

# Platform Strategies and Industry 4.0

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# Nine Technologies are Transforming Industrial Production Process into Industry 4.0

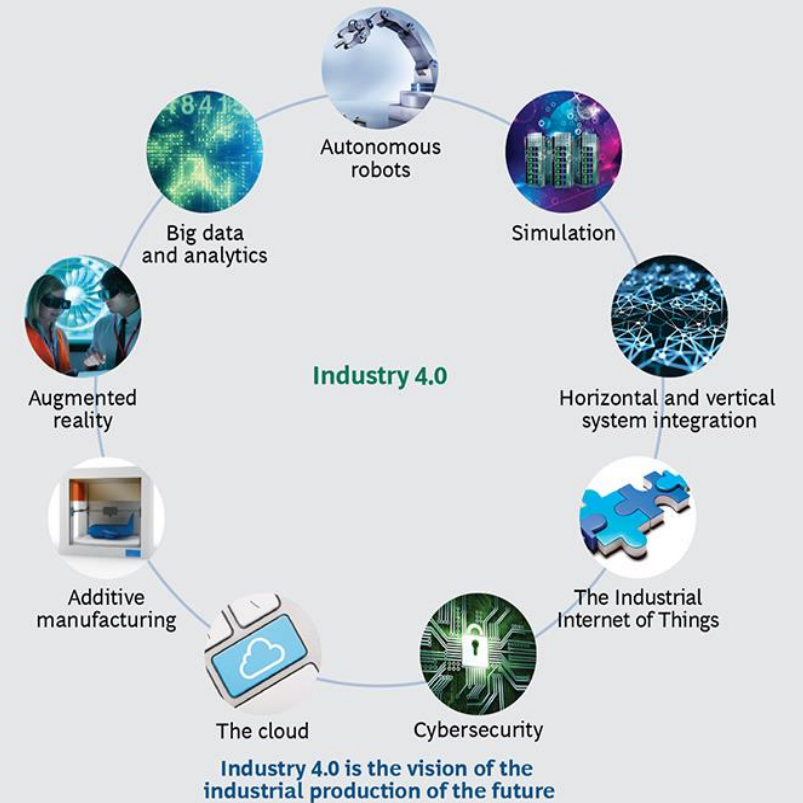
**Industry 1.0:**  
Systematic implementation of water and steam power to mechanical production.  
1st mechanical weaving loom in 1784 developed by Edmund Cartwright, UK

**Industry 2.0:**  
Power revolution to electric infrastructure and labor division for mass production.  
1st assembly line in 1870 by meat-packing industry of Chicago and Cincinnati, USA.

**Industry 3.0:**  
Digital revolution of implementation of intelligent computing enhancement to industry.  
1st PLC-programmable logic controller in 1969 designed by Dick Morley, GM, USA.

**Industry 4.0:**  
Information revolution of everyone and everything are connected as a global brain of network.  
A high-tech strategy of the German government, which was presented by the Working Group Industry 4.0 on April 8th, 2013 at the Hanover Fair.

