Industry-Academia Collaborative Initiative of Human Resources Development and the Digitalisation of Manufacturing

Prof. Dr.-Ing Shigeru KUCHII

Agenda

1. Connected Industries and Smart Monozukuri Supporting Teams
2. SDGs ‘Future City’
3. Introducing KOSEN and Kitakyushu College
4. Digitalisation of Manufacturing Project

Connected Industries

and Smart Monozukuri Supporting Teams

What is “Monozukuri”？

Monozukuri（ものづくり）

‘Production' or 'making of things' in Japanese. The Japanese term for 'manufacturing'.

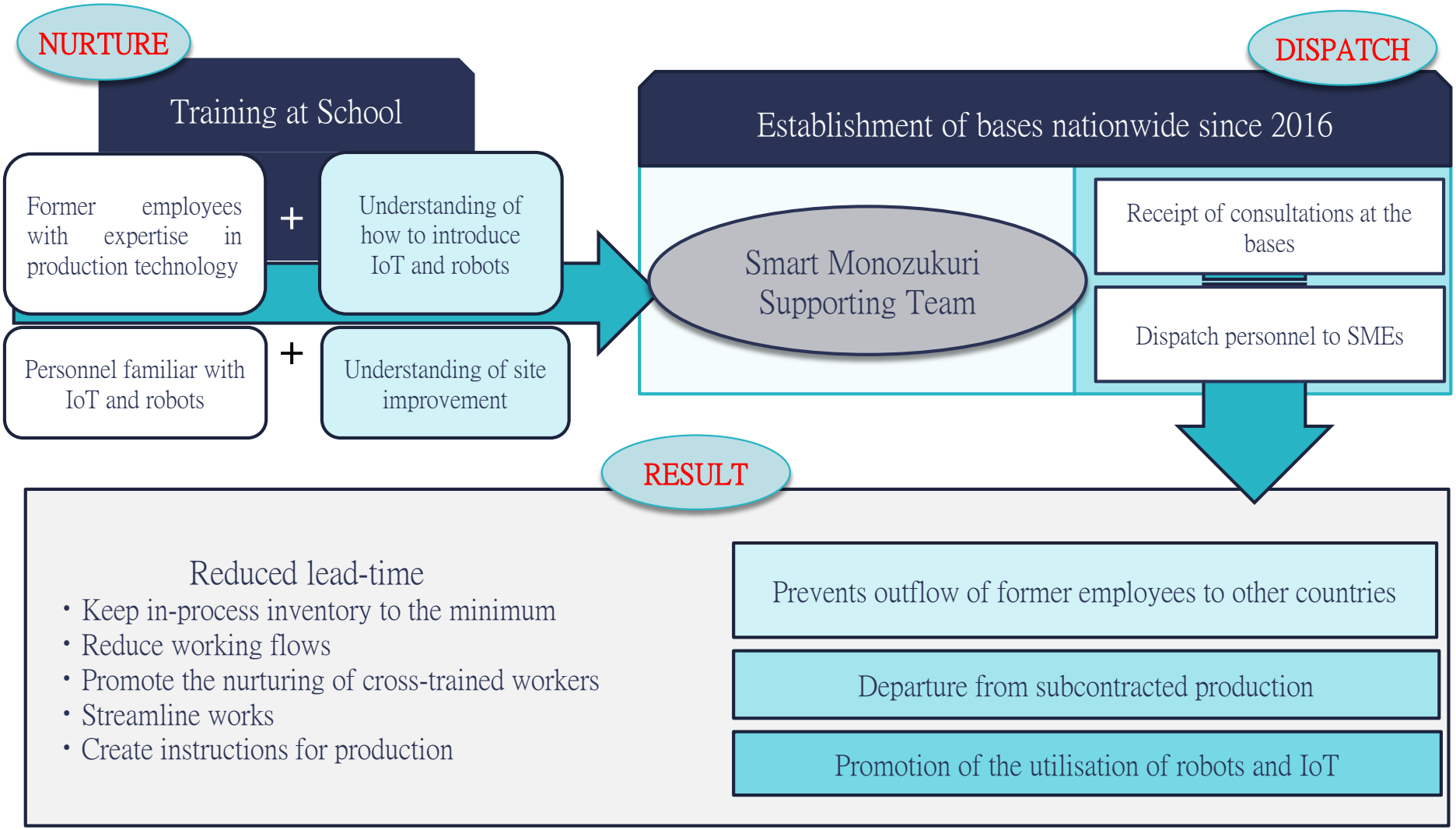
Smart Monozukuri (Manufacturing) Supporting Teams

