



# Transforming Business through Digital Co-Creation

**Kazushi Kuse**

Senior Executive Officer

Senior General Manager, Digital Value Co-Creation

# Outline

## 1 Promotion of DX in Asahi Kasei

- Digital transformation roadmap:  
Introduction Period → Deployment Period → Creation Period → Normal Period
- 

## 2 Digital Introduction Period

- 400 digital projects, IP landscaping, digital professional personnel
- 

## 3 Digital Deployment Period

- DX Vision, Digital Value Co-Creation, 40,000 digital personnel, example cases
- 

## 4 Digital Creation Period

- Asahi Kasei Garage and example cases, contributing to social innovation
- 

## 5 Summary

# Three business sectors

## Material

Environment & Energy  
Mobility Life Material

## Homes

Home & Living

## Health Care

Health Care

# Value provision for sustainable society

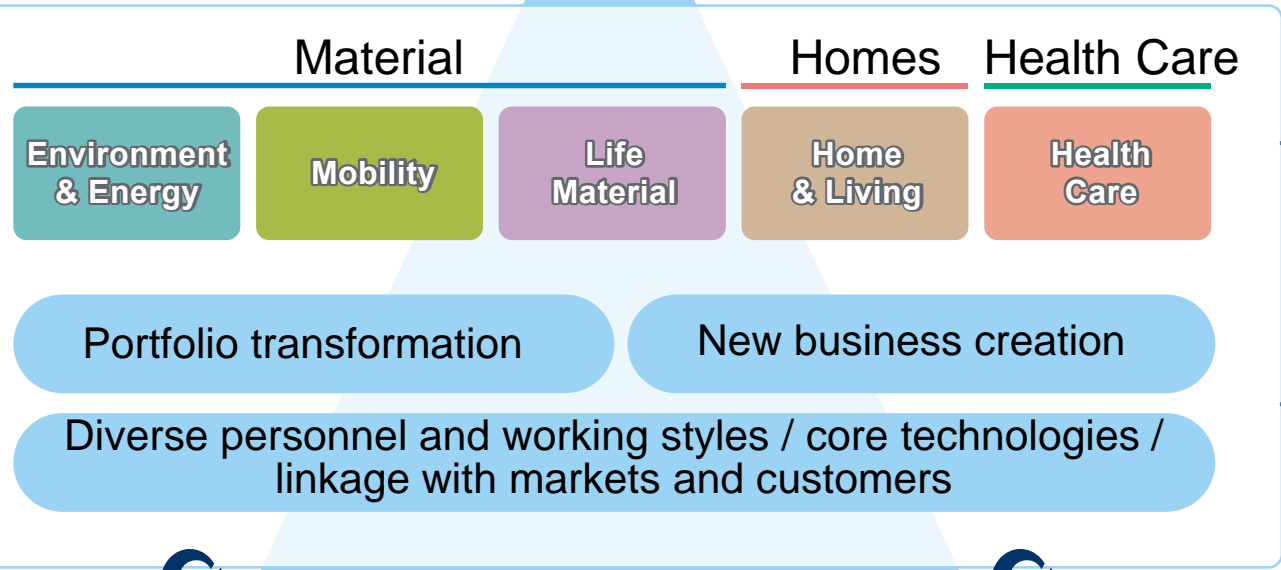
Execution aligned with management environment, but no fundamental change in concept for value provision

## Contributing to sustainable society

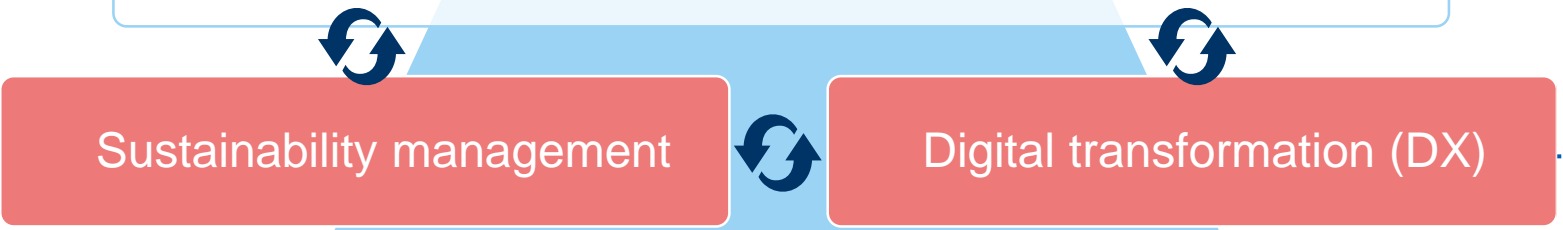
Group Mission

Contributing to life and living for people around the world

Growth strategy in priority fields for provision of value



Reinforcing the base for growth



### Policy for execution

**Growth investments considering cost of capital** emphasizing financial discipline

Business portfolio transformation and **cultivating new growth fields**

Advancing **sustainability and DX** as sources of competitiveness

# Areas of focus

Heightening the Asahi Kasei Group's overall **G D P** to contribute to society and increase corporate value



## Green

Reducing the Asahi Kasei Group's GHG emissions, providing environmental contribution products that help to reduce the world's GHG emissions, aiming to achieve a sustainable society



## Digital

Accelerating the use of digital technology to raise the effectiveness and efficiency of functions such as R&D, production technology, and IP, while strengthening management capabilities

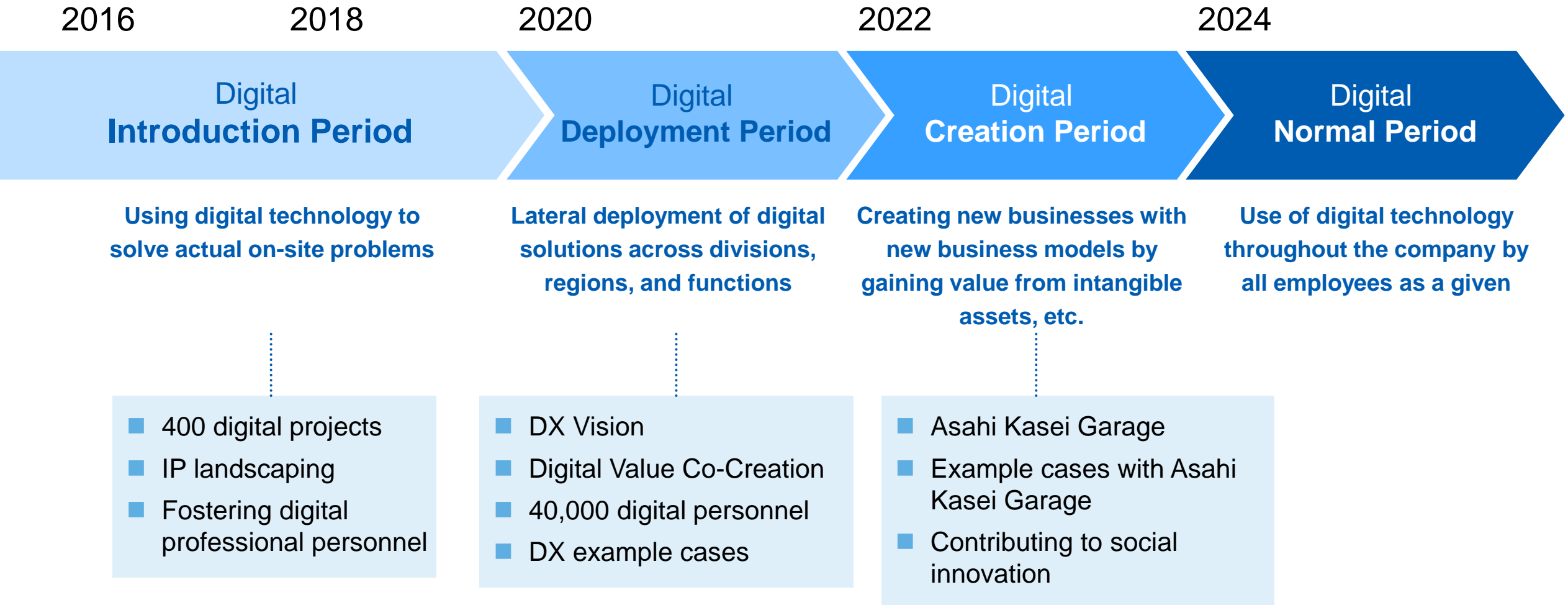


## People

Focusing on "lifelong growth" to enable employees to proactively grow with various styles of working amid dramatic changes to society and diversification of values



