

# Indonesia's 4<sup>th</sup> Industrial Revolution



**Making  
Indonesia  
4.0**



# Industry 4.0 initiative is the global trend in the manufacturing industry

*End of  
18<sup>th</sup> century*



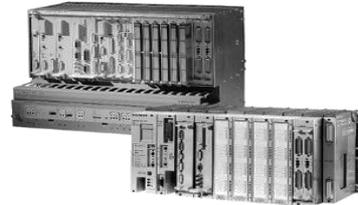
First mechanical loom - 1784

*Beginning of  
20<sup>th</sup> century*



First production line, slaughter-houses in Cincinnati - 1870

*Beginning of  
the seventies*



First programmable logic controller (PLC)  
Modicon 084 - 1969

*Today*



Ubiquitous connectivity of people, machines and real time data

**Industry 4.0**  
Cyber-physical systems

**Industry 3.0**

Use of electronics and IT to further automate the production

**Industry 2.0**

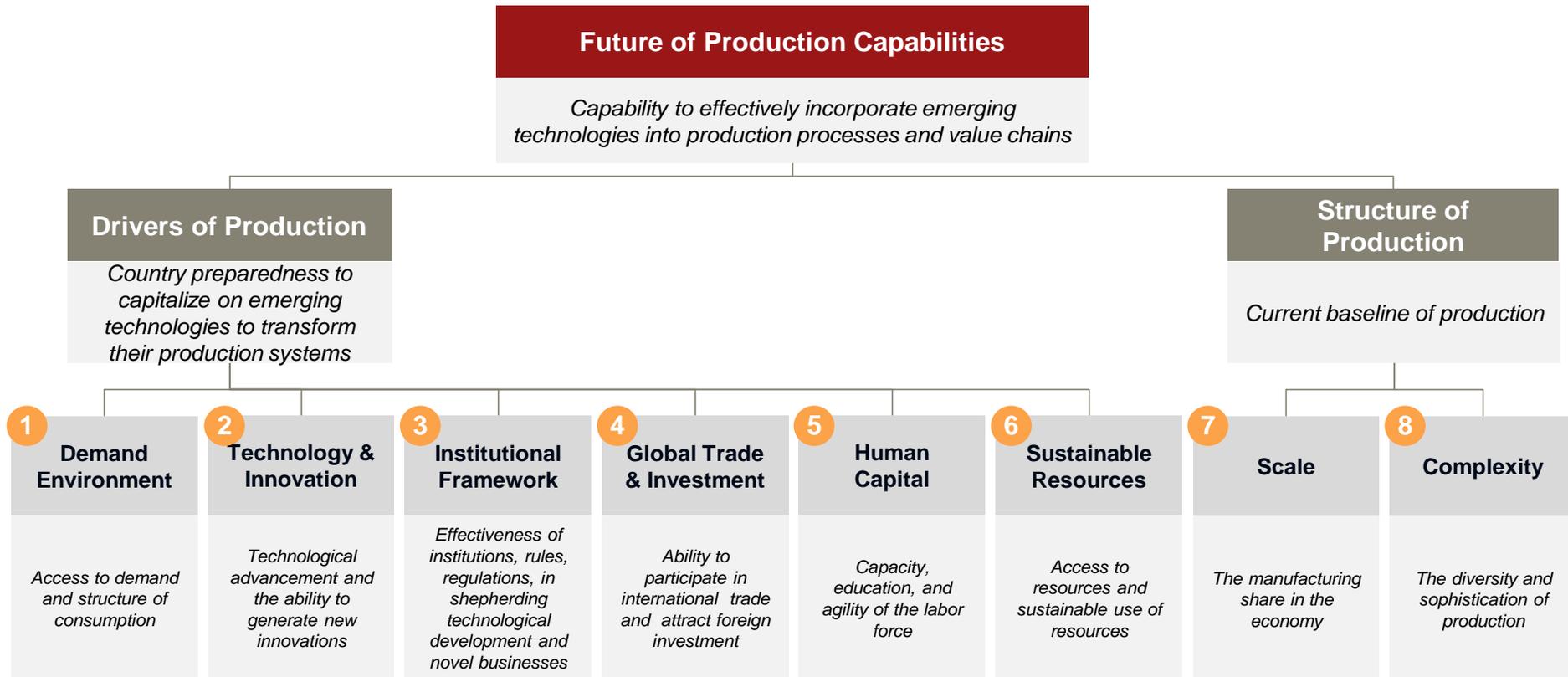
Introduction of mass production based on the division of labor

