

Artificial Intelligence Research and Industry

Directorate General of Metal, Machinery, Transportation and
Electronics Industries

“Making Indonesia 4.0” Aspiration



The contribution of net exports is 10% of GDP

Revive net export advantage (as in 2000)

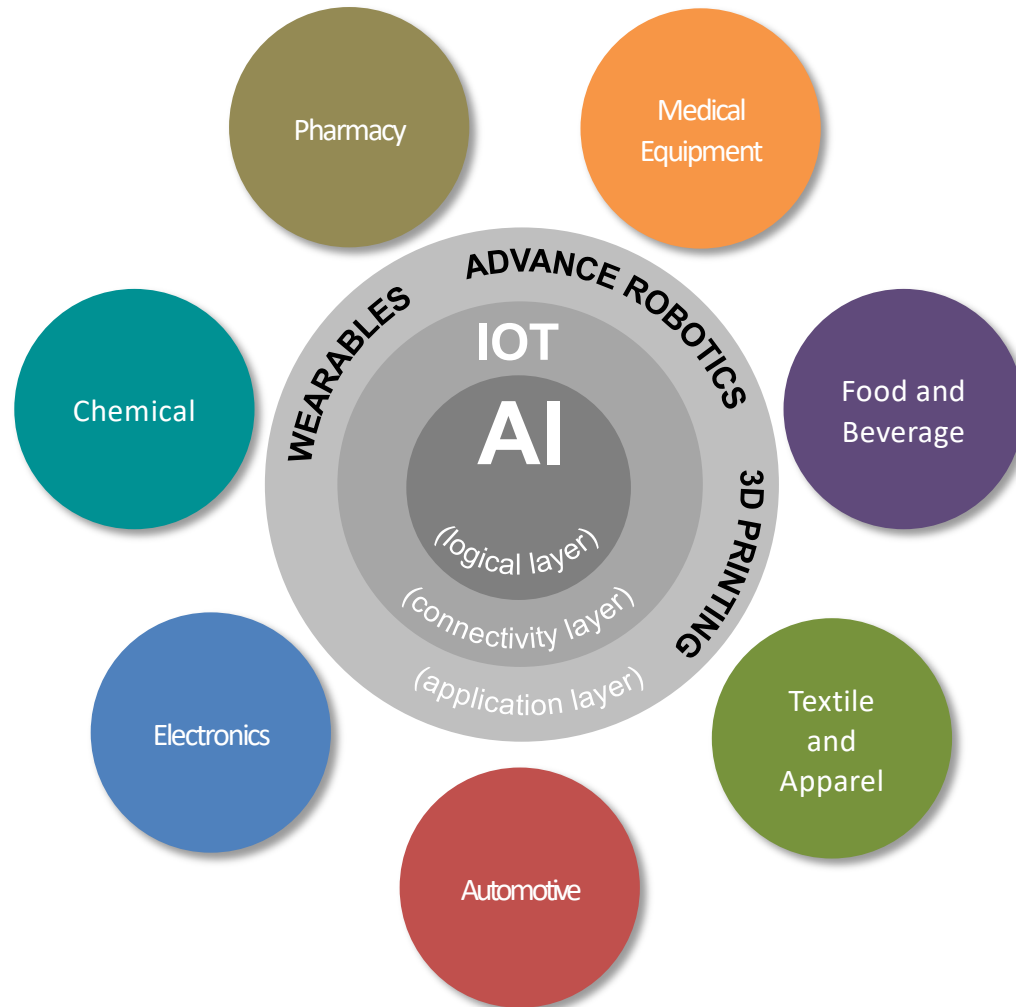
2x current productivity to costs¹

Increase production while keeping costs down (Speed of improvement is similar to India)

R&D expenditure is 2% of GDP

Building local innovation capabilities (At a similar level to China²)

1. 2016 as a base
2. Indonesia current R&D expenditure is 0.1-0.3% of GDP
3. Source: World Bank, A.T. Kearney

