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**How can services help SMEs enhance productive capacity?
With the focus on “Ppuri Industry”**


by

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How Can Services Help SMEs Enhance Productive Capacity? *- with the focus on "Ppuri Industry" -*

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Sung Duk Kim, Ph.D.

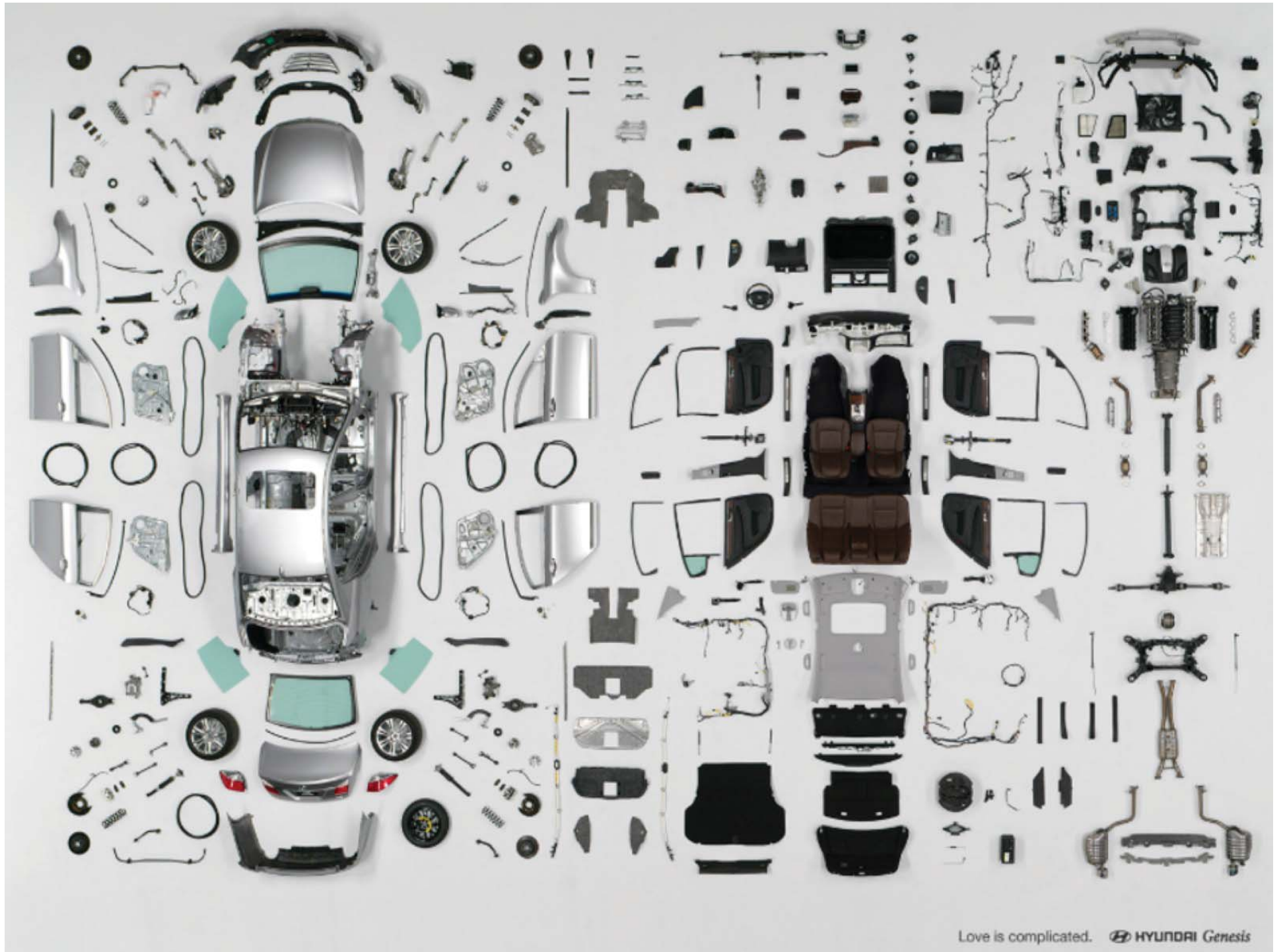






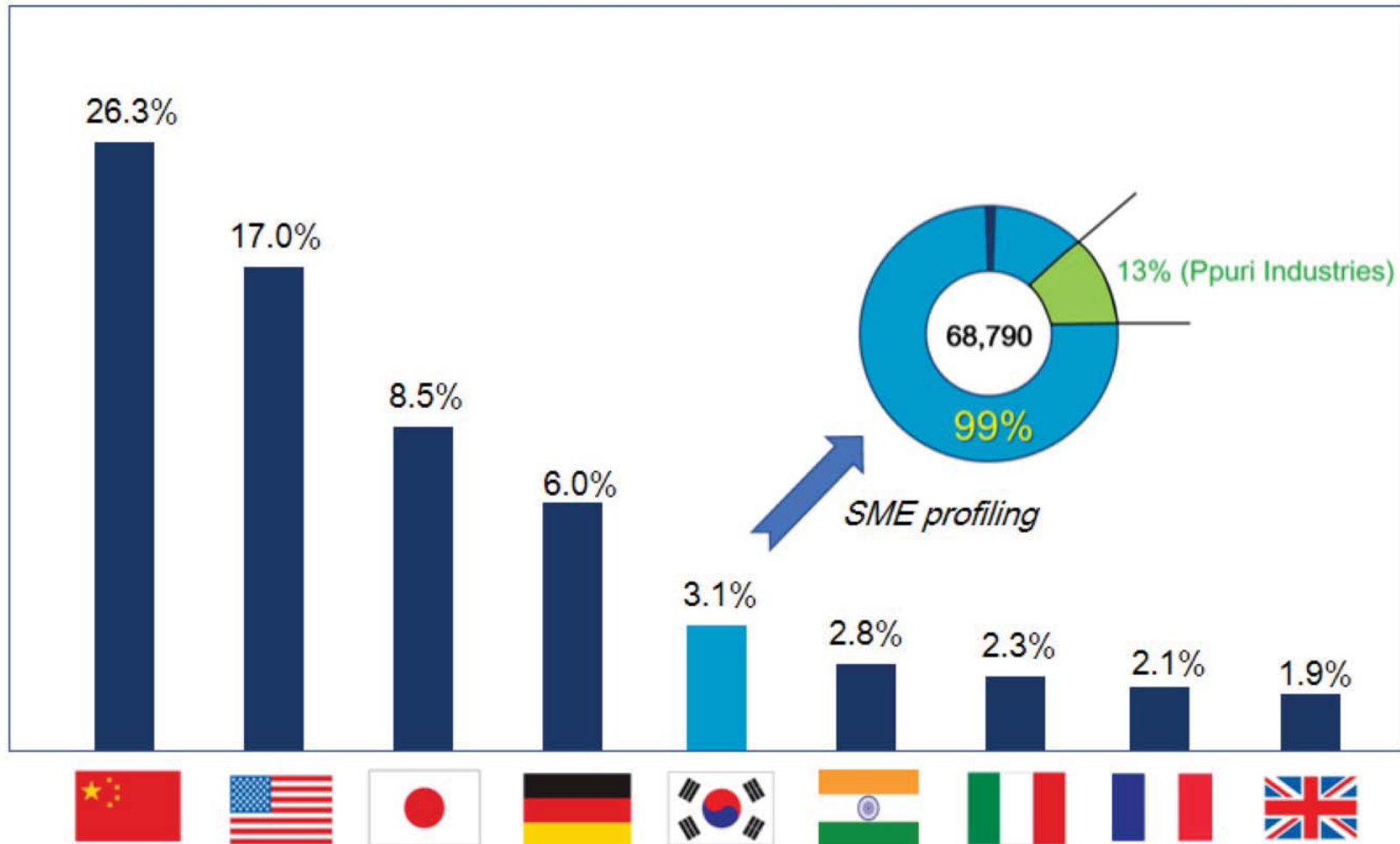
Ppuri industry is the manufacturing industry that produces components and finished products using manufacturing process technologies such as casting, molding, metal forming, welding, surface treatment, and heat treatment.





