



德律科技股份有限公司
www.tri.com.tw

Nov. 26, 2021

報告人：陳冠元/財務長兼代理發言人

德律科技股份有限公司



- 成立時間：1989年4月10日
- 創立人：陳玠源董事長
- 資本額：新台幣23.62億



主力產品: 電路板組裝檢測設備



☆ 自動光學檢測設備(IT/Image Tester)

- ☆ 錫膏自動光學影像檢測機(SPI)
- ☆ 自動光學影像檢測機(AOI)
- ☆ X-ray自動檢測機(AXI)

☆ 電路板測試機(BT/In-Circuit Board Tester)

- ☆ 組裝電路板測試機(MDA)
- ☆ 全功能電路板自動測試機(ICT)

全球唯一“一條龍”電路板組裝檢測設備廠

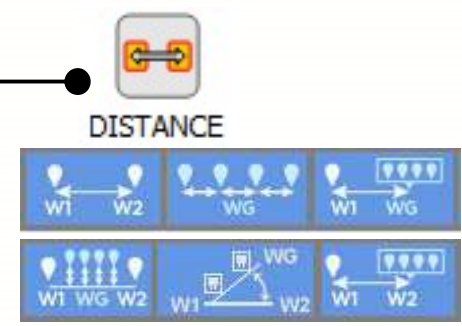
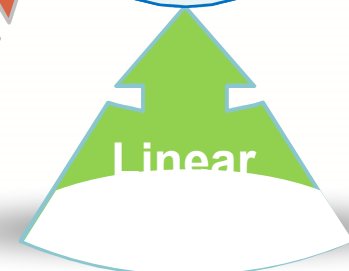
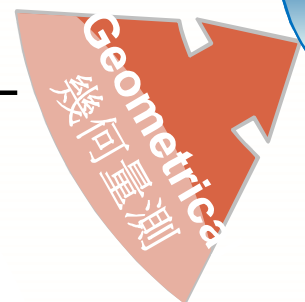
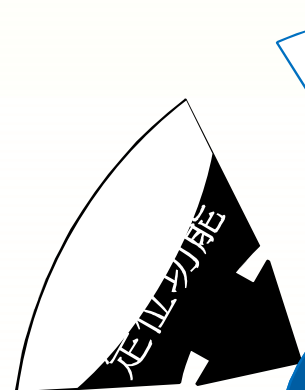


德律產品在客戶的電路板組裝產線的應用



整合多項視覺核心新技術 因應:

- 高精密電子料件量測需求
- 先進半導體製程/封裝檢測需求



主要競爭對手



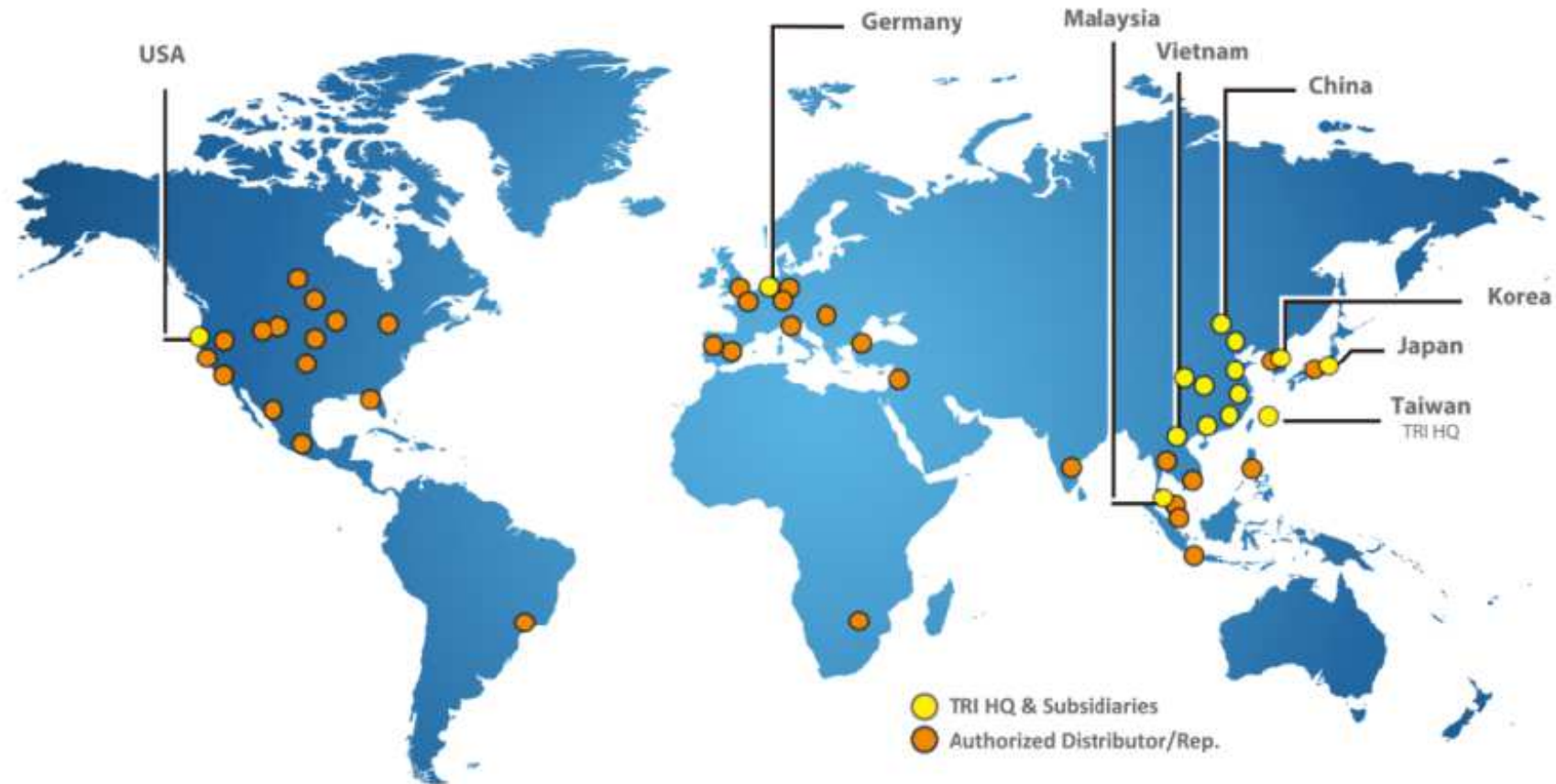
- 韓國: Koh Young
- 日本: Omron
- 中國大陸: Jutze/Sinic-Tek/Holly
- 馬來西亞: Vitrox
- 美國: Keysight/Teradyne
- 德國: Viscom/SPEA

