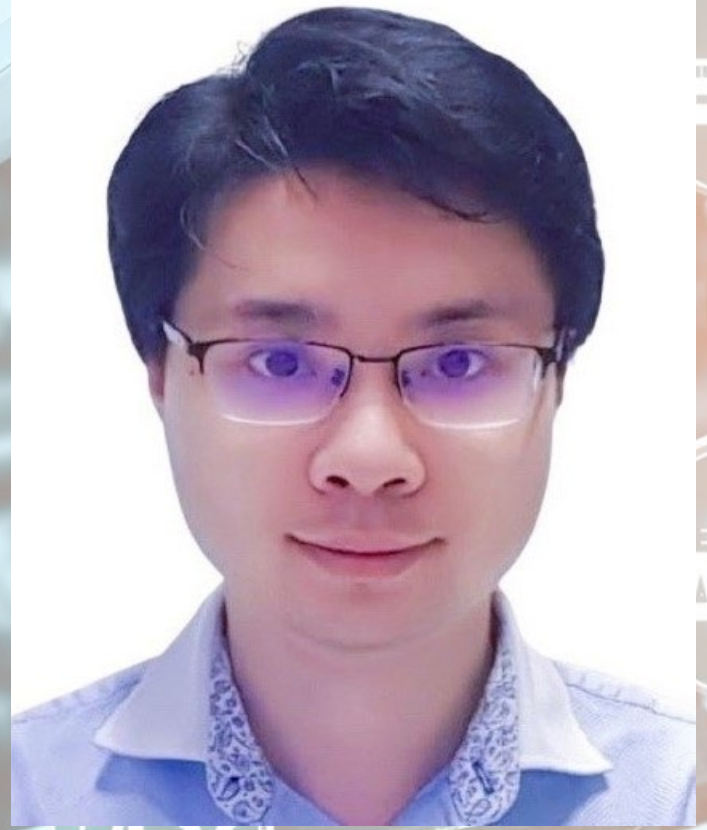


First Speaker

Dr Liu Shiyu

Head of Skills Development at the Advanced Manufacturing Training Academy (AMTA)


Future-Proofing the Manufacturing Workforce for I4.0 Transformation
Advanced Manufacturing Training Academy

Talent Attraction & Retention

I lost 30% of my skilled workers to my neighbour across the road…

…almost impossible for us to hire any local talent for the factory floor…

The work orders are coming in, but we don't have anyone to man the shift…

Workforce Resilience

The downturn is making some of my workforce redundant…

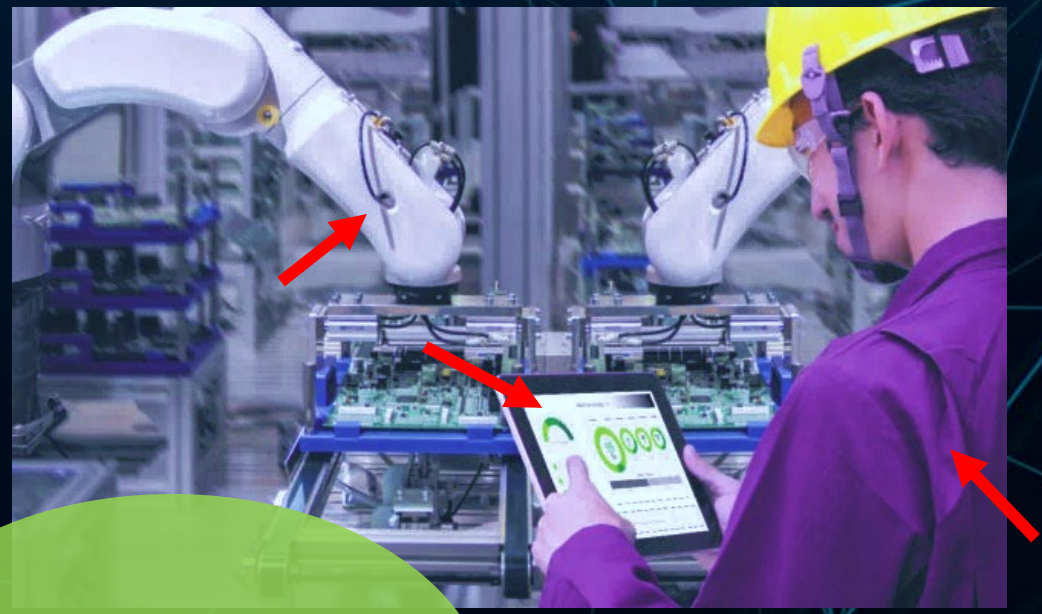
…but I can't let go of my workers because I won't be able to get them back again when things pick up…