EXHIBIT 1 | Nine Technologies Are Transforming Industrial Production

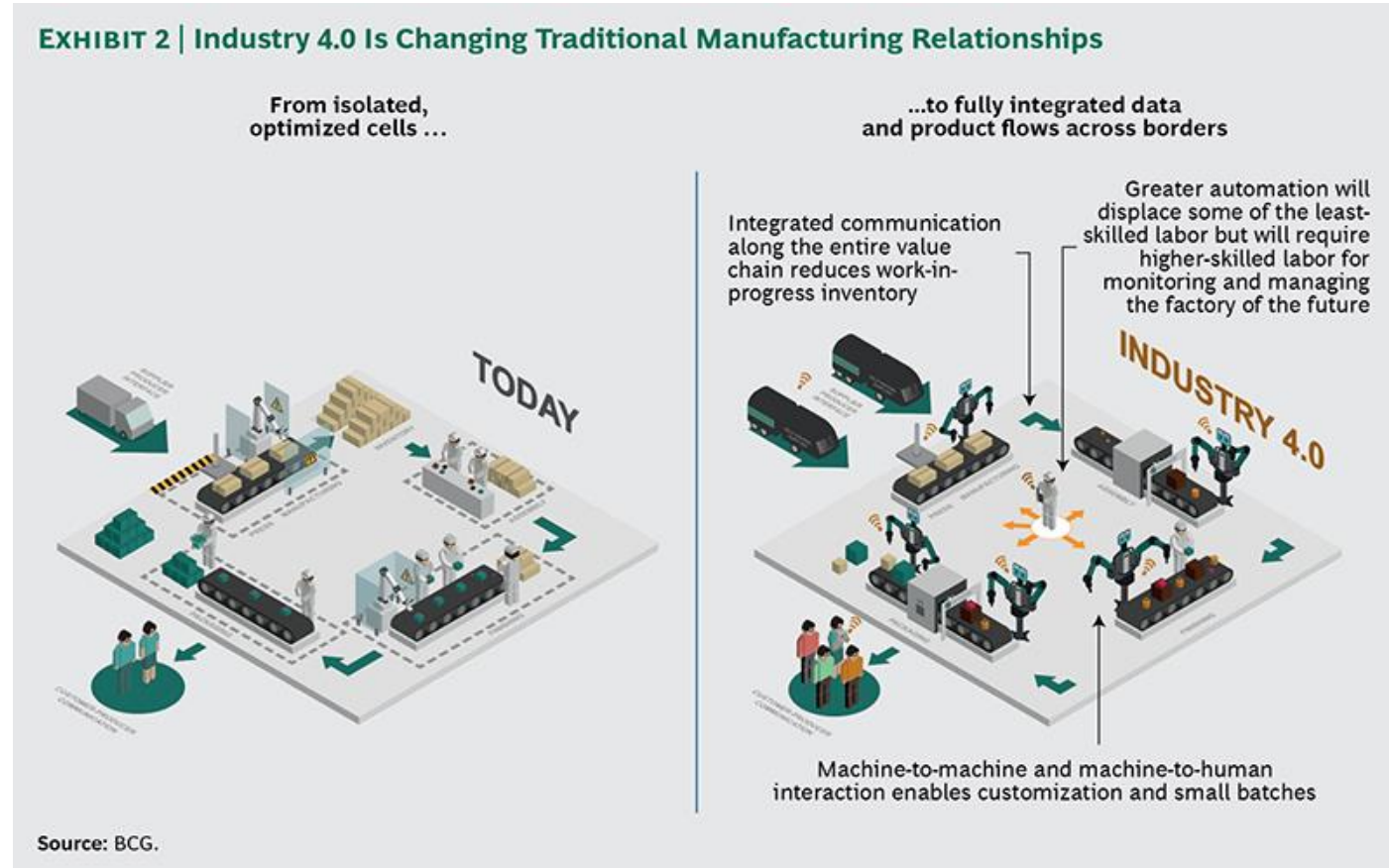


Source: BCG.

5 Cyber Tech + 4 Physical Tech = CPS

# Industrialized Countries Drive Different Degrees of Customization, Productivity, and Quality by Industry 4.0

- High level of product variants by smart and flexible manufacturing to gain productivity
  - Automotive industry
  - Food-and-beverage industries
  - ICT industries
- High quality by data-analytics-driven improvements of precision and accuracy to reach 6 sigma standard
  - Semiconductors industry
  - Pharmaceutical industry
  - Aeronautical and Aerospace industries
- The champion and stakeholders need form an ecosystem to implement the BCG's nine pillars of technological advancement by adapting the appropriate infrastructure, process, standards, and education.



# 'Digital Leapfrog' should be on the National Agenda for all ASEAN Countries, said by Jamaludin Ibrahim, President of Malaysia's Axiata Group,

- The World Economic Forum (WEF) analyzed the next step for ASEAN governments is to address the skills gap and be prepared to fully adopt the Industry 4.0 (IR4) to increase the region's productivity and competitiveness whilst lowering unemployment rates and creating higher income jobs. .
- IR4 will focus on the formulation and implementation of a strategic industrial direction to develop skills, private sector partnerships, infrastructures and capital requirements.
  - Singapore, Skills Future initiative by the Future Economy Council (FEC), Singapore developed an integrated high-quality system of education and training.
  - Malaysia, IR4 technology certification and training initiative by Penang Skills Development Centre together with Human Resources Development Fund (HRDF).
- If manufacturers in ASEAN can improve the IR4 gaps with their counterparts in the US, Germany and Israel. Like integration, adoption has the potential to make a big positive impact on profits - with an estimated increase of between US\$25 billion to US\$45 billion by 2030.



