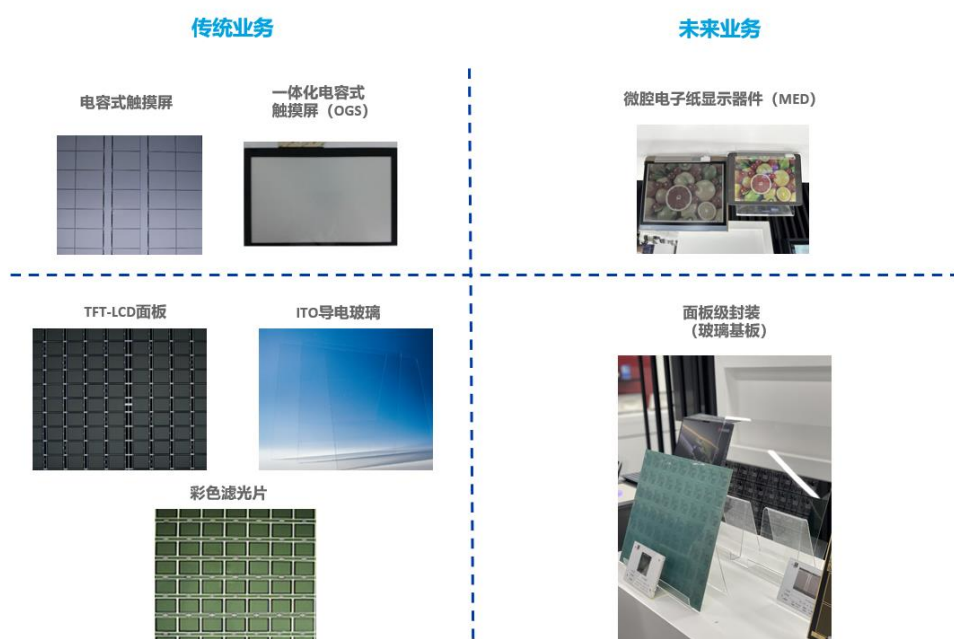


资料来源: 莱宝高科, HTI

主营业务:

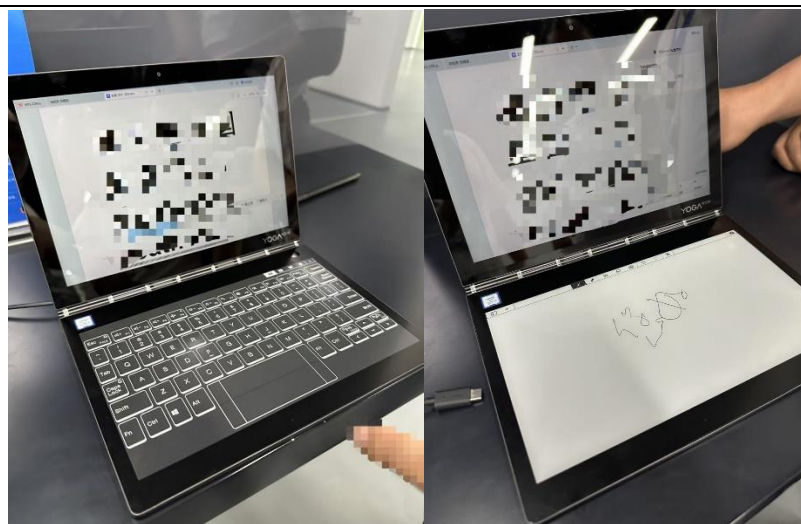
- 1. 电容式触摸屏 (占 FY23 营收 92.3%):** 公司拥有国内目前唯一一条批量生产的第5代触摸屏生产线, 包括全贴合电容式触摸屏 (中大尺寸 10-27 英寸为主) 以及一体化电容式触摸屏 (单体), 研发并量产采用多种柔性载板的 SFM 结构、AOFT 结构的触摸屏新产品。触摸屏产品最终用于平板电脑、触控笔记本电脑等 (如联想 YOGA Book 9i 双屏笔记本, 下屏可模拟键盘及手写触控板) 新兴消费类电子产品及车载触摸屏。
- 2. ITO 导电玻璃与 TFT-LCD 产品 (占 FY23 营收 2.2%):** 在中高档液晶显示器件用 ITO 导电玻璃 (10 英寸以下为主) 方面处于市场领先地位。TFT-LCD 面板仅有一条 2.5 代线, 主要以满足多品种、小批量的定制化订单, 市占率有限。
- 3. 彩色滤光片、触摸屏面板与盖板玻璃 (占 FY23 营收 2.6%):** 彩色滤光片以自用为主。
- 4. 中尺寸 TFT-LCM (占 FY23 营收 1.3%)**
- 5. 其他:** 一体化计算机 (AIO PC) 用触摸屏产品