If only I can freely transfer my operators across different manufacturing processes…

Adopting I4.0 to Attract Talents and Enhance Workforce Resilience

A

B



I4.0 Technologies

Human Capital


ANALYTICS
AUTOMATION
CLOUD COMPUTING
SYSTEM INTEGRATION
SMART FACTORY
BIG DATA
MANUFACTURING
SKILLS GAPS
CYBER SECURITY
AUTONOMOUS ROBOTS
INDUSTRIAL REVOLUTION
SMART
TECHNOLOGY
IOT
NEW BUSINESS MODEL

Emerging Advanced Manufacturing Technologies	Emerging Skills
1 Lights Out Manufacturing enabled by advanced robotics and intelligent automation	Robotics programming, automation design, computer vision, human-machine interaction
2 Smart horizontal and vertical integration enabled by manufacturing platform, IIoT and connected technologies	Smart manufacturing platforms, IIOT management, sensorization, shopfloor connectivity
3 Predictive maintenance applied in more manufacturing industries, enabled by machine learning and advanced analytics	Machine learning, data mining, artificial intelligence
4 Digital twins (digital design, simulation and integration) at the core of product and process development	Product and process modelling and simulation
5 Additive manufacturing making product innovation and production more effective and efficient	Additive manufacturing (product design, processes and safety)
6 Immersive collaboration and training enabled by extended reality and metaverse technologies	AR/VR, virtual collaboration
7 Increasing use of advanced materials developed using computational methods	Advanced materials, computational materials development
8 Increasing focus on sustainability in product design and manufacturing operations	Sustainable manufacturing transformation

AMTA’s Skills Gap and Training Needs Analysis

Creation of Skills Profiles & Benchmarks Aligned with I4.0 Adoption

Skills profiles covering both fundamental and emerging AM skills

Skills benchmarks aligned with companies’ I4.0 adoption

1

Skills Gaps Analysis

Evaluation of workforce skills proficiency against company benchmark

2

Training Needs Prioritization

Identification of priority training topics for intervention

3

Skills Profiles: the Foundation for Manufacturing Skills Gap Identification

1. What are the foundational skills required to perform the role's functions?

2. What skills are required to accommodate I4.0 technology adoptions?
(e.g. automated CMM tools and robot arm for component handling)

3. What skills are needed to further enhance the role's effectiveness and efficiency?

4. What skills are needed to advance the role's career to another level?

- Applications of AR and VR in training
- Leadership
- Change management

Quality Engineer, SME in Precision Engineering

Skills Benchmarking and Evaluation: Empowered by the Skills Framework

Evaluation ↓ Skills Gap ↓ Benchmark

Data and Statistical Analytics 1 2 3 4 5 6

Level 1: Carryout the collection of data for data analytics processing

Knowledge:
- Business Statistics
- Microsoft Excel functionalities

Abilities:
- Identify areas with meaningful data for collection
- Carry out the collection of data in a format for easy manipulation

Level 2: Support the collection of data required for data analytics application
… …