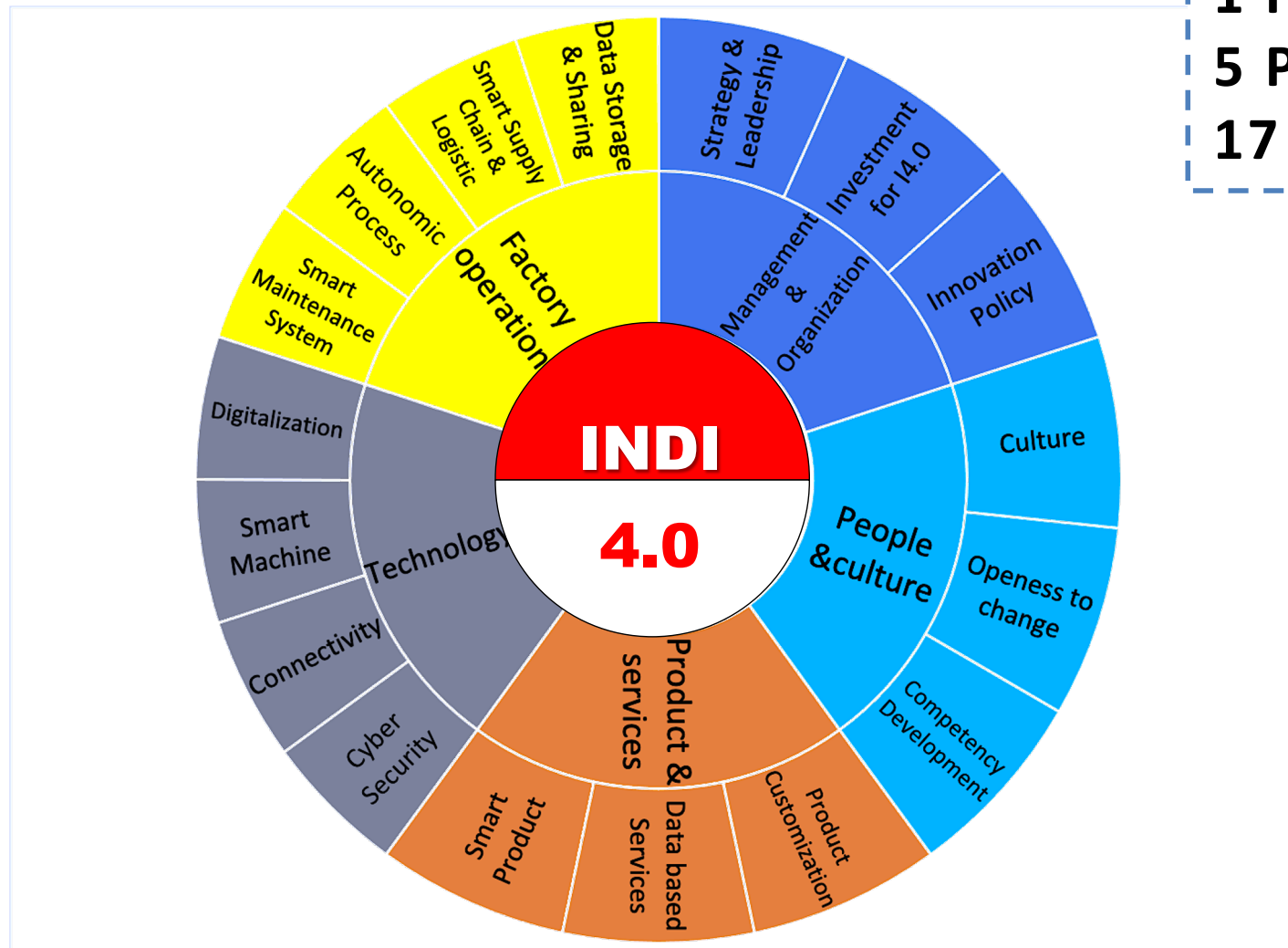


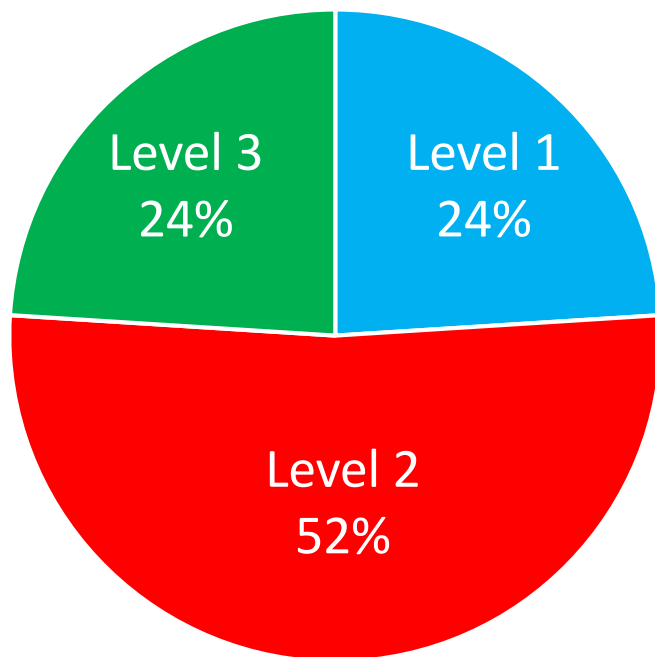
10 Strategic Initiatives “Making Indonesia 4.0”

1. Reform Material Flow
2. Redesign Industrial Geographical Footprint
3. Accommodate Sustainability Plan
4. Empower SMEs
5. Build Digital Infrastructure Nationwide
6. Attract Foreign Investments
7. Upgrade Human Capital
8. Establish Innovation Ecosystem
9. Incentivize Innovation
10. Reoptimize Industry Regulations & Policies

INDONESIA INDUSTRY 4.0 READINESS INDEX (INDI 4.0)