**Industry 1.0**

Introduction of mechanical production facilities using water and steam power

# 4IR Country Readiness Index (CRI) measures ~100 countries' readiness to face Industry 4.0

## Country Readiness Index Framework and Drivers



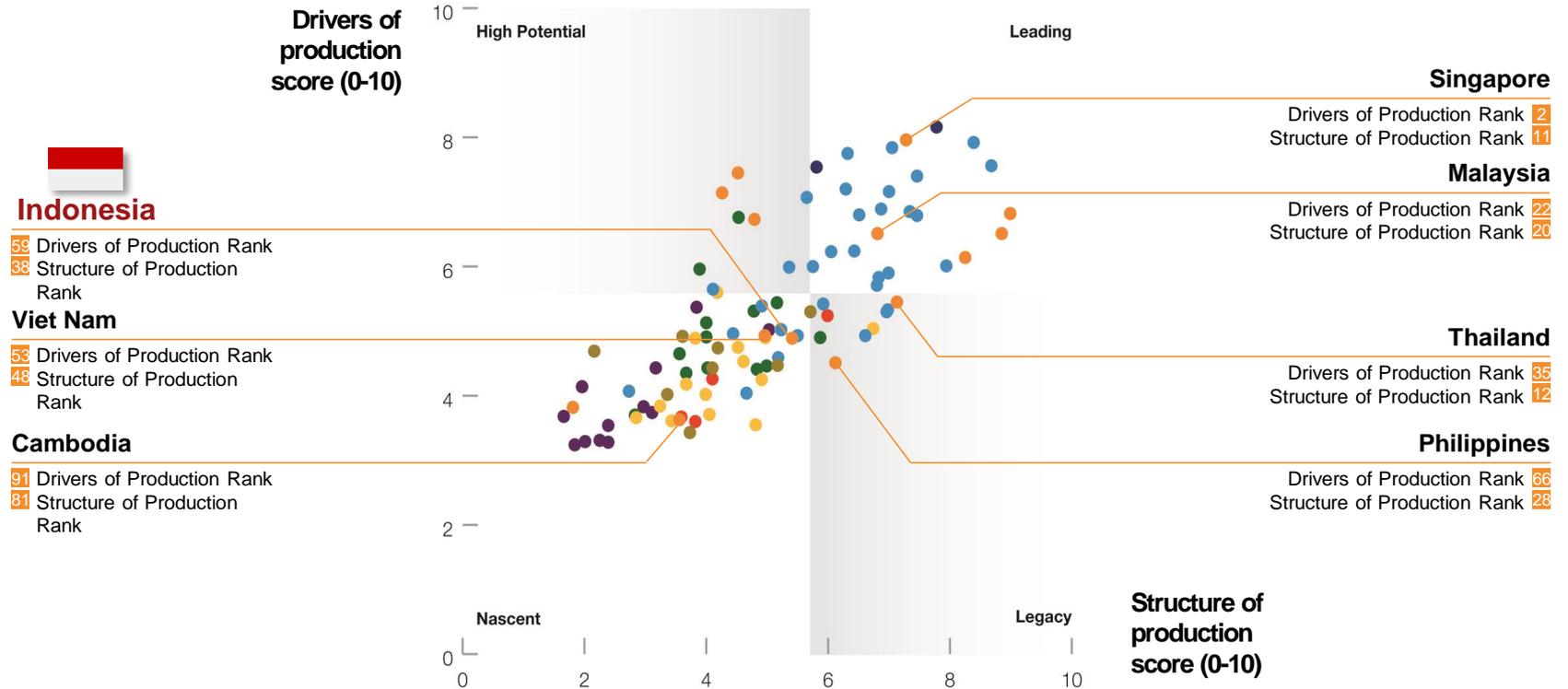