Level 3: Implement the application of data analytics across the organization
… …

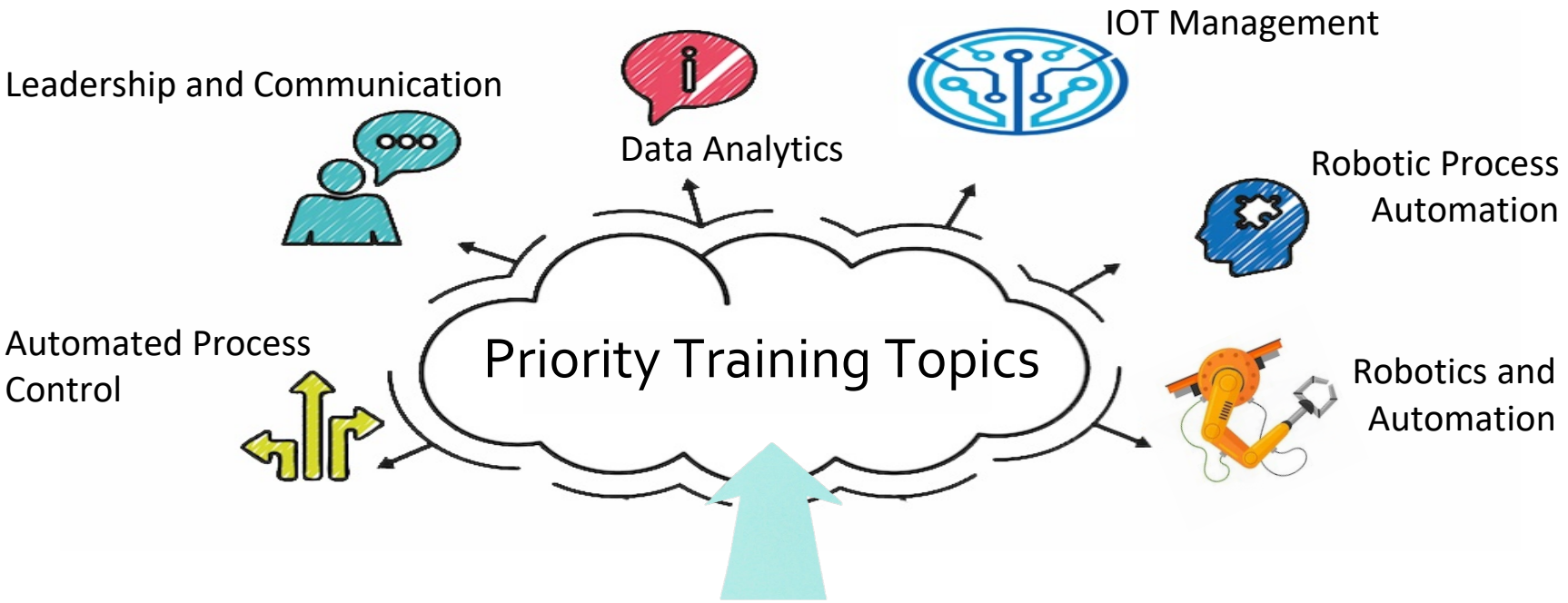
Level 4: Facilitate the development of new analytics solutions to address existing gaps in analytics tools

Knowledge:
- Operations of statistical techniques, e.g. probability theory, probability distribution, hypothesis testing
- Test conditions required for each statistical technique
- Interpretation of the results from statistical modelling
- Types of statistical software

Abilities:
- Review data sets to uncover trends or patterns
- Develop new methods to conduct analysis of large complex data sets specific to each issue
- Facilitate the discussion on areas for the application of big data analytics to examine issues

Level 5: Devise the next generation of data science with the use of big data analytics to aid in the discovery of new process improvement opportunities
… …

Training Program Curation to Address Priority Training Topics



Curation of Contextualized Training Courses in Collaboration with Training Providers

Advanced Manufacturing Training Academy

AMTA's Manufacturing Workforce Transformation Pathway

Exposure

- Awareness of I4.0 & advanced manufacturing
- Change management
- Jump-starting I4.0 transformation

IHCI
Industry 4.0 Human Capital Initiative

Assessment

- Skills Gaps and Training Needs Analysis at both organizational and individual levels
- Contextualized workforce development roadmap and role-based individual upskilling plans.

Advanced Manufacturing Training Academy

Implementation

- Holistic training programs leveraging the strength of multiple training providers.
- Joint support from multiple agencies to streamline training implementation.

SkillsFuture SG

Advanced Remanufacturing and Technology Centre
ARTC

Singapore Institute of Manufacturing Technology
SIMTech

Temasek Polytechnic

UTAC

Common Gap Topics in the Training Eco-system

Advanced Manufacturing Training Academy

Thank You!