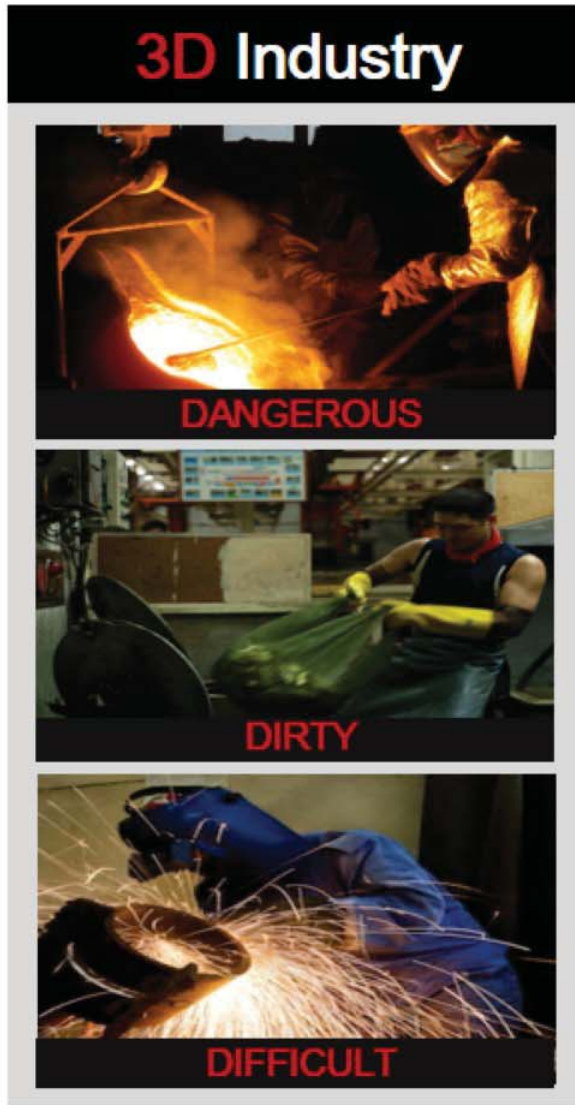
Love is complicated.  HYUNDAI Genesis

Proportion of manufacturing sector by nations



Sources: <https://unstats.un.org/unsd/snaama>

The Reality?