图2 公司主要产品



资料来源：莱宝高科，HTI

图3 联想 YOGA Book 9i 双屏笔记本



资料来源：莱宝高科，HTI

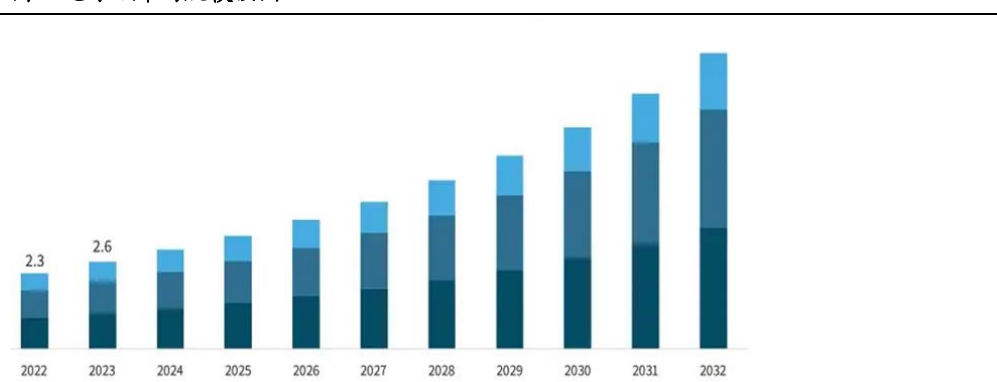
未来空间一：电子纸产品

1. 电子纸行业概况

电子纸是一种显示技术，也称为电子墨水（E-ink），不需要背光源而是利用环境光「反射」(reflective)，相较于一般背光模组或自体发光的显示器，具有轻薄、护眼、高对比度、可视角广等特性；此外，其「双稳态」(Bi-stability)特性让面板只有在更换影像资讯时才需耗电，因此耗电量非常低、待机时间特长，电子纸现在已广泛被应用在电子书、电子看板、数位标签、公车站牌等地方。

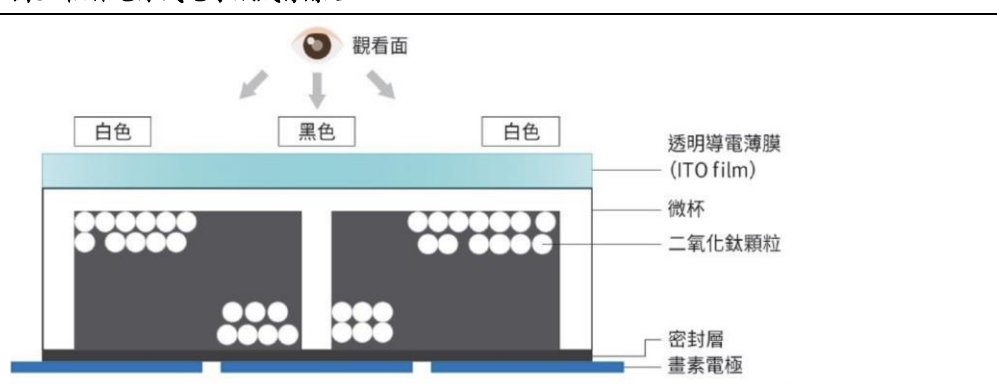
电子纸主要的应用产品可分为电子显示器和电子标签(Electronic Shelf Labels, ESL)，其中，电子书阅读器市场稳定，年销量略超千万台，近期增长来自于主流的黑白两色阅读器转换为彩色阅读器，受惠于彩色电子纸的解决方案越趋成熟。另一方面，电子标签则受益于商家及工厂端的渗透率逐步提升。值得注意的是，电子货架标签前几年受大型零售业者的青睐，除能够更清晰的显示商品名称、价格外，也方便产品资讯更新并节省人力成本及纸张浪费。电子纸显示器的市场规模正快速增长，根据研究机构GMI预估，电子纸2032年将增至90亿美元，期间CAGR为14.5%。