# Digital transformation roadmap



# Digital transformation roadmap

2016

2018

2020

2022

2024

## Digital Introduction Period

Using digital technology to solve actual on-site problems

- 400 digital projects
- IP landscaping
- Fostering digital professional personnel

## Digital Deployment Period

Lateral deployment of digital solutions across divisions, regions, and functions

- DX Vision
- Digital Value Co-Creation
- 40,000 digital personnel
- DX example cases

## Digital Creation Period

Creating new businesses with new business models by gaining value from intangible assets, etc.

- Asahi Kasei Garage
- Example cases with Asahi Kasei Garage
- Contributing to social innovation

## Digital Normal Period

Use of digital technology throughout the company by all employees as a given

## Digital **Introduction** Period

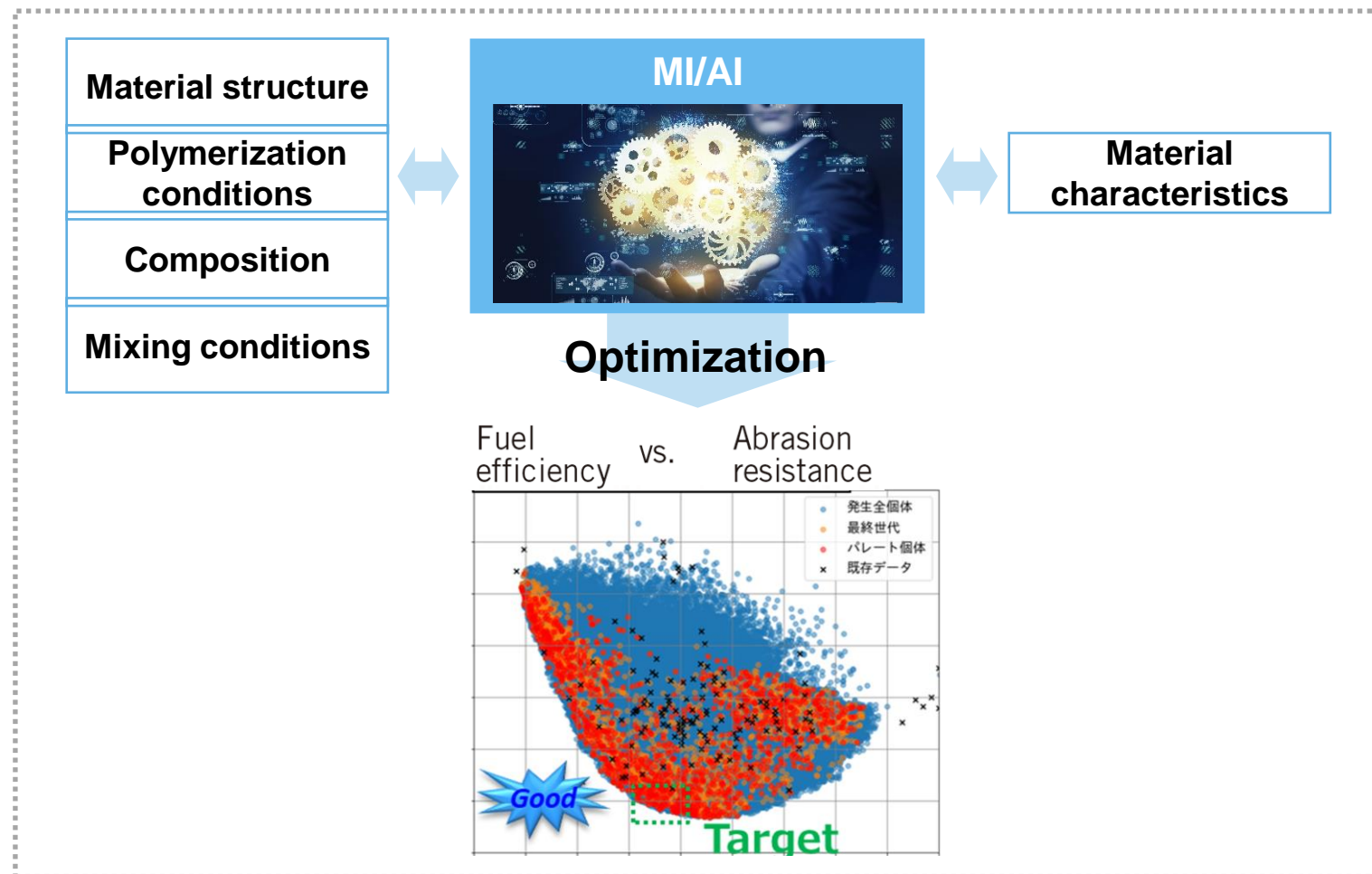
- 400 digital projects
- IP landscaping
- Fostering digital professional personnel



# Materials Informatics for quick development of new grade

R&amp;D

Materials Informatics (MI) utilized to quickly develop a new grade of synthetic rubber during the pandemic