Costs

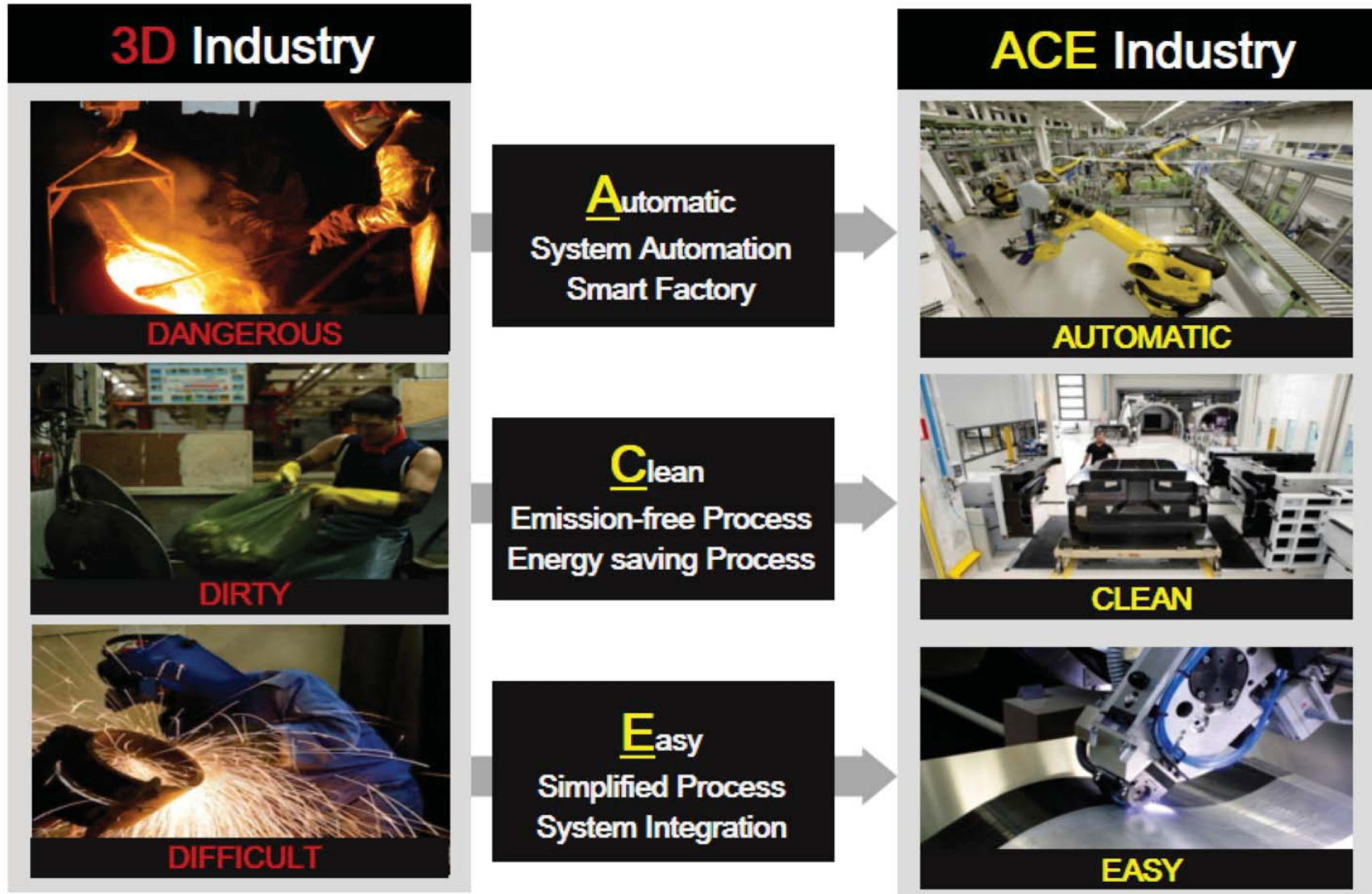


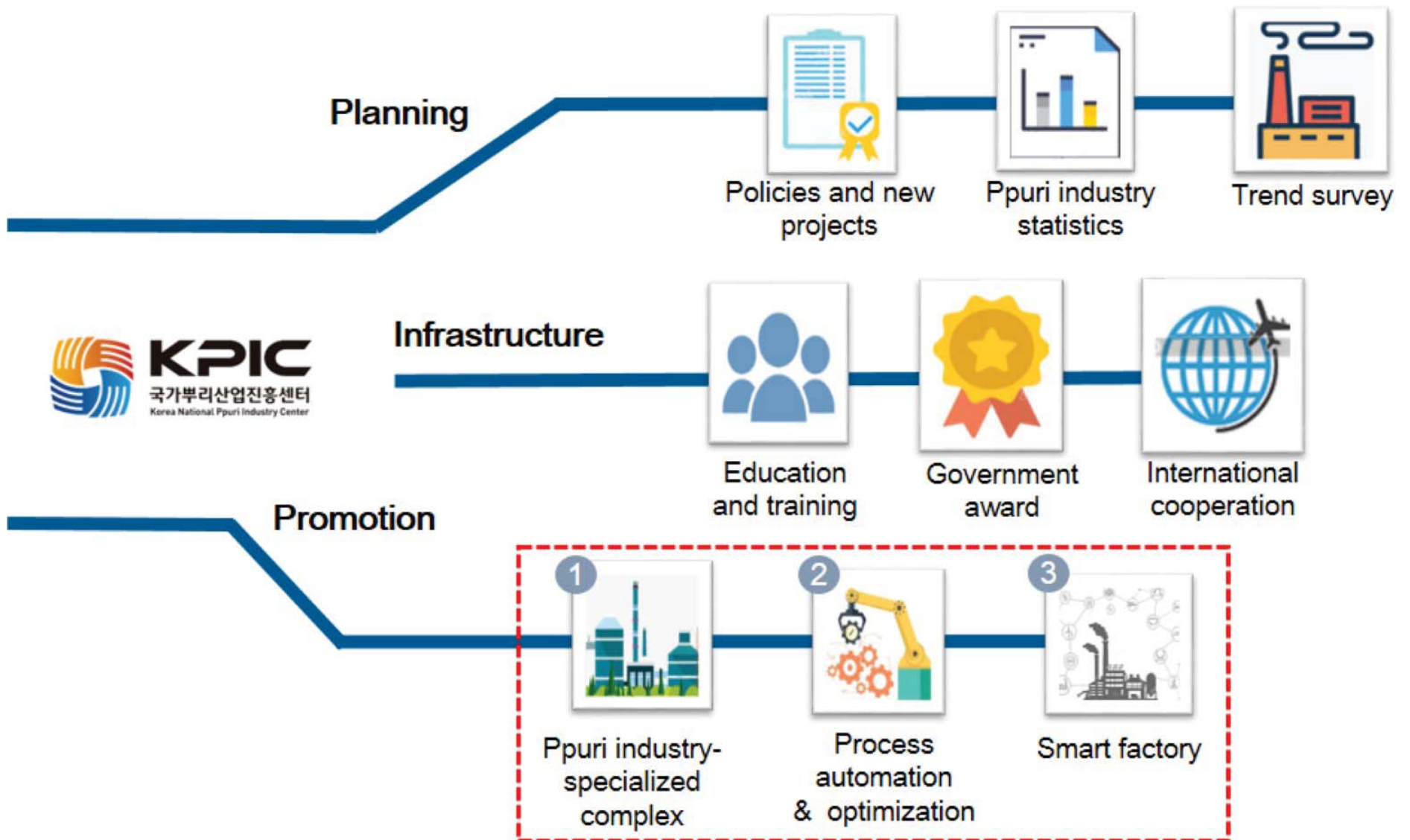
~~JOB~~
Wanted!