Fourth Speaker

Goh Soo Lin

*Senior Research Engineer at A*STAR SIMTech.*

Singapore Institute of Manufacturing Technology
SIMTech

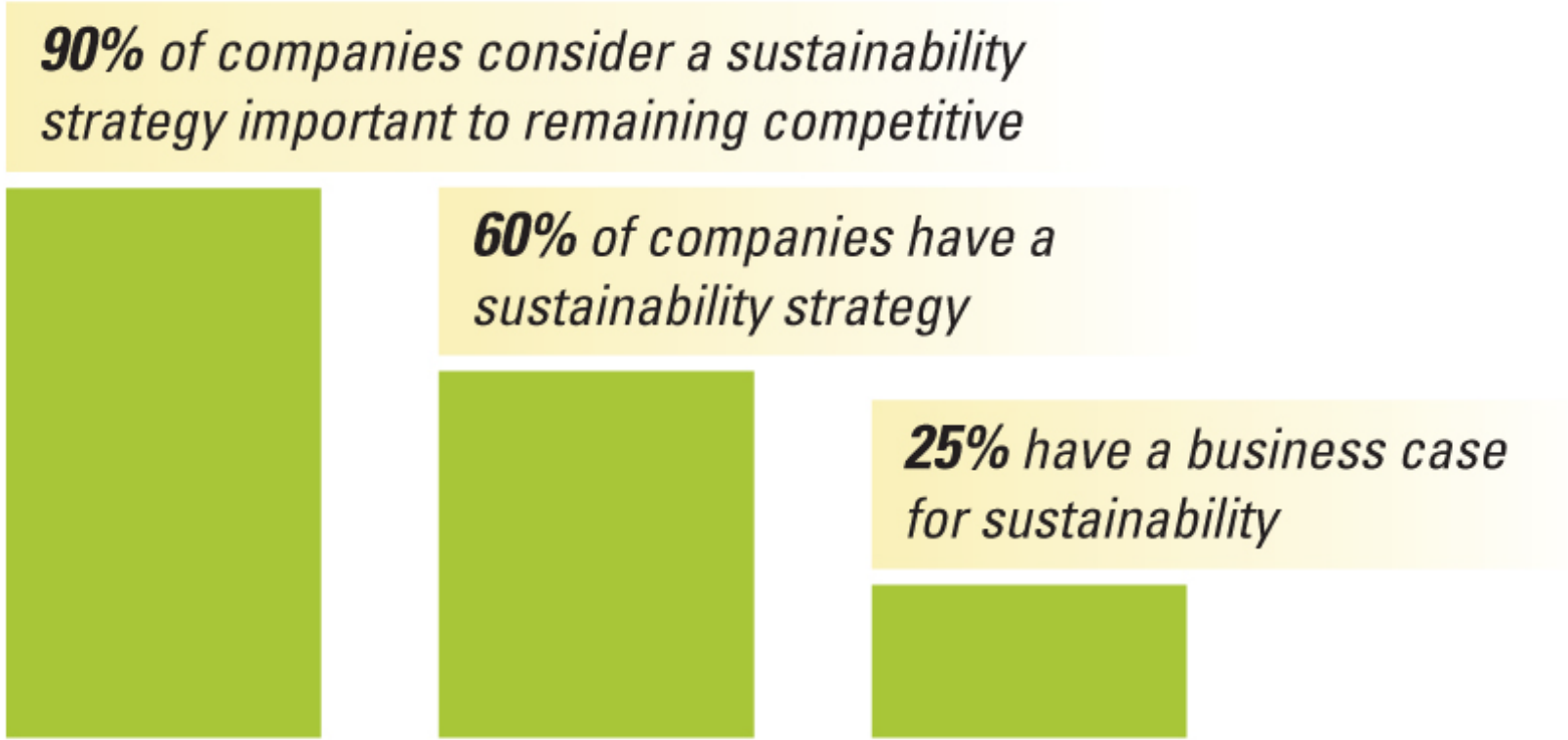
SUSTAINABILITY TRANSFORMATION THROUGH GREEN COMPASS™

Goh Soo Lin
Senior Research Engineer
Sustainability and Life Cycle Management Research Division, SIMTech