- **"Smart Monozukuri (manufacturing) Supporting Teams"** was launched in 2016 (with **31 bases throughout Japan** as of June 2019).
- The Supporting Team **nurtures** and **dispatches** supporting personnel who are familiar with the introduction of **business improvement, IoT and robots**.
- Aim to **provide SMEs with support** for the introduction of IoT and robots to address such issues as emerging labour shortages in regional areas and challenges in improving productivity

National Forum of Smart Monozukuri Supporting Organizations in October 2018

METI
Ministry of Economy, Trade and Industry

Smart Monozukuri Supporting Teams – Implementation Flow Diagram



Smart Monozukuri Supporting Teams – Robot Industry Promotion

Research and Development

Innovative robot development at the Yasukawa Technology Centre (Kyushu Inst. of Technology, Yasukawa Electric)

Introduction of support

Introduction of support for productivity revolution of regional manufacturing companies

Robot Industrial promotion

HR development Youth retention

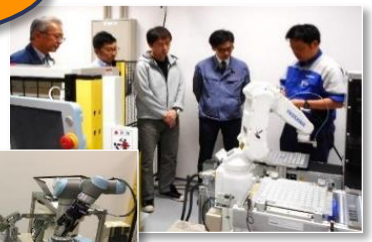
Realised productivity of local companies

Regional university

Safe and secure

Teacherless

Advanced work ability



Innovative robot development

"SDGs Future City"

Initiative of Kitakyushu City

SUSTAINABLE DEVELOPMENT GOALS

What are SDGs?

- Sustainable Development Goals
- Set of 17 goals aiming to end poverty, to protect the planet
- Aim to achieve them by 2030

Introducing Kitakyushu City

Networks with 18 countries and 62 cities

- Population：940,460 (Aug. 2019)
- Area：491.95㎢
- GDP：324 million USD (2016)

Main companies in Kitakyushu

Nippon Steel

YASKAWA Electric Co.

TOTO

Mitsubishi Chemical co.

TOYOTA NISSAN

Mitsubishi Material Co.

Kitakyushu’ s Problem Solving Initiative Timeline

PAST

Overcoming Pollution and International Cooperation

"We Want Our Blue Skies Back" campaign


Overcoming pollution through cooperation between industries, government, academia and citizens.

- Winner of Global 500 Award
- Winner of UN Local Governmental Honours

PRESENT

Promotion of a Future City

Kitakyushu Eco-Town (1997)

Eco-Model City (2008)

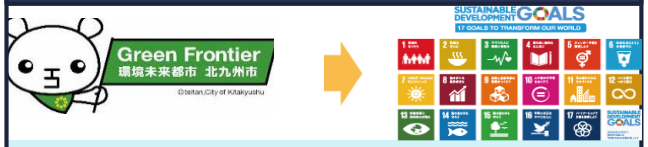


Future City (2011)

- Selected as a Green City by OECD (Paris, Chicago, Stockholm, Kitakyushu)
- Host of the G7 Energy Ministerial Summit

FUTURE

Development of a leading SDGs city



Enhance ‘Future City’ Activities

Develop a low-carbon energy base

International Environmental cooperation → International Environmental Business


- Improve City Brand
- Disseminate Kitakyushu Model to the World

Kitakyushu SDGs Club

Kitakyushu SDGs Club

Partnership between members

Citizens

Schools — Interchange party (Activity announcement) Transmission of information — Companies

Group (NPO)

Advice

Cooperation

Kitakyushu City SDGs meeting
[knowledgeable person meeting]

Kitakyushu city

Number of members
525
(Companies: 115, Groups: 85,
Schools: 193,
Citizens: 132)

A banner is set up in with the aim of creating the first "SDGs shopping street" in Japan

Kitakyushu City: SDGs Achievements

Winner of the 1st "Japan SDGs Award"
(December 2017)

(Photo: Cabinet Public Relations Office)

Selected by the OECD to be "The world's model city for promoting SDGs"
(April 2018)

First selected in Asia

Joint press conference

Selected as "SDGs Future City" and "Local Government SDGs Model Project"
(June 2018)

Mayor interview

The mayor takes office as chairman of "local creation SDGs public-private partnership platform" of Japan
(August 2018)