Productivity

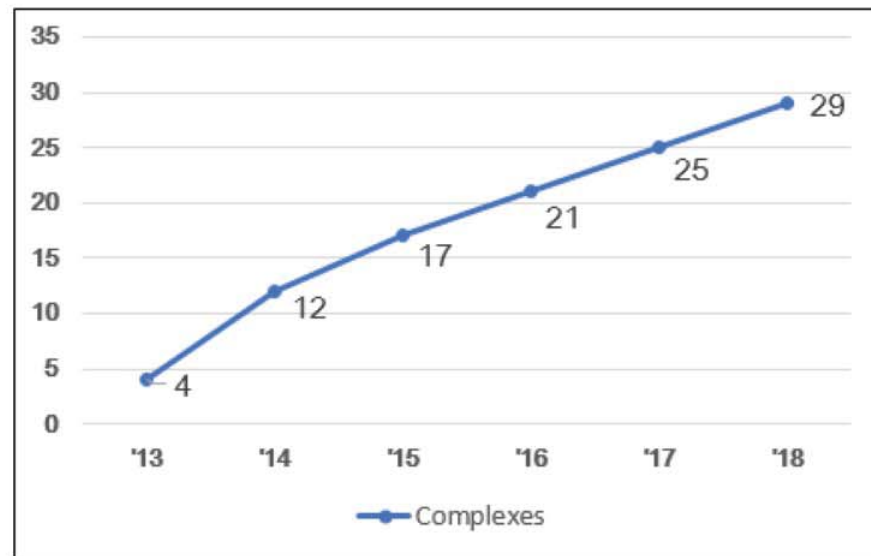
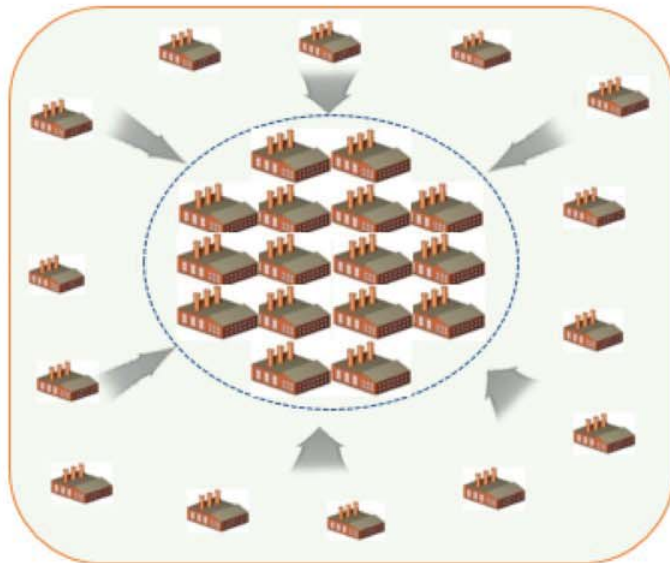
What Should We Do?