30 March 2023

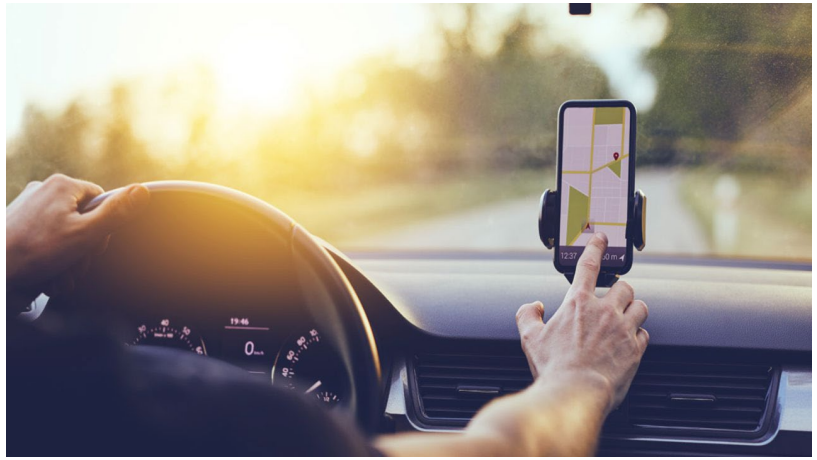
Green Compass™

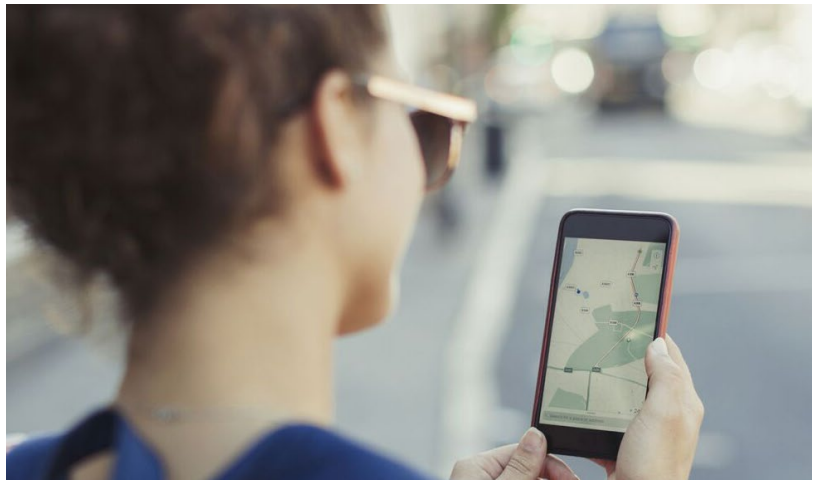
Is Environmental Sustainability Important For Your Business?



1. Unruh et. al, Investing for a Sustainable Future: Investors Care More About Sustainability Than Many Executives Believe, 2016. Based on a survey of more than 3,000 executives and managers from more than 100 countries.
2. Image credit: https://sloanreview.mit.edu/wp-content/uploads/2017/05/17su_01-01.jpg

Poll: How did you get here today?