图4 电子纸市场规模预测



资料来源：Global Market Insights

图5 微杯电泳式电子纸成像原理



资料来源：科学月刊

市场目前以电泳式电子纸 (electrophoretic display, EPD) 为主流，原理是依据被施加的电场，带电颗粒/胶囊便会根据电极的正负而向上或向下移动，使像素显示出白色或黑色，再搭配黏滞系数较高的胶体，使染料粒子在介质中不易移动，达到断电时保持原画面的特性。电子墨水会涂布在一层塑胶薄膜上，再贴覆上薄膜电晶体(TFT)电路，经由驱动IC控制，形成像素图形，而彩色电子纸需要更多颜色粒子/胶囊或使用彩色滤光

片成像，需开发更精密的电场控制呈现不同的颜色。显示器搭配 TFT 主动式矩阵驱动的电子纸系统架构，是将薄膜贴合在 TFT 背板上。背板提供电路，快闪记忆体用于储存驱动波形对照表与影像，协助开机时将资料载入到 RAM 中，并将讯号推送至驱动 IC 使影像呈现出来。

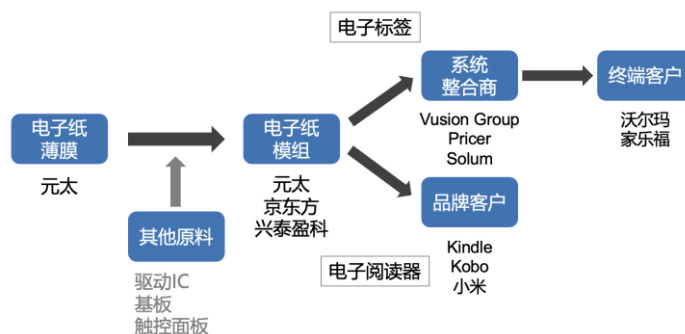
除了电泳显示技术外，还有胆固醇液晶(CH-LCD)、电湿润(EFD)、电浆显示(DES)等技术路线，其中友达转投资的虹彩光电致力开发胆固醇液晶的电子纸，受益于其大尺寸应用中明显的高刷新率及动态显示优势；另一方面，莱宝高科选择无锡威峰的电浆显示(DES)路线，而后改名微腔电子纸显示器(MED)项目，持续取信资本市场并努力拓展客户。

然而，考量显示稳定度及系统整合等实务方面，我们预计短期内电泳式阵营将持续成为市场主流。其一，元太的专利布局及策略，成为其护城河及市场壁垒，此外，元太不断扩大的技术联盟阵营及策略伙伴，持续推动其商业上的整合，产品导入更加顺利，元太已扩大技术联盟阵营至 BOE 京东方、TCL 华星、DKE 东方科脉、群创等一线面板大厂，合作推广彩色电子纸应用；最后，更大的终端产量也反应其定价权及获利能力上，元太的降本提效也将为后进者带来重重挑战。因此，新进者在进入市场时，除了需要拥有丰沛的财务资源协助市场份额取得，也需要与下游系统整合商通力合作，才有机会在寡占的电子纸市场开拓新的技术流派。

元太(8069 TT)成立于 1992 年，总部位于新竹。2004 年挂牌上柜，2023 年营收 271 亿新台币，营收组合：消费性电子(电子书阅读器、电子纸笔记本)46%、物联网应用及其他(电子货架标签)54%。元太不断透过并购合作伙伴及竞争对手达成供应链整合，并逐步垄断电子纸中上游，从 2005 年飞利浦电子纸部门开始，接着 2009 年并购 E-INK 开始量产电子墨水、2012 年收购同业达意(SiPix)取得微杯技术，因此手上握有电子纸核心专利，包括微胶囊、微杯、黑白墨水等，使其能够持续技术研发以拓展多元的市场应用，如三/四色电子墨水、彩色电子纸等。元太由于近乎垄断的行业地位，而享有约 50% 的毛利率，除电子薄膜、电子墨水及模块的本业销售外，公司也有固定的业外权利金收入。元太持续运用其行业地位协助推展新规格及新产品导入，如彩色阅读器、四色电子标签，也持续发展大尺寸数位看板业务。