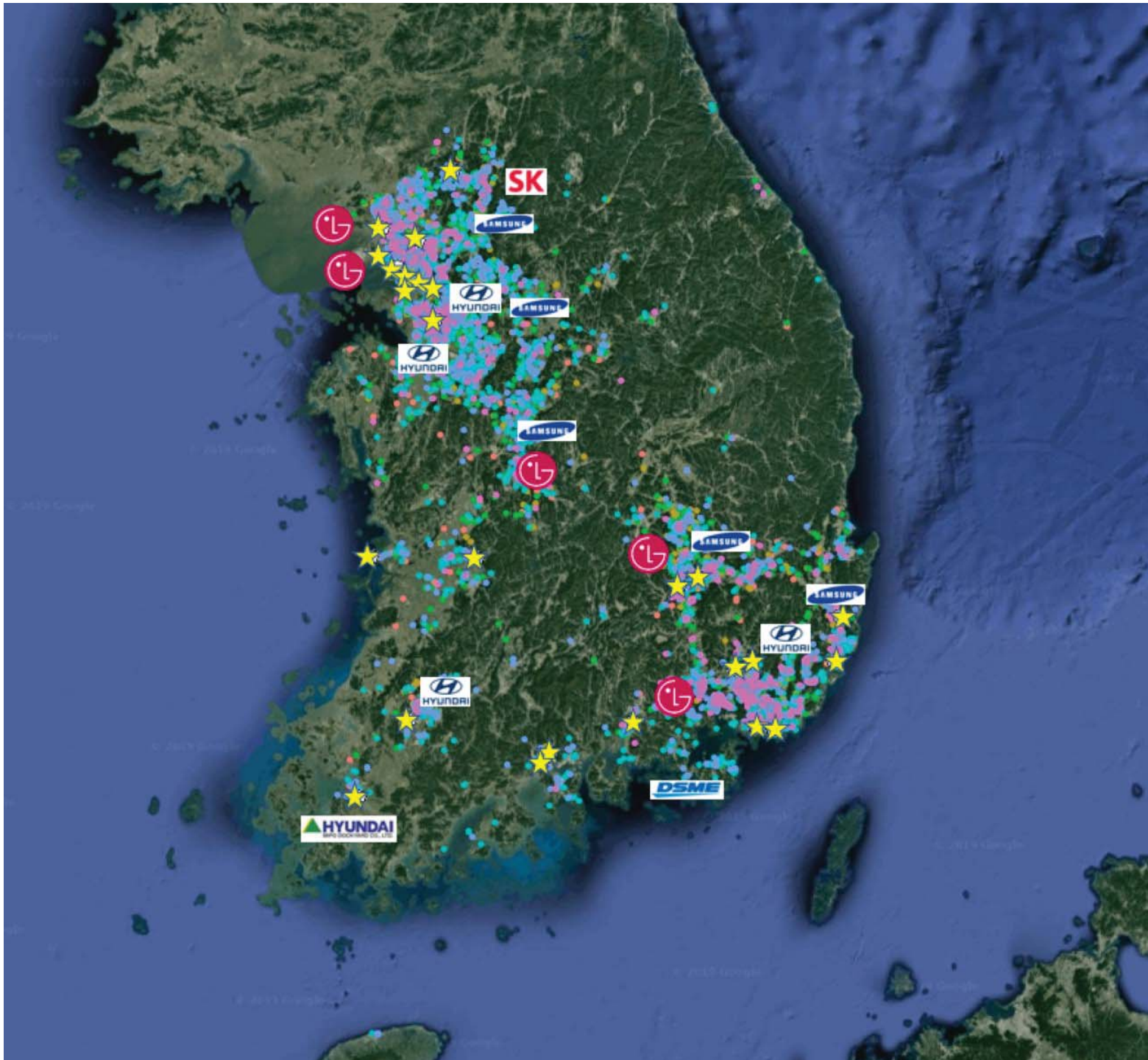


1 Ppuri Industry-Specialized Complex Project

- Designating complexes as a cluster of Ppuri companies to enhance productivity and reduce environmental costs



- Supporting sharable facilities and innovative activities
 - Sharable facilities:** common wastewater treatment plant system, waste heat retrieval system, recyclable energy generation facility, etc.
 - Innovative activities:** planning new ideas to enhance productivity



- Casting
- Molding
- Metal forming
- Welding
- Surface treatment
- Heat treatment
- ★ Specialized Complexes

Wastewater treatment costs of surface treatment plants



<Industrial Complex-Type>
Cost : 15 ~ 20 USD/ton



<Apartment-Type>
Cost : 10 ~ 15 USD/ton

2 Process Automation & Optimization Project

- Facilitating automation and optimization for improvements in productivity and work environment of Ppuri industry

Surface Treatment (SAMIL BUFFING)



Automation of the plating process
⇒ Increasing productivity and improving working environment

Before



(2.4 ton/day)

87.5% ↑

After



(4.5 ton/day)

Casting (CASTEC KOREA)



Replacement of manual pouring with a stopper-type automatic pouring system
⇒ Increasing productivity and preventing workplace accidents



(51.8 ton/day)

6.8% ↑



(55.3 ton/day)

Welding (YUSEUNG)



Integration of manual assembly and inspection process into a continuous automatic system
⇒ Decreasing defect rate and shortening the working hours



(500 unit/hr)

20.0% ↑



(600 unit/hr)

3 Smart Factory Project

An intelligent factory that produces customized products using ICT in all manufacturing processes