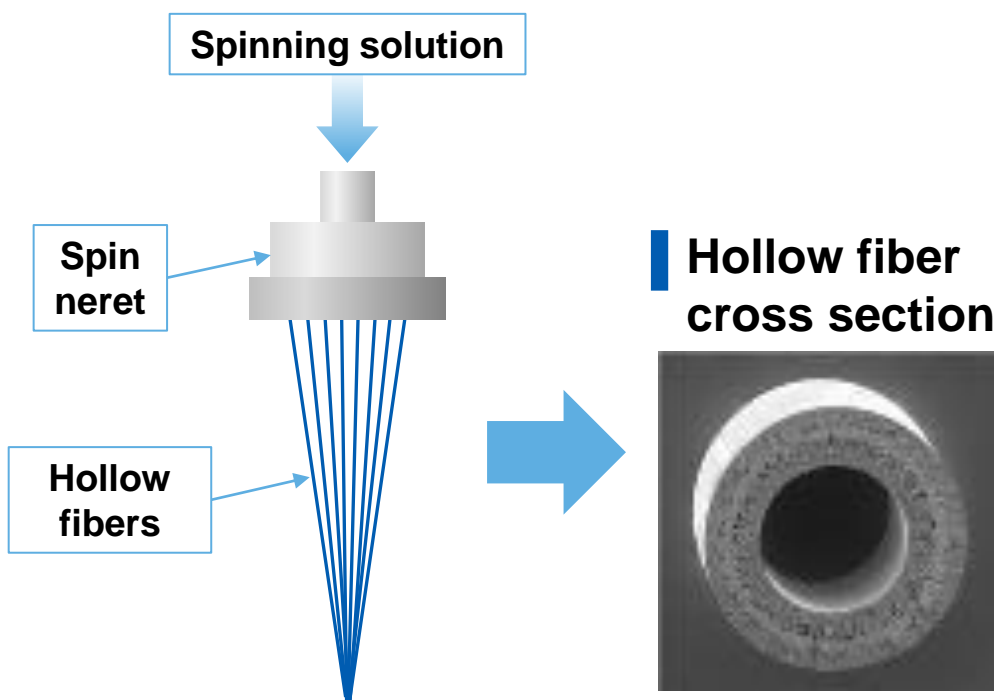


# Heightening performance of virus removal filter

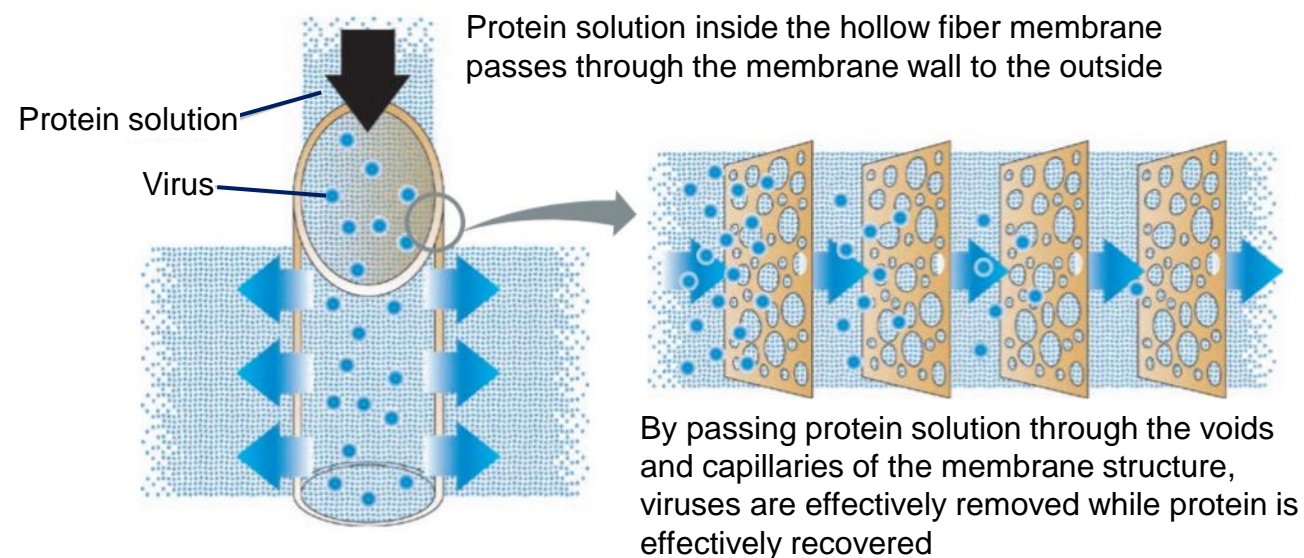
R&amp;D

Using informatics technology to determine spinning process conditions for maximum product performance

## Hollow fiber spinning process



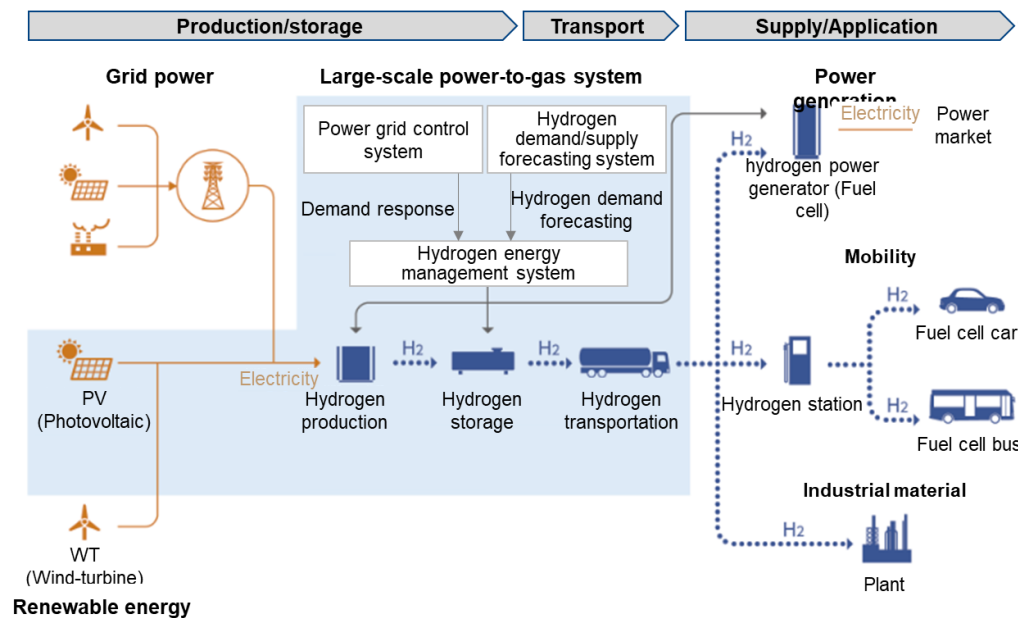
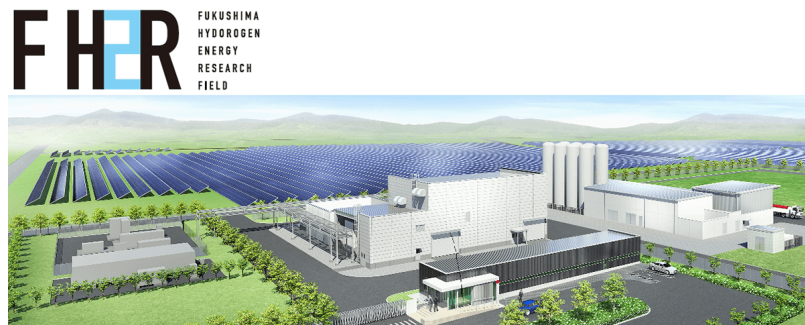
## Maximizing water permeability and filtration performance



# Digital twin of the world's largest-scale alkaline water electrolysis system

Production/  
manufacturing

Using digital twin of process equipment to optimize operation, enhance maintenance, and remotely monitor