元太现阶段掌握绝大部分客源与业务，产品开发多元，供应链完整且达到经济规模的量产，对手短时间难突围。然而，微腔电子纸显示器(MED)将以另一技术路线持续挑战，其简单的制程较微胶囊与微杯所需的复杂制程具有成本优势，但关键在于元太驱动黑白粒子的方法专利有效期限及未来的专利竞争，且目前技术发展尚未成熟。市场预期未来元太原先非主要的面板提供商，会考虑转向新阵营，并让电子纸薄膜的生产转移到面板厂一条龙式生产，进而逐步打破由元太一手垄断的行业格局。

图6 元太电子纸供应链



资料来源：HTI

2. 莱宝高科 MED 电子纸项目

微电腔显示（Micro Electric-Chamber Display，简称“MED”，又称“电浆显示”）属于微腔电子纸显示器件的类别，为电子纸的类型之一，是一种依靠反射环境光实现信息显示的反射式显示器件，无需背光源和偏光片，可实现双稳态（显示静态画面不耗电，仅在切换画面瞬间耗电）、纯反射、全彩色化电子纸、类纸张、高对比度、高分辨率、窄边框显示具有本质护眼、超低功耗、轻薄、户外观阅舒适等显著优点，但彩色显示画质不如 TFT-LCD 和 AMOLED 等主流显示面板，产品主要定位于彩色电子纸市场，涵盖大、中、小全尺寸系列，可应用于电子标签、彩色电子书包、彩色电子书阅读器、电子纸平板、扩展显示器、护眼显示器、电子看板、电子公交站牌、电子信息牌、电子白板、公共显示等多种终端应用领域。

该 MED 项目于 2023 年 10 月启动，预计建设期 24 个月。总投资 90 亿元其中注册资本为 55 亿元由莱宝高科出资 30 亿元及浙江湖州南浔地方政府出资 25 亿元，另 35 亿元来自银团贷款。新建玻璃载板月投片量 18 万平方米，制作产品尺寸涵盖 7.8 英寸至 55 英寸的微电腔显示屏（含触控显示一体化产品，属于微腔电子纸显示器件的类别，以代表尺寸 12.3 英寸折合月产 320 万块或以代表尺寸 31.2 英寸折合月产 50 万块）的生产线。公司利用现有 2.5 代 TFT-LCD 面板产线已自主掌握 MED 的驱动背板、反射式彩膜、灌浆、成盒、模组组装等全制程制作工艺技术并具备小尺寸 MED 产品量产能力。公司 2022 年建立中尺寸微电腔显示（MED）模组的中试线，已制作出多款微电腔显示屏的产品，正在进行客户验证推广使用。MED 产品中的关键材料电浆已取得无锡威峰科技 20 年 MED 专利长期授权许可和电浆材料长期供应保障。公司预计项目量产后年均营收可达 91.6 亿元。

图7 元太科技电子纸（左）与莱宝高科电子纸（右）对比



资料来源：莱宝高科，HTI

公司中尺寸 MED 产品已成功制作出多款样品，2025 年将小批量生产。如上图所示，公司 MED 样品在色彩饱和度上显著优于元太电子纸产品，提供了更好的显示视觉效果，未来量产后可大范围运用于电子书等产品。

未来空间二：面板级玻璃封装载板（PLP）

1. 扇出型面板级封装（FOPLP）行业概况：

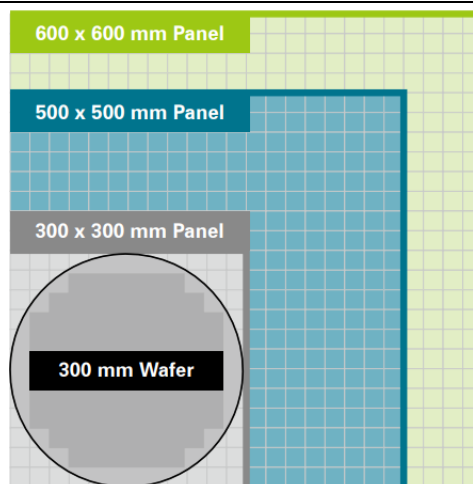
伴随人工智能、高性能计算的发展，未来封装工艺的发展方向正在转向 FOPLP（Fan-out panel-level packaging，扇出型面板级封装）。其中，扇入型（Fan-in）封装将芯片的 I/O 引脚控制在 die 的面积区域内，扇出型（Fan-out）封装将芯片的 I/O 口向外引出。我们认为，针对多引脚、高密度封装，扇出是最好的解决方法之一。晶圆级封装（WLP，Wafer-level packaging）一直用直径为 200mm 或 300mm 晶圆片作为 Carrier 进行封装，但由于最后的封装体是矩形的，圆形硅片不能提供最高的加工效率和最有效的面密度，而越大的芯片面积，圆形基板的使用效率越低。因此直接在更大面积的矩形面板上进行 FOPLP 将在性能的基础上有效降低成本。根据 Yole 数据，FOWLP（Fan-out wafer-level packaging，扇出型晶圆级封装）的面积利用率<85%，而 FOPLP 的面积使用率>95%。当晶圆级封装从 200mm 过渡到 300mm，节省成本约 25%；而从 300mm 晶圆过度到面板级封装，则能节约 66%成本。

