4-steps Transformation Journey to Achieve Manufacturing Operation Sustainability

实现制造运营可持续性的4步转型之旅

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- 工业4.0培训首席培训师
- TÜV南德数字化服务部

Add value.
Inspire trust.

讲师介绍

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工业4.0培训首席培训师

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工作职责

- 工业4.0培训服务主讲
- 开发研制新的培训课程
- 培训业务的开发与拓展
- 认证SIRI评估师（Certified SIRI Assessor – CSA）

职业履历

- > 14年培训领域专家级讲师经验
  - TÜV南德数字化服务部
  - Emerson艾默生（流体控制和气动装置）
  - Mercedes-Benz 梅赛德斯-奔驰
- > 13.5年工业自动化领域专业经验
  - Omron 欧姆龙新加坡总代理商
- > 1.5年自主创业经验
  - 开发能源监控软件

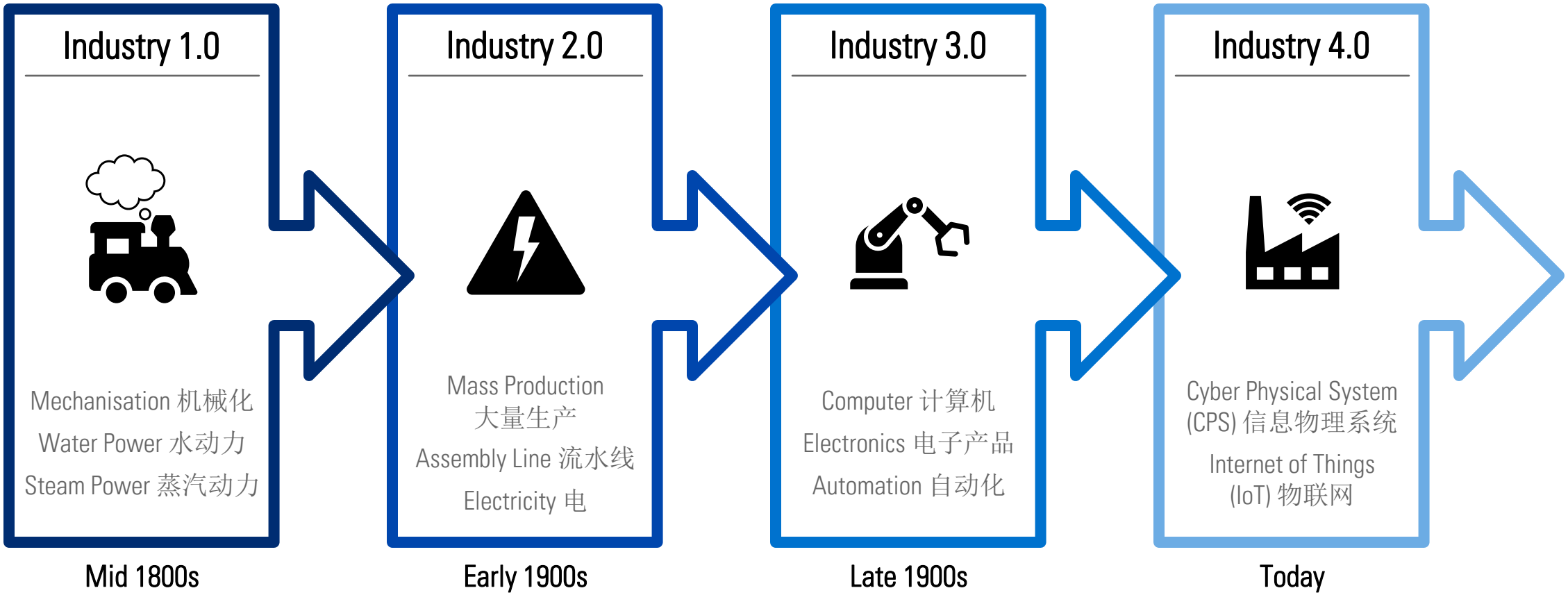
教育背景

- 电子、计算机和通信工程
- 市场营销管理
- 工业与企业心理学
- 培训与评估领域高级专家资格证(ACTA)

Agenda | 议程

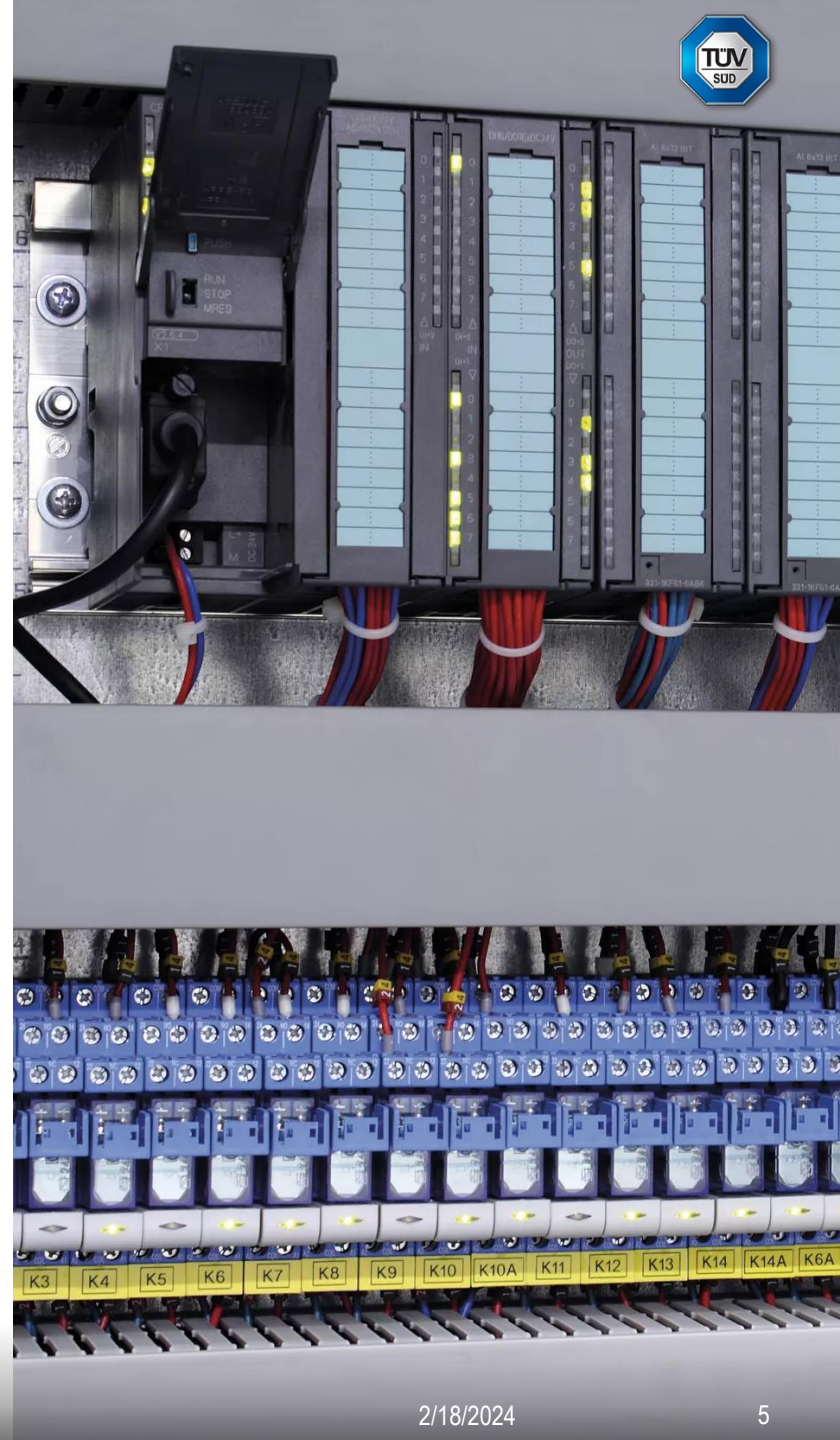
1	Industry 3.0 vs Industry 4.0 Analogy 工业3.0与工业4.0类比
2	Overview of Smart Industry Readiness Index (SIRI) 智能制造成熟度指数(SIRI)概览
3	4-steps Transformation Journey using SIRI's L.E.A.D. Framework 4步转型之旅SIRI L.E.A.D.框架
4	SIRI Case Studies: Pepperl + Fuchs (SG) & Haier (CN) SIRI案例：P+F倍加福(新加坡) & 海尔(中国)
5	Summary + Q&A 总结 + 问题与解答

Stages of Industrial Revolutions | 工业革命的阶段



Industry 3.0 | 工业3. 0

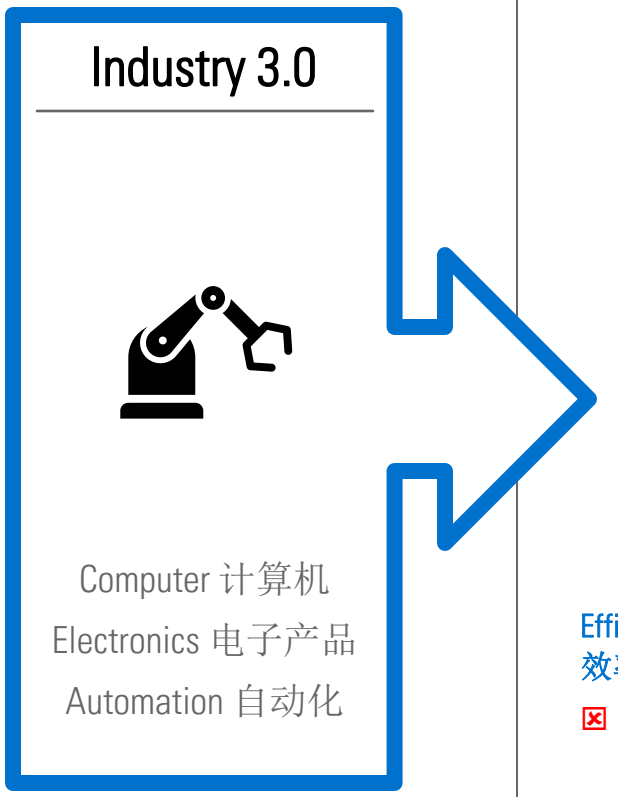
- Emerged during the **last few decades of the 20th century**
  出现在**20世纪的最后几十年**
- Based on the use of electronics devices and Information technology (IT) systems to **automate production**
  使用电子设备和信息技术(IT)系统**实现生产自动化**
- Development of **Programmable Logic Controllers (PLC)** enabled automation and simplified the production processes
  可编程逻辑控制器(PLC)的开发实现了自动化并简化了生产流程
- Introduction of **Enterprise Resources and Planning (ERP)** and **Manufacturing Executive System (MES)** software systems to manage the business and manufacturing processes respectively
  引入**企业资源与规划(ERP)**和**制造执行系统(MES)**软件系统，分别管理业务和制造流程