全球銷售服務網

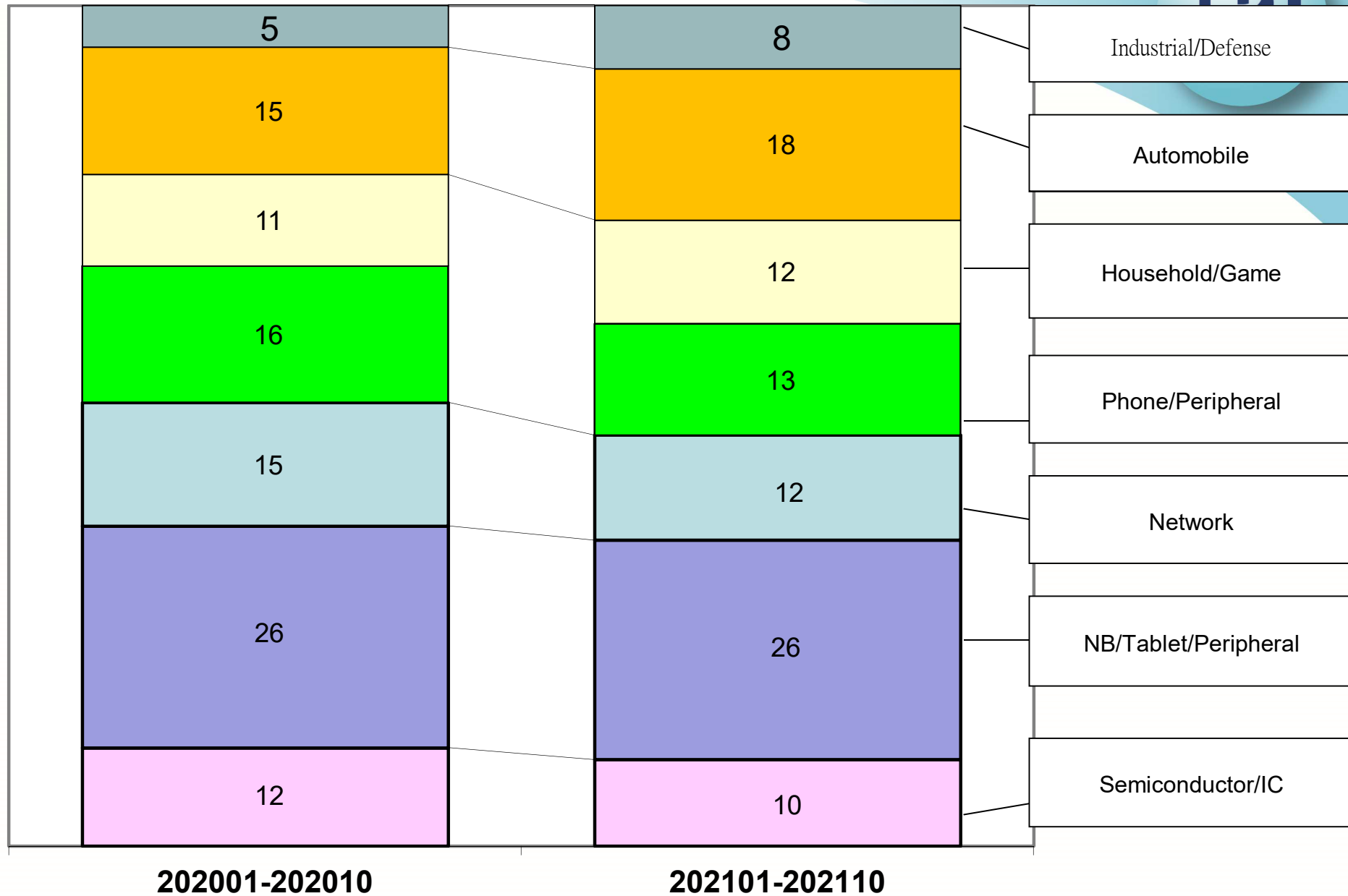


More than 3000 customers have been serviced
through worldwide partners
More than 50 distributors and Rep. worldwide.