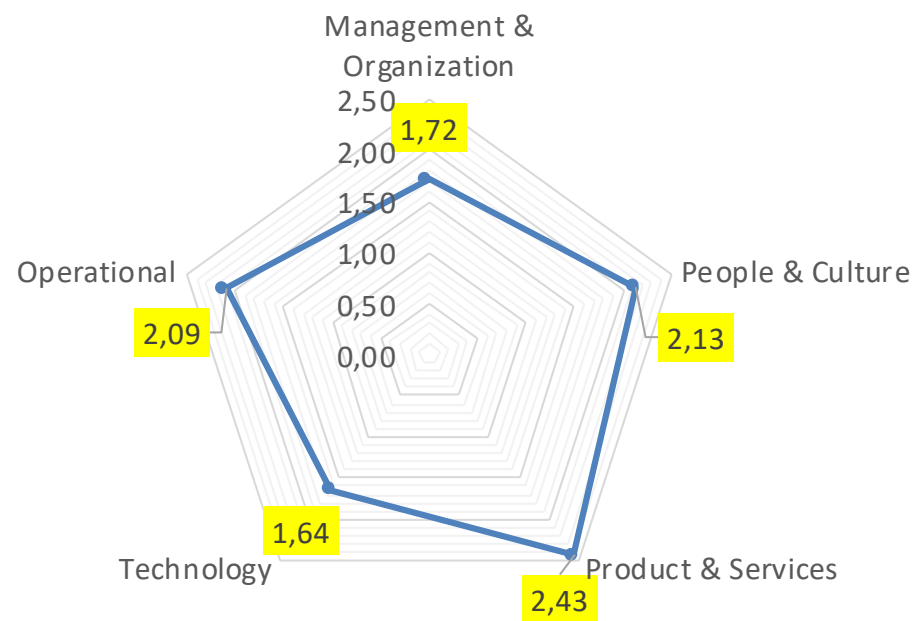
1 INDEX
5 Pillars
17 Fields





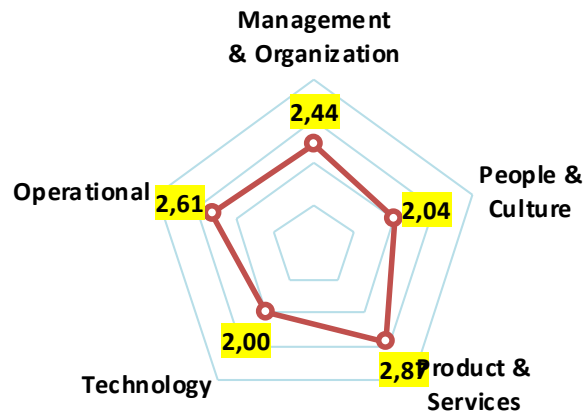
INDI 4.0 LEVEL CRITERIA:



0: Score 0,00 – 0,50	Not ready
1: Score 0,51 – 1,50	Initial readiness
2: Score 1,51 – 2,50	Medium
3: Score 2,51 – 3,50	Mature
4: Score 3,51 – 4,00	Implemented



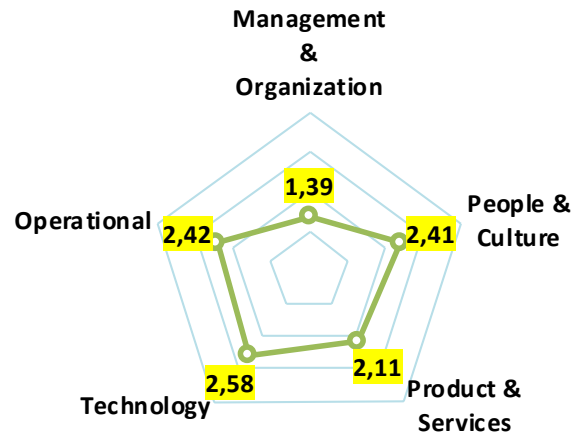
Readiness Index: Medium



 **Vehicle (2,71)**



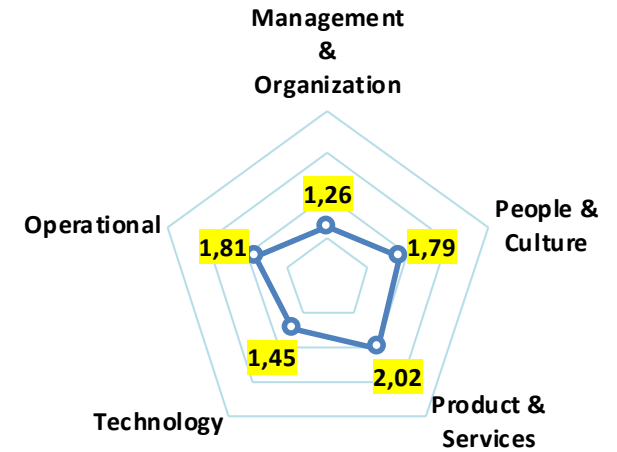
 Total : 8 Company
 Readiness Index: Medium



 **Motorcycle (2,21)**



 Total : 3 Company
 Readiness Index: Medium

 **Component (1,73)**



 Total : 367 Company
 Readiness Index: Initial readiness

- The challenges in implementing IR 4.0 in the Automotive sector are "management and organization" and "people & culture".