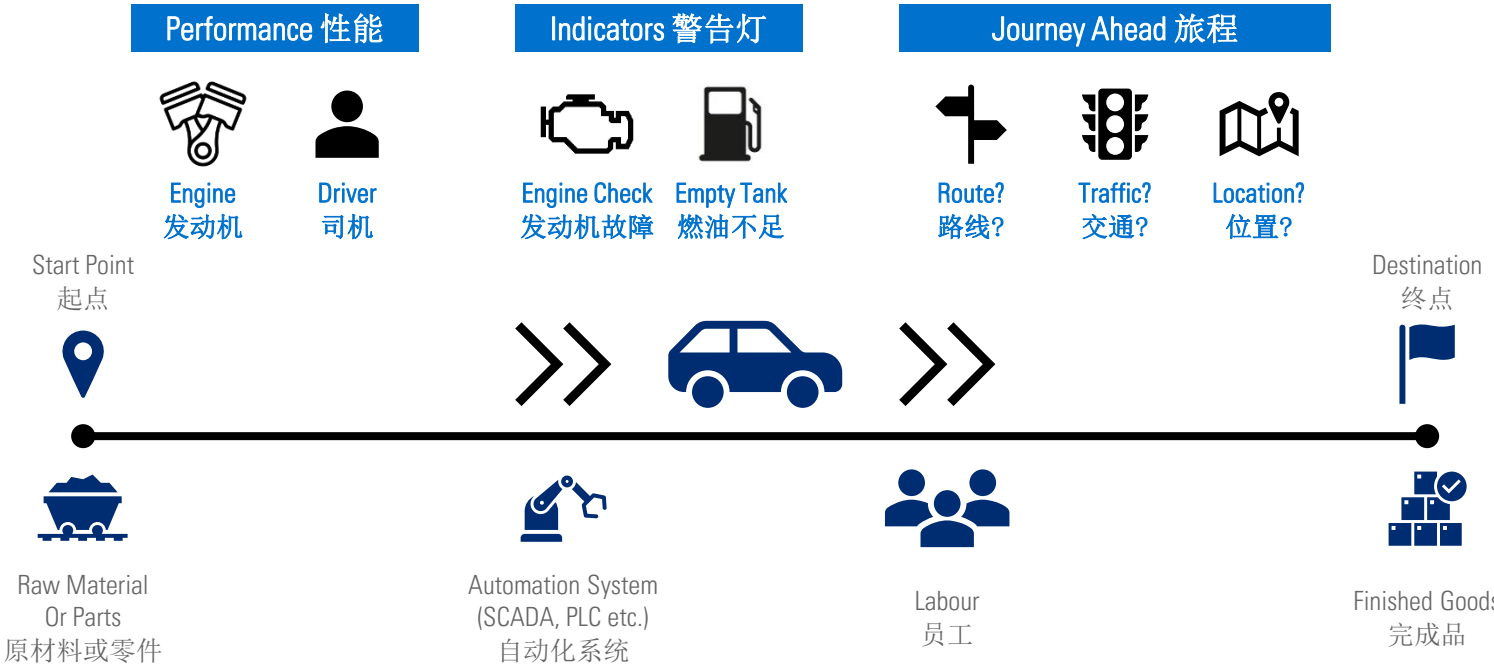


Quiz | 测验

- **Question:** Is Manufacturing Executive System (MES) an “Industry 3.0” or “Industry 4.0” technology? 制造执行系统(MES)是“工业3.0”还是“工业4.0”的技术？
- **Answer:** It depends on the type of MES modules being used. 这取决于所使用的MES模块的类型。

Industry 3.0 Analogy | 工业3. 0类比





Efficiently & Effectiveness
效率和有效性

- ☒ Automation has its limit and constraints
  自动化已达到极限

Analytic / Insights
分析/见解

- ☒ Lack of data and information to make informed decision
  缺乏数据和信息来做出明智的决定

Flexibility 灵活性

- ☒ Process, system and people lacks flexibility to adapt to changes
  流程、系统和员工缺乏适应变化的灵活性

Agility 敏捷性

- ☒ Process, system and people are unable to response quickly to changes
  流程、系统和人员无法快速响应变化

Industry 4.0 | 工业4. 0

- Introduced by **Klaus Schwab (Executive Chairman of World Economic Forum)** in 2015
  2015年**由克劳斯·施瓦布（世界经济论坛执行主席）**介绍
- Convergence of physical, digital and biological spheres – **Cyber-Physical Systems (CPS)**
  物理、数字和生物领域的融合 – 信息物理系统(CPS)
  - **Integration of computation and physical processes**, with the usage of embedded computers and networks monitoring and controlling physical processes
    计算和物理过程的集成，使用嵌入式计算机和网络监视和控制物理过程
- Emerging **technology breakthrough and trends** such as:
  新兴**技术突破和趋势**，例如：

Internet of Things (IoT) 物联网	Big Data Analytics 大数据分析	Cloud Computing 云计算
Additive Manufacturing 增材制造	Augmented Reality 虚拟现实	Artificial Intelligence (AI) 人工智能
Digital Twin 数字孪生	Robotics 机器人技术	Cyber Security 网络安全

Industry 4.0 Analogy | 工业4. 0类比

Industry 4.0

Cyber Physical System (CPS) 信息物理系统

Internet of Things (IoT) 物联网

Today

Performance 性能

ICE / EV / Hybrid 发动机

Driver / Autopilot 司机/自动驾驶仪

Navigation System 导航系统

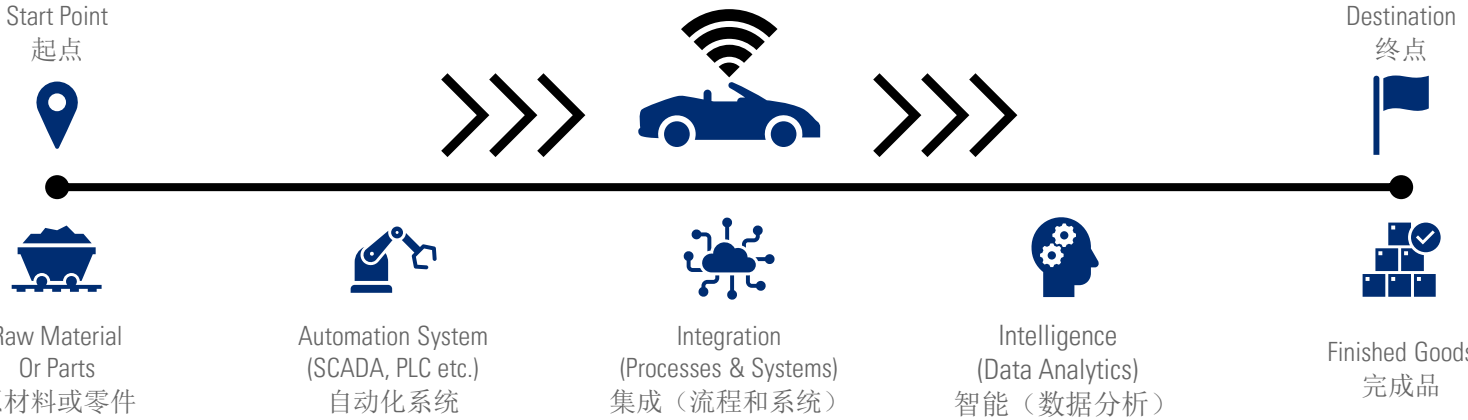
- Current position 当前位置
- Shortest/Fastest route 最短/最快的路线

- Traffic 交通状况
- Toll 收费

Information 信息

Error Message 错误信息

Remaining Distance 剩余距离



Benefit 益处 1: Operation Improvement 改进运营

Faster 快

☑ Doing things efficiently (Product, process, system, people etc.)
高效率（产品、流程、系统、人员等）

Better 好

☑ Doing things effectively (Product, process, system, people etc.)
有效性（产品、流程、系统、人员等）

Benefit 益处 2: Business Sustainability 业务可持续性

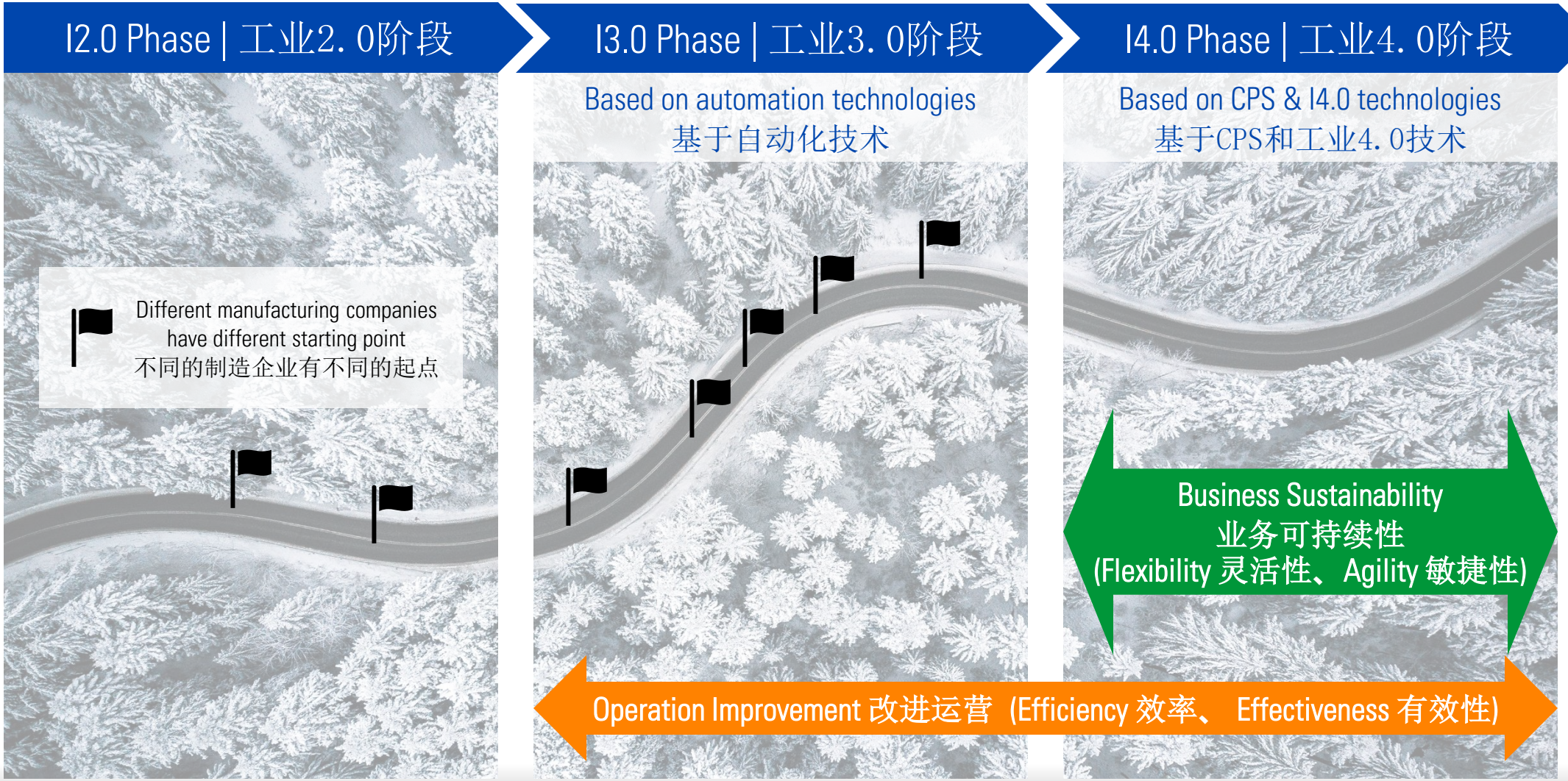
Flexibility 灵活性

☑ Manufacturing operation that adapts to changes
适应变化的制造运作

Agility 敏捷性

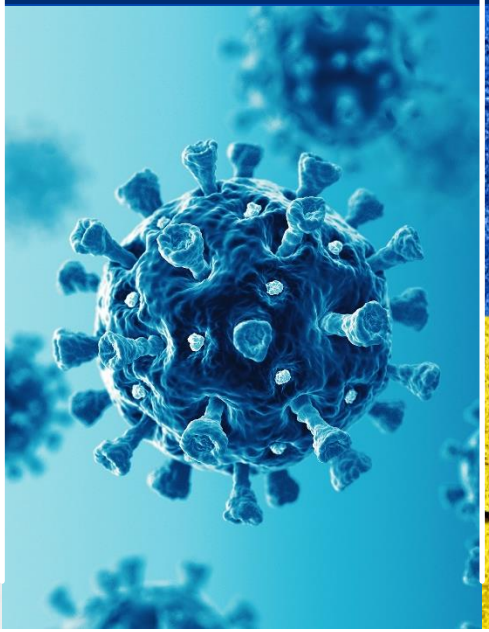
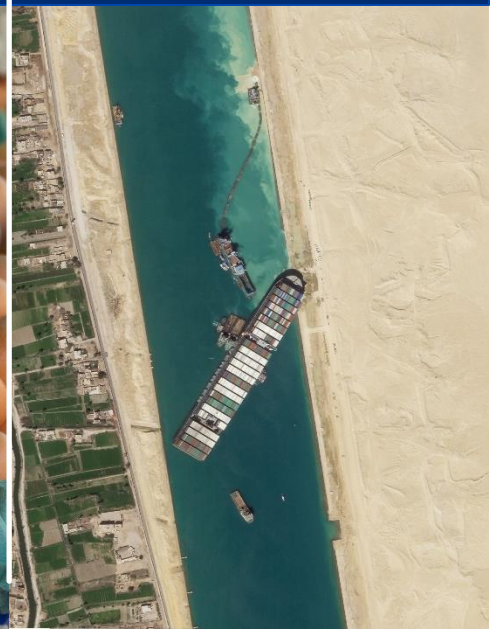
☑ Fast response to changes or unexpected events
对变化或意外事件的快速响应

Industry 4.0 Journey (For Manufacturing Industry) | 工业4. 0之旅(制造业)



Why Industry 4.0? 为什么要迈向工业4. 0?