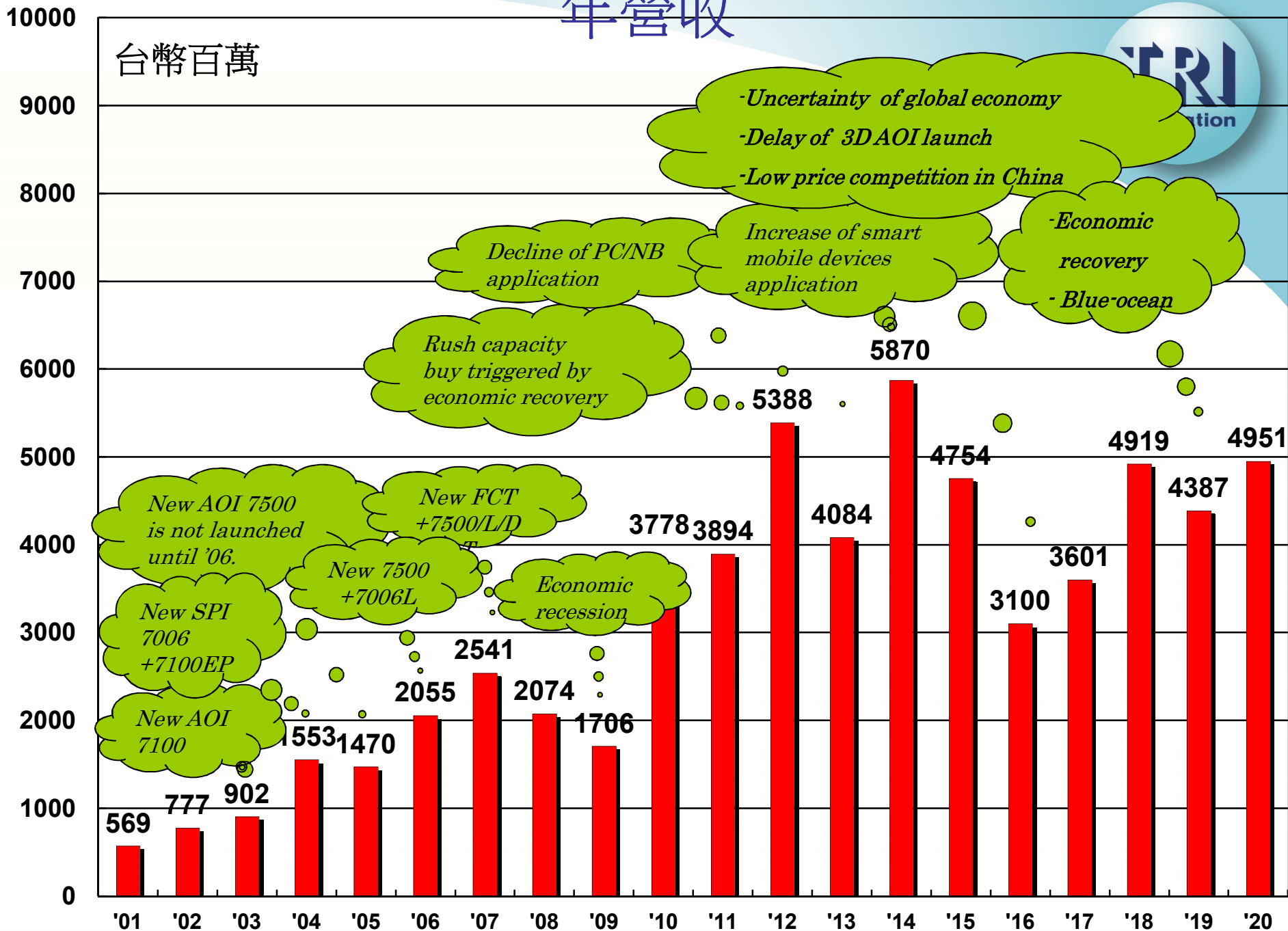
主要客戶為全球各大電子產品組裝廠



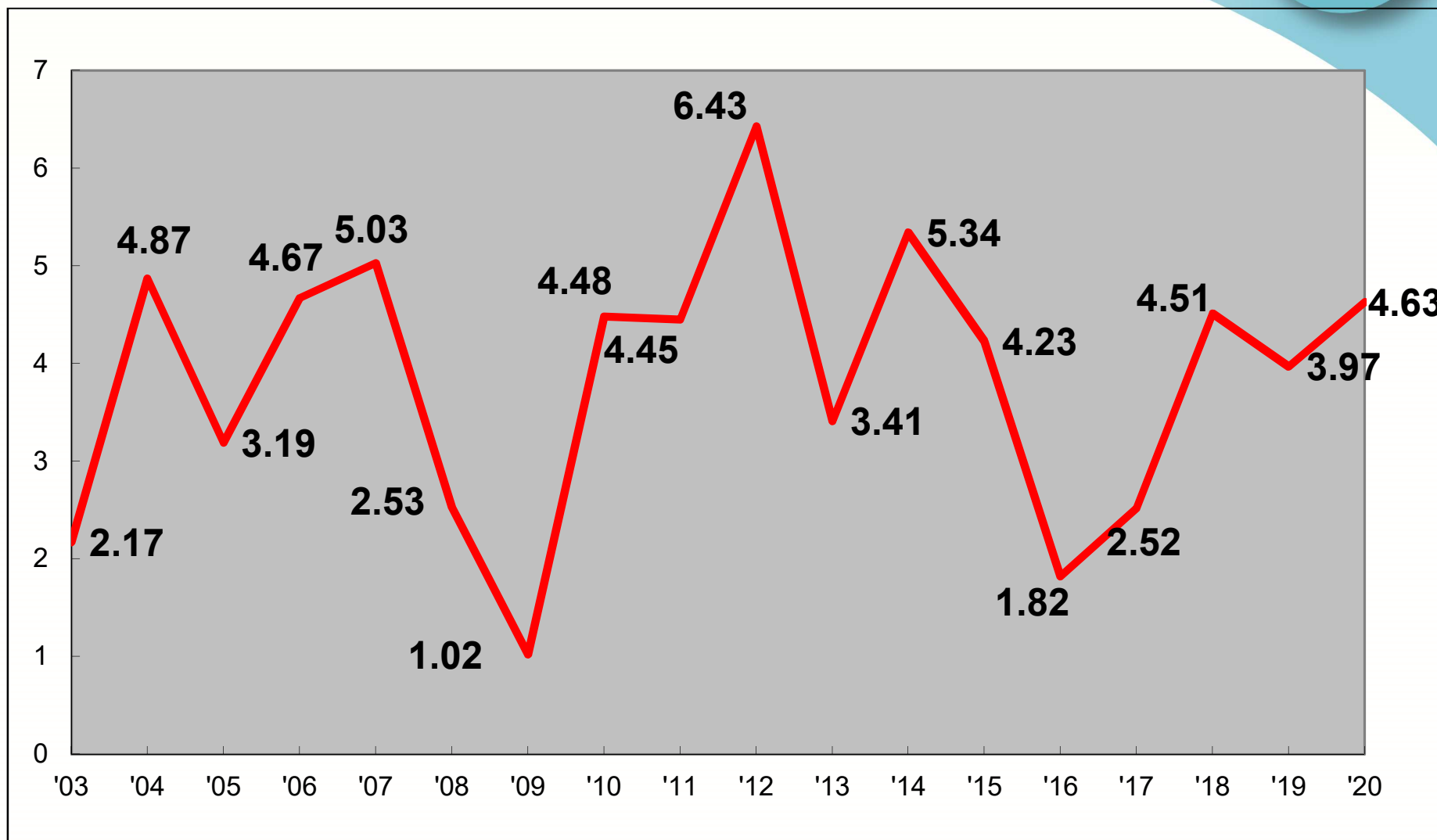
Electronic Industry/Revenue Movement



年營收



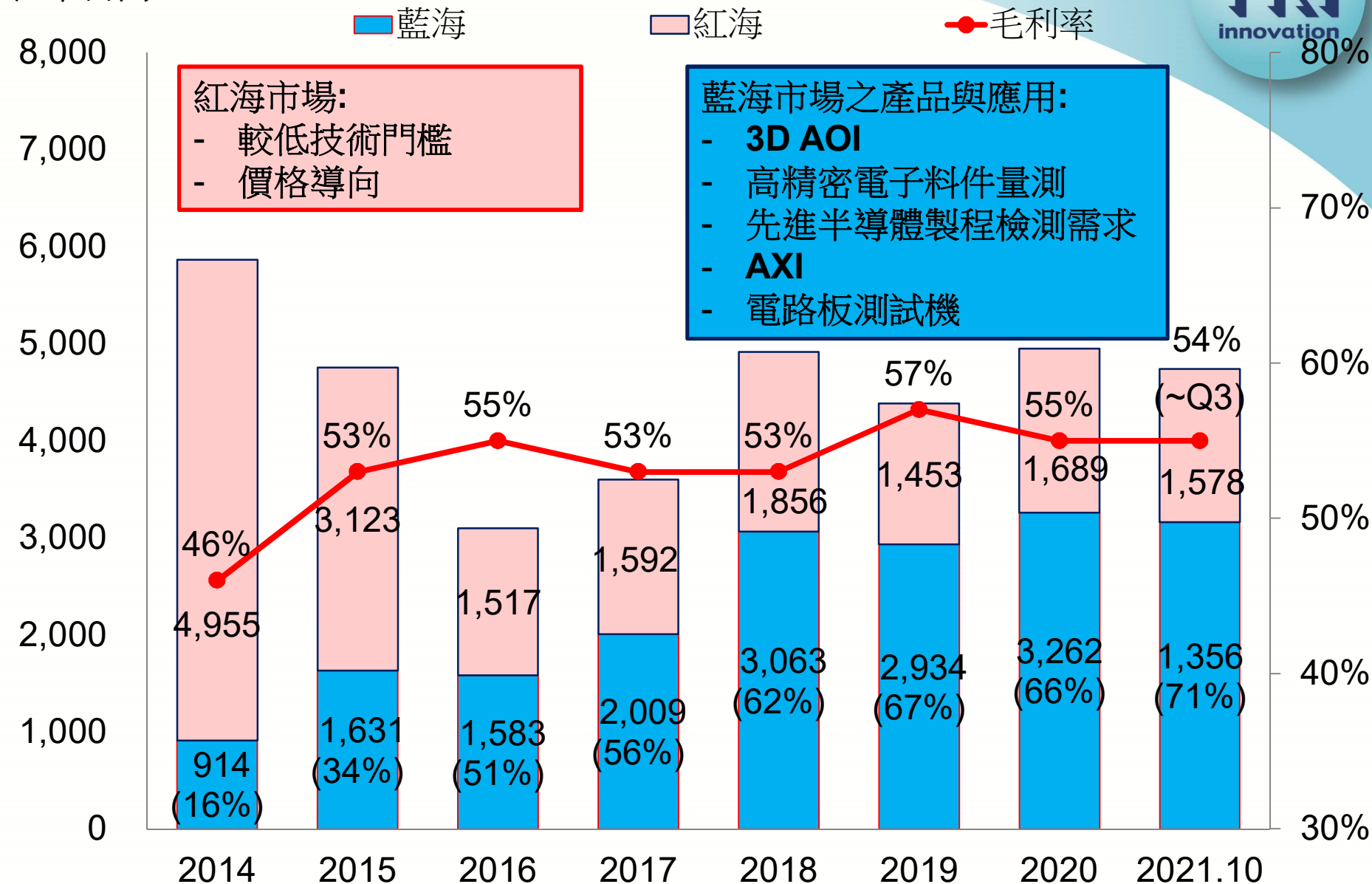
每股盈餘



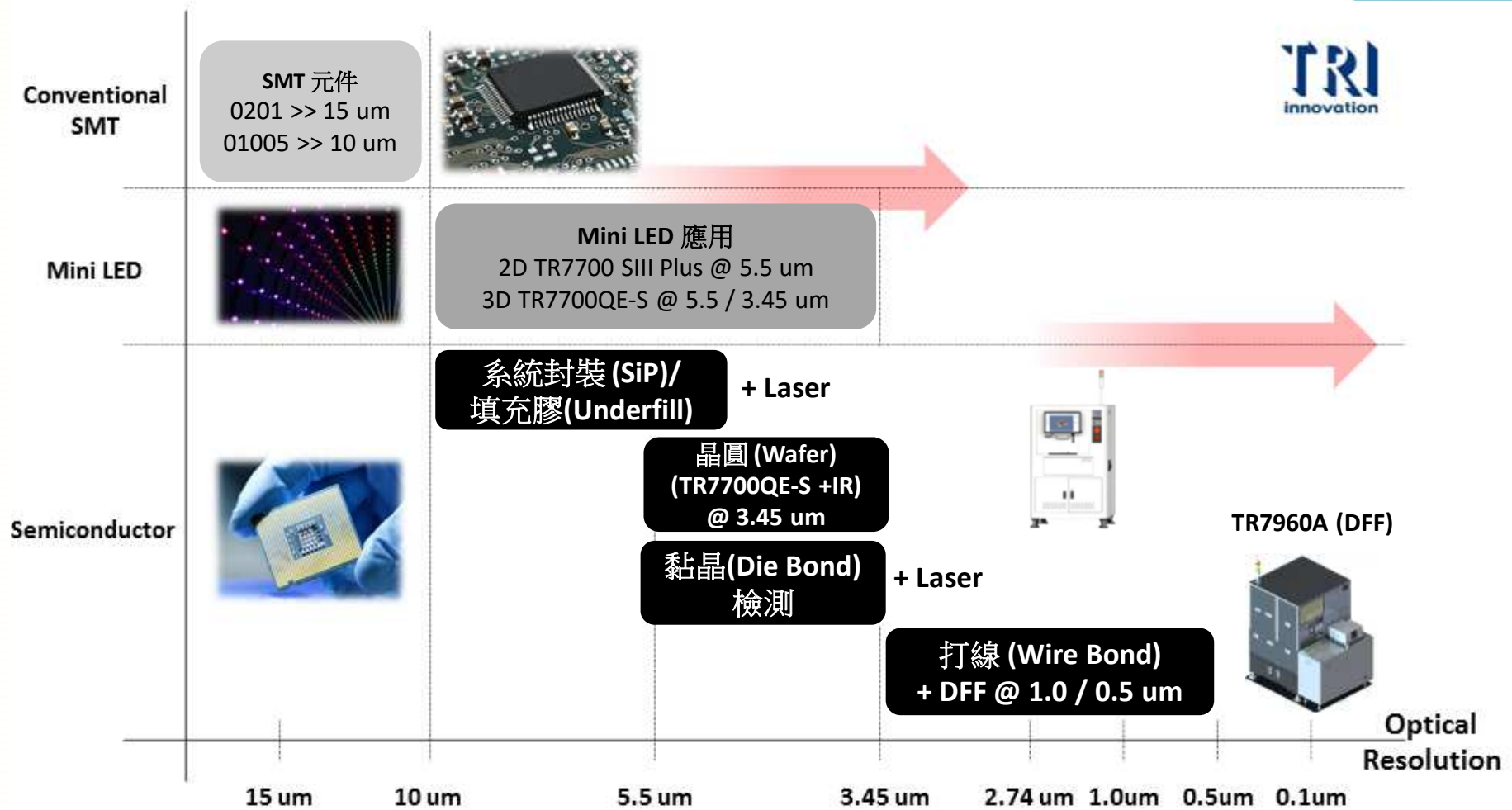
紅海與藍海市場營收變化