Establishment general meeting

National Institute of Technology (KOSEN), Kitakyushu College

School System of Japan

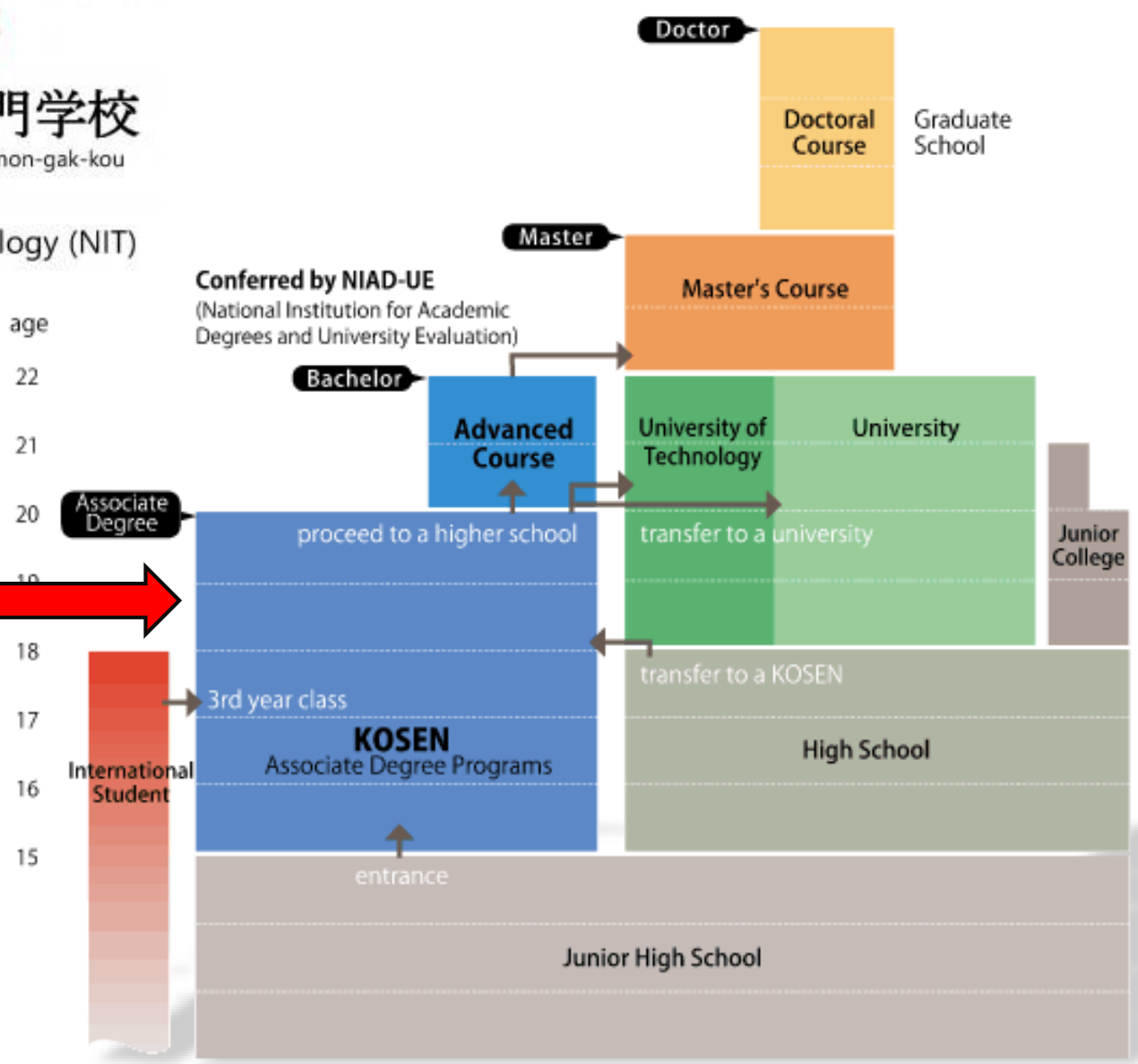
KOSEN: 高専

国立工業高等専門学校

Koku-ritsu-kou-gyou-**KOU**-tou-**SEN**-mon-gak-kou

National Institute of Technology (NIT)