- Business sustainability 业务可持续性
- VUCA (Volatility, Uncertainty, Complexity, Ambiguity) environment
  易变、不确定、复杂、模糊

Business Sustainability 业务可持续性	COVID-19 新冠肺炎 (2020-2022)	Ukraine-Russia War 乌俄战争 (2022…)	Hyper Inflation 高通货膨胀 (2022)	Suez Canal Blockage 苏伊士运河堵塞 (2022)
				

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5	Summary + Q&A 总结 + 问题与解答

Industry 4.0 Challenges | 工业4. 0的挑战

41%

Trying to identify where and how to start
不知如何以及从哪里开始

23%

Defining the roadmap and blueprint for transformation
建造转型的路线图和蓝图

19%

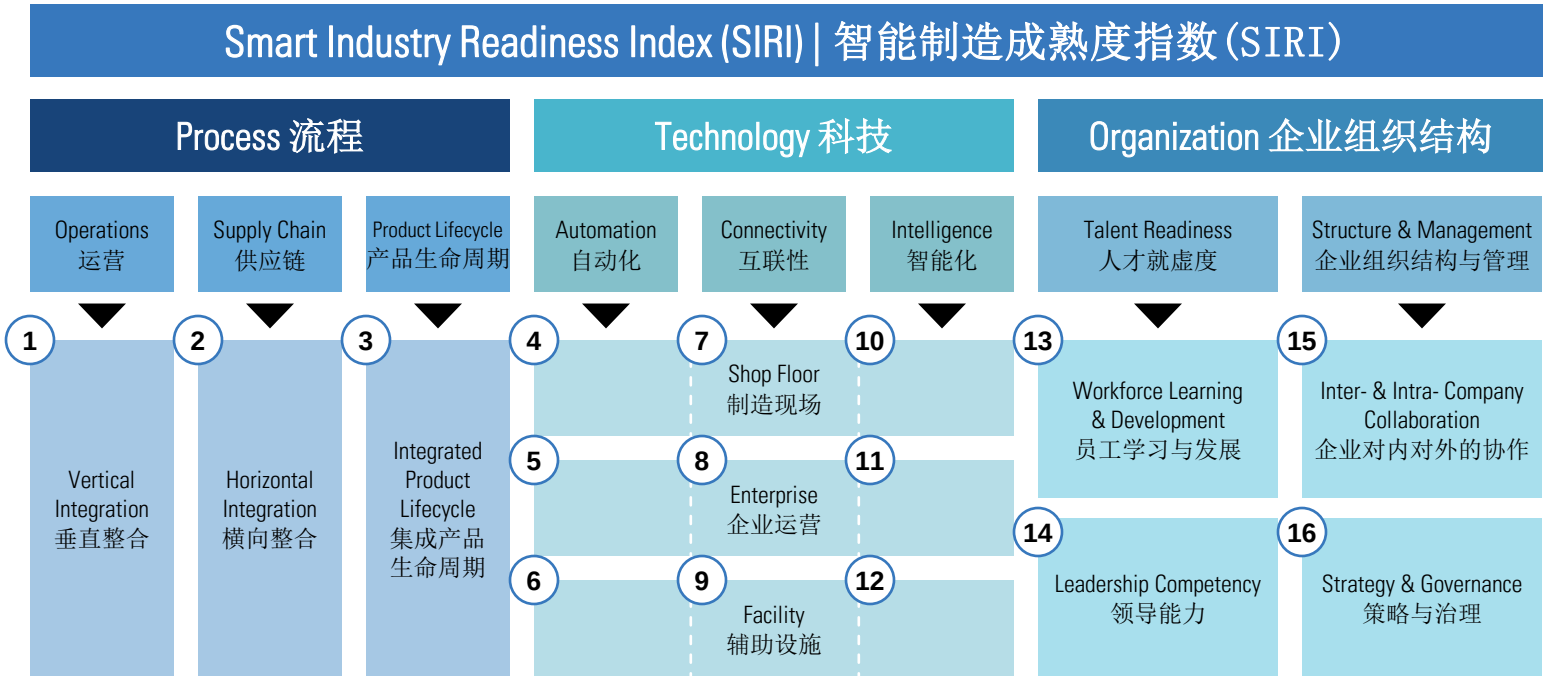
Improving legacy systems and its OEE*
改进老旧系统及其OEE*

17%

Lack of operations and supply chain visibility
缺乏运营和供应链可见性

OEE*: Overall Equipment Effectiveness
整体设备效率

Catalysing the Transformation of Manufacturing
促进制造业转型



SMART INDUSTRY READINESS INDEX

- The **Smart Industry Readiness Index (SIRI)** was created by the **Singapore Economic Development Board (EDB)** in partnership with **TÜV SÜD** and validated by Industry 4.0 thought leaders and experts from Industry and academia.

  智能制造成熟度指数 (SIRI) 由**新加坡经济发展局 (EDB)** 与**TÜV南德**合作创建，并得到工业界和学术界的专家的验证。

- Comprises **a suite of frameworks and tools** to help manufacturers to start, scale, and sustain their manufacturing transformation journeys.

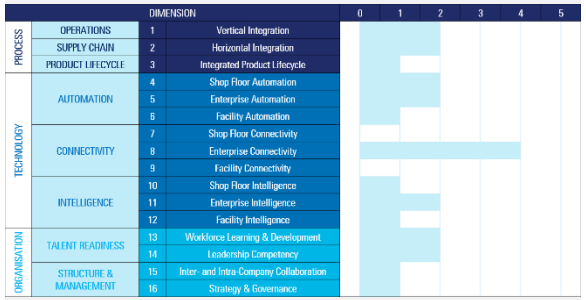
  包含**一套框架和工具**来协助制造企业开始、扩展和维持它们的制造业转型之旅。

SIRI's Frameworks & Tools | SIRI框架和工具

LEAD Framework
LEAD 框架

- A circular and continuous **4-step transformation process**
  循环连续的**4步转型过程**
  - Learn | 掌握
  - Evaluate | 评估
  - Architect | 构建
  - Deliver | 落实

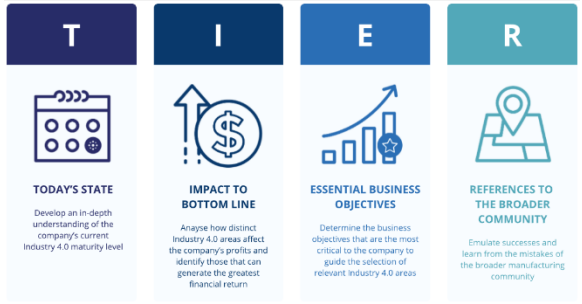
Assessment Matrix (AM)
评估矩阵



			DIMENSION	0	1	2	3	4	5
PROCESS	OPERATIONS	1	Vertical Integration						
	SUPPLY CHAIN	2	Horizontal Integration						
	PRODUCT LIFECYCLE	3	Integrated Product Lifecycle						
TECHNOLOGY	AUTOMATION	4	Shop Floor Automation						
		5	Enterprise Automation						
		6	Facility Automation						
	CONNECTIVITY	7	Shop Floor Connectivity						
		8	Enterprise Connectivity						
		9	Facility Connectivity						
	INTELLIGENCE	10	Shop Floor Intelligence						
		11	Enterprise Intelligence						
		12	Facility Intelligence						
ORGANISATION	TALENT READINESS	13	Workforce Learning & Development						
		14	Leadership Competency						
	STRUCTURE & MANAGEMENT	15	Inter- and Intra-Company Collaboration						
		16	Strategy & Governance						

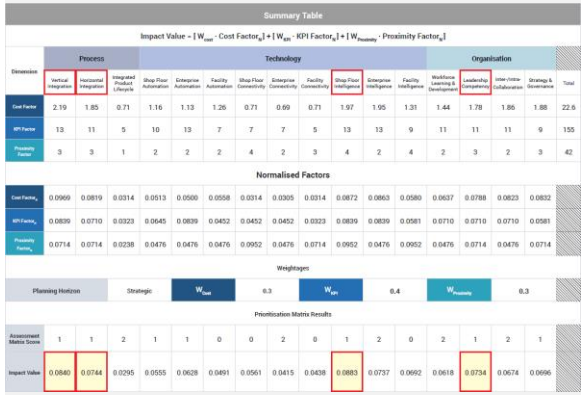
- A **holistic assessment of companies' I4.0 maturity level (Band 0…5)**:
  协助企业进行一个**全面的工业4. 0成熟度水平评估**(0至5级):
  - 3 Building Blocks | 3大基础模块
  - 8 Pillars | 8大支柱
  - 16 Dimensions | 16个维度

TIER Framework
TIER 框架



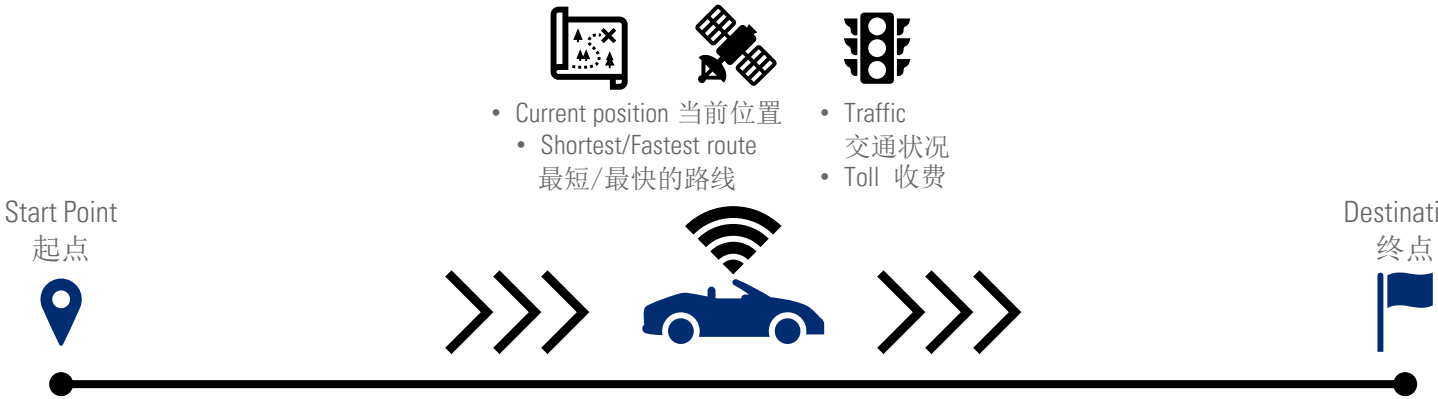
- **4 principles to consider** as part of prioritisation exercise
  确定优先顺序时应考虑的**4项原则**
  - Today's state | 评估矩阵(16个维度)
  - Impact to bottom line
    对经营成本的影响(10成本分类)
  - Essential business objectives
    必要的业务目标(14个KPI)
  - Reference to the broader community
    参考更广泛的领域(行业)