NEDO: Hydrogen social construction technical development project



Digital twin

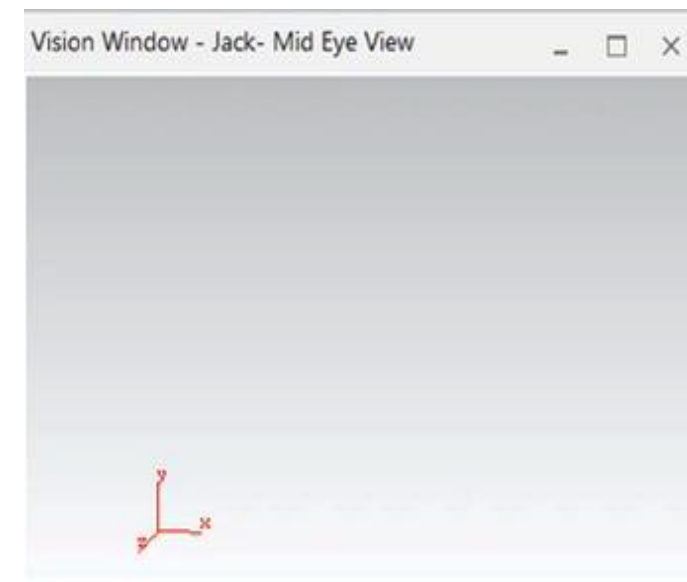
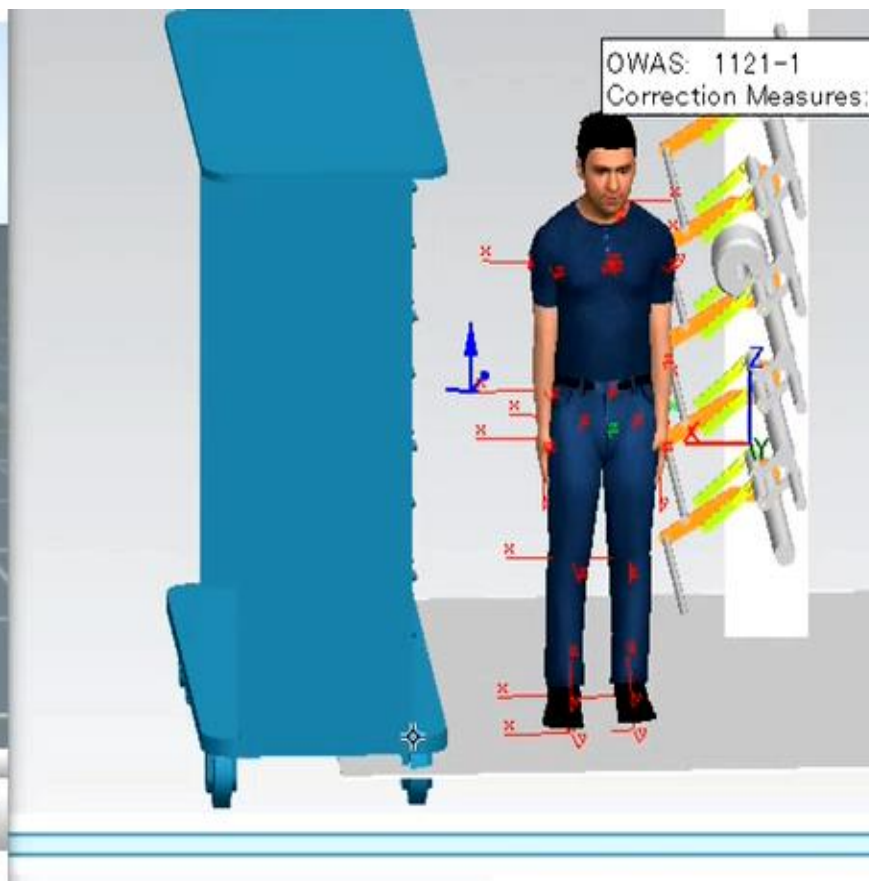
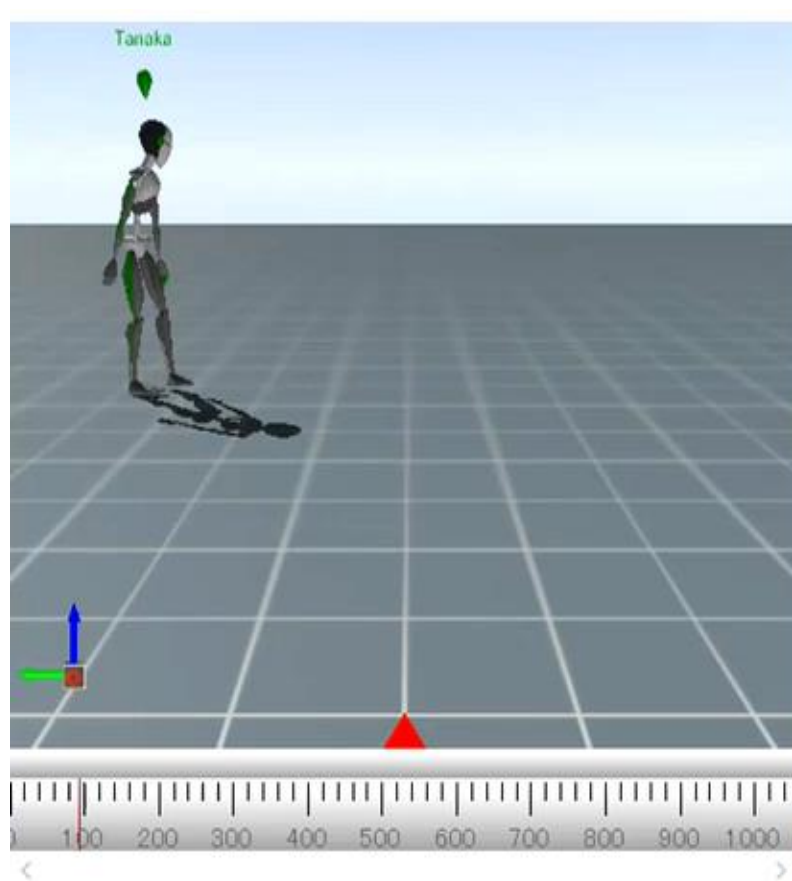




# Digital twin of operator work

Production/  
manufacturing

Digitizing human movement, analyzing work posture, and setting original indexes considering the environment and psychological burden in order to reduce the burden of work



# Eliminating petrochemical plant accidents from pipe corrosion

Service/  
maintenance

Predicting corrosion under insulation by analysis of operating conditions, etc., and corrosion measurement data; rationalizing inspections and heightening equipment reliability



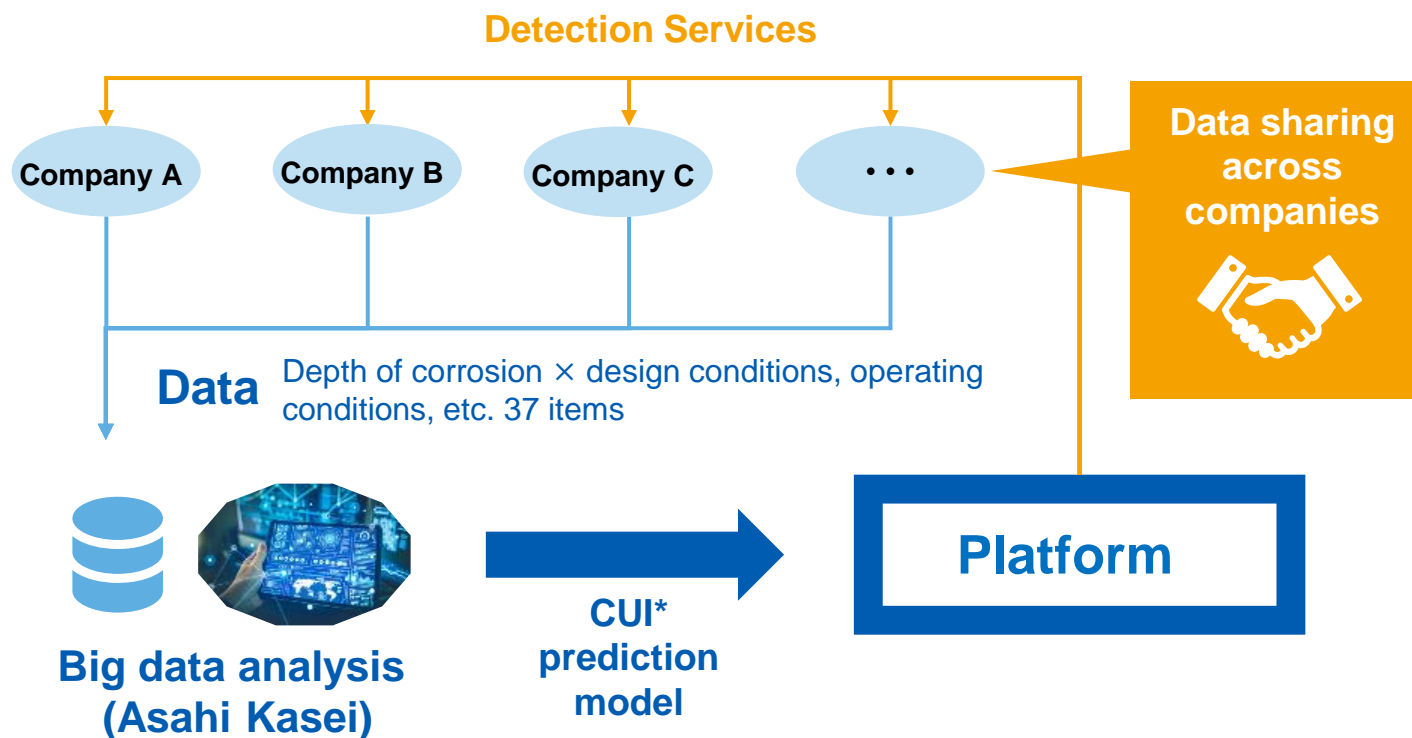
Usually hidden by insulation and can't be seen directly