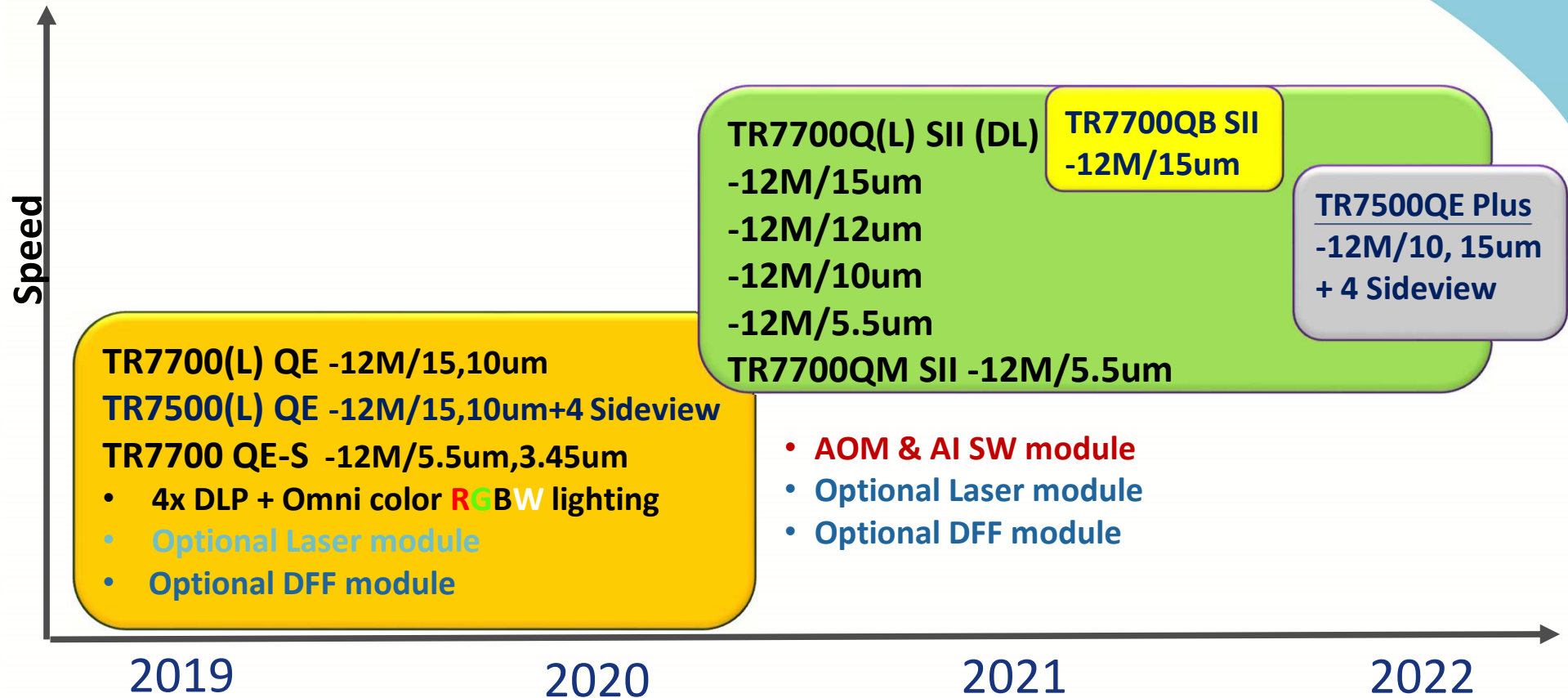
台幣百萬



TRI 3D AOI Product Roadmap



TRI 3D AOI Product Roadmap



NEW

TR7700Q SII 3D AOI 特點



**Industry-Leading Inspection
Speed up to 57 cm²/sec**



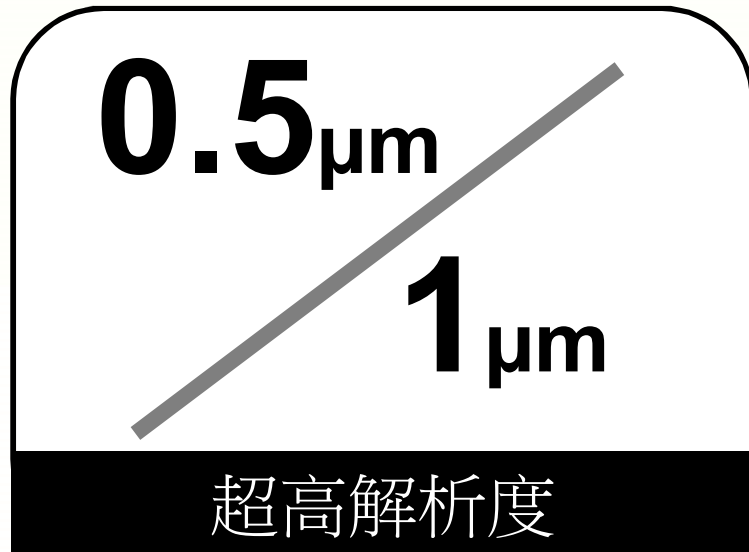
**Ease of Programming with
TRI's Smart Library**