Prioritisation Matrix (PM)
优先级矩阵



- Assist companies in **quantitatively identifying the high-priority SIRI Dimensions** in which improvements will bring the most benefit
  帮助企业定量确定改进将带来**最大收益的高优先级SIRI维度**

SIRI: A Navigation System for Industry 4.0 Transformation Journey
SIRI：工业4.0转型之旅的导航系统



SMART INDUSTRY READINESS INDEX

1. **Assessment Matrix (AM) | 评估矩阵**
   - Determine I4.0 maturity level across 3 building blocks & 16 dimensions
     一个全面的工业4.0成熟度水平评估

SMART INDUSTRY READINESS INDEX

3. **Prioritization Matrix (PM) | 优先级矩阵**
   - Identify 4 high impact dimensions to focus on
     确认4个最大收益的高优先级SIRI维度

SMART INDUSTRY READINESS INDEX

2. **T.I.E.R. Framework | TIER 框架**
   - Assessment Matrix Score (16 Dimensions)
     评估矩阵得分(16个维度)
   - Impact to bottom line (10 Cost Categories)
     对经营成本的影响(10个成本分类)
   - Essential Business Objectives (14 KPIs)
     必要的业务目标(14个KPI)
   - Reference to Broader Community (Industry)
     参考更广泛的领域(行业)
   - Planning Horizon (Short. Mid and Long-term)
     规划期限(短期、中期、长期)

Recognized by W.E.F. as International Framework for Ind. 4.0 Transformation
被世界经济论坛承认为工业4.0转型的国际框架

WORLD ECONOMIC FORUM

EDB SINGAPORE

Industry Partners

TÜV SÜD

SIEMENS

McKinsey & Company

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TÜV SÜD Digital Service Industry 4.0 Ecosystem
TÜV南德数字化服务部的工业4. 0生态系统

- Assists manufacturers in their transformation journey | 协助制造企业进行转型之旅

Certified SIRI Assessor (CSA)
认证SIRI评估员

I4.0 Advisory + Tech. Partners
咨询+技术伙伴

掌握
1 LEARN
Learn key concepts and build a common language for alignment

落实
4 DELIVER
Deliver impact and sustain transformation initiatives

评估
2 EVALUATE
Evaluate the current Industry 4.0 maturity levels of existing facilities

构建
3 ARCHITECT
Architect a comprehensive transformation strategy and implementation roadmap

Official SIRI Assessment (OSA)
SIRI评估

DX Architect (DXA)
数字化转型架构

I4.0 Advisory
工业4. 0咨询

Training
培训服务

Assessment
评估服务

Advisory
咨询服务

❶ Learn | 掌握

Certified SIRI Assessor (CSA) Programme | 认证SIRI评估员

a) Training | 培训

- 5-days (40-hours)
- Virtual Instructor Led Training, VILT (Global – English)
- Face-to-face (China – Chinese)

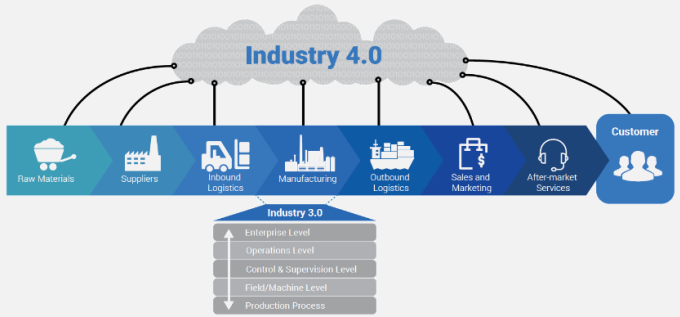
b) Examination | 考试

- Practical 面试 (Case interview via MS Team)
- Theory 笔试 (Online)

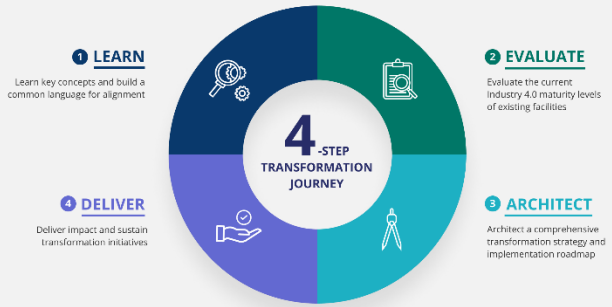
❶ Learn | 掌握

- Certified SIRI Assessor (CSA) Programme | 认证SIRI评估员

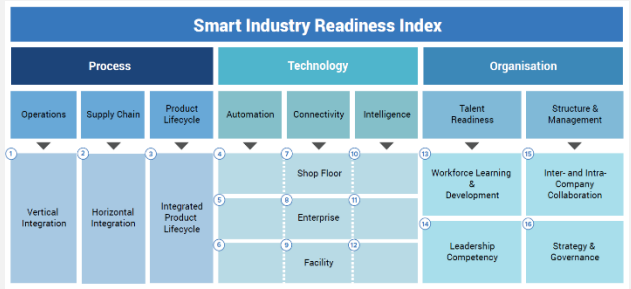
Key concepts of Industry 4.0
工业4. 0的关键概念



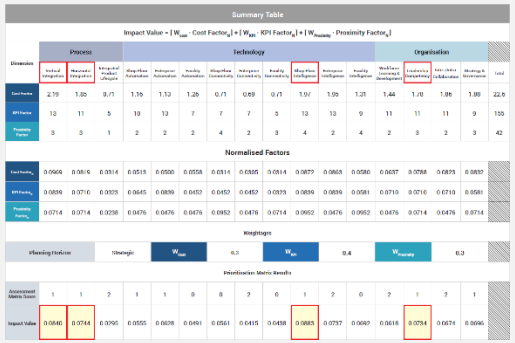
SIRI's Frameworks and tools | SIRI框架和工具



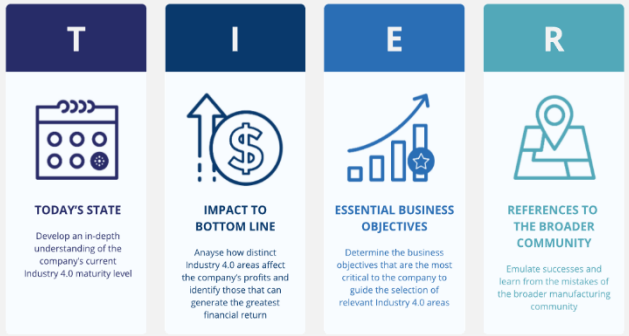
LEAD Framework | LEAD 框架



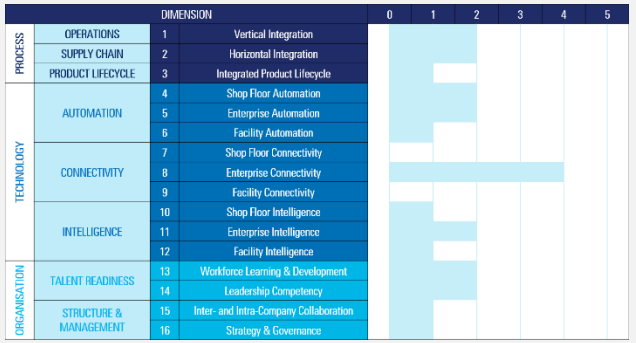
SIRI Framework | SIRI 框架



Prioritisation Matrix (PM) | 优先级矩阵



TIER Framework | TIER 框架



Assessment Matrix (AM) | 评估矩阵

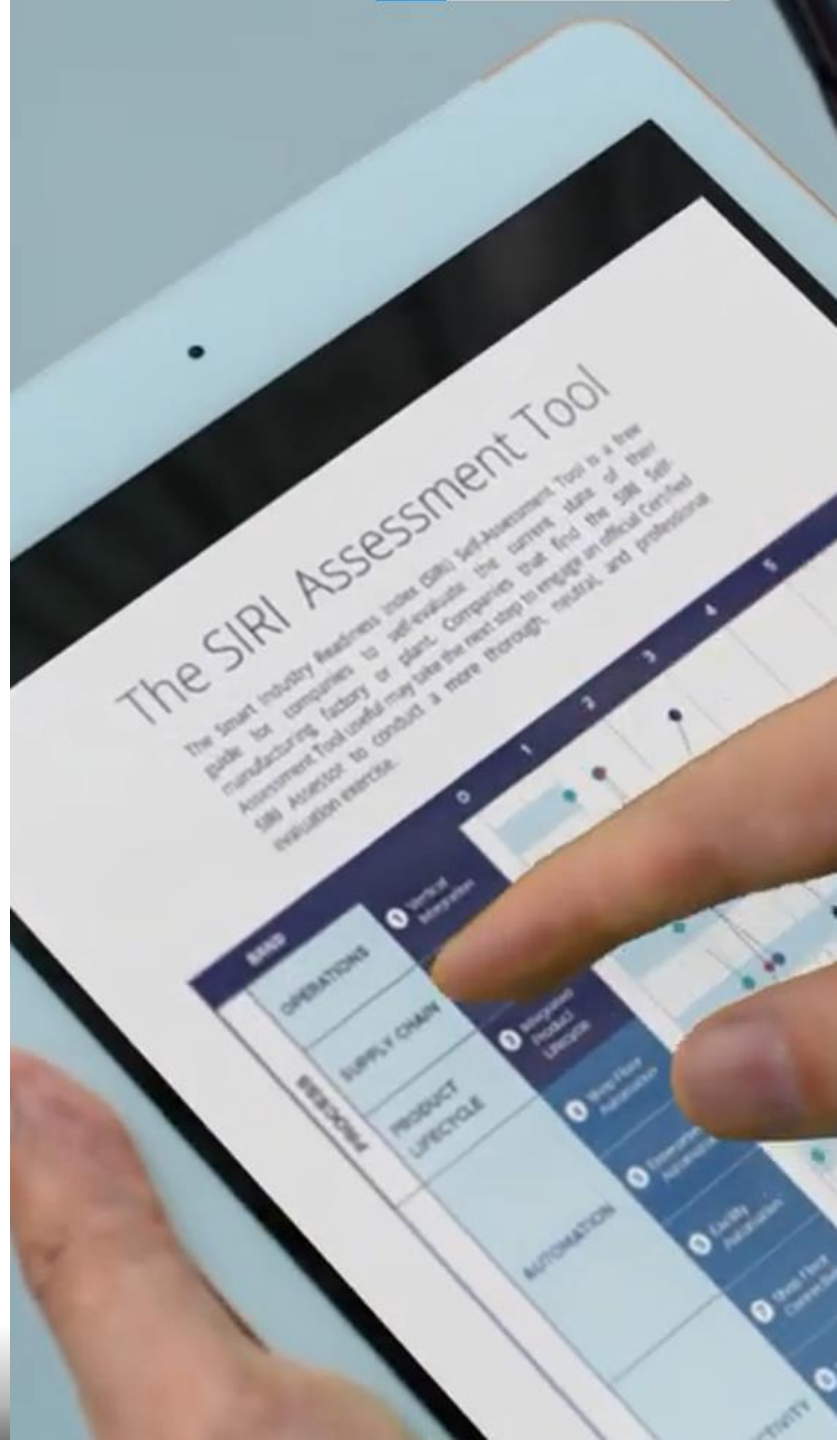
❶ Learn | 掌握

- Official Opening of CSA China Training Centre on 13 June 2023 at Suzhou Industrial Park
- CSA中国培训中心于2023年6月13日在苏州工业园区正式开业