图8 各类封装工艺比较



资料来源：亚智科技官网，HTI

图9 晶圆级 vs 面板级封装的比较

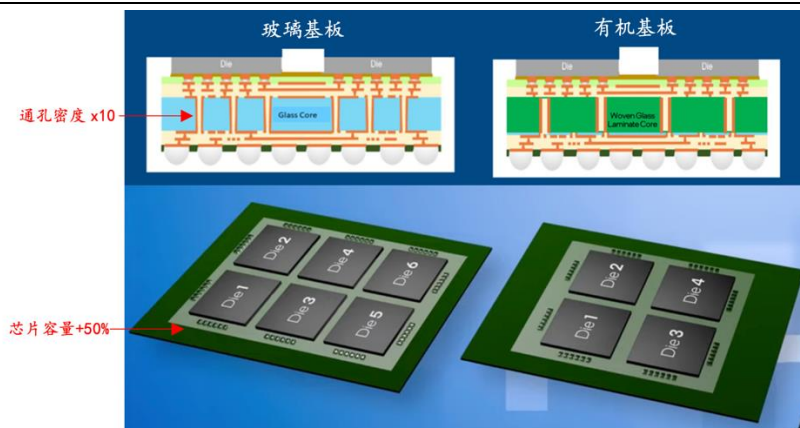


资料来源：亚智科技官网，HTI

1.1 玻璃载板的优势

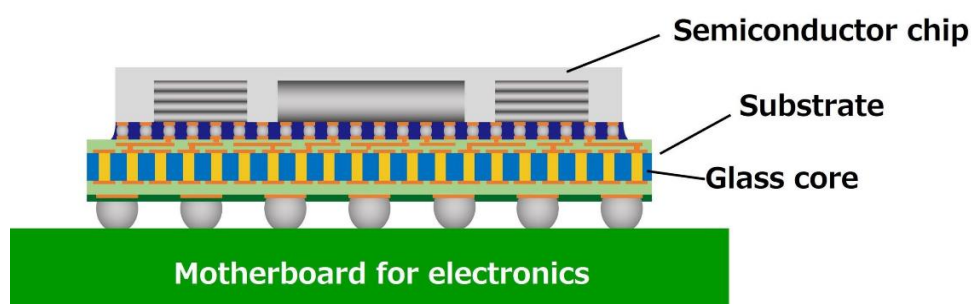
玻璃载板由于其优越的电气性能和机械性能开始代替传统的有机材料载板。玻璃载板拥有比传统载板更高的尺寸稳定性、表面平整度、和温度稳定性，使其有更高的通孔密度（是传统有机载板的10倍），更好的RDL布线，并且能更好的保障封装内元件的长期稳定性；玻璃材料拥有低介电常数与高电阻率，能带来更快的信号传输并减少传输损耗。

图10 英特尔玻璃载板 vs 有机载板



资料来源：英特尔，HTI

图11 DNP 玻璃载板



资料来源：DNP, HTI

TGV（玻璃通孔）是玻璃载板封装中的关键技术。相比传统 TSV，目前 TGV 的深刻蚀工艺不够成熟，主要难点有：1）玻璃刻蚀的精度/速率问题，传统激光、干、湿法刻蚀在平整度、垂直度、宽深比等表现各有其优劣；2）玻璃衬底上沉积/电镀工艺的难度，玻璃的表面相比硅等更不容易被金属粘附，容易导致金属层分层、卷曲等。