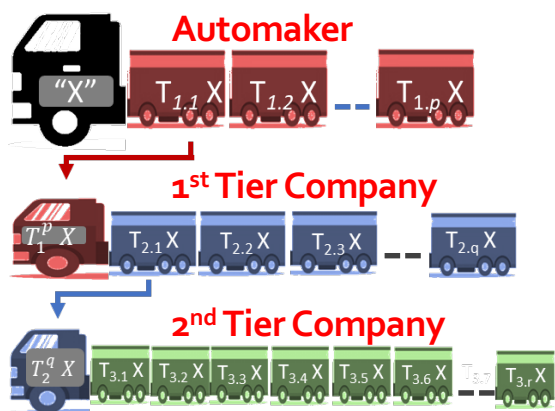
Development of Making Indonesia 4.0 Program in 2019-2020 Managerial Level Human Resources : RSKKNI Industry 4.0 Transformation

Function	Competence
<p>Industry 4.0 Transformation Manager</p>	<ul style="list-style-type: none"> Formulating Industry 4.0 transformation aspirations Formulating the opportunity of industry 4.0 transformation implementation Planning the pilot project of industry 4.0 Evaluate the implementation of transformation of industry 4.0 technology solution Evaluate the impact of implementing industry 4.0 transformation
<p>Industry 4.0 Transformation Engineer</p>	<ul style="list-style-type: none"> Planning the engineering of industry 4.0 business case Implementing business case for industry 4.0 implementation Socializing the solution for industry 4.0 business case
<p>Industry 4.0 Transformation Maintainer</p>	<ul style="list-style-type: none"> Manage smart maintenance Use digital assistance according to core technology 4.0 Perform predictive maintenance according to core technology 4.0

Shoopfloor Level Human Resources: RSKKNI Lean Manufacturing

Function	Competence
<p>Kaizenman</p>	<ul style="list-style-type: none"> Map the lean manufacturing condition Just in time condition development Jidouka condition development Work standardization development Implementation of improvement
<p>National Trainer</p>	<ul style="list-style-type: none"> Increase the level up of lean manufacturing across line and across production processes Lead the improvement across line and across production processes
<p>Master Trainer</p>	<ul style="list-style-type: none"> Increase the level up of lean manufacturing in various types of manufacturing and non-manufacturing industries Lead the improvement in various types of manufacturing and non-manufacturing industries

HUMAN RESOURCES 4.0 DEVELOPMENT PROGRAM SCHEME



Establishments of Human Resources 4.0 Infrastructure Development

- Drafting HR 4.0 Training Syllabus
- Job mapping in the training scheme
- Making Training 4.0 Module
- Establishment of HR 4.0 training institutions



Data Mining & Data Processing
Tooling Maker Database
New Product Innovation Dev

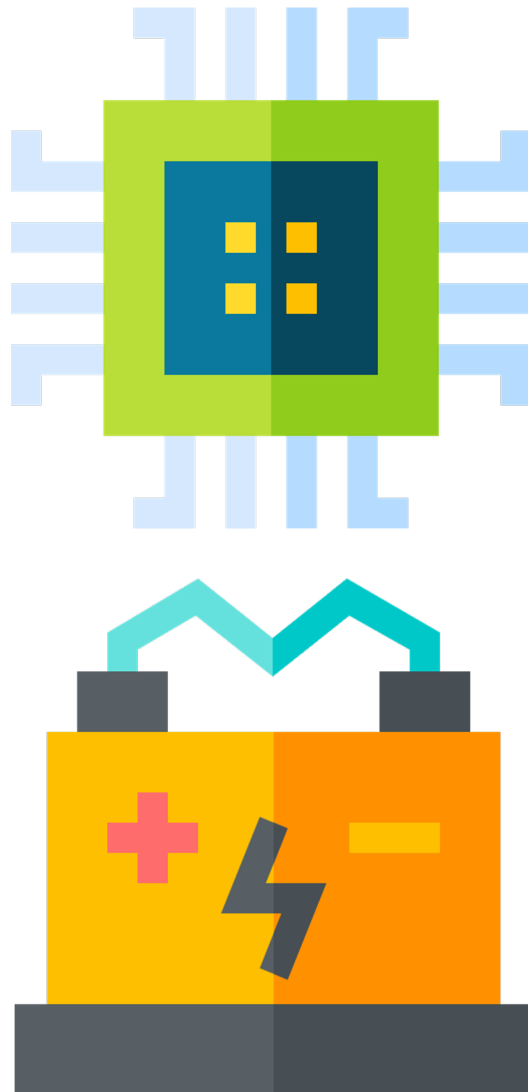
Deep Learning & Machine Learning
Digital Control System
JIT Research