❷ Evaluate | 评估

- Official SIRI Assessment (OSA) | SIRI评估

Phase 阶段 1	2 weeks →	Phase 阶段 2	2 weeks →	Phase 阶段 3
Onboarding Call (1 hr) **线上会议（1小时）**		**Evaluation (1-1.5 days)** **现场评估（1–1. 5天）**		**Debrief (1-2 hr)** **汇报（1–2小时）**
• Introduce the SIRI assessment • Determine of assessment scope • Identify relevant participants • Send relevant materials to company • Schedule dates for Phase 2 and 3		• Factory / plant tour • Conduct Assessment Matrix (AM) • Refinement and validation of AM Bandings • Collect inputs for Prioritization Matrix (PM) • Refinement and validation of PM inputs		• Review of information obtained during the evaluation phase • Analysis of AM and PM results • Generation of OSA report • Conduct client debrief

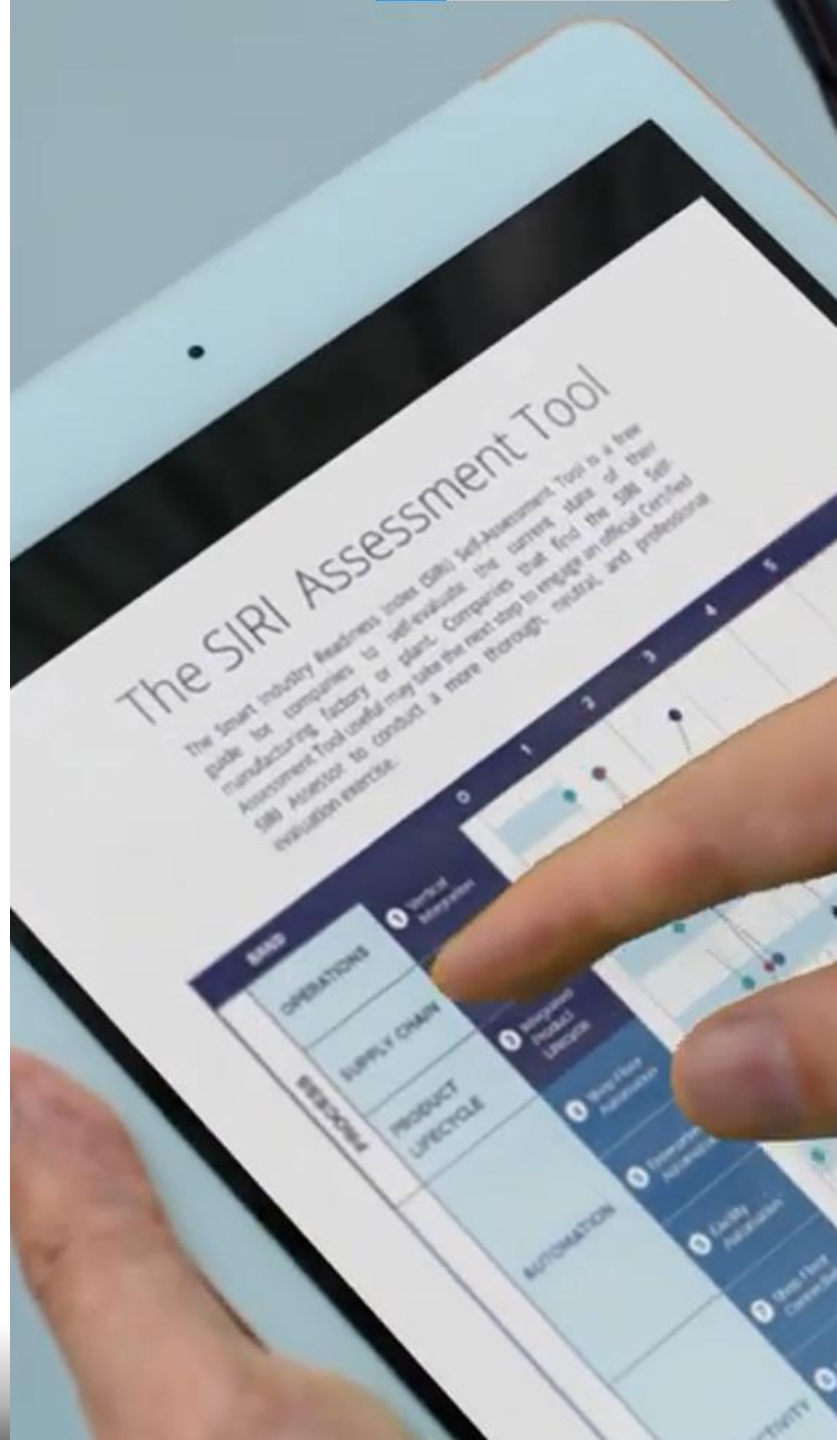


❷ Evaluate | 评估

- Official SIRI Assessment (OSA) Report (1 of 3) – Assessment Matrix Score
  SIRI评估报告(1/3) – 评估矩阵得分(16个维度)

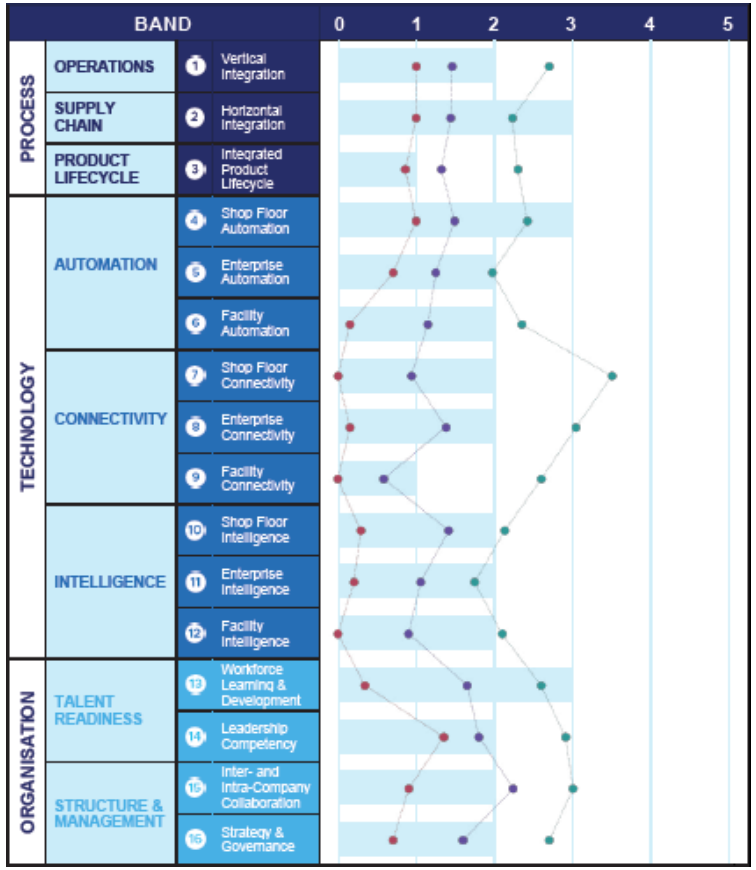
DIMENSION			BAND		DEFINITION
OPERATIONS	1	Vertical Integration	2	Digital	Defined vertical processes are completed by humans with the support of digital tools.
SUPPLY CHAIN	2	Horizontal Integration	3	Integrated	Digitised supply chain processes and systems are securely integrated across business partners and clients along the value chain.
PRODUCT LIFECYCLE	3	Integrated Product Lifecycle	1	Defined	Product lifecycle processes are defined and executed by humans, with the support of analogue tools.
AUTOMATION	4	Shop Floor Automation	3	Full	Repetitive production processes are fully automated, with no human intervention. Repetitive support processes are partially automated, with limited human intervention.
	5	Enterprise Automation	2	Advanced	Enterprise processes are automated, with minimal human intervention.
	6	Facility Automation	2	Advanced	Facility processes are automated, with minimal human intervention.
CONNECTIVITY	7	Shop Floor Connectivity	2	Interoperable	Connected production assets and systems are interoperable across multiple communication technologies and protocols.
	8	Enterprise Connectivity	2	Interoperable	Enterprise IT systems are interoperable across multiple communication technologies and protocols.
	9	Facility Connectivity	1	Connected	Facility assets and systems are connected via multiple communication technologies and protocols.
INTELLIGENCE	10	Shop Floor Intelligence	2	Visible	Computerised OT and IT systems are able to identify deviations.
	11	Enterprise Intelligence	2	Visible	Enterprise IT systems are able to identify deviations.
	12	Facility Intelligence	2	Visible	Computerised OT and IT systems are able to identify deviations.
TALENT READINESS	13	Workforce Learning & Development	3	Integrated	Continuous L&D programmes are formally aligned with the organisation's business needs and human resources (HR) functions.
	14	Leadership Competency	2	Informed	Management is well-informed, through formal channels and avenues, of the most recent trends and technologies.
STRUCTURE & MANAGEMENT	15	Inter- and Intra-Company Collaboration	2	Cooperating	Formal channels are established to allow teams to work together on discrete/one-off tasks and projects.
	16	Strategy & Governance	2	Development	Transformation initiative towards a Factory/Plant-of-the-Future is being developed or has been developed by a dedicated team.

Assessment Matrix (AM) Score | 评估矩阵得分



❷ Evaluate | 评估

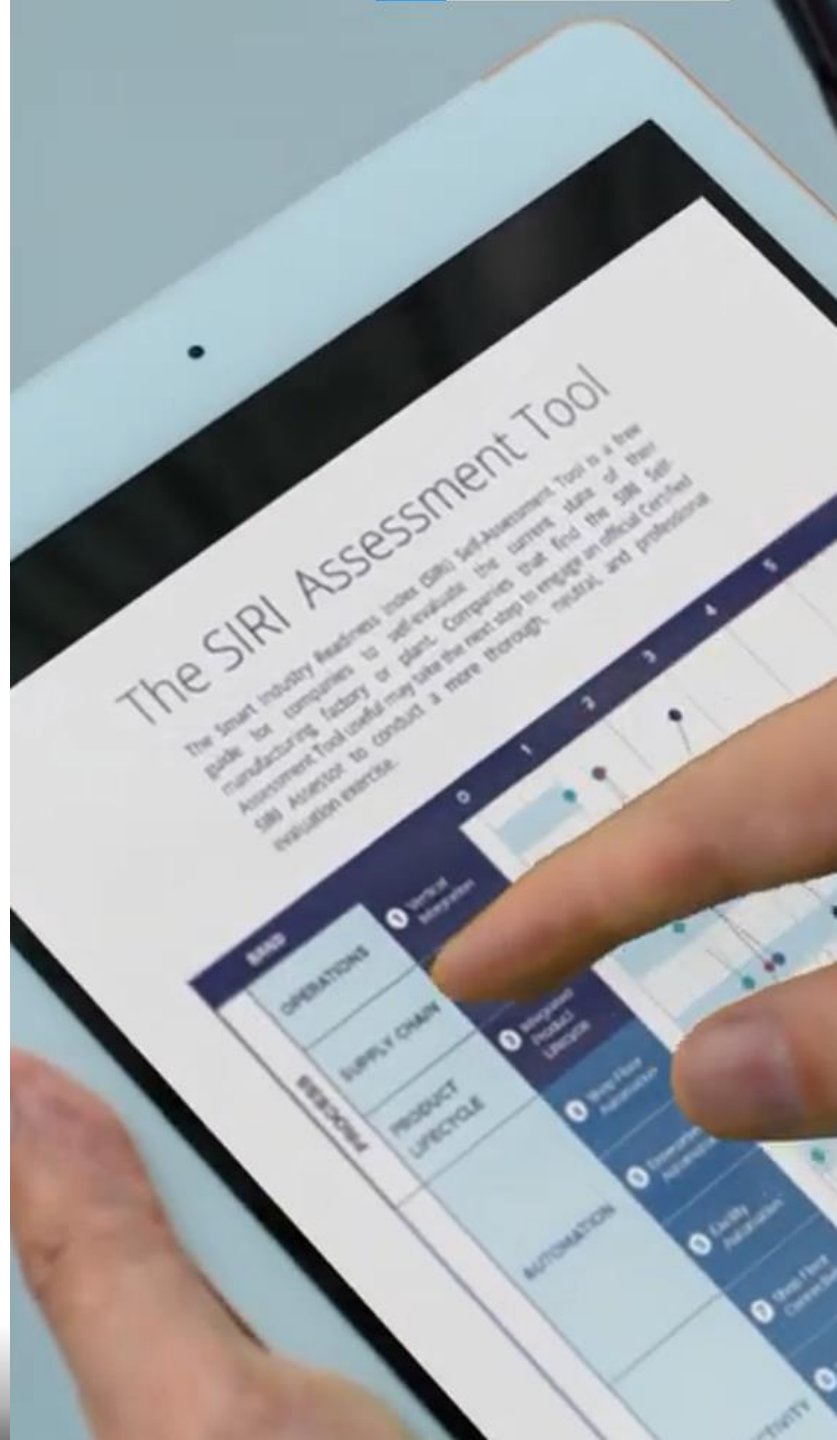
- Official SIRI Assessment (OSA) Report (2 of 3) – Benchmarking
  SIRI评估报告(2/3) – 对标分析