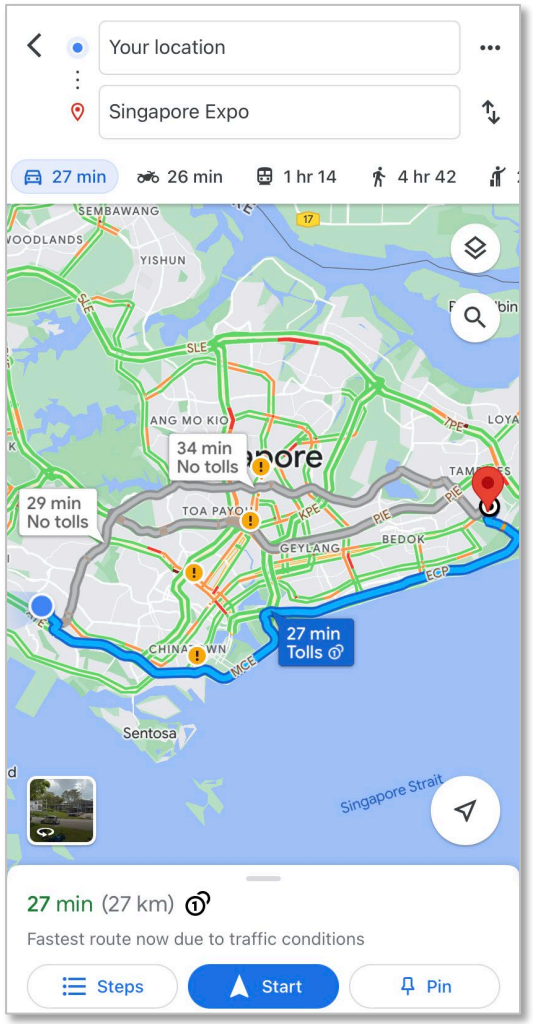
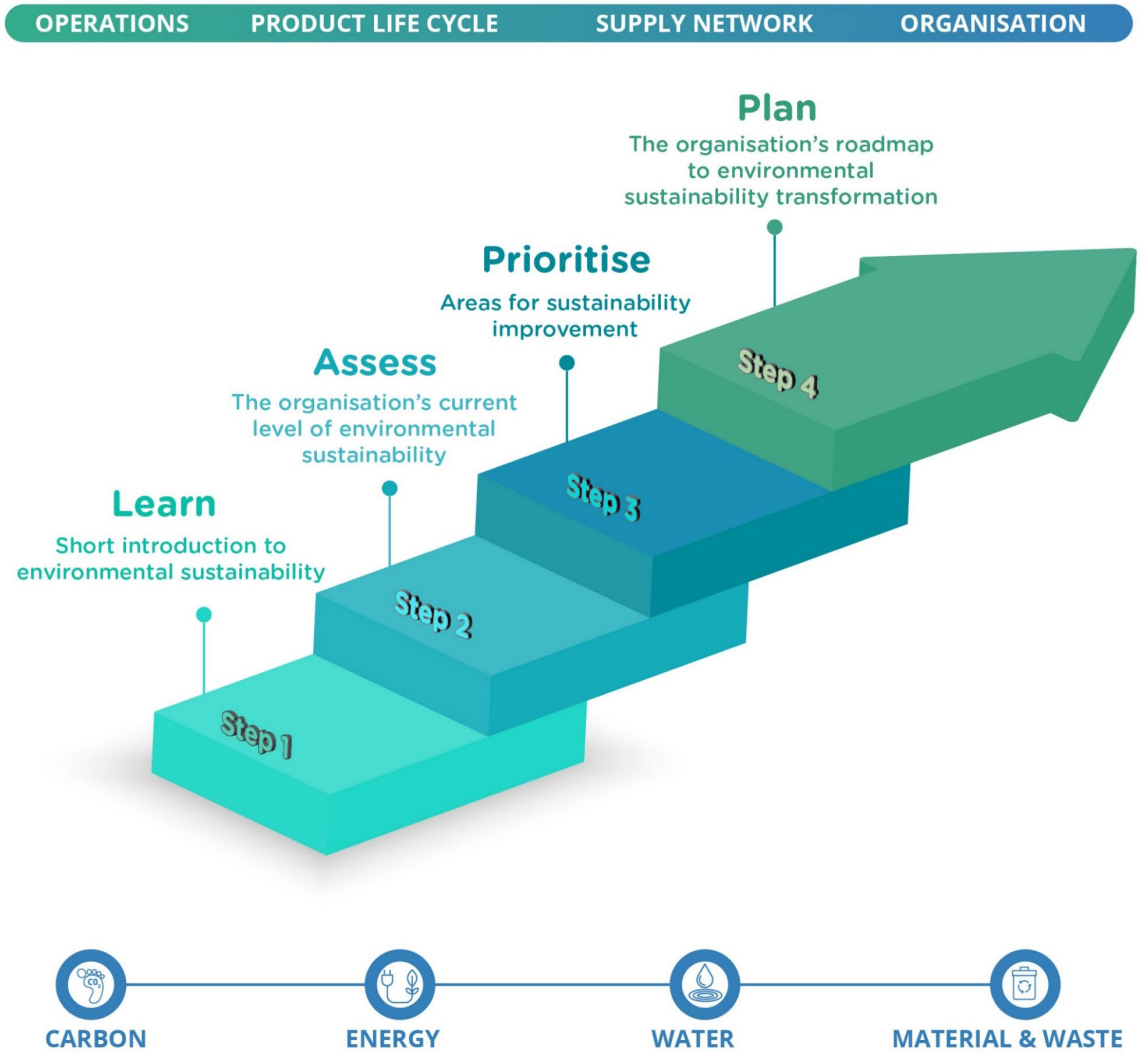