图12 玻璃载板/TGV 重要厂商研发生产进度

厂商	国家	进度
康宁	美国	拥有成熟的玻璃载板和 TGV 技术，能够为下游 IC 生产商提供 4-12 英寸、厚度 100-700 μm ，以及最大面积 500mm ² 的玻璃显示载板；TGV 孔径范围在 20-100 μm ，深宽比可以达到 10:1
肖特	德国	可以提供 Hermes 玻璃晶圆载板，采用 TGV 技术，可实现晶圆级芯片尺寸 (WLCSP) 的超小型化、全密封传感器和 MEMS 器件的封装
Mosaic Microsystems	美国	微电子和光子封装的 TGV 玻璃厂商，公司可在厚度小于 100 μm 玻璃上实现直径 15-35 μm 的定制 TGV 图案、填充、过孔和金属化
LPKF	德国	用于刻蚀 TGV 的激光诱导深度蚀刻技术 LPKF LIDE 已成功用于半导体行业玻璃载板量产
Samtec	美国	拥有超高密度 TGV 金属化和气密密封工艺，通孔直径最小为 40 μm ，通过位置精度为误差 5 μm ，总厚度变化为 15 μm
群创光电	中国台湾	拥有丰富的处理玻璃和防止其破损经验，可以生产 TGV 玻璃厚度范围为 100-200 μm ，孔径范围为 50-100 μm ，通孔间距为 100-300 μm

资料来源：公司公开信息整理，HTI

2. 莱宝高科面板级玻璃封装载板:

公司利用已有的 2.5 代 TFT-LCD 面板线及采购必要设备，已自主/合作设计并制作出多款玻璃封装载板的测试样品，其中包括可应用于 Mini/MicroLED 显示的玻璃封装载板（MIP）以及可与 CPU/GPU 等芯片配套的具有 TGV 的面板级玻璃封装载板（PLP），目前尚未量产。莱宝玻璃载板有望用于 CPU/GPU 领域，替代目前主流的有机载板（如 ABF 载板）。其中每块载板含 6.7 万个 TGV 玻璃通孔，能够链接上层的芯片和下方的 PCB 板，相比传统有机载板有更好的稳定性、导热性、平整度及通孔密度，芯片容量更大。