3B Maturity Benchmark | 全部制造业

DIMENSION			BAND		COMPARISON
			COMPANY	INDUSTRY IPC	
PROCESS	OPERATIONS	1 Vertical Integration	2	1.38	
	SUPPLY CHAIN	2 Horizontal Integration	3	1.31	
	PRODUCT LIFECYCLE	3 Integrated Product Lifecycle	1	1.23	
TECHNOLOGY	AUTOMATION	4 Shop Floor Automation	3	1.62	
		5 Enterprise Automation	2	1.38	
		6 Facility Automation	2	1.00	
	CONNECTIVITY	7 Shop Floor Connectivity	2	0.54	
		8 Enterprise Connectivity	2	0.69	
		9 Facility Connectivity	1	0.31	
	INTELLIGENCE	10 Shop Floor Intelligence	2	1.23	
		11 Enterprise Intelligence	2	0.77	
		12 Facility Intelligence	2	0.54	
ORGANISATION	TALENT READINESS	13 Workforce Learning & Development	3	1.15	
		14 Leadership Competency	2	1.85	
	STRUCTURE & MANAGEMENT	15 Inter- and Intra-Company Collaboration	2	2.00	
		16 Strategy & Governance	2	1.46	

Industry Performance Card | 相同行业

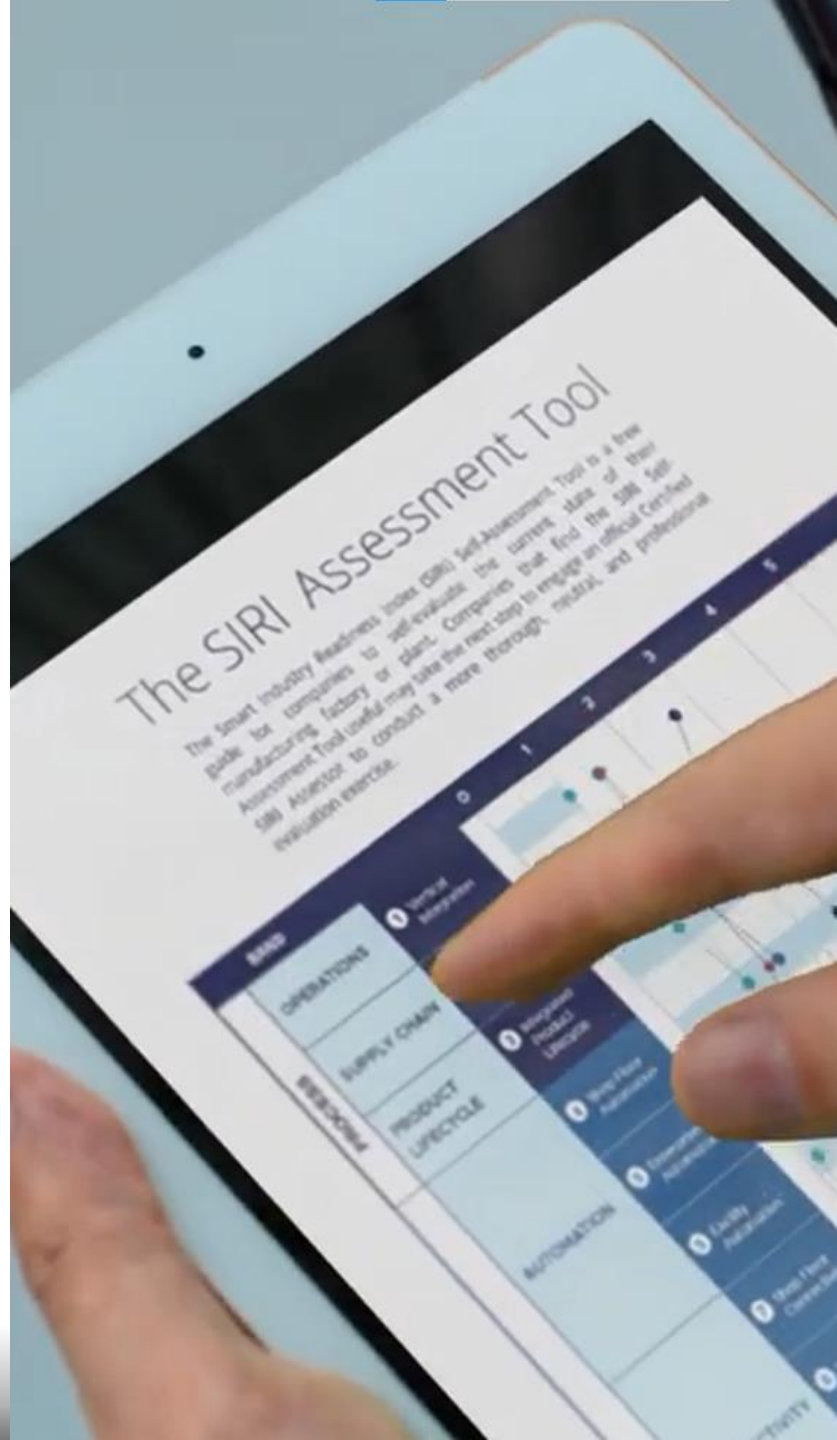


❷ Evaluate | 评估

- Official SIRI Assessment (OSA) Report (3 of 3) – Prioritization Matrix
- SIRI评估报告(3/3) – 优先级矩阵

Planning Horizon	Tactical					
Weightages	Cost Factor	45%	KPI Factor	30%	Proximity Factor	25%
Recommended Dimensions for Prioritisation						
Building Block	Process		Technology		Organisation	
Highest Impact Value	Vertical Integration		Shop Floor Intelligence; Enterprise Intelligence		Leadership Competency	

Prioritisation SIRI Dimension

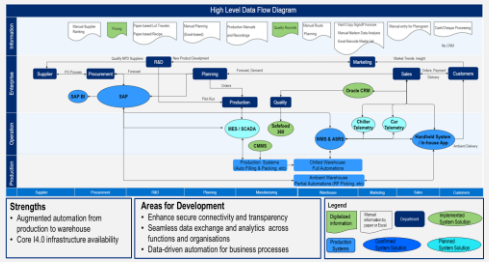


❸ Architect 构建 + ❹ Deliver 落实

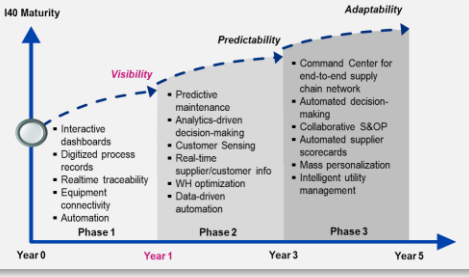
- Advisory Services | 咨询服务

Stakeholder Engagement | 利益相关者参与

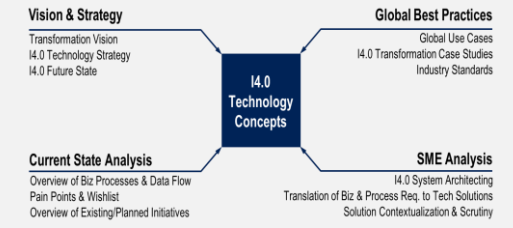
Current State Analysis | 现状分析



Vision & Future State | 愿景与未来状态

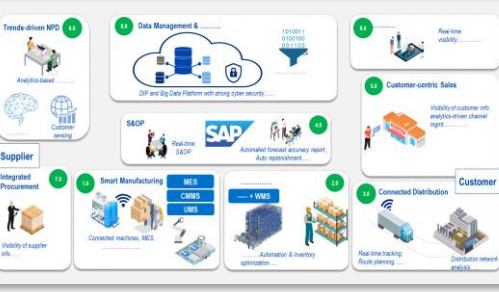


I4.0 Solution Ideation | I4. 0解决方案构思

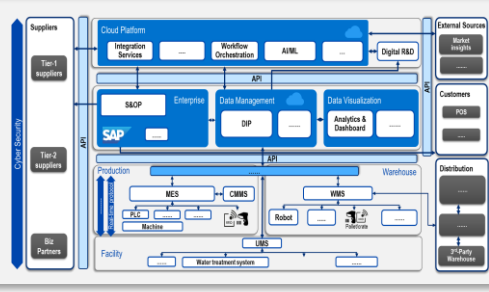


I4.0 Solution Mapping | I4. 0解决方案

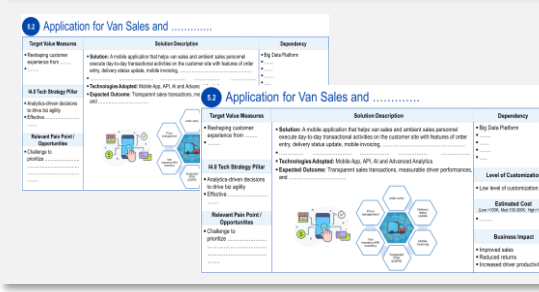
Target Picture | 目标图片



Reference System Architecture | 参考系统架构

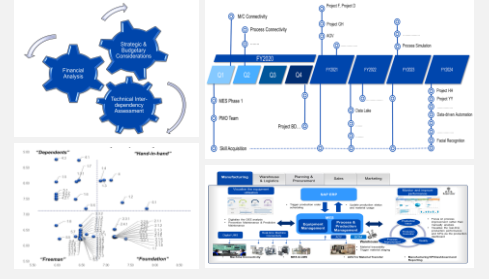


I4.0 Solution Design | I4. 0方案设计

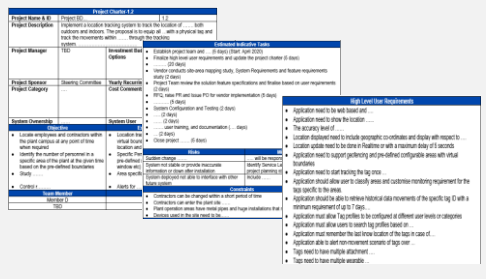


Business Case | 商业案例

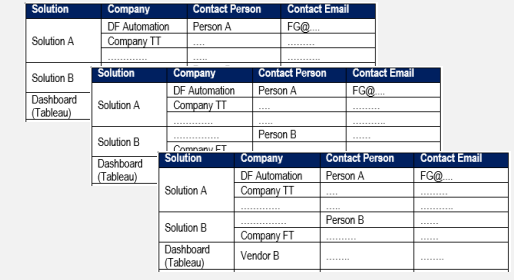
Roadmap | 路线图



Project Charters | 项目章程



Recommend Vendors | 推荐供应商



Agenda | 议程

1	Industry 3.0 vs Industry 4.0 Analogy 工业3.0与工业4.0类比
2	Overview of Smart Industry Readiness Index (SIRI) 智能制造成熟度指数(SIRI)概览
3	4-steps Transformation Journey using SIRI's L.E.A.D. Framework 4步转型之旅SIRI L.E.A.D.框架
4	SIRI Case Studies: Pepperl + Fuchs (SG) & Haier (CN) SIRI案例：P+F倍加福(新加坡) & 海尔(中国)
5	Summary + Q&A 总结 + 问题与解答