Planning and Design

Product performance simulation

→ Developing customized products



Resource efficiency ↑

Manufacturing Process

Real-time communication between components

→ Improving facility efficiency and mass customization



Productivity ↑

Supply Chain

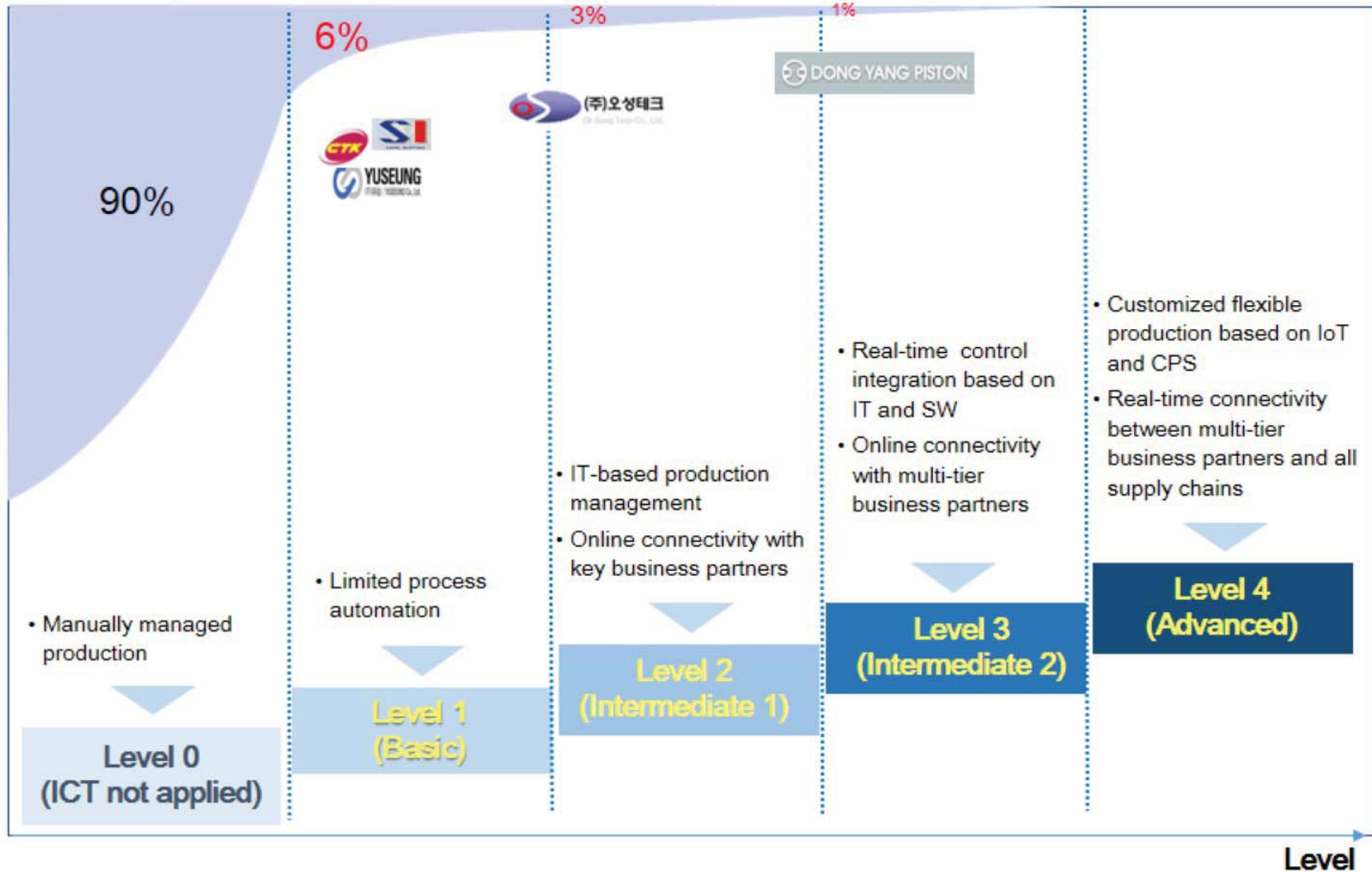
Predicting the needs of customers in real time

→ Optimizing net profits and improving customer service



Flexibility ↑

Levels of Smart Factory of Ppuri Industry



Model case 1



Mold design and manufacturing company for large high-pressure die casting

- ICT connection to the large die casting manufacturing process
- Installation of NC processing optimization program
- Real-time monitoring
 - Rapid improvement by identifying the causes of the defect



(90 hr/set)



(70 hr/set)