# The 4IR Country Readiness Evaluation

## Initial mapping – country readiness

### Country archetypes

Country readiness score

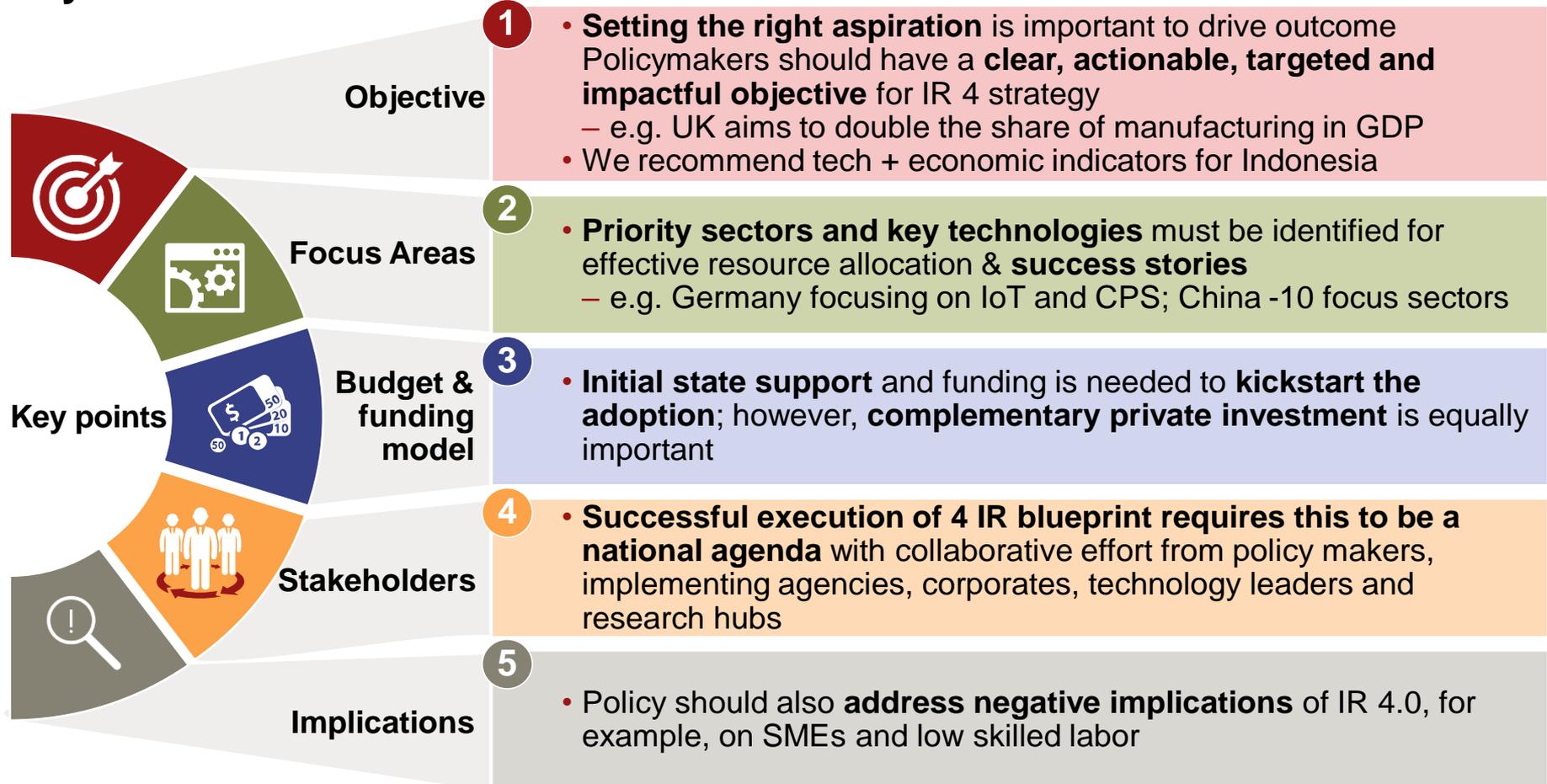
- East Asia and the Pacific
- Latin America and the Caribbean
- South Asia
- Eurasia
- Middle East and North Africa
- Sub-Sharan Africa
- Europe
- North America