SIRI Case Study | SIRI案例研究

Please use your mobile phone to scan the above QR code to download the report
请用手机扫描以上二维码下载报告

1

Pepperl+Fuchs P+F (Singapore) | 倍加福（新加坡）

2

Haier (China) | 海尔（中国）

Case Study 案例分析 1

PEPPERL+FUCHS
倍加福
SENSING YOUR NEEDS

- **German industrial technology company** that specializes in sensor technology and electrical explosion protection.
  专门制造传感器和电气防爆保护的**德国工业科技公司**
- **Aims to be a reference point for customers** in the areas of automation and digitalization by deploying new processes and technologies to transform its production facilities.
  要通过部署新的流程和技术来改造其生产设施，**成为客户在自动化和数字化领域的参考点**

P+F Transformation Journey
倍加福转型之旅

P+F Global Distribution Centre


P+F Asian Production HQ

1. Site selection: Singapore
选址：新加坡

- **P+F's headquarters for Asian production** was chosen because the production facility, established in 1991, was relatively dated
  选择 **P+F 的亚洲生产总部**，是因为该生产设施成立于1991年，已相对陈旧

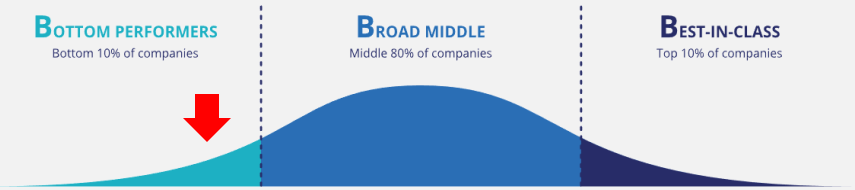
- In 2016, an **IoT-enabled global distribution centre** was set up in Singapore
  2016年，P+F在新加坡建立了一个**支持物联网的全球分销中心**

- **Greater integration** between its production and supply chain functions.
  进一步**整合其生产和供应链功能**

P+F Transformation Journey
倍加福转型之旅

2. Conduct the 1st OSA (2018)
在2018年，进行第一次SIRI评估

- The general maturity profile of the Singapore Site was **below the 80% Broad Middle average**.
  一般SIRI成熟度指数**低于80%的平均水平**



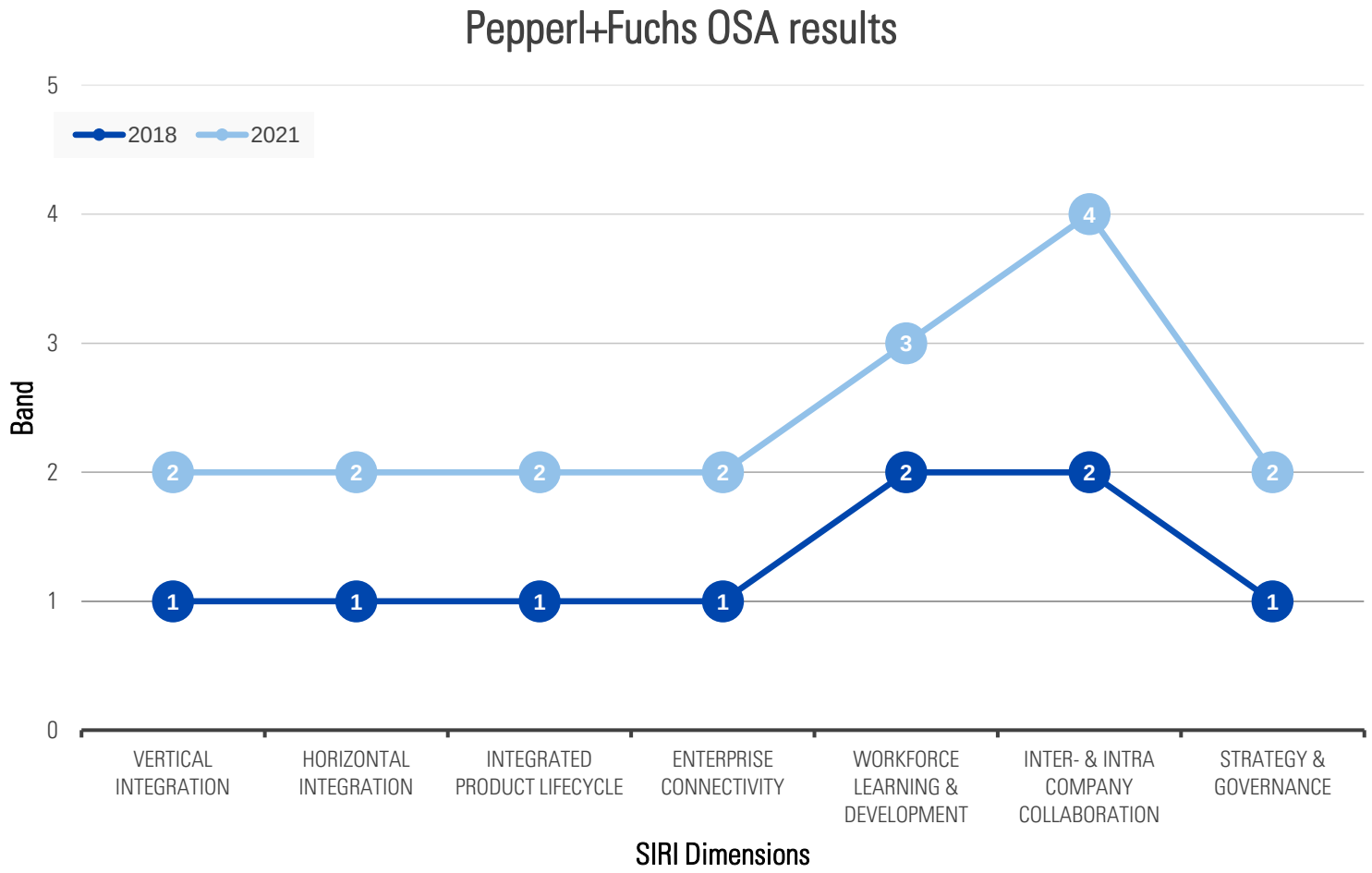
- **Vertical Integration** and **Horizontal Integration**, as well as **Workforce Learning & Development**, were key areas to focus on.
  垂直整合、横向整合与**员工学习与发展**是优先级SIRI维度

P+F Transformation Journey
倍加福转型之旅

3. Execute transformation initiative (2019–2020)
实施数字化转型项目(2019–2020)

- **Digitalizing shop floor processes** by reviewing all existing processes before streamlining workflows and commencing a site-wide exercise to digitalize all remaining processes.
  实现车间流程数字化：审查和简化现有的工作流程才开始实施数字系统
- Introducing **new supply chain management tools** to increase supply chain responsiveness
  引入**新的供应链管理系统**以提高供应链响应能力
- **Updating HR talent development programmes** to encourage employees to embrace the spirit of lifelong learning
  更新人力资源人才发展计划，提倡终身学习的精神

P+F Transformation Journey
倍加福转型之旅



4. Reassessing the site (2021)
重新评估（2021）

- Saw a **progression of one maturity band** among half of the 16 dimensions.
  在16个SIRI维度里，**有一半得到一个等级的提升**
- Based on 2022 benchmarks, P+F Singapore's current maturity across **8-dimensions has equaled or exceeded its industry peers'.**
  根据2022年的基准，**有8个维度的成熟度已经等于或超过了同行**
- **Met its objective in the 2018**: 3-year plan to upgrade its Singapore site to be on par with the Broad Middle segment.
  实现了2018年所定下的目标：3年计划将新加坡亚洲生产总部升级为与80%Broad Middle相当

Looking Ahead | 未来展望

- **Deployed SIRI at 3 other production facilities in 2021**, across Vietnam, Hungary and the Czech Republic.
  2021年，**在越南、匈牙利和捷克共和国的制造设施部署SIRI**
- **Formed an international working group** that will leverage the aggregated findings to develop a 3-year, group-wide corporate digitalization strategy for rollout across all P+F subsidiaries.
  组建一个国际工作组来制定一个为期3年的全企业数字化战略，并在所有倍加福的子公司推广

工业4.0是一个新的范例转变：以往企业着重于优化实体资产和系统；如今则着重于集合运营，业务和产品生产周期层面的大数据从而优化流程。无论是企业内部各部门，或企业与外部利益相关者如供应商和客户，工业4.0将加强跨功能整合、促进更密切的合作。

Gunther Kegel
CEO, 倍加福

Case Study 案例分析 2

Haier

- **A global Chinese company** that provides innovative home appliances and consumer electronics to more than 1 billion users across 160 countries.
  海尔是一家提供创新家用电器和消费电子产品的**中国国际企业**。在全球160多个国家里，拥有10多亿用户。
- From IoT in the early 2010s to the Fourth Industrial Revolution, Haier has been **a pioneer in deploying new innovations into its manufacturing plants.**
  从2010年初开始，海尔就一直**将新技术部署到其下的制造工厂**。
- Today, Haier has **3 factories designated as Lighthouses and** included in the World Economic Forum's Global Lighthouse Network.
  如今，海尔有**3家工厂**被纳入世界经济论坛的全球灯塔网络。