⇒ **Difficulty of inspection and management, large inspection costs**

Infrastructure  
Maintenance Award  
from the Ministry of  
Economy, Trade and  
Industry (January 2021)



## Consortium of chemical companies (JPCA members)



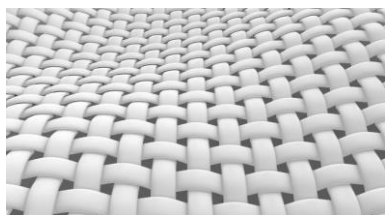
\* Corrosion Under Insulation

# Improving product yield with image inspection and machine learning

Quality  
control

Predicting yarn quality and sorting from relationship between yarn images and quality defect positions; substantial improvement in woven product yield

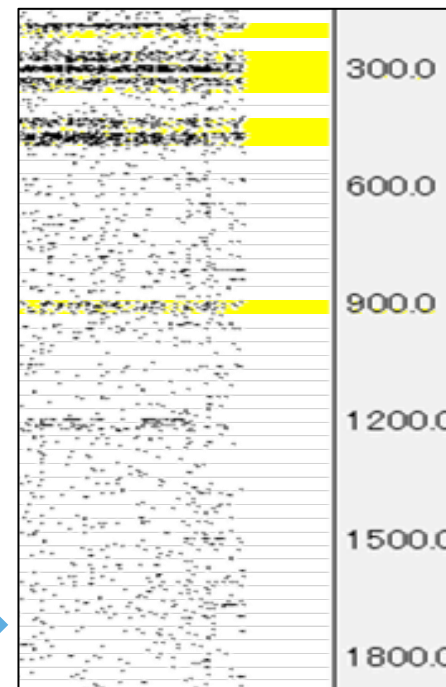
Woven  
product



Defect prediction map

MOV2072ZH	
MOV2060SG	
MOV207E2R	
MOV207E3C	
MOV2071NK	
MOV2071X1	
MOV2052DW	
MOV206665	

Defect results map



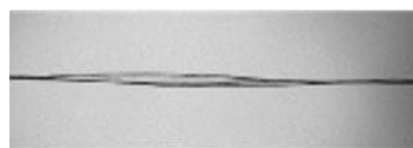
Types of defect



Cut



Loose



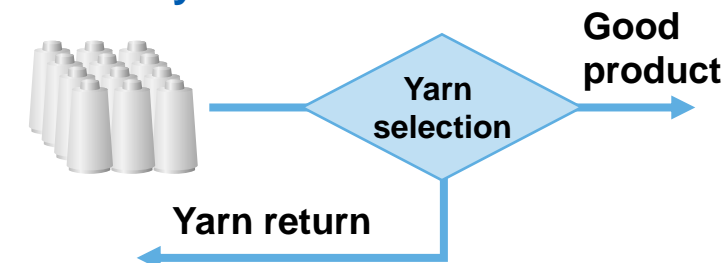
Spread



Learning

Predicting quality by  
sensing yarn surface

Which yarns are bad?



Development of yarn selection equipment

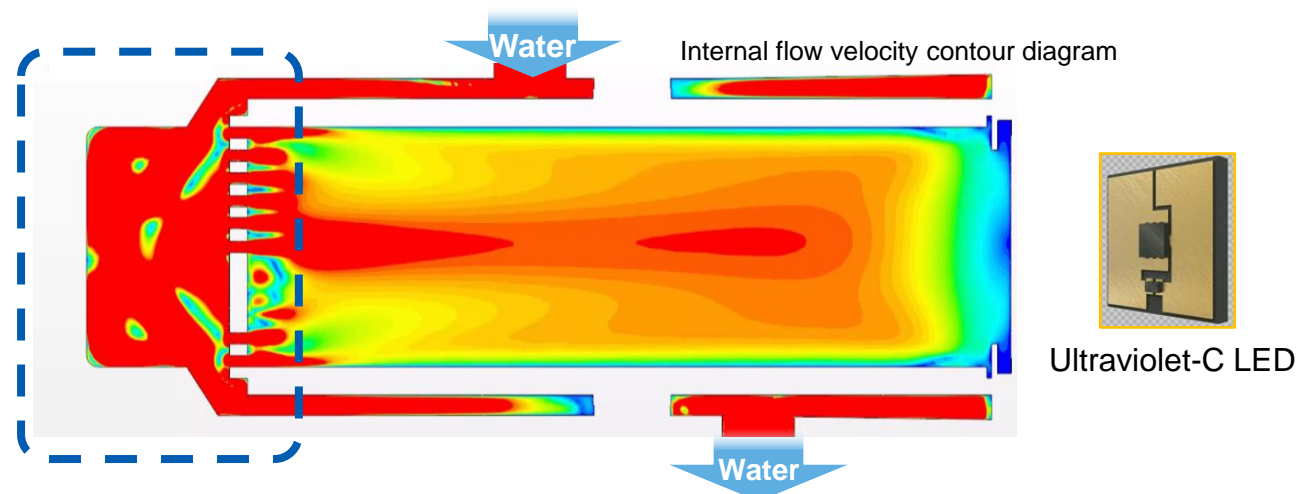


# Automated optimization of product design to heighten performance

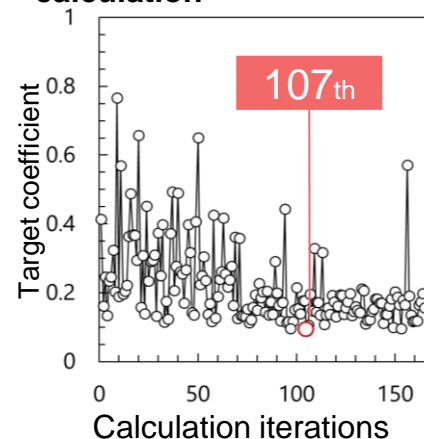
Product  
design

Developed tool for automated optimization of product design; created shape experienced designers wouldn't think of in short time, raised product performance