图13 莱宝高科玻璃封装载板（含 TGV）



资料来源：莱宝高科，HTI

同时公司也生产出玻璃材质的 FCBGA 封装基板样品也可用于 CPU/GPU 芯片封装。

图14 莱宝高科 FCBGA 封装基板

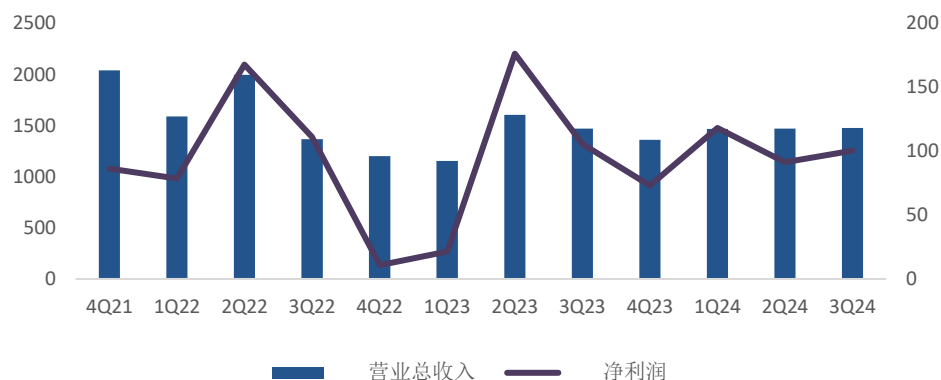


资料来源：莱宝高科，HTI

财务分析：

公司 FY23 营收 55.86 亿元，净利润 3.76 亿。3Q24 营收 14.77 亿，+0.5% QoQ/+0.4% YoY，净利润 0.98 亿，+5% QoQ/-7% YoY。FY24 前三季度累计营收 44.14 亿元，净利润 3.09 亿元。公司目前处于业务转型阶段，传统电容屏及 TFT-LCD 面板业务销量和单价承压，MED 电子纸和面板级玻璃封装基板等新业务仍处于样品阶段等待放量。目前公司 FY24/25 在 Wind 未有一致预测，3Q24 BPS 7.7 元对应 1.5x PB，处于同业合理估值水平，如京东方（000725 CH）1.3x 2024 PB，维信诺（002387 CH）2.3x 2024 PB。另外假设 4Q 净利润与 3Q 持平则 FY24 全年净利润约 4 亿元，对应 21x 2024 PE，对比电子纸同行如元太（8069 TT）40x 2024 PE 估值水平较低。我们认为公司当前新业务进展顺利，产品竞争力优异，未来新产品放量后盈利和估值水平或将显著提升，估值或可高于同业水平。

图15 莱宝高科营收及净利润情况（单位：百万元）



资料来源：莱宝高科，HTI

APPENDIX 1

Summary

Event: We conducted a field trip to Laibao Hi-Tech (002106 CH) in Shenzhen on November 18th with investors, where we visited the company's latest products in two new business areas: MED electronic paper and panel-level glass substrates. Investors feedback was positive, agreeing that company's new products are highly competitive and have huge potential.

Company Overview: The company's current main business is capacitive touch screens and TFT-LCD panels/conductive glass/color filters, etc. According to the company's 2023 annual report, capacitive touch screens account for 92.3% of revenue. Currently, the company is transitioning to new businesses based on the experience, technology, and equipment accumulated from traditional businesses, developed samples of MED electronic paper and panel-level glass packaging substrates as two new businesses.

MED Electronic Paper with Broad Application Prospects and Excellent Performance: In 2022, the company established a pilot line for medium-sized MED modules and has produced several samples that are currently undergoing customer validation and promotion. The company estimates that after MP, the project can achieve an annual run rate of 9.16 billion yuan. The MED samples significantly outperform the current mainstream electronic paper products in color saturation, indicating broad application prospects in products such as e-books.

Panel-Level Glass Packaging Substrates: Glass substrates, due to their better stability, thermal conductivity, flatness, and via density, are expected to replace the current mainstream organic substrates (such as ABF substrates) and become advanced packaging substrate materials for CPUs/GPUs. According to Yole's forecast, the FOPLP (Fan-Out Panel-Level Packaging) market size could grow from USD 50 million in 2023 to USD 250 million in 2028, with a CAGR of 38%. The company, based on its 2.5-generation TFT-LCD panel line and the purchase of necessary equipment, has independently/cooperatively designed and produced several test samples of glass packaging substrates, including glass packaging substrates for Mini/MicroLED displays (MIP) and panel-level glass packaging substrates (PLP) with TGV that can be matched with CPUs/GPUs and other chips. After MP, it is expected to be widely used in advanced packaging of AI GPUs.

Valuation: The company announced a revenue of RMB 4.414 billion for the first three quarters of 2024, an increase of 4.5% YoY, and a net profit of 309 million yuan, an increase of 2% YoY. Currently, the company's stock price trades at 1.5x 2024 PB at a reasonable valuation level compared to its panel industry peers, such as BOE Technology (000725.CH) at 1.3x 2024 PB and Visionox (002387 CH) at 2.3x 2024 PB. Additionally, the company's stock price trades at 21x 2024 PE lower than its electronic paper peers such as E Ink (8069 TT) at 40x 2024 PE. We believe that the company's current new business is progressing smoothly, with excellent product competitiveness, and profitability and valuation may significantly improve or even exceed peers' valuations after the new products ramp up.

Risks: 1) The progress of new product development is not as expected. 2) Customer promotion and validation do not meet expectations. 3) Intense market competition.

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，赵方舟，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。我和我的家属 (我已经告知他们) 将不会在本研究报告发布后的 3 个工作日内交易此研究报告所讨论目标公司的证券。I, Eugene Zhao, 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. I and my household, whom I have already notified of this, will not deal in or trade any securities in respect of the issuer that I review within 3 business days after the research report is published.

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。我和我的家属 (我已经告知他们) 将不会在本研究报告发布后的 3 个工作日内交易此研究报告所讨论目标公司的证券。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. I and my household, whom I have already notified of this, will not deal in or trade any securities in respect of the issuer that I review within 3 business days after the research report is published.