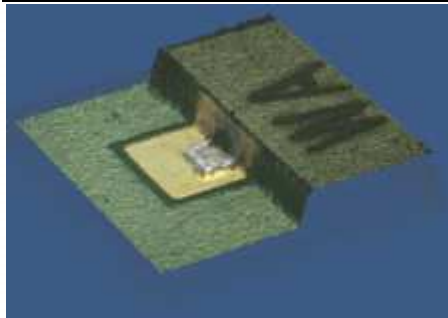
**Multiple 3D Technologies:
Zero-escapes Inspection**



升級 DFF 3D 科技



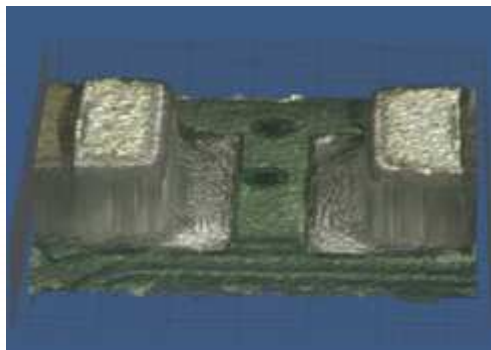
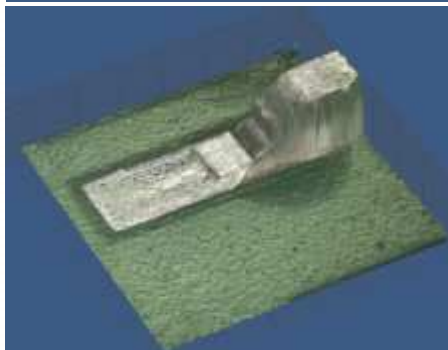
- Optimal **focus** position
- **Clearer** 2D Images
- **Sharper** images
- **Shadow-free** 3D Image



SMT
- 錫點
(Solder joint)



Semiconductor
- 打線接合
(Wire bond)



TR7700QE-S 3D AOI 特點



NEW



**Supports 3.45 / 5.5um
Ultra High Resolution**

可支援半導體封裝等級檢測應用:

貼片元件 (SMD)

表面凸塊 (Bump)

黏晶/打線接合 (Die / Wire Bonding)

填充膠 (Underfill)