Product Design Dev
Inventor
CAMCAD
Solidworks

Image Processing
Control Swarm Robot Simulation

Prototype Dev, Product Design,
Manufacture Research

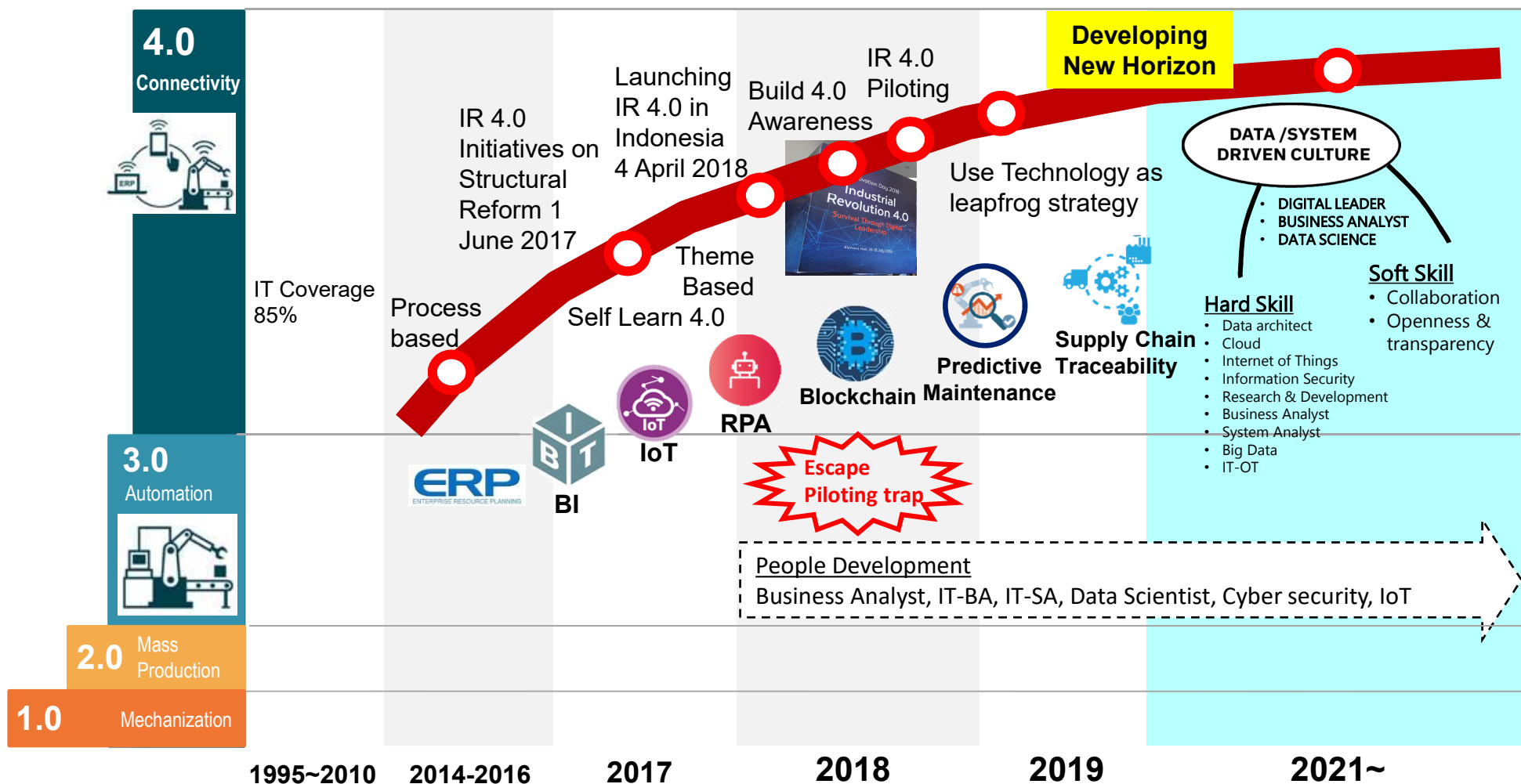


No	Company	Nilai INDI
1	Yamaha Electronics Manufacturing Indonesia	3,49
2	Siemens Indonesia	3,19
3	Samsung Electronics Indonesia	3,16
4	Panasonic Industrial Devices Batam	3,08
5	Avatec Services Indonesia	2,94
6	Panasonic Gobel Energy Indonesia	2,79
7	Panasonic Manufacturing Indonesia	2,78
8	Panggung Electric Citrabuana	2,73
9	Voksel Electric	2,71
10	Lg Electronics Indonesia	2,69
11	Century Batteries Indonesia	2,65
12	Hartono Istana Teknologi	2,51
13	Sanwa Engineering Indonesia	2,45
14	Phc Indonesia	2,42
15	Sinko Prima Alloy	2,40
16	Skyworth Industry Indonesia	2,38
17	Solarens Ledindo	2,30
18	E-t-a Indonesia	2,26
19	Battery Technology Indonesia	2,24
20	Asus Technology Indonesia Batam	1,99
21	Perum Percetakan Negara Ri	1,98
22	Alita Prayamitra	1,92
23	Sharp Semiconductor Indonesia	1,90
24	Mandiri Teknik Indonesia	1,89
25	PT Industri Telekomunikasi Indonesia	1,85