Note: Drivers of production shows potential to adopt the 4IR - consist of Demand factor, Technology & Innovation, Institutional Framework, Global Trade & Investment, Human Capital, Sustainable Resources; while Structure of production shows the existing factors on the ability for 4IR – consists of scale and complexity of production  
Source: A.T. Kearney, World Economic Forum

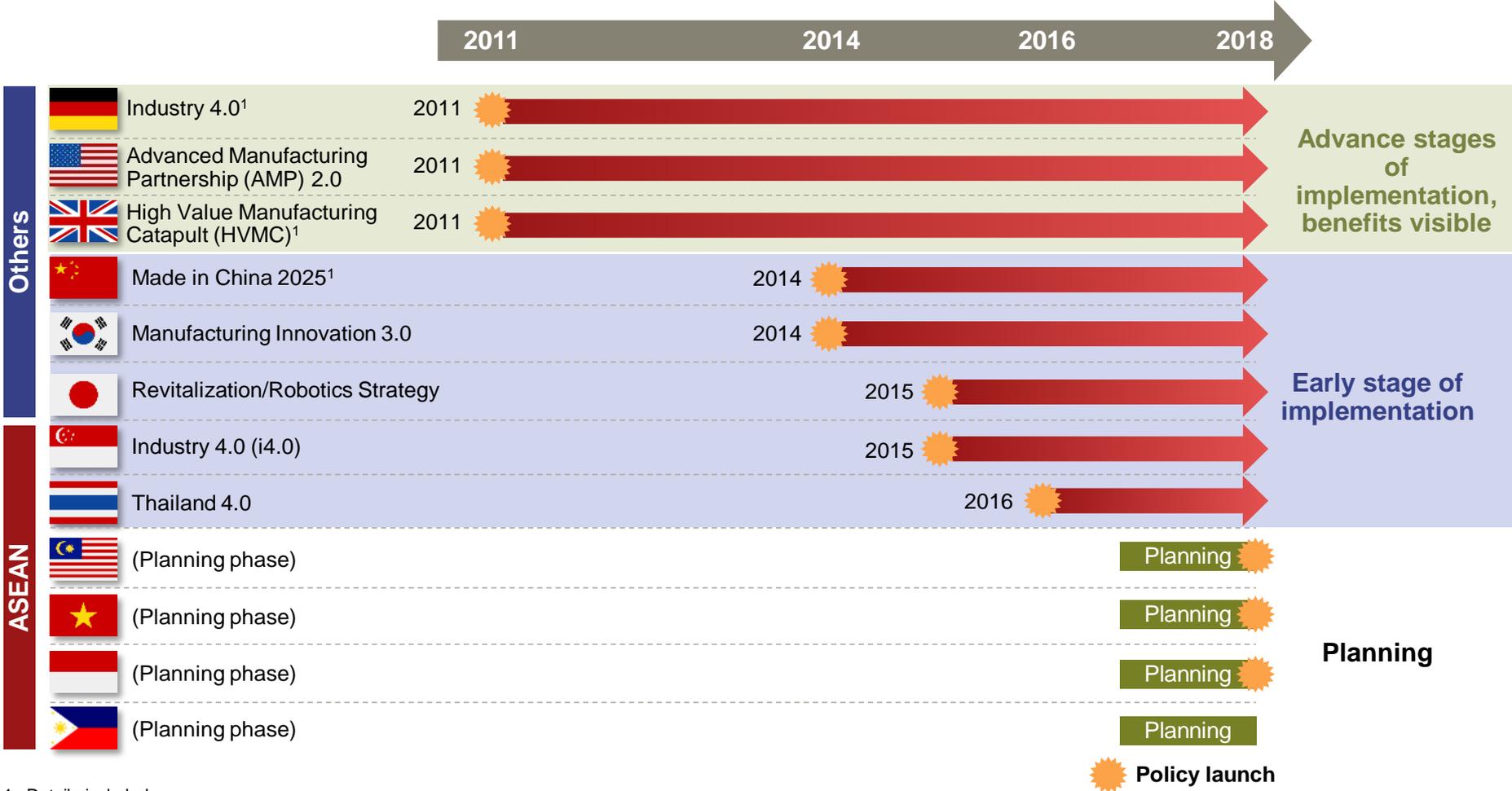
# 5 key lessons learnt from other countries' 4IR policies