Haier's Transformation Journey
海尔转型之旅

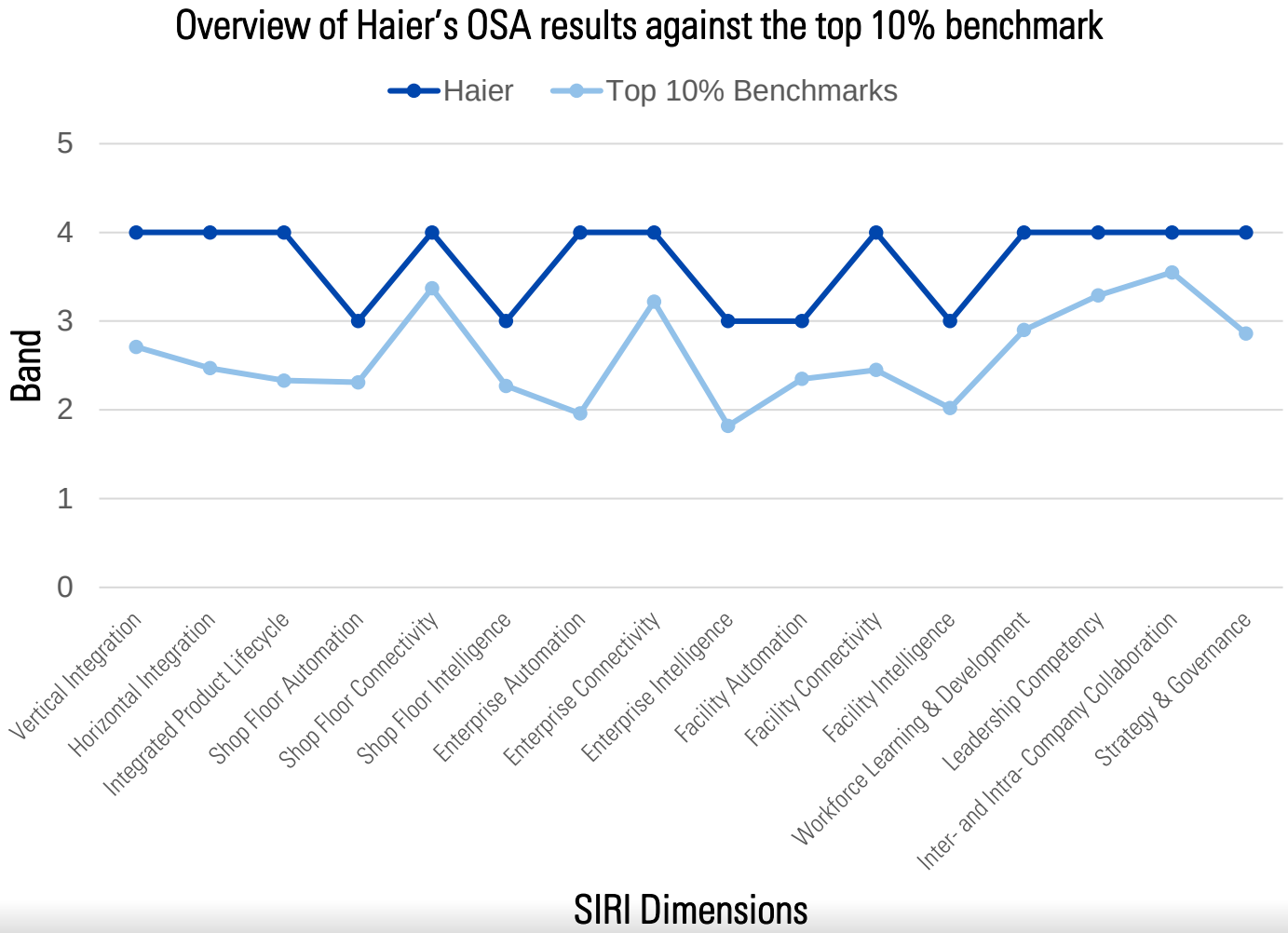
1. Take stock of Haier's digitalization programme
鉴定海尔数字化转型的成果

- **Using SIRI to validate whether its ongoing efforts** had enabled these facilities to be more advanced than their competitors'.
  使用SIRI来验证数字化转型的努力是否使这些设施比竞争对手更先进

- **Future-proof its global operations** by transferring successfully solutions and applications to its manufacturing facilities worldwide.
  将成功的方案和应用，转移到世界各地的海尔工厂，**使全球业务面向未来**

- Before embarking on this ambitious project, the company wanted to **confirm that its transformation strategy to date had been effective and holistic.**
  在开始这个雄心勃勃的项目之前，海尔希望**确认目前为止的转型战略是否全面有效**

Haier's Transformation Journey
海尔转型之旅



2. Ongoing transformation efforts were validated
正在进行的转型工作得到验证

- OSA showed that Haier's sites consistently **performed as well as, or better than, the Best-in-Class (Top 10%)**
  OSA报告显示海尔的表现**比前10%的企业还来的好**

- Attributed to the deployment of its **in-house developed COSMOPlat industrial internet platform**, coupled with advanced technologies (e.g., 5G and edge computing)
  将这佳绩归功于其**内部开发的COSMOPlat工业互联网平台**的部署。该平台结合了最新技术(如5G和边缘计算)

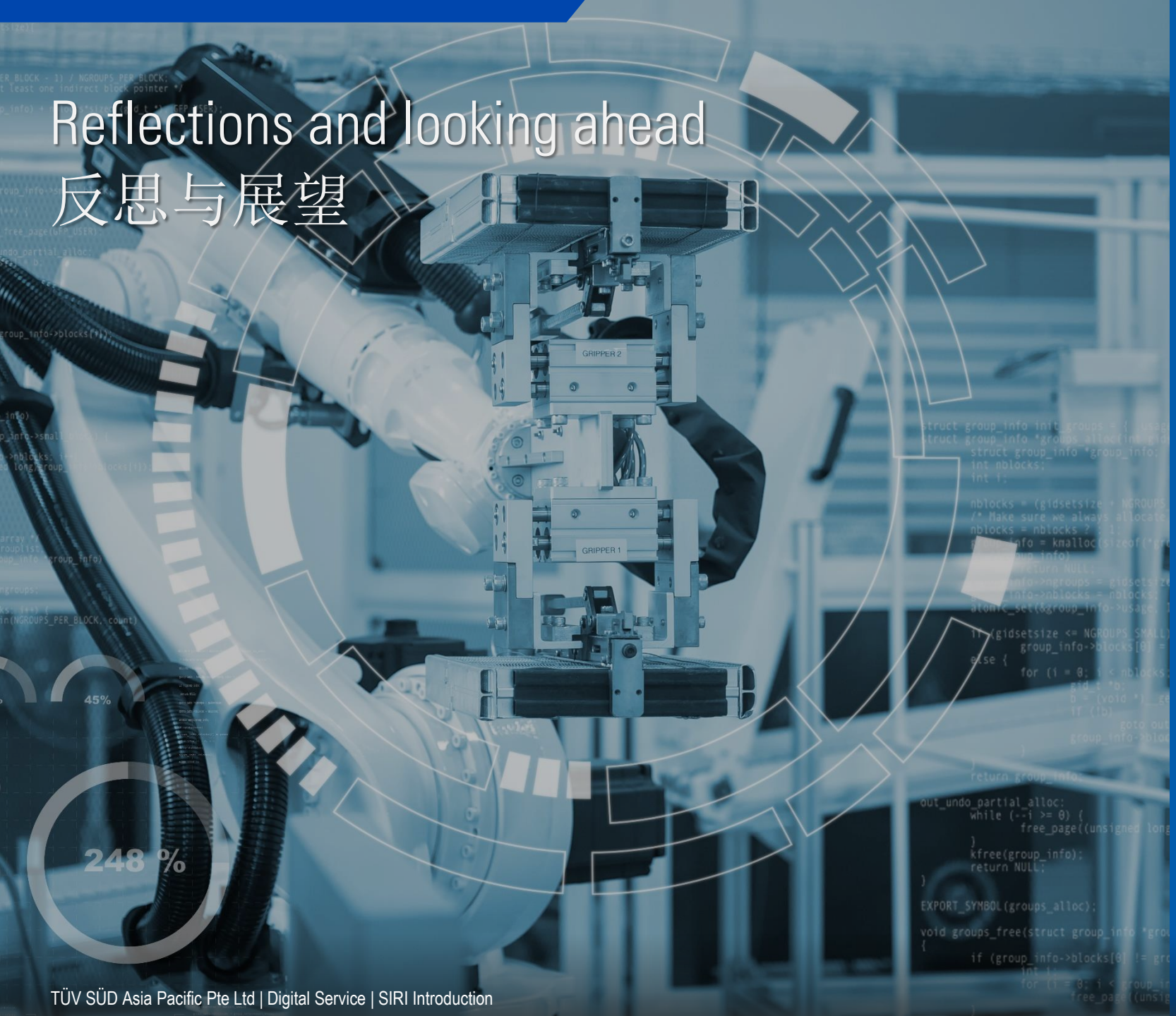
Haier's Transformation Journey
海尔转型之旅

3. Identify weak points and opportunities
找出弱点和改进机会

- By doing a comparative analysis of the OSA results across 4 sites, Haier is able to **identify weak points and opportunities** to strengthen the company's digitalization programme.
  通过4个工厂的SIRI评估结果进行比较，来**找出弱点和改进机会**，以加强公司的数字化转型计划。

- These discoveries will help **pave the way for interventions** that will form part of Haier's future transformation plans.
  这些发现将助于海尔构成未来转型计划一部分的措施与道路

Reflections and looking ahead
反思与展望



1. **Hefei & Qingdao Factory**
   合肥和青岛工厂

   - **Shop Floor Intelligence**: Improve from **Band 3 (Diagnostic) to Band 4 (Predictive)**
     车间智能化：级别3(诊断)提升至级别4(预测)
   - Introducing **predictive analytics functions** within the Equipment Management Platform (EMP) system
     在设备管理平台(EMP)系统中**引入预测分析功能**
   - **Extending EMP coverage** to include the entire product life cycle of all working assets
     扩展EMP的覆盖范围以包括所有工作资产的整个产品生命周期

Reflections and looking ahead
反思与展望

2. Hefei Washing Machine Factory
合肥洗衣机工厂

- **Facility Automation**: Improves from **Band 3 (Full)** to **Band 4 (Flexible)**
  辅助设施自动化：级别3(全自动)提升至级别4(灵活性)
- **Centralizing the controls of various facility assets** to be managed by a single remote monitoring and management (RMM) platform.
  集中控制由单个远程监控和管理（RMM）平台管理的各种设施资产。
- Data optimization and analysis application to **identify energy saving opportunities and reconfigure FM assets to achieve them**.
  数据优化和分析应用程序，用于**识别节能机会并重新配置FM资产以实现它们**。

Reflections and looking ahead
反思与展望

3. **Across all sites 遍及所有工厂**
   - **Horizontal Integration 横向整合**
   - **Found untapped opportunities** to further integrate and automate their supply chain and logistics systems, boosting the efficiency and resilience of their distribution networks and channels
     进一步整合和自动化他们的供应链和物流系统，提高他们的分销网络的效率和弹性

通过这16个维度，SIRI为制造商提供了一个结构化的综合框架，不仅可以评估我们正在进行的转型措施的有效性，还可以指导我们系统性地思考未来发展的方向。这确保了我们能够在全球持续的地实现生产所的全方位的数字化。

Liu Yuping 刘玉平
首席技术官，先进制造业，海尔

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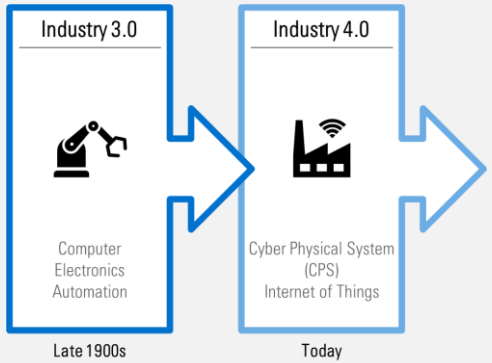
Summary | 总结

工业3.0 vs 工业4.0



Industry 3.0 | 工业3.0

- Improves efficiency & effectiveness via **automation**
  通过**自动化**提高效率和有效性

Industry 4.0 | 工业4.0

- Improves efficiency & effectiveness via **intelligence**
  通过**智能化**提高效率和有效性
- High **Flexibility** & **Agility**
  高**灵活性**和**敏捷性**

智能制造成熟度指数SIRI

SMART INDUSTRY READINESS INDEX

- A **suite of frameworks and tools** to help manufacturers – regardless of size and industry – start, scale, and sustain their manufacturing transformation journeys.
  包含**一套框架和工具**来协助制造企业开始、扩展和维持它们的制造业转型之旅。

4步转型之旅

- TÜV SÜD Digital Service **Industry 4.0 Ecosystem**
  TÜV南德数字服务**工业4.0生态系统**
- **Assists manufacturers** in their transformation journey
  协助制造企业进行转型之旅

Case Studies | 案例分析

PEPPERL+FUCHS

Haier

Pepperl+Fuchs 倍加福

- SIRI 评估 ▶ Transformation 转型 ▶ SIRI 评估 ▶ Transformation 转型…

Haier 海尔

- Transformation 转型 ▶ SIRI 评估 ▶ Transformation 转型…


Question & Answer


Thank you!