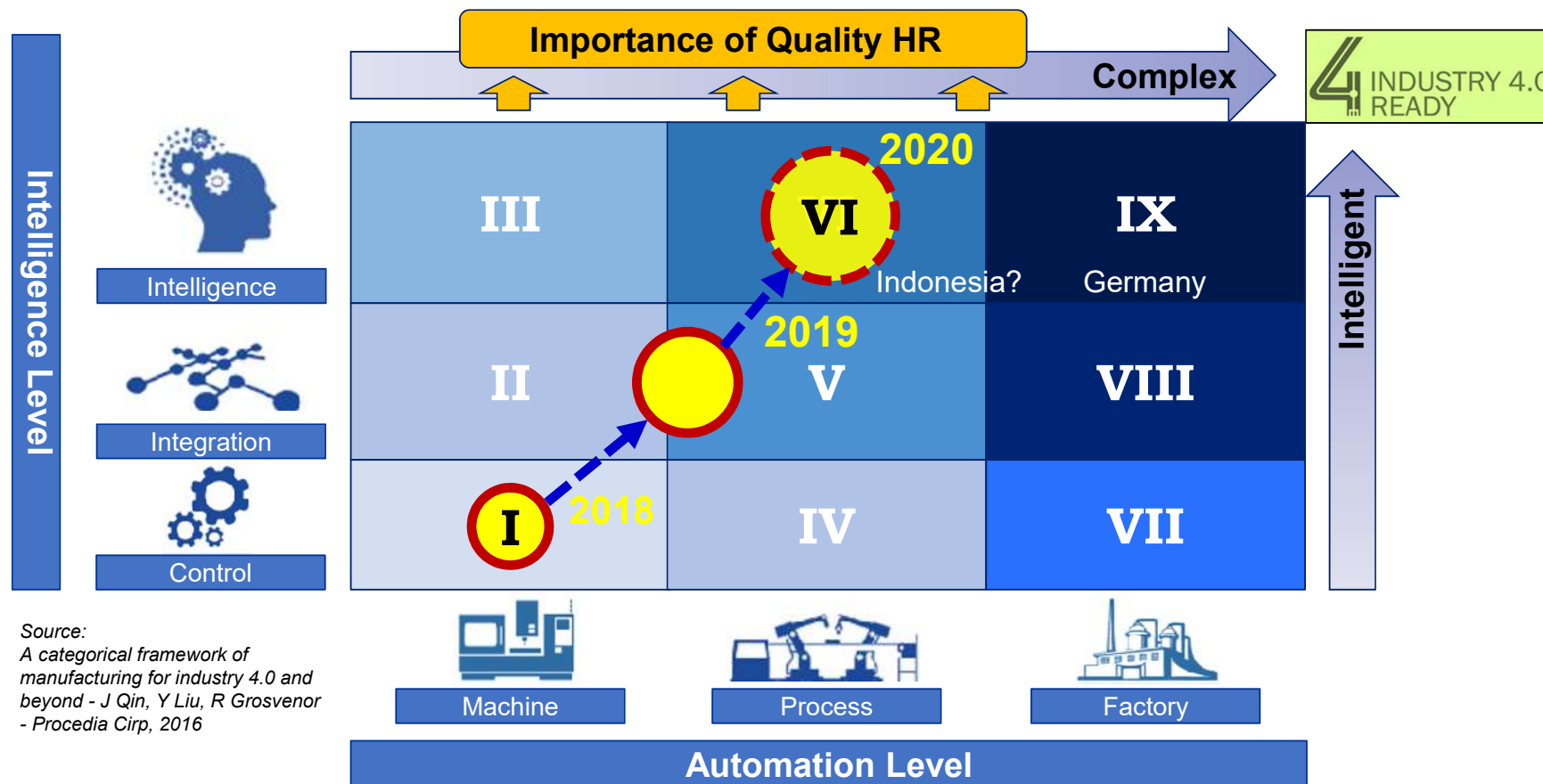


No	Company	Nilai INDI
26	PT Tridharma Kencana	1,85
27	Elektrindodaya Pakarnusa	1,83
28	Century Batteries Indonesia	1,82
29	Sinar Angkasa Rungkut	1,80
30	Evercross-technology Indonesia	1,78
31	Pura Mayungan	1,78
32	PT Adi Reka Mandiri	1,70
33	Cipta Coilindo	1,65
34	Indonesia Chemi-con	1,59
35	Industri Tata Udara Indonesia Airconco	1,56
36	Samindo Electronics	1,56
37	Kencana Gemilang	1,55
38	Cikarang Presisi	1,54
39	Armstrong Industri Indonesia	1,43
40	Len Industri (persero)	1,42
41	PT Haier Electrical Appliances Indonesia	1,39
42	Panggung Electric Citrabuana	1,35
43	Sgp Elektronik Indonesia	1,33
44	Panca Aditya Sejahtera	1,32
45	Cg Power Systems Indonesia	1,24
46	PT Bangga Teknologi Indonesia	1,24
47	Sanken Argadwija	1,20
48	Megah Nusantara Perkasa	1,11
49	PT Bali Indo Comunication	0,73
50	Selalu Bahagia Bersama	0,53