KOSEN



OECD Reviews of Tertiary Education in Japan

OECD Reviews of Tertiary Education

JAPAN

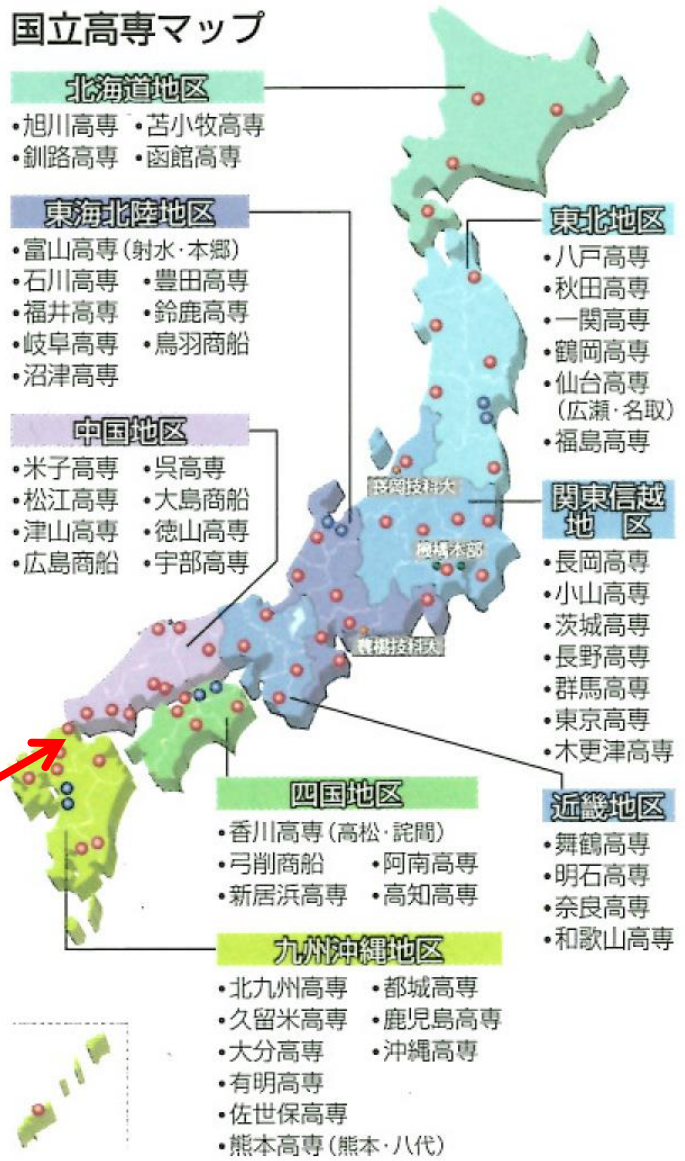
Howard Newby, Thomas Weko,
David Breneman, Thomas Johanneson
and Peter Maassen

"We, like countless other overseas evaluators, were impressed by their management, quality and innovation."

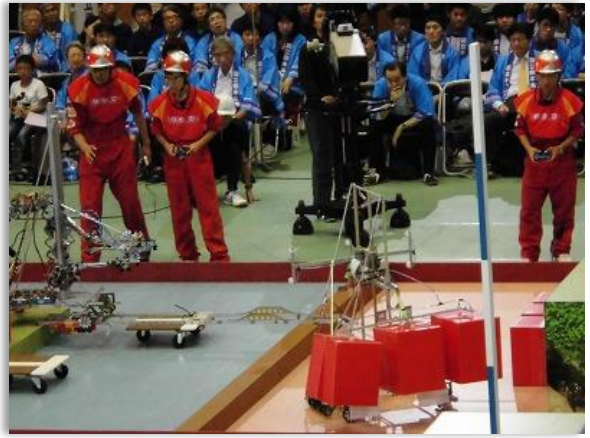
About NIT, Kitakyushu College

Department of Creative Engineering

- Machine Systems Engineering Course
- Robotics and Mechatronics Course
- Electrical and Electronic Engineering Course
- Information and Systems Engineering Course
- Materials Chemistry Course