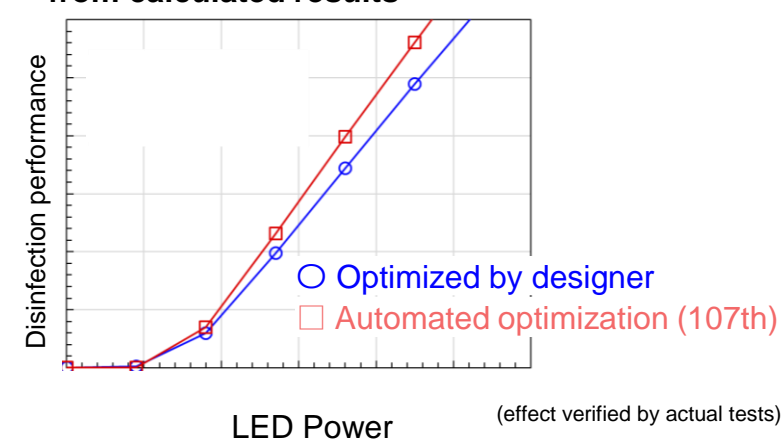
## Running water disinfection



## Results of optimization calculation

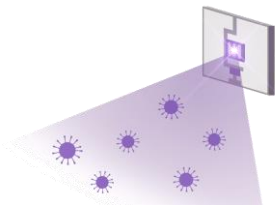


## Predicted performance values from calculated results



## Air disinfection

UV Streamer Air Purifier  
(Daikin Industries, Ltd.)





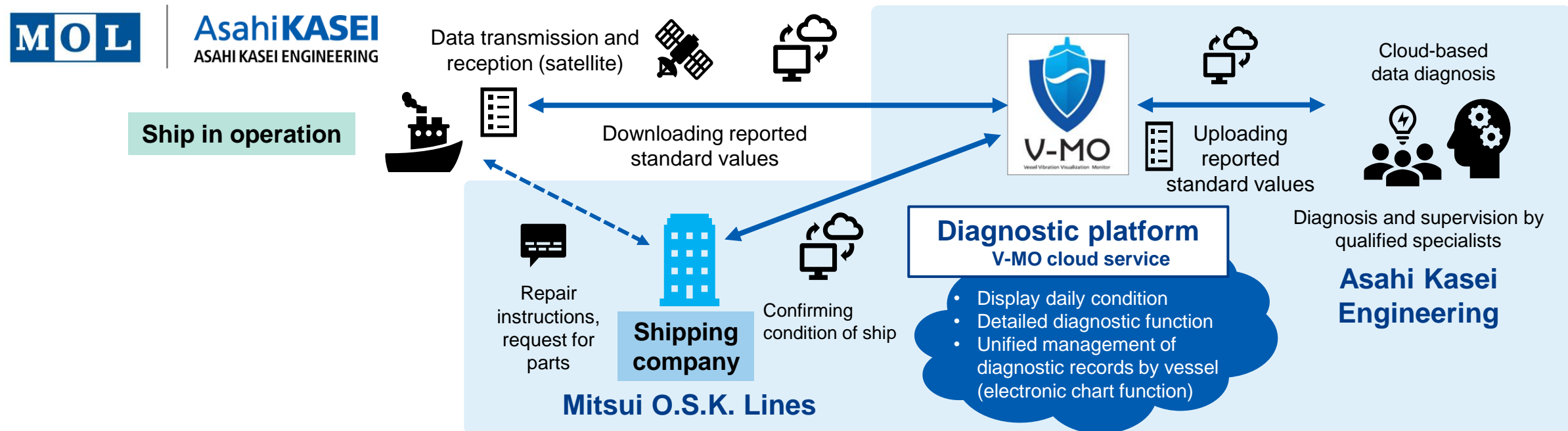
# Early detection of equipment abnormalities on ocean vessels

New  
business

V-MO cloud service: Demonstrating condition monitoring on 13 ocean vessels (90 pieces of equipment), to enable early detection of abnormalities

Joint development by Mitsui O.S.K. Lines, Ltd. and Asahi Kasei Engineering Corp.

V-MO: Vessel Vibration Visualization Monitor





## Digital **Introduction** Period

- 400 digital projects
- **IP landscaping**
- Fostering digital professional personnel

# IP landscaping for business reform based on patent data

Management  
Strategy

## Visualization of characteristics of each business by IP landscaping, utilization in management strategy

(18) 日本国特許庁 (JP)

(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2019-119773

(P2019-119773A)

(43) 公開日 令和1年7月22日 (2019. 7. 22)

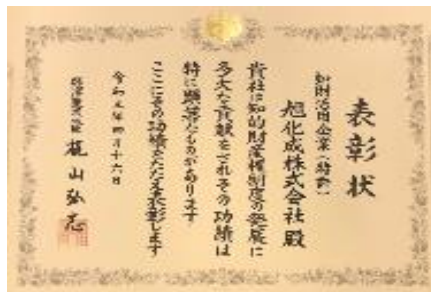
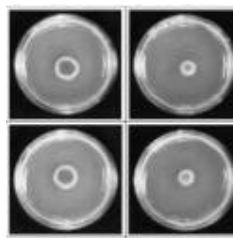
(51) Int. Cl.	F I	テーマコード (参考)
CO8L 59/00 (2006.01)	CO8L 59/00	4J002
CO8K 3/08 (2006.01)	CO8K 3/08	
CO8K 9/02 (2006.01)	CO8K 9/02	

審査請求 未請求 請求項の数 6 OL (全 22 頁)

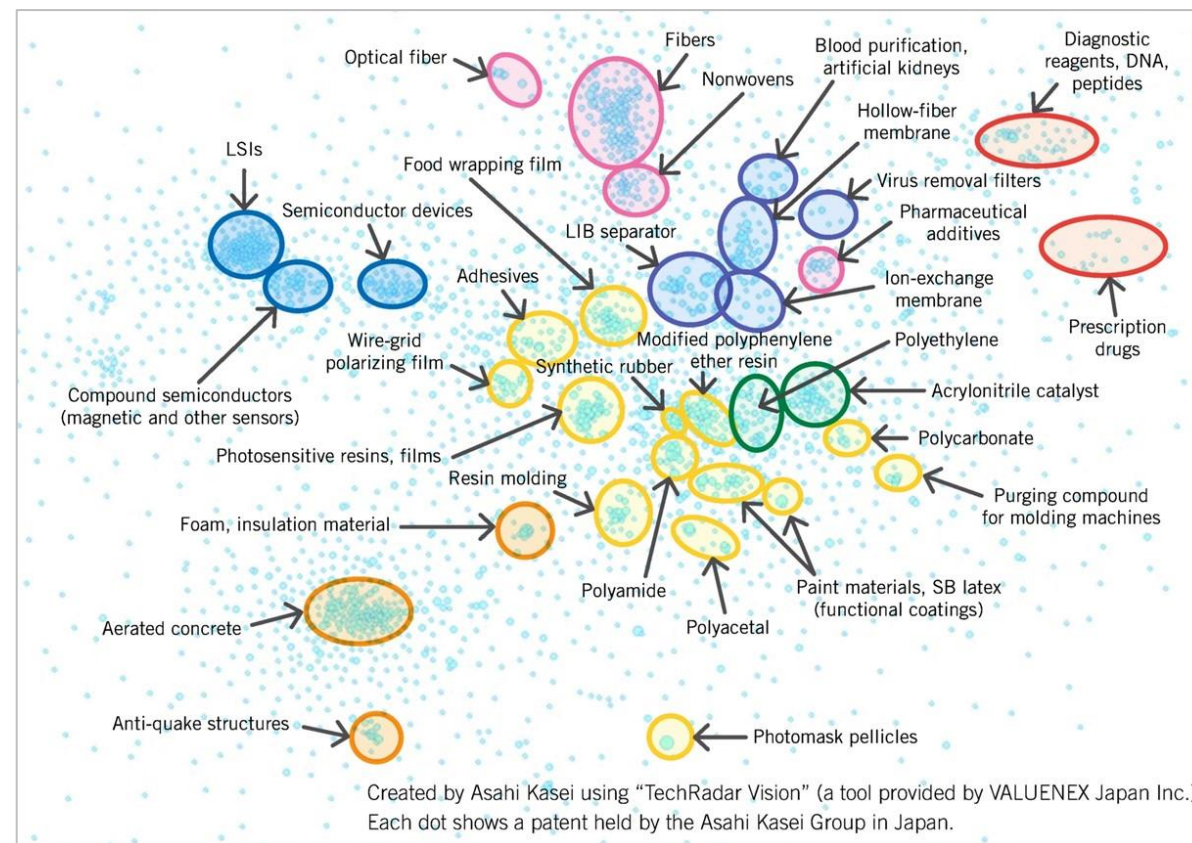
(21) 出願番号 特願2017-233920 (P2017-233920)  
(22) 出願日 平成29年12月28日 (2017. 12. 28)