TRI's SPI 最新應用項目



Fast Inspection Speed



Large FOV

CoaXpress Technology

Dynamic Imaging

Stop & Go Imaging

Precision Inspection

5.5 μm

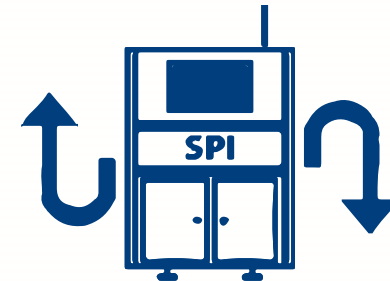
High Resolution

Shadow Free

Smart Warpage Technology

High Inspection Range

Smart Factory



Closed Loop

IPC-CFX

Smart Library

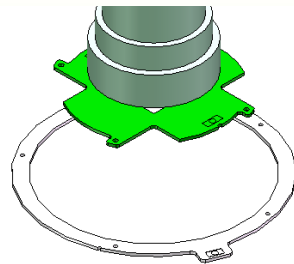
YMS 4.0

TR7007D/Q Plus Series SPI

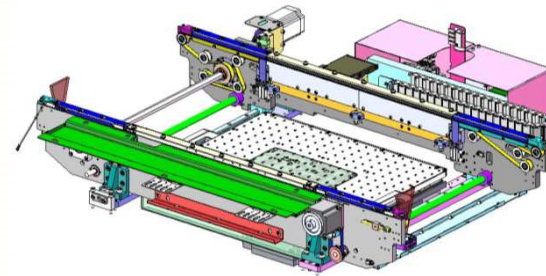


新應用特點

Improved Inspection Stability and Capability



**Enhanced 2D Light
Improved Imaging**

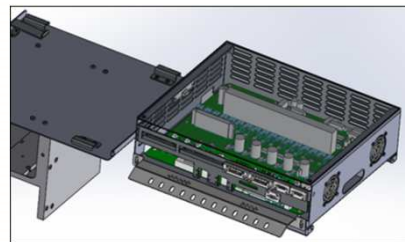


**Full Size Support Pin
(Optional)**

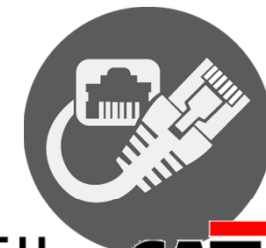
Easy Maintenance



New Log Interface



**Easy hardware
Upgrading design**



EtherCAT®

NEW Motion Controller

完備的3D在線型 AXI



NEW



TR7600(LL/TL) SIII

TRI新一代具指標性的在線型PCBA檢測解決方案。結合了業界最快速的高解析取像速度，並在先進的自動X光檢測中大大提升了影像品質。

NEW



TR7600F3D(LL) SII

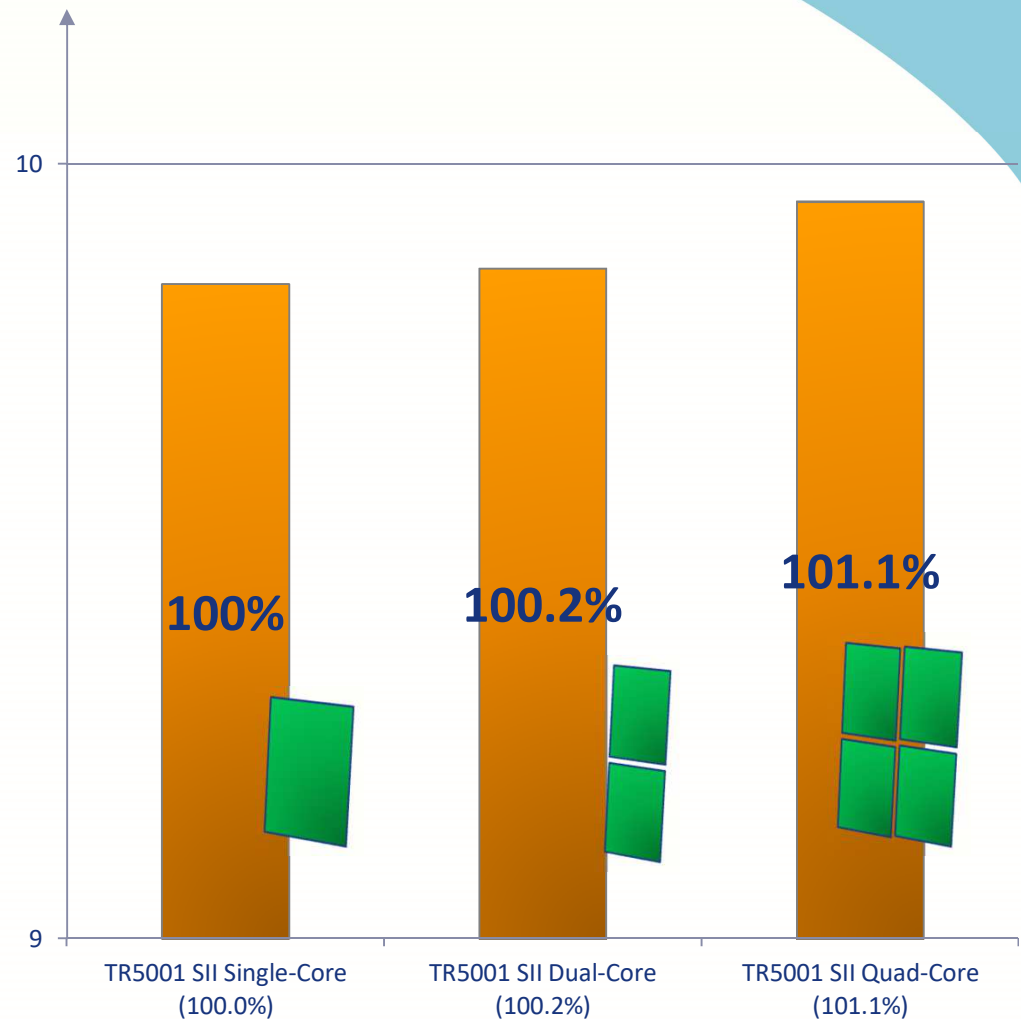
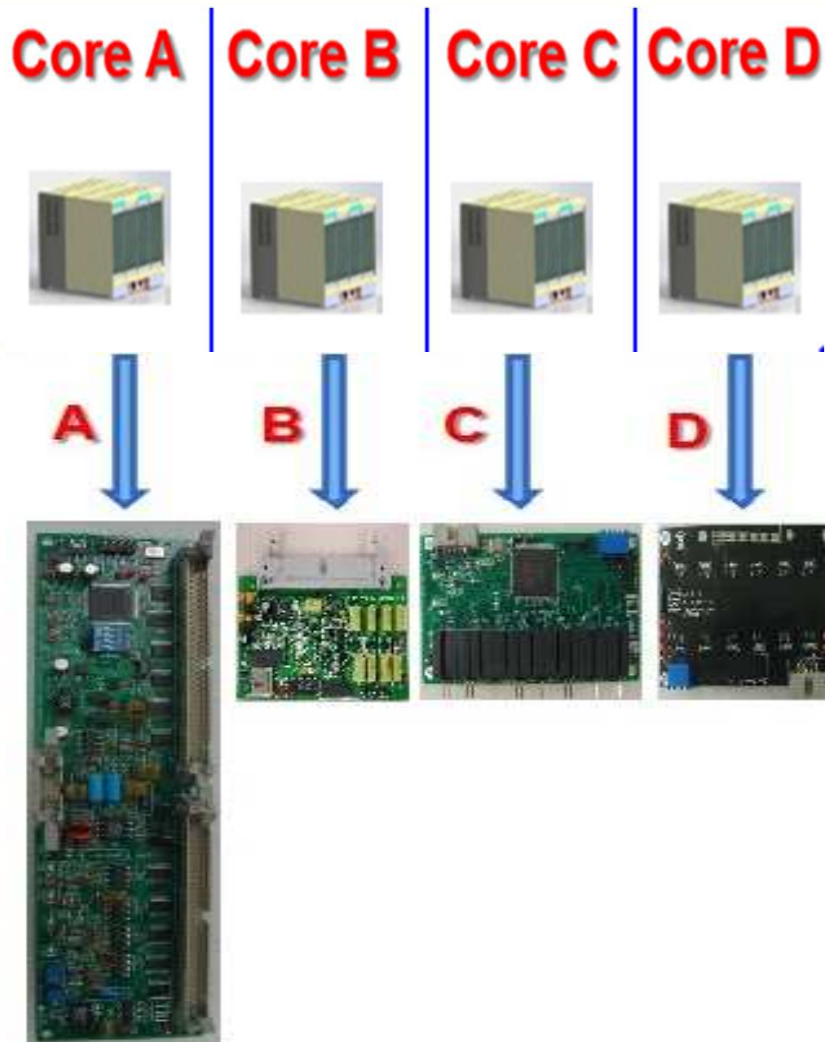
大幅提升檢測速度的高解析度在線型3D AXI，並可應用CT電腦斷層掃描科技，專門用於檢測需要高影像品質的組裝電路板和軟板組件。

電路板測試機-多核心配置



TR5001 SII Quad-code System

單核心與多核心測試時間比較



高密度測試點數ICT TR8100H SII / TR8100HL SII



Original Model	Test Points.	New SII Model
TR8100LV	3584 pins	7056 pins
TR8100LLV	5632 pins	11088 pins



TRI 整合完整的解決方案



**multiOptical
Multi-Sensing**

An icon of a red Swiss Army knife with various tools extended, symbolizing multi-functional sensing capabilities.

**Metrology
AOM**

OMM
OIMM

**2D/3D
AOI & AVI**

A hand pointing to the word 'Defect' written on a chalkboard, illustrating defect detection in AOI/AVI systems.

Industry 4.0

Icons representing Industry 4.0: a crane, a car, a robotic arm, and a server tower, with a numbered sequence 1, 2, 3, 4 below them.

Hermes/CFX

SECS/GEM

A diagram showing the SECS/GEM architecture. It includes a 'Manufacturer System' with a 'MES System SECS/GEM Host' and 'Equipment Hardware & Software' with a 'GEM Interface'. An arrow labeled 'protocol' connects the MES system to the GEM interface.

**TRI
AOI**

An icon of a human head profile filled with circuitry and the letters 'AI', with a neural network diagram below it, representing artificial intelligence.

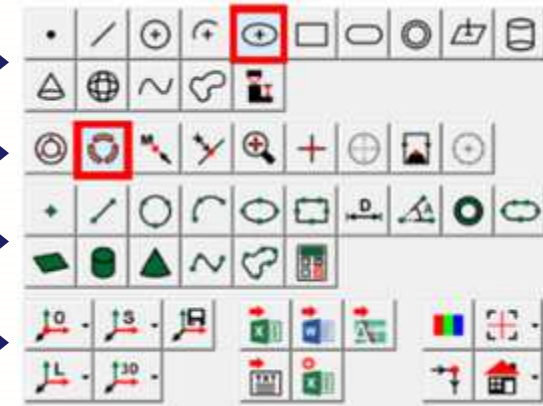
全新TRI量測功能(AOM)



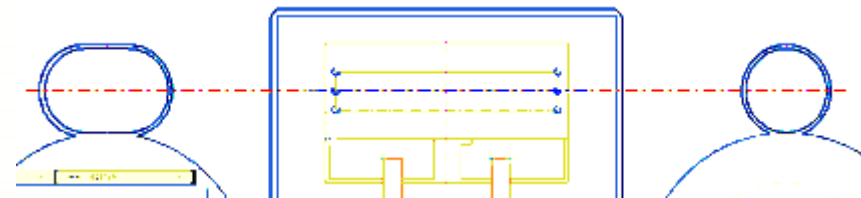
- ❖ UI: New designed and friendly user interface