Source: Digitalizing ASEAN's manufacturing sector, Premalatha Jayaraman, 22 August 2017

# Benchmark the Leading Countries' IR4 Guidelines

- It is a collective term for technologies and concepts of value chain integration
  - It is based on the technological concepts of cyber-physical systems (CPS), the Internet of Things (IoT), and the Internet of Services (IoS).
- It facilitates the vision of the Smart Factory
  - Within the modular structured Smart Factories of Industry 4.0,
  - CPS monitor physical processes, create a virtual copy and make decentralized decisions,
  - Over the IoT, CPS communicate and cooperate with each other and humans in real time,
  - Via the IoS, both internal and cross-organizational services to integrate participants' value chain.
- It is designed with critical concept (from e-PDCA to i-PDCAS Cycles) in aspects such as,
  - Interoperability: capability of CPS, IIoT, and IoS,
  - Virtualization: a virtual copy of the Smart Factory by linking sensor data with virtual plants' simulation,
  - Decentralization: capability of CPS within Smart Factories to make decisions on their own,
  - Real-Time Capability: capability to collect analytical data and provide the derived insights immediately,
  - Service Orientation: offering of services of CPS, humans or Smart Factories via IIoT,
  - Modularity: flexible adaptation of Smart Factories to change requirements by adjusting individuals.



# Benchmark “ a Series of well Thought out Five-Year Plans” Carried out by ROK Government

- ASEAN shall learn from Korean path of transformation from 1950s to 2010s and its policy & strategies for IR4 implementation
  - A series of well thought out five-year plans,
  - Major emphasis on human resource improvement,
  - Increased productivity,
  - Infrastructure development,
  - Key industry prioritization.
- ROK transformed from an agriculture-based economy to a service-based economy
  - The service sector grew from 3% to 63% by 2014,
  - Its GDP ranking improved from 38th in 1961 to 11th globally in 2015,
  - Enrollment rates for university increased from 9% to 80% in 2014.
- ASEAN shall set your own Vision, Missions, and Goals for IR4
  - From productivity to value creation,
  - From digitalization to national niche valuable platform initiation.

# Policy Recommendation - ASEAN IR4 Platform

**IR4 Platform**  
**Formulation, and Optimization**

**Capital Requirements and Investment**  
**Cooperation with Regional Win-Win Partnership**  
**Investment with National Capacity Building**

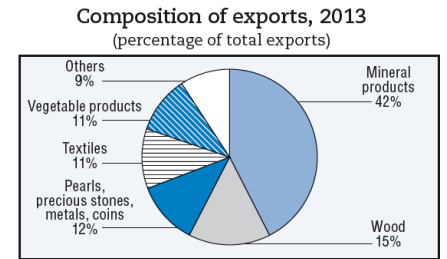
**Strategic Industrial Direction**  
**Exports' Value Enhancement and/ or Imports' Substitution**

**Skills Development**  
**Digitalization to CAD/ CAM/ Simulation of Scenario, Behavior, Biz Model, Technology**  
**Fundamental Engineering / Service Practice Lab./ Center**  
**National Competition and Certification System**

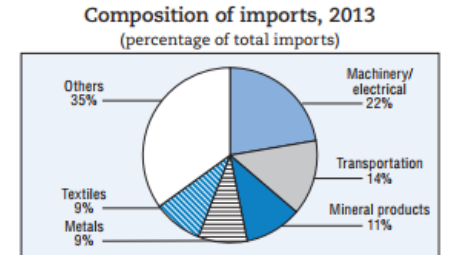
**Infrastructures**  
**Theme Driven – Smart City/ Smart Transportation,**  
**Clean Power Drive Quality Environment,**  
**Open Lab./ Demonstration Platform link with Strategic Industries**

**Private Sector Partnership**  
**FDI/ Alliance/ Local Growing**

- **International Airport**
- **Deep Sea Port**
- **Electric Power Water-Dam**
- **Special Economic Zone**



Source: Trademap.