Processing time 17% ↓
Defect rate 50% ↓

Model case 2 DONG YANG PISTON

The annual production capacity of approx. 40million pistons

▶ CASTING PROCESS



▶ MACHINING PROCESS



▶ SURFACE TREATMENT PROCESS



PISTONS FOR AUTOMOBILE

Gasoline and diesel engine pistons for passenger cars



PISTONS FOR COMMERCIAL

Diesel engine pistons for commercial vehicles



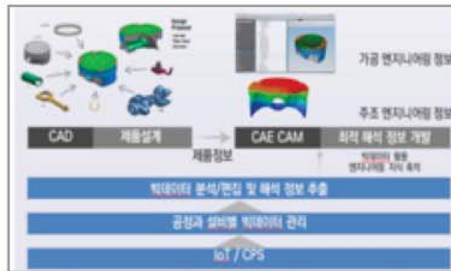
PISTONS FOR INDUSTRIAL

Gasoline and diesel engine pistons for air compressors and construction equipment



Source: <http://www.dypiston.co.kr>

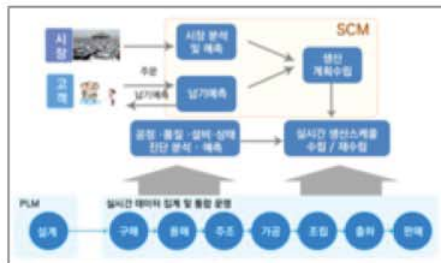
Key Activities in the Overall Process



Planning & Design



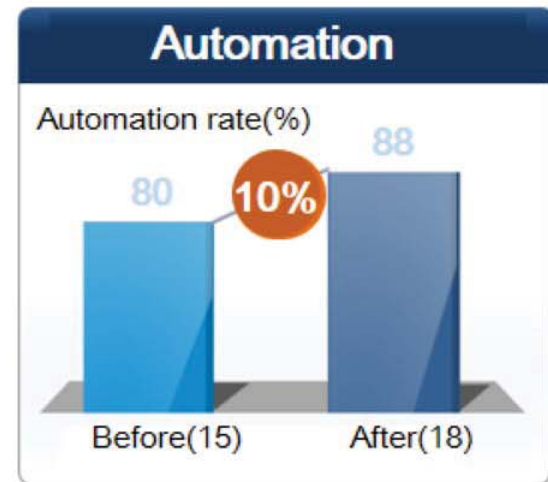
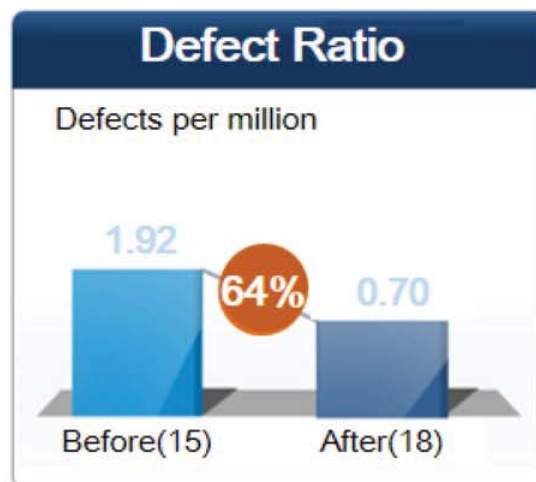
Manufacturing Process



Supply Chain

- Simultaneous implementation of process design and analysis
- Engineering data collection utilizing IoT
- Automatic and flexible casting process including salt core inserting process
- Development of flexible machining lines and automatic surface treatment system
- Automatic assembly system (precise measurement and vision inspection data management)
- Integrated management system of purchase, production, and sales through SCM

Measuring the project performance



Source: <https://www.youtube.com/watch?v=0cUMxVMUFcl>

Summary

All three projects help SMEs improve productive capacity

- “Specialized Complex Project” is effective for surface treatment and molding industry in need of cooperative activities such as wastewater treatment, procurement of raw materials, and logistics.
- “Automation Optimization Project” is suitable for small company units that need improvements in their work environment.
- “Smart Factory Project” is the most impactful and future-oriented project, although it is at an early stage.

Suggestions

Seven keys to a successful switch to a Smart Factory

1. Customizing smart factory construction to an acceptable level
2. Developing related technology(5G, big data analysis, knowledge information security, AR / VR, etc.)
3. Building testbeds & developing leading models
4. Supporting shared infrastructure (database server, cloud system, operational management platform, etc.)
5. Developing human resource training programs for the management of smart factory
6. Sharing case studies on success and failures
7. Arousing social interest through public relations(PR)



Thank you!

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