(71) 出願人 000000033  
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東京都千代田区有楽町一丁目1番2号

【特許請求の範囲】  
【請求項1】  
波長範囲外の照射光を照射面に反射する光導体と、当該光源を駆動制御する駆動部と、を備え、前記駆動部は、前記照射光が照射されない時間から3日を越えないように、前記光源を間欠動作させる無放射型光導体装置。  
【請求項2】  
前記駆動部は、X (0.1≦X≦3) 日を周期として前記光源を間欠動作させ、前記X日当たりの、前記駆動部に対する前記照射光の照射下—式量が、1.0×X [mJ/cm<sup>2</sup>] 以上1.6×X [mJ/cm<sup>2</sup>] 以下の範囲内の値となるように前記光源を駆動制御する請求項1に記載の無放射型光導体装置。



## Asahi Kasei Group patent map



## Digital **Introduction** Period

- 400 digital projects
- IP landscaping
- **Fostering digital professional personnel**

# Fostering digital professional personnel

Fostering  
personnel

Started training program for data scientists and data analysts in 2019

## Fostering data analysts

- Eligibility expanded from production technology and manufacturing members to marketing and planning
- Data collection, accumulation, analysis, utilization

## Fostering data scientists

- R&D members eligible
- Materials Informatics

### Common characteristics

- Original materials
- Actual on-site problems
- Mentoring
- Community activity
- Work platform

## Manufacturing IoT platform

Data collection /accumulation



Data analysis /modeling



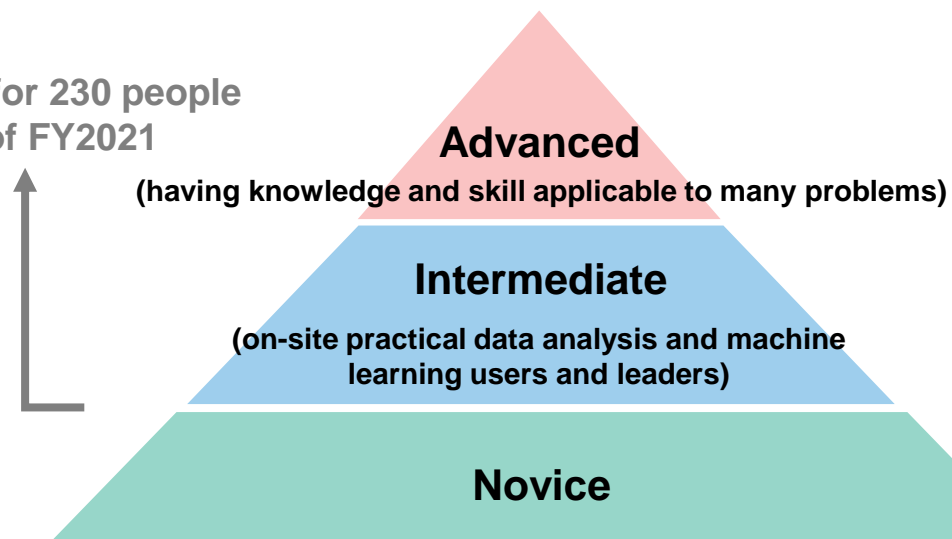
Field utilization



Users work with  
PCs at desks



Aiming for 230 people  
by end of FY2021



## MI-Hub

python



# Digital transformation roadmap

2016

2018

2020

2022

2024

Digital  
Introduction Period

Digital  
**Deployment Period**

Digital  
Creation Period

Digital  
Normal Period

Using digital technology to solve actual on-site problems

**Lateral deployment of digital solutions across divisions, regions, and functions**

Creating new businesses with new business models by gaining value from intangible assets, etc.

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- 400 digital projects
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- DX Vision
- Digital Value Co-Creation
- 40,000 digital personnel
- DX example cases

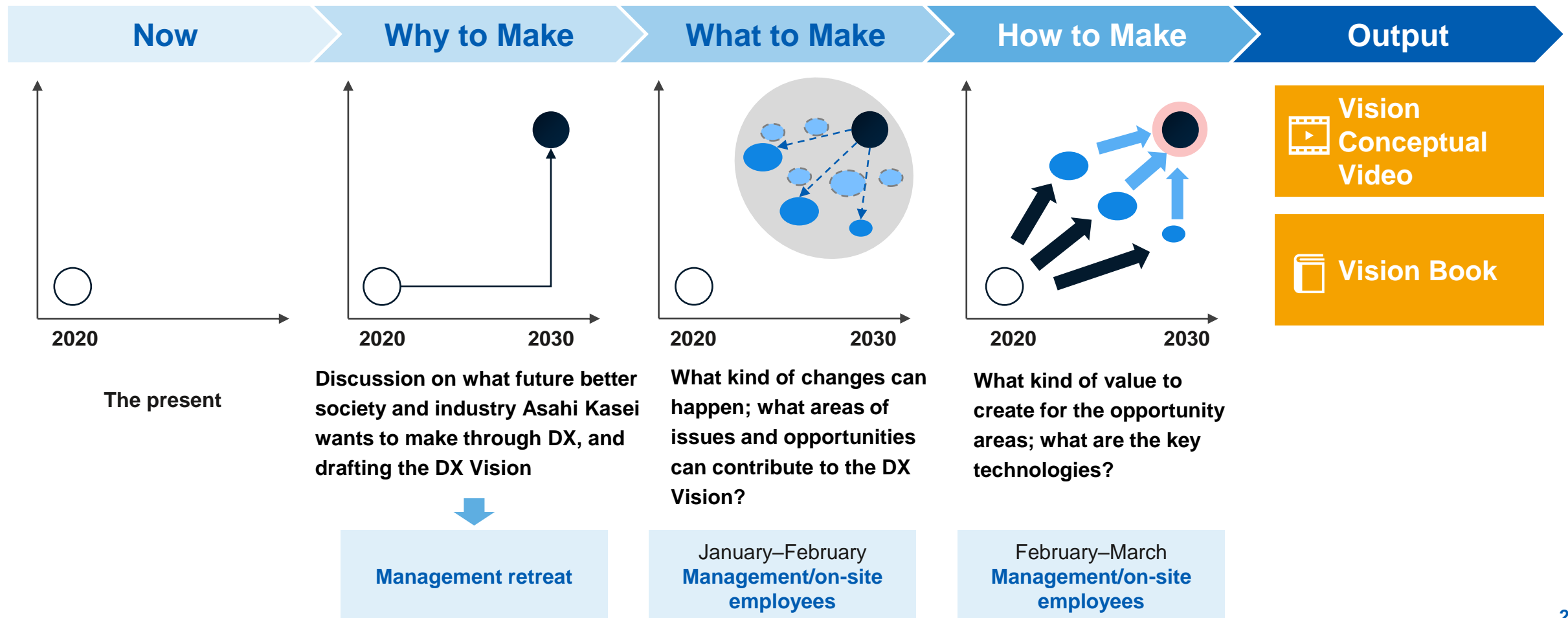
- Asahi Kasei Garage
- Example cases with Asahi Kasei Garage
- Contributing to social innovation