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# Strategic Industrial Direction – Bench Marking CT's Metal Industries

## CT SMEs in the 90s:

- Most of SMEs are **Exported-oriented** due to small domestic market
- SMEs forms clusters locally

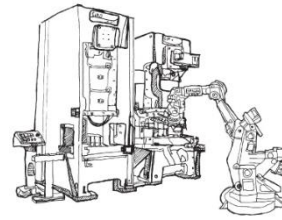
## Needs of SMEs:

- **Increase added-values** of metal products
- Industry moving offshore , **Core technology needs to be preserved**

## Evolution of MSMEs



Fasteners



Machining Center



Hand Tools

### As-is:

- OEM,
- Labor-intensive industry
- Mass production, low profit

Technology  
Innovation

Design &  
Creation

### To-be:

- ODM, OBM
- Technology-intensive industry
- High added-value products



# IR4 Program Design R&R/ Road Map

## ➤ Policy Maker

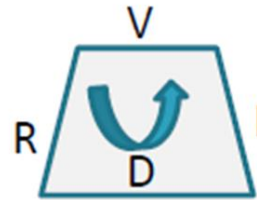
- ✓ Vision, mission, goal
- ✓ Infrastructure
- ✓ Investment

## ➤ Industry

- ✓ Scenario, behavior, business model
- ✓ Product development
- ✓ Cluster of engineering and services

## ➤ University

- ✓ Research Theme
- ✓ Operation methodology investigation
- ✓ Cloud computing and big data analysis

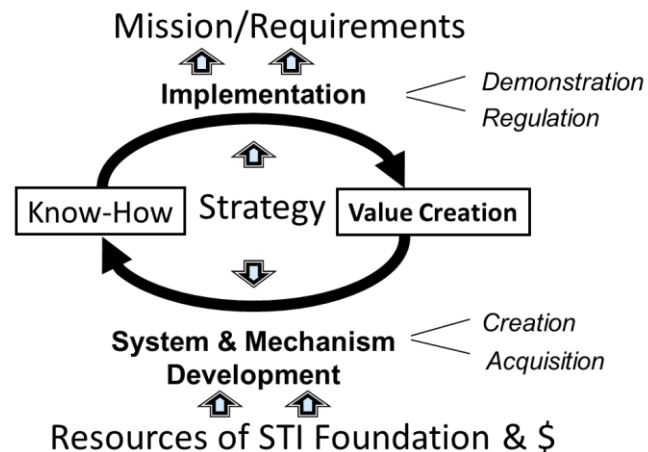
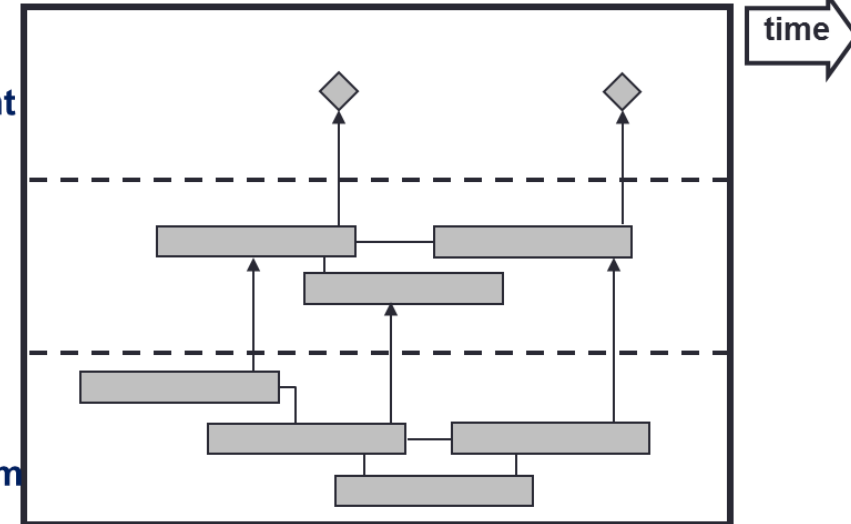


1. R: Requirements
2. D: Development
3. I: Integration
4. V: Validation

Mission / Requirement

Policy / Service

System/ Mechanism



**Thank You !**