- ❖ Features: More complete measurement functions will be available



- ❖ High Flexibility: Multi-Layer measurements





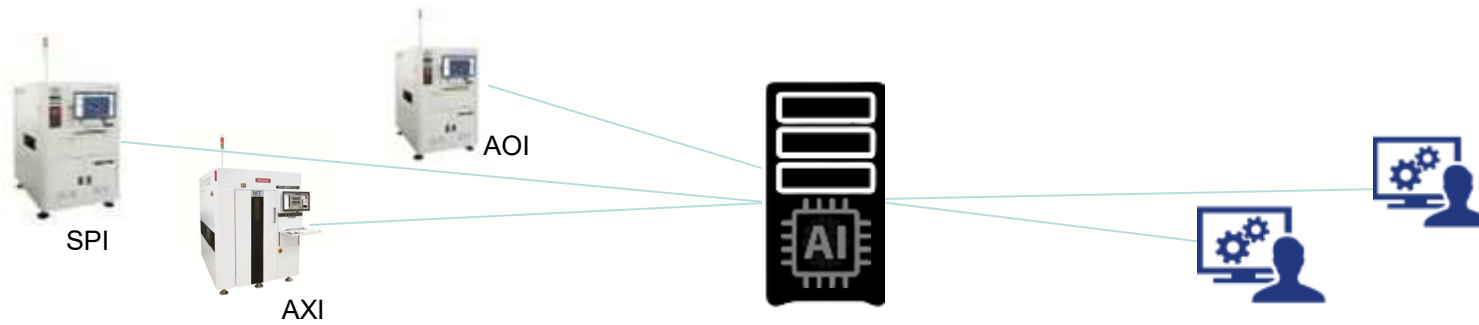
TRI的AI應用

檢測階段

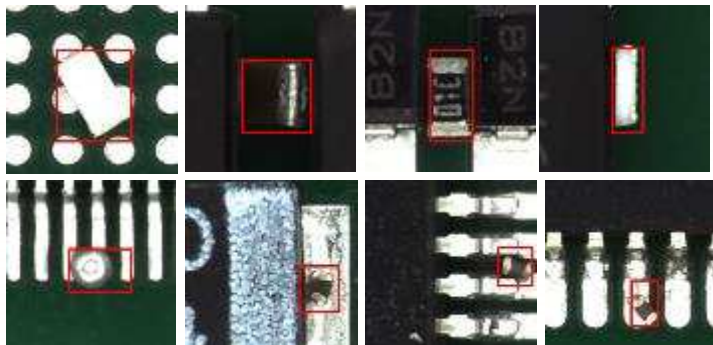
缺陷檢測/ 字元識別/ 視覺檢測/ 量測輔助
優點：提高檢測品質，減少誤判

複判階段

維修站缺陷分類和複檢
優點：減少人工複檢的工作量



TRI 檢測解決方案



TRI AI 工作站

維修/複判站

Std-Img	Insp-Img	Gray-Img	Edge	Line	Original Type	Result Type
					Missing Parts	Tombstone
					Billboard	Missing Parts
					Billboard	Missing Parts
					Billboard	Billboard

TRI的AI應用



1. AI 智慧編程 (Smart Programing)
2. AI 工作站:伺服器-終端架構的 AI 檢測及調試
3. AI 智能複判主機 (Verify Host):
AI 維修/複判站(Repair Station) 管理
4. AI 檢測:
 - 字元辨識 (OCV/OCR)
 - 瑕疵檢測
 - 待測物外觀檢測
 - 異物檢測

TRI AI 發展歷程及規劃藍圖



AI 發展藍圖:



❖ 快速發展

- ❖ 取得商用化元件資料庫
- ❖ 外部合作單位

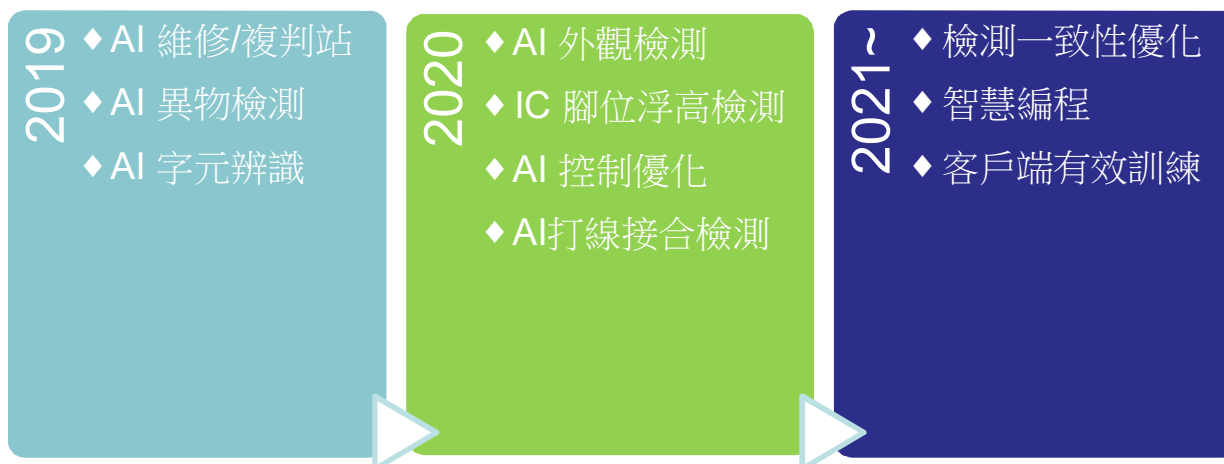
❖ 技術紮根

- ❖ 採用開源 (Open-source) 方案
- ❖ 推論/訓練 伺服器
- ❖ 發展更快速及更精確檢測方案

❖ 無人化 AOI應用

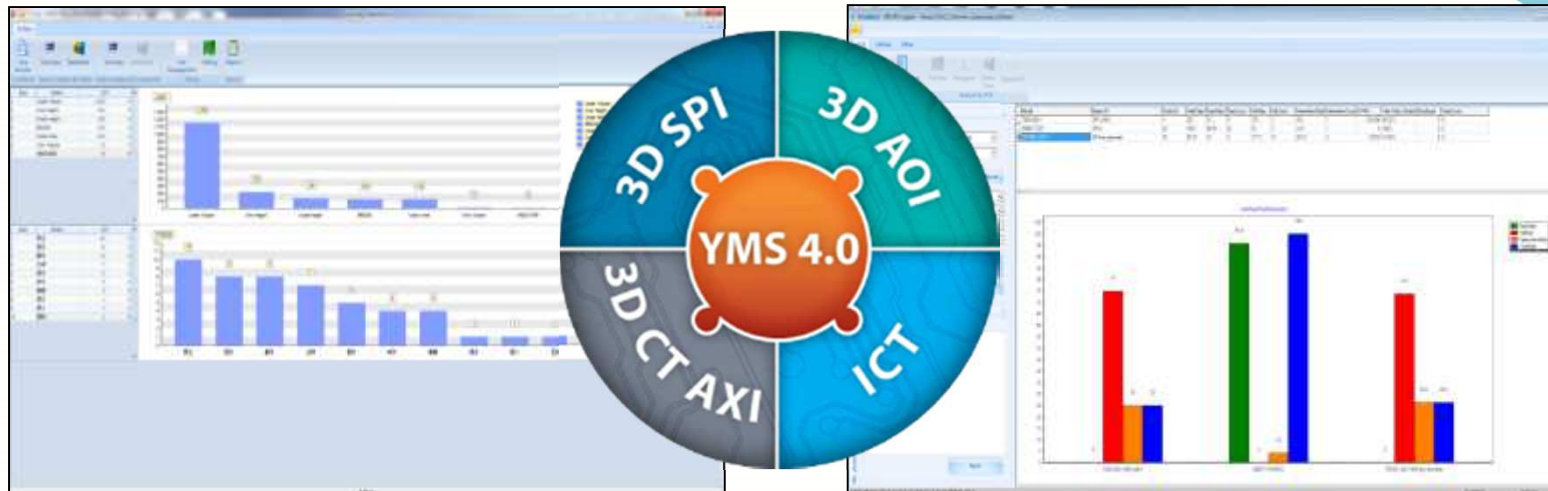
- ❖ 零漏測及零誤判
- ❖ TRI 規格/標準訂定

AI 應用:



TRI YMS 4.0 良率管理系統

協助客戶提升生產力及品質管理



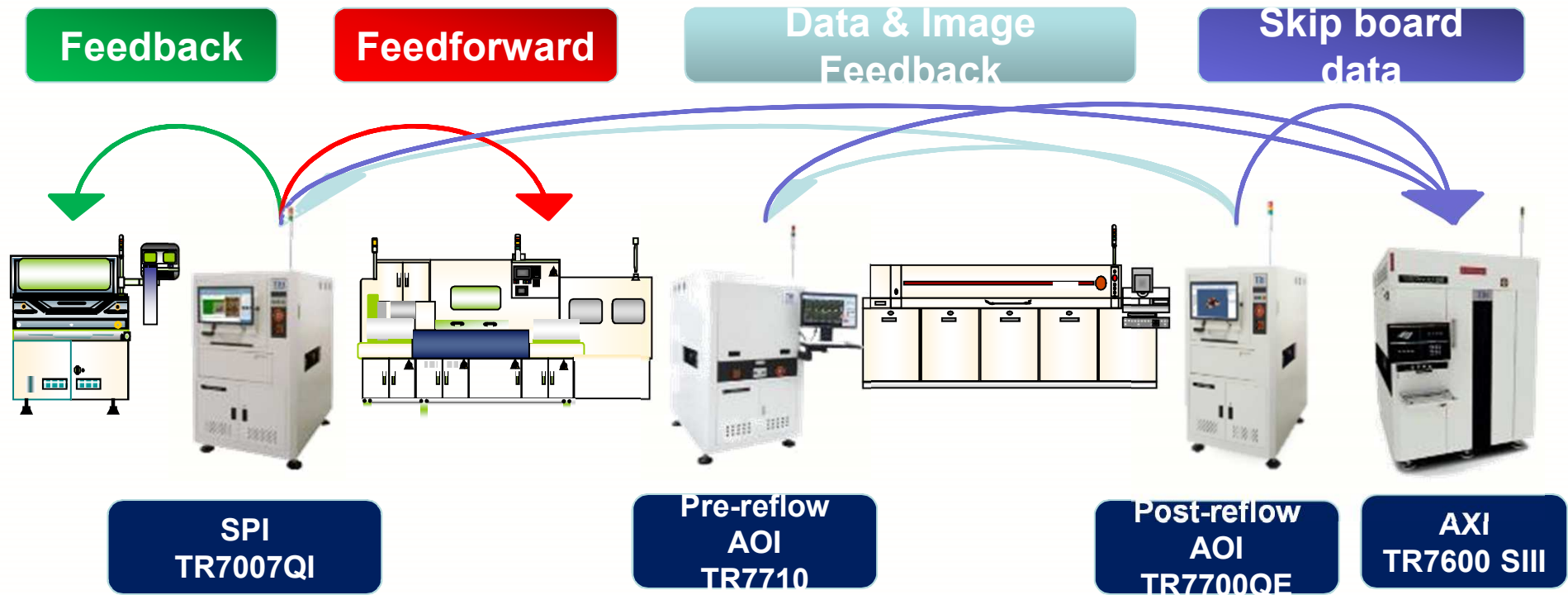
- 實時狀態檢查
- SPC和生產力監控
- 列出排名前10的不良項目和對應圖像
- 依各站別, 線別, 流程找出問題點
- 監控生產問題改善狀況
- PDCA改善循環
- 支持品質優化
- 輸出報告到MES / SFCS

工業4.0解決方案

TRI 支援封閉迴路控制系統



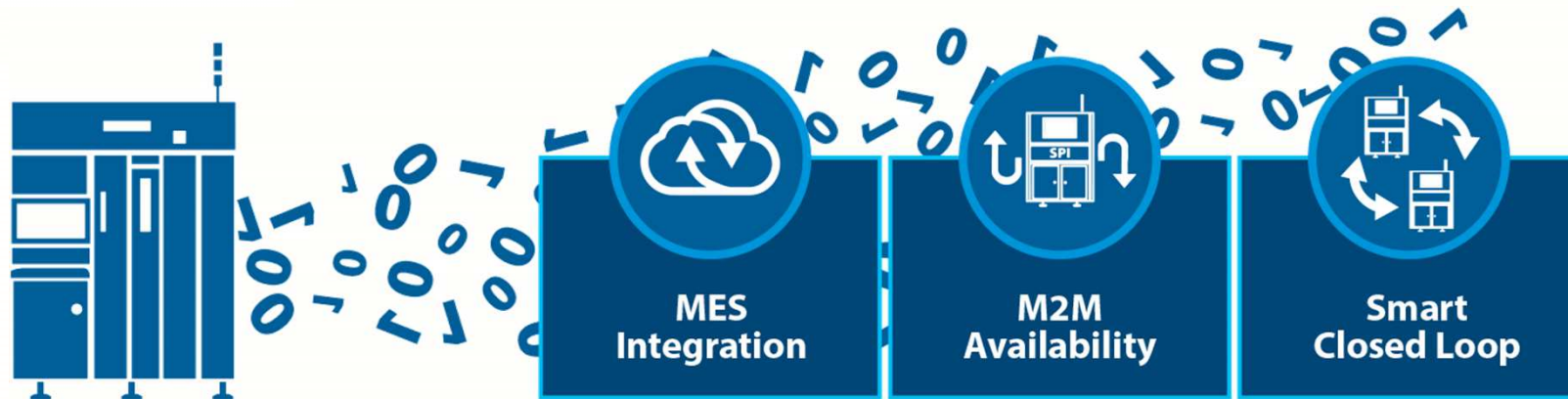
TRI SPI, AOI, AXI 檢測資訊的串流 IPC CFX(data)/HERMES(M2M)



智慧工廠解決方案



Big Data Ready



Smart Monitoring



內部研發團隊



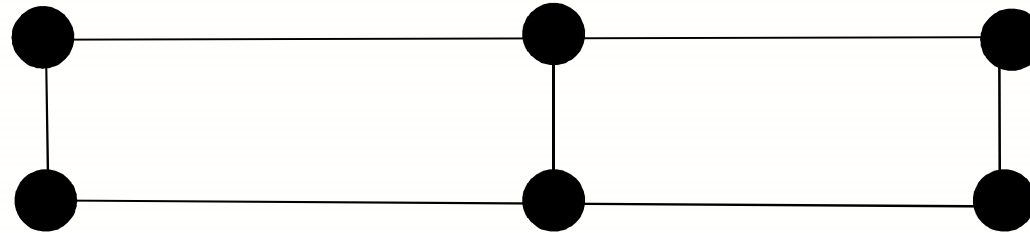
•Optical Dept.
• Mechanical Dept.

• system S/W
YMS, R/S

•PLC control
•Lighting control

光學檢測

電路板測試



200+ RD

外部機構技術支援

Department of Computer science, 台灣大學

- 影像處理 / Understanding

Department of Power Mechanical, 清華大學

- X-ray 3D Reconstruction/Digital Tomosynthesis Algorithm/電腦切層演算法

Center of Measurement Standards, 工研院

- Length/ Camera / 色彩校正

近年獲獎



- 2016 Global Technology Award
- 2017 Circuits Assembly NPI Award
- 2017 EM Asia 創新獎
- 2018 Circuits Assembly NPI Award
- 2018 EM Asia 最佳供應商獎
- 2019 Global Technology Award
- 2019 EM Asia 傑出產品獎
- 2020 Global Technology Award
- 2021 EM Asia 創新獎

* TRI's Company Milestones:

<https://www.tri.com.tw/tw/about/about-21-1-2.html>

免責聲明



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Better Testing Better Quality



THANK YOU!

***For more information about
Test Research, Inc.***



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