TMMIN Digital Transformation Journey



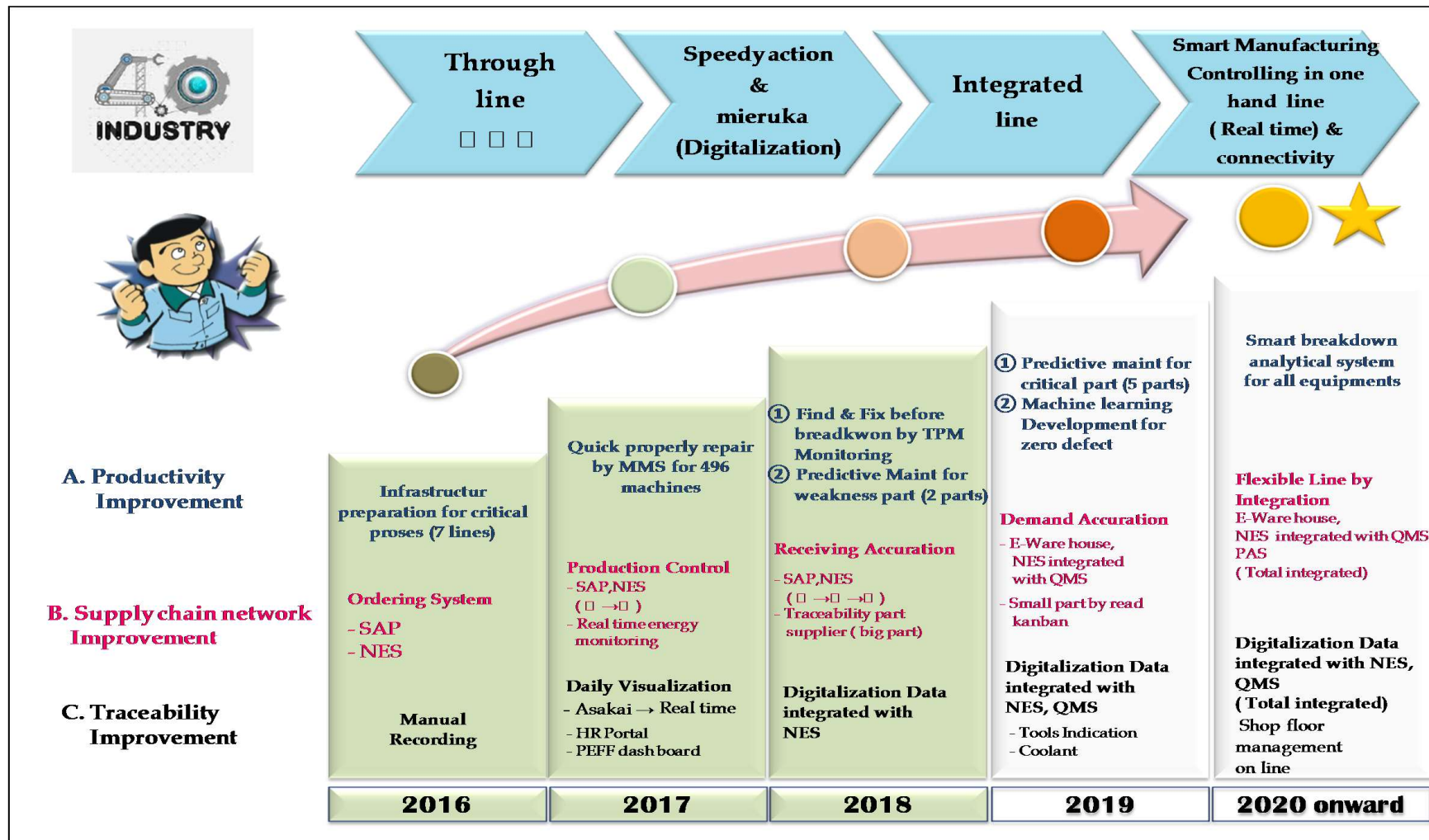
The Categorical Framework Of Manufacturing For Industry 4.0 - TMMIN



Source:
A categorical framework of manufacturing for industry 4.0 and beyond - J Qin, Y Liu, R Grosvenor - Procedia Cirp, 2016

- Adoption IR 4.0 in Toyota Indonesia is how to increase employee analytics capability as enabler for collaboration (labor intensive industry)

Increasing Automotive Competitiveness through IR 4.0 - TMMIN



Road Map IR 4.0 Engine Production

IR 4.0 Initiatives in TMMIN

<p>A</p> <p>Productivity Improvement</p>	<p>Robot Process Automation (RPA)</p>	<p>Predictive Maintenance</p>	<p>D</p> <p>Human Resource</p> <p>Analyst : Mar'19 → 29 MP certified < IoT Skill Development ></p>
<p>B</p> <p>Supply Chain Network Improvement</p>	<p>New Engine System (NES)</p> <p>Real Time End to End System</p>	<p>E-Warehouse</p> <p>Warehouse mgmt. & replenishment</p>	<p>< Welding Virtual Reality (VR) Training ></p> <p>Before</p> <p>After</p>
<p>C</p> <p>Trace Ability Improvement</p>	<p>Traceability Engine</p>	<p>Blockchain for Export-Import</p> <p>Blockchain technology for traceability from import part to export realization</p>	<p>< Mechatronics ></p> <p>< Data Science ></p>