## Key lessons for Indonesia



# Countries, who have launched IR 4.0 related initiatives, span across 3 levels of maturity

## Policy launch timeline



1. Details included  
Source: A.T. Kearney, press research

# Germany launched I40 initiative in 2011, aimed at driving digital manufacturing and consolidating technological leadership

## Germany's Industry 4.0 Program Outline

### Objective and Focus Industry

- **Objective:** Establish Germany as lead market and provider for advanced manufacturing solutions
- **Timeline:** 2011- 2020
- **Focus Sector:**
  - Climate/Energy
  - Health
  - Mobility
  - Security
  - Communication
- **Focus Technologies:**
  - Internet of Things
  - Cyber Physical Systems

### Program Scheme

The diagram illustrates the 'INDUSTRIE 4.0 Platform' at the center, with bidirectional arrows connecting it to several key partners: acatech (National Academy of Science and Engineering), DEK (German Research Center for Artificial Intelligence), FESTO, TRUMPF, SAP, BOSCH (Invented for life), and WITTENSTEIN.

- Mixing **public funding (EUR 200Mn)** with **private financials** for research and technology deployment
  - SMEs typically get **50% public funding** for the IR4.0 related projects
- The platform initiates, funds and supports research and company-led projects and test-beds and competence centers for the piloting of production systems



### Program Impact

- Expected productivity benefits of **EUR 90-150Bn** over next 5-10years
- I40 platform has become the **largest and most diverse i40 network** globally
- Has funded over **500** I40 projects

# Singapore clearly leads the ASEAN countries in terms of initiatives for IR 4 adoption

## IR 4.0 Initiatives in ASEAN region

### Leader

*Deep-dive*

**Singapore** 

- Comprehensive IR 4.0 strategy in place focusing on **capability development, industry transformation and reskilling workforce**
- Planned investment of **SGD 3.3Bn** over 4 years for R&D in advanced manufacturing and engineering
  - Special programs for industry aligned R&D for **robotics and 3D printing**
  - Alliance with 13 companies to develop IoT solutions
- Earmarked SGD **4.5Bn** to develop individual transformation roadmaps for 23 industries across 6 clusters
  - Facilitating SMEs to access advanced manufacturing equipment's & expertise
- Commenced New skilling programs as per industry needs

### Legacy champions

*Deep-dive*

**Thailand** 

- Thailand 4.0 is aimed at creating a value based economy
- Identified **10 priority sectors** for investment – 5 existing industries and 5 new industries to support future competitiveness
- Created a fund of **~\$280Mn** to investment in R&D for targeted industries

**Malaysia** 

- Govt. close to formulating IR 4.0 strategy - Invited suggestions from industry, collaborated with other nations
- Agreements with **Chinese and German players** for investments in robotics, manufacturing, etc.
- Programs in place to **upskill workforce** for next generation technologies

### Followers

**Philippines** 

- A broader manufacturing industry roadmap in place but is yet to be implemented
- Appointed nodal agency to coordinate the process among stakeholders
- Secured **Japan's backing** (investment commitments) to better prepare for IR 4.0

**Vietnam** 

- Ministries reviewing current strategies and action plans with development trends in IR 4.0
- Govt. push on developing IT infra, incentives to encourage investments
- Working with **Siemens for education and training** for Industry 4.0

# Thailand's 4IR adoption is an integrated part of the country's 4.0 economical model which aim to develop into a valued-based economy