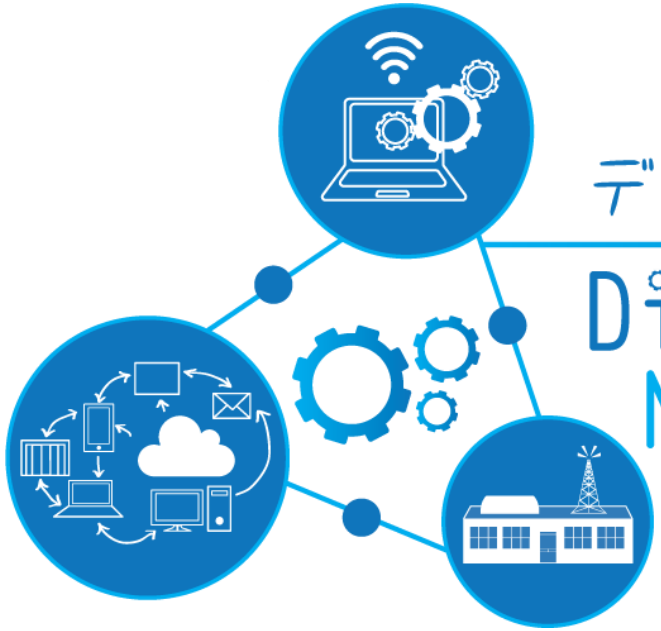
We are here



2016

2017

2018



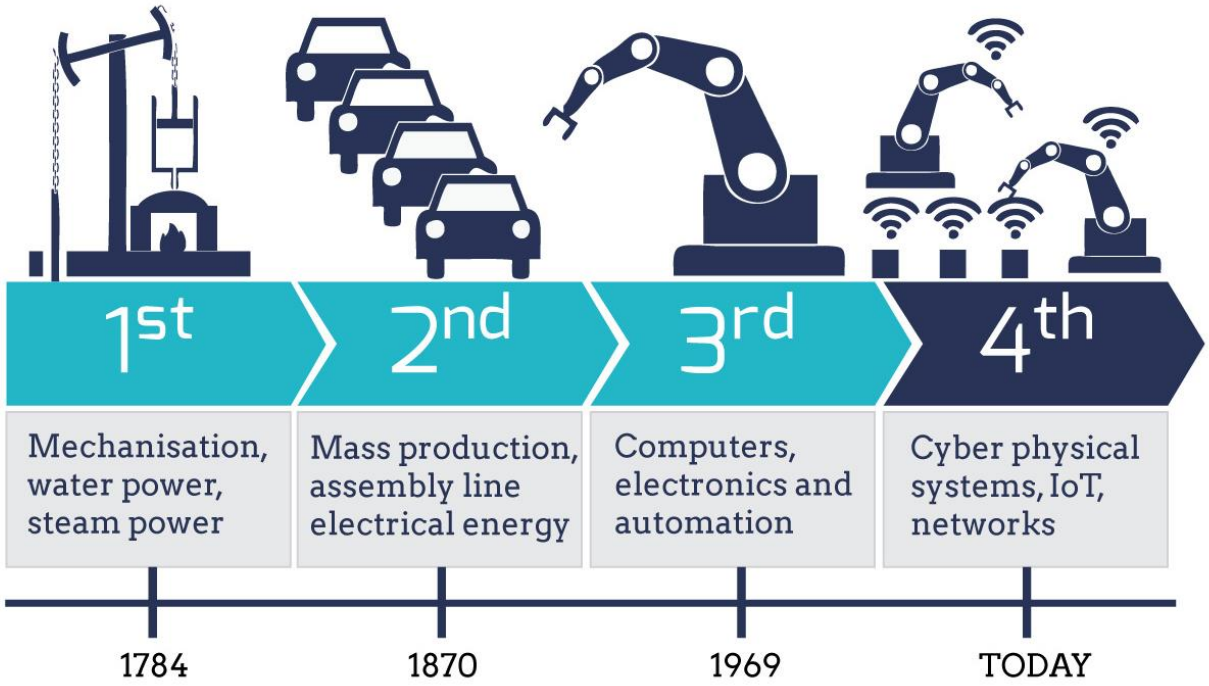
デジタルものづくり

Digitalisation of Manufacturing Project

Digitalisation of Manufacturing Project

Industry 4.0

Industry 4.0 is the current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, mixed reality (MR) and artificial intelligence (AI) are changing the way we live and work.



As these changes develop we are leading a project that aims to create a curriculum which promotes a sophisticated and innovative value chain for small and medium businesses in the manufacturing industry.

Project Promotion System

Advisors

YASKAWA
KIAC
SURUGA SEIKI
BECKHOFF
福岡県 Fukuoka Prefecture
ふくおか IST ふくおかアイスト 公益財団法人 福岡県産業・科学技術振興財団

IoTAcceleration Kitakyushu city Lab

Smart Factory Experience in Colleges (KOSEN), Universities, Public Institutions
<Demonstration Lab - Test Bed>

Implementation of recurrent education in collaboration with industry, acedemia and the Government.

Promotion in collaboration with innovation bases.