- TMMIN continually expand implement IR 4.0 technology to all areas as digitalization initiatives

Industry 4.0 Global Lighthouse (WEF) PT. Schneider Electric Manufacturing Batam



PT Schneider Electric Manufacturing Batam
acknowledged as 'lighthouse' for Indonesia's
drive towards Industry 4.0
September 2018

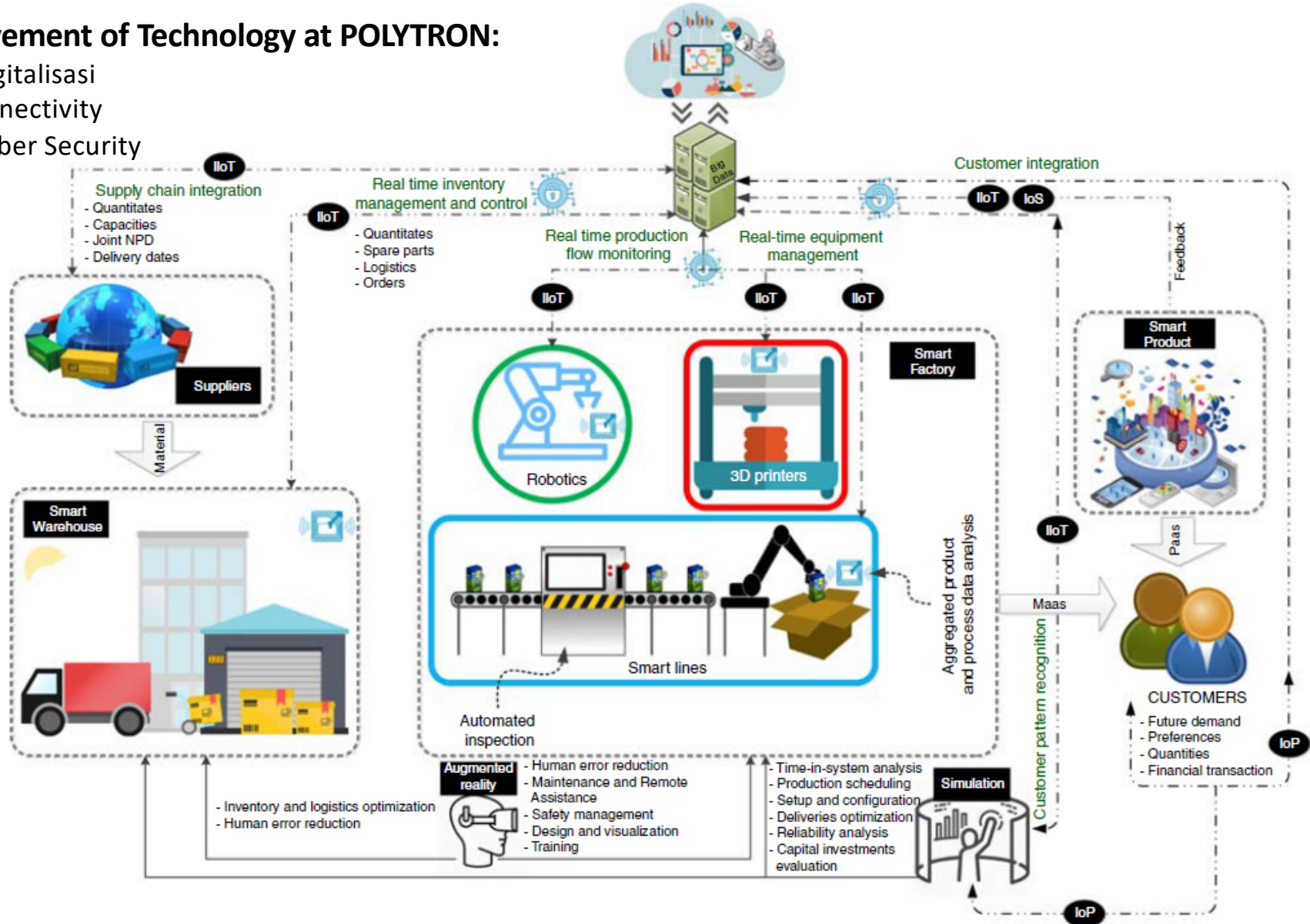
Lighthouse

- *Lighthouse* can be a role model for other industries to carry out digital transformation into industry 4.0 implementation.
- *Lighthouse* as Smart Factory Schneider Electric will provide a more real picture to industry players in Indonesia regarding the process of the industrial digital transformation journey and its benefits for business.
- PT Schneider Electric Manufacturing Batam has experience and competency to create **smart factory** facility and **digital transformation journey**



Improvement of Technology at POLYTRON:

- Digitalisasi
- Conectivity
- Cyber Security



Thank You

**Directorate of Electronics and ICT Industry
Directorate General of Metal, Machinery,
Transportation and Electronics Industries**