## Thailand's 4IR guiding principles



### Launch and focus areas



- In May 2016, The NSTDA, the Ministry of Science and Technology, and Autodesk signed a **MOU to help advance manufacturing competitiveness through adoption of 3D technologies and digital manufacturing capabilities**
- Government is devising a 20- year national strategy, "6-6-4 plan", consisting of **six target areas, six primary strategies and four support strategies** to help the country achieve **sustainable development**

### Key goals



- Focus on developing technologies (target **R&D expenditure 4% of GDP**)
- Achieve **5-6% economic growth** level in next 5 years and improve **GDP per capita to ~2.7x by 2032**
- Reduce **social disparity by ~30% in 20 years**
- Develop 10 cities into the **world's most livable cities**
- **10 priority sectors for investment-** automotive, electronics, tourism, food, agriculture & biotechnology, robotics, digital industry, aviation, bioenergy and medical industry

### Policies



- Key elements of **Thailand 4.0 policies and programs:**
  - Change the country's traditional farming to smart farming, traditional SMEs to smart enterprises, and traditional services to high-value services
  - **Developing Thailand as a high-income country** by developing knowledge-based economy, emphasising on **research and development, science and technology, creative thinking, and innovation**

### Key guiding principles



- **4IR as a National Agenda**
  - **Supported by each policymaker**
  - **Aligned with the nation's strategic agenda** (e.g. Thailand 4.0 economy)
- **Aggressively encouraging foreign investment** through favorable programs, e.g.:
  - No local content required
  - 100% foreign ownership
  - No export requirements
  - No restriction on foreign currency
  - Deductions for qualifying infrastructure costs

Their 4IR aspirations fall into 3 categories: **tech** only, **econ** only or tech & econ (**hybrid**) – hybrid most suitable for Indonesia

**4IR country aspiration archetypes**

Not Exhaustive



**Technology**

**Key indicators**

- Sectoral adoption of advanced technology
- Science & industry partnership

**Country examples**



**Germany**

(Industrie 4.0)



**Turkey**

(Intelligent Mfg. Systems Tech. Roadmap )

**If Indonesia follows this...**

- Ease of implementation is low as **tech readiness is limited**
- **Weak direct linkage** to overall economic impact



**Economy**

**Key indicators**

- GDP, mfg. contribution to GDP, exports value
- Job creation, skills enhancement

**Country examples**



**UK**

(HVMC Catapult)



**US**

(Adv. Mfg. Partnership)



**India**

(Make in India)

**If Indonesia follows this...**

- **No urgency to drive innovation and technological advancement** where Indonesia is still lagging in (compared to above countries)

Most suitable archetype for Indonesia to adopt



**Hybrid**

**Key indicators**

- **Economic:** GDP per capita, growth of industrial VA<sup>1</sup>, productivity
- **Tech:** innovation, 4IR tech market

**Country examples**



**China**

(Made in China 2025)



**Japan**

(Robot Strategy)



**Mexico**

(Industry 4.0 Mexico)



**Thailand**

(Thailand 4.0)

**If Indonesia follows this...**

- **Clear target to improve innovation & tech** – where Indonesia is lagging
- **Clear linkage to economic performance**

1. Value-added  
Source: A.T. Kearney

# Industry 4.0 can revive the Indonesian manufacturing sector; Indonesia should launch “Making Indonesia 4.0” initiative

## Impact of Industry 4.0



**Making  
Indonesia  
4.0**

**Global Top 10  
Economy by 2030**

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**10% Net  
Export**  
contribution to GDP

**Regain net export position**  
(the same level as 2000)

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**2x current<sup>1</sup>  
productivity-  
to-cost**

**Enhance output while  
managing cost** (Similar  
improvement speed to India)

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**2% of R&D  
spending**  
share to GDP

**Build local innovation  
capabilities** (Similar level to  
China<sup>2</sup>)

1. Based on 2016  
 2. Indonesia's R&D spending per GDP is currently around 0.1-0.3%  
 Source: World Bank, A.T. Kearney