Partners

NRI 未来創発 Dream up the future.
野村総合研究所 Nomura Research Institute
MISHIMA OA SYSTEM CORPORATION
ptc
Microsoft
Web·i
aras corp
DASSAULT SYSTEMES

Business Structure Chart

[Project Leader]
Business Management, Recurrent Education Curriculum at College

National Institute of Technology in Kitakyushu Department of Industrial Design Engineering

Expert Panel (planned)

[Implementation Place]
Demonstration Lab/Test Bed

Monozukuri Centre

Joint Venture

[Project Subleader]
Recurrent Education Curriculum Development

Graduate School of Information, Production and Systems, Waseda University

[Project Promotion]
SME Support in Kitakyushu Area

Organisation for Promotion of Industrial Science and Technology in Kitakyushu

[Advisor]
Education Curriculum Creation Support

Nomura Research Institute, Inc.

[Project Promotion] Promotion and deployment of information to demonstration lab and overseas

Kyushu Foundation for the advancement of Industry, Science and Technology Centre Fukuoka City. Fukuoka Industry, Science & Technology Foundation

[Technical Support]
Demonstration System Environment Setup
Academic Licence Provision

- Mishima OA Systems, Inc.
- Aras Japan Ltd.
- Web I Ltd.
- Dassault Systemes Ltd.
- Microsoft Japan Ltd.
- PTC Japan Ltd.

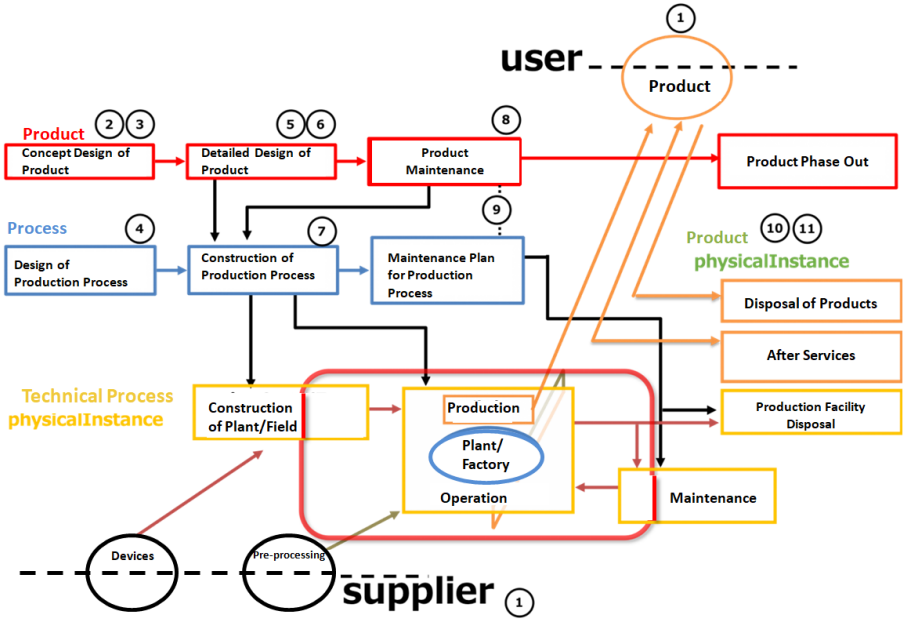
[Advisor] Cooperation Support

- Yaskawa Electric Corp.
- Suruga Seiki Ltd.
- Beckhoff Automation Ltd.

Conclusion

- Application of international standards
- Overall optimization
- Importance of education

No.	Curriculum
1.	An overview of IoT and Industry 4.0, inspired by your own problems.
2.	Order Management (Estimate/cost planning)
3.	Order Management (Delivery time response)
4.	Production Execution Perspective View/Performance Monitoring Cooperation with ERP, MES, Various Sensors and ERP, IoT Platform.
5.	Quality Control, Design of quality control process. The mechanism of Iot tracing. Quality control of process design. History management and management using MES.
6.	Manufacturing plan management (product design - production design - manufacturing plan - progress management - change in delivery date - rescheduling)
7.	Use of project schedule application in project production system.
8.	Improve the efficiency of design work and shorten the time period by front-loading (tolerance simulation/shape search, etc.)
9.	The maintenance and management of products and equipment using cyber physical systems (CPS)
10.	Product design/production design and manufacturing site (About the integrated management of after market data.)
11.	Visualisation of management performance and agile adjustment of management plan.



Ministry of Economy, Trade and Industry, 2019 White Paper on Manufacturing, Chapter 2, Section 3, pp.169-170

Thank you for your kind attention.

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National Institute of Technology, Kitakyushu College

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