我，荆子洪，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。我和我的家属 (我已经告知他们) 将不会在本研究报告发布后的 3 个工作日内交易此研究报告所讨论目标公司的证券。I, Michelle Jing, 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. I and my household, whom I have already notified of this, will not deal in or trade any securities in respect of the issuer that I review within 3 business days after the research report is published.

我，Evan Lee，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。我和我的家属 (我已经告知他们) 将不会在本研究报告发布后的 3 个工作日内交易此研究报告所讨论目标公司的证券。I, Evan Lee, 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. I and my household, whom I have already notified of this, will not deal in or trade any securities in respect of the issuer that I review within 3 business days after the research report is published.

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).

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。

评级分布 Rating Distribution

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

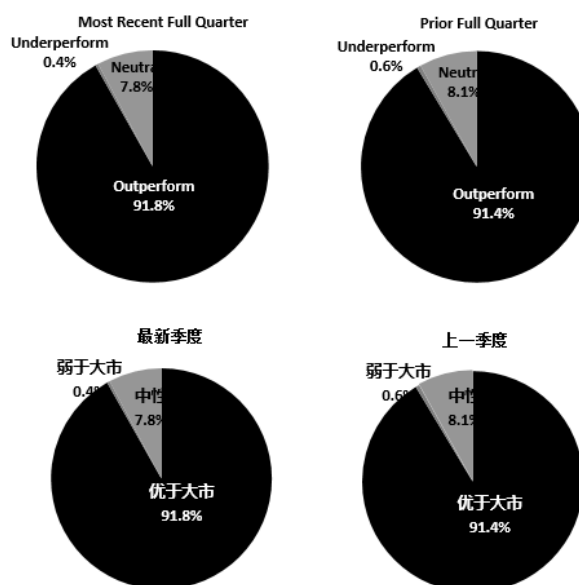
Outperform: The stock's total return over the next 12-18 months is expected to exceed the return of its relevant broad market benchmark, as indicated below.

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.

Ratings Distribution



截至 2024 年 9 月 30 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	91.8%	7.8%	0.4%
投资银行客户*	3.5%	4.4%	0.0%

*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 September 30, 2024

	Outperform	Neutral (hold)	Underperform
HTI Equity Research Coverage	91.8%	7.8%	0.4%
IB clients*	3.5%	4.4%	0.0%

*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.

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。对公司的评估结果仅供参考，并不构成对任何个人或机构投资建议，也不能作为任何个人或机构购买、出售或持有相关金融产品的依据。本公司不对任何个人或机构投资者因使用本数据表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 disclaimer 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. (“HTIJK”), 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, HTIJK 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策。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。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”) 于新加坡提供。HTISSPL 是符合《财务顾问法》2001 (“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》2001 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

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

电话: (65) 6713 0473

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。

研究机构名称: Haitong Securities India Private Limited

SEBI 研究分析师注册号: INH000002590

地址: 1203A, Floor 12A, Tower 2A, One World Center

841 Senapati Bapat Marg, Elphinstone Road, Mumbai 400 013, India

CIN U74140MH2011FTC224070

电话: +91 22 43156800 传真: +91 22 24216327

合规和申诉办公室联系人: Prasanna Chandwaskar; 电话: +91 22 43156803; 电子邮箱: prasanna.chandwaskar@htisec.com

“请注意, SEBI 授予的注册和 NISM 的认证并不保证中介的表现或为投资者提供任何回报保证”。

本项研究仅供收件人使用, 未经海通国际的书面同意不得予以复制和再次分发。

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”). HTISSPL is an Exempt Financial Adviser under the Financial Advisers Act 2001 (“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 2001. 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) 6713 0473

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").

Name of the entity: Haitong Securities India Private Limited

SEBI Research Analyst Registration Number: INH000002590

Address : 1203A, Floor 12A, Tower 2A, One World Center

841 Senapati Bapat Marg, Elphinstone Road, Mumbai 400 013, India

CIN U74140MH2011FTC224070

Ph: +91 22 43156800 Fax:+91 22 24216327

Details of the Compliance Officer and Grievance Officer : Prasanna Chandwaskar : Ph: +91 22 43156803; Email id: prasanna.chandwaskar@htisec.com

"Please note that Registration granted by SEBI and Certification from NISM in no way guarantee performance of the intermediary or provide any assurance of returns to investors".

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.

Copyright: Haitong International Securities Group Limited 2019. All rights reserved.

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