Image credits: Hexagon; ACTS; Google Maps

Green Compass™

Green Compass™ is an environmental sustainability assessment and strategic roadmapping tool.

Companies can utilise the tool through our 16-hour Green Compass™ course, co-delivered by SIMTech and TÜV SÜD.



Key benefits:

- ✓ Reduce business costs by learning how to improve resource efficiency
- ✓ Future-proof operations against supply chain or resource shocks
- ✓ Preparing for sustainability transformation through an increased awareness of key improvement areas and a strategic roadmap for immediate implementation

A joint collaboration among

Singapore Institute of Manufacturing Technology SIMTech

jtc BUILDING INDUSTRIES

TÜV SÜD

Scope of Green Compass™

- **Comprehensive and holistic approach to environmental sustainability**
- **Carbon, Energy, Water, Material & Waste: important in Singapore's context**

Building Blocks	Green Organisation		Green Business		
Dimensions	Talent Readiness Management	Structure & Management	Operations Management	Supply Network Management	Product Life Cycle Management
Domains	Leadership Competency	Strategy & Governance	Carbon	Carbon	Carbon
		Policy & Compliance	Energy	Energy	Energy
	Workforce Learning & Development		Water	Water	Water
		Stakeholder Engagement	Material	Material	Material

Learn-Assess-Prioritise-Plan in action

Brainstorming and sharing of ideas, with a focus on implementation

Participation from various departments and mix of seniority levels for maximum impact across the organisation

Testimonials

*"The **Green Compass Assessment results were comprehensive**, which helped us to identify not just which specific areas to work on, but how to work on them. **The trainers were knowledgeable in the topic covered and were helpful in our specific issues** when brainstorming for improvement ideas. As a result of the course, we put together a roadmap of improvement actions that we are excited to get started on to **scale up our environmental sustainability transformation**."*

James Chua, Senior Manager (Quality)
I-PEX Singapore

*"**Our key challenge was the lack of a data-driven structured approach to identify our sustainability objectives.** During the programme, we gained **better visibility** of various cost structures within the company that impacts our sustainability agenda. The **step-by-step consultative approach** has also helped us to identify, assess, and prioritise key sustainability focus areas."*

Colin Tan, Chief R&D Officer
YHS (Singapore) Pte Ltd

Organisations that have utilised Green Compass™

Spanning across Multinational Companies (MNCs), Trade Associations, Institute of Higher Learning (IHL) and Small Medium Enterprises (SMEs).

- Applied Materials Southeast Asia
- SATS Ltd
- Emerson Automation Solutions
- Tru-Marine
- AMT Pte Ltd
- A*STAR
- Technoform Edge Bond Solutions
- Sing Mah Wooden Cases Manufacturer
- Singapore Polytechnic
- Yokogawa Engineering Asia
- Insect Feed Technologies
- Advanced Remanufacturing and Technology Centre (ARTC)

Expert reviewers from:

- Shell
- GlaxoSmithKline
- Neste
- Sustinere
- Panasonic
- Engie Impact

CREATING GROWTH, ENHANCING LIVES

Singapore Institute of Manufacturing Technology

SIMTech

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THANK YOU

www.a-star.edu.sg

Green Compass™

Scan the QR code to register for the Green Compass™ course today!