## Digital **Deployment** Period

- **DX Vision**
- Digital Value Co-Creation
- 40,000 digital personnel
- DX example cases

# Formulating DX Vision

Formulation of a vision for “Why” and clarifying “What” needs to be done for that and “How” to achieve it; sharing and conveying this as our DX Vision





# Asahi Kasei DX Vision 2030

**Asahi Kasei will co-create “healthy living” and “a future world full of smiles” through borderless connections enhanced by digital innovation.**





# Success factors: People, data, and organizational culture

## People



## Data



## Organizational culture





# CoCo CAFE

Creative Agile Flexible Evolving

CoCo-CAFE: **Co**mmunication & **Co**ncentration–**C**reative, **A**gile, **F**lexible, and **E**volving

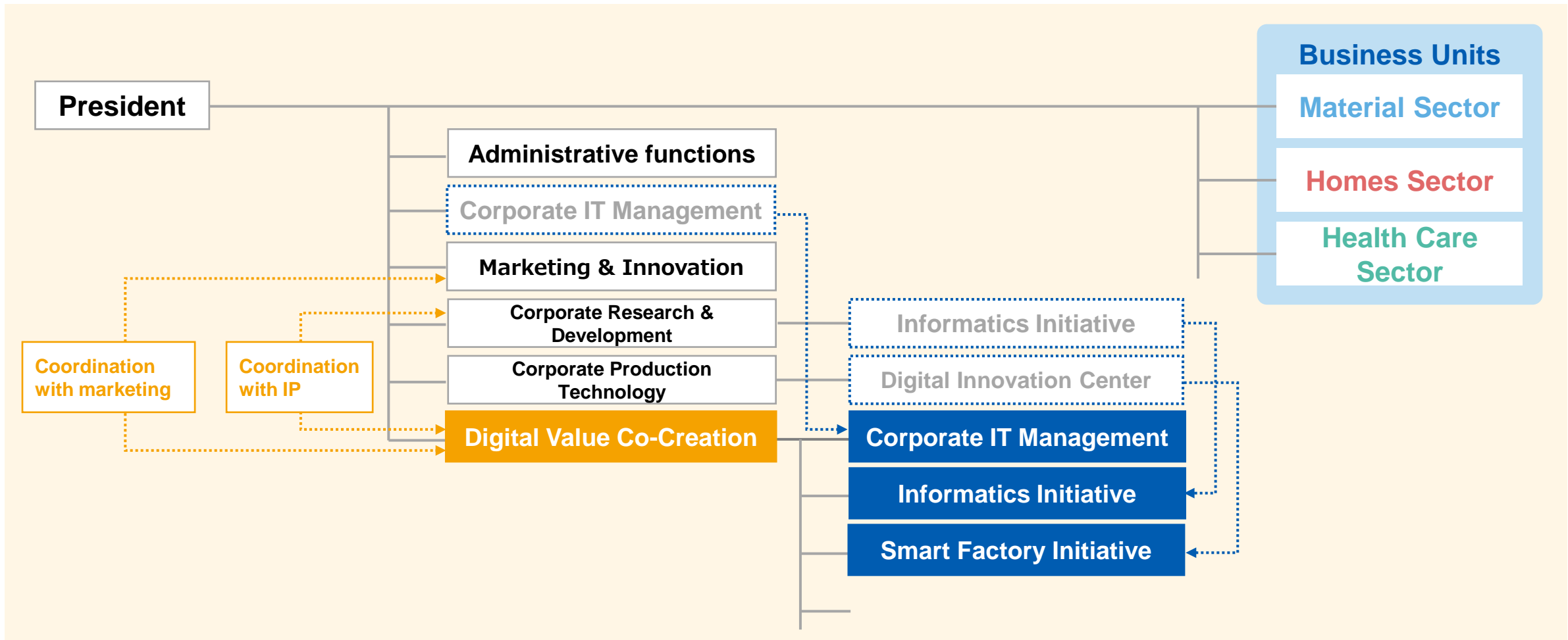


## Digital **Deployment** Period

- DX Vision
- **Digital Value Co-Creation**
- 40,000 digital personnel
- DX example cases

# Establishment of Digital Value Co-Creation

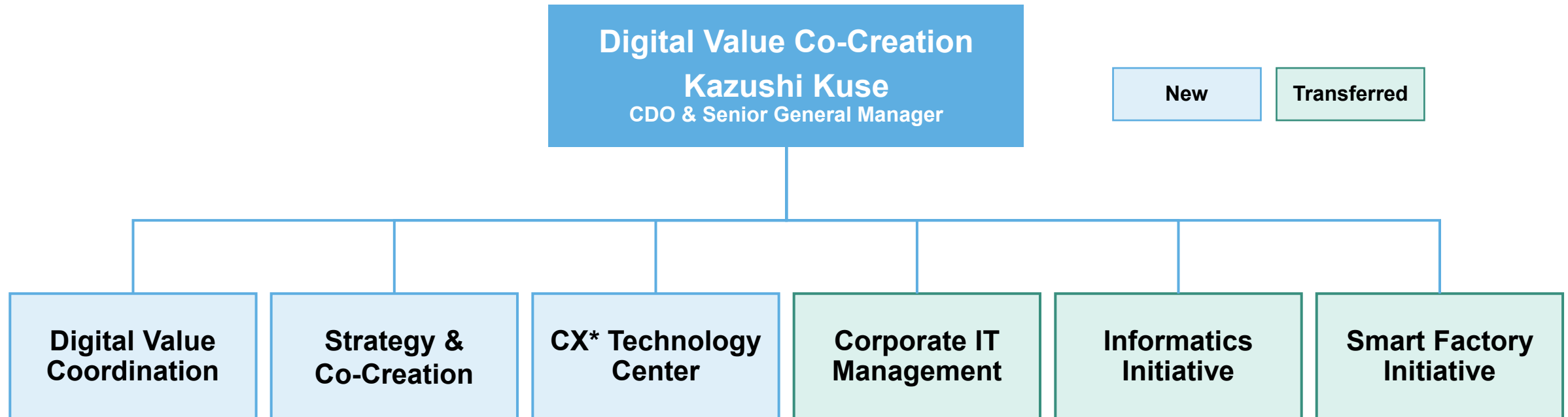
**Consolidation of IT and digital organizations to accelerate entrenchment of DX in management and promotion of DX company-wide**



## Mission and organizational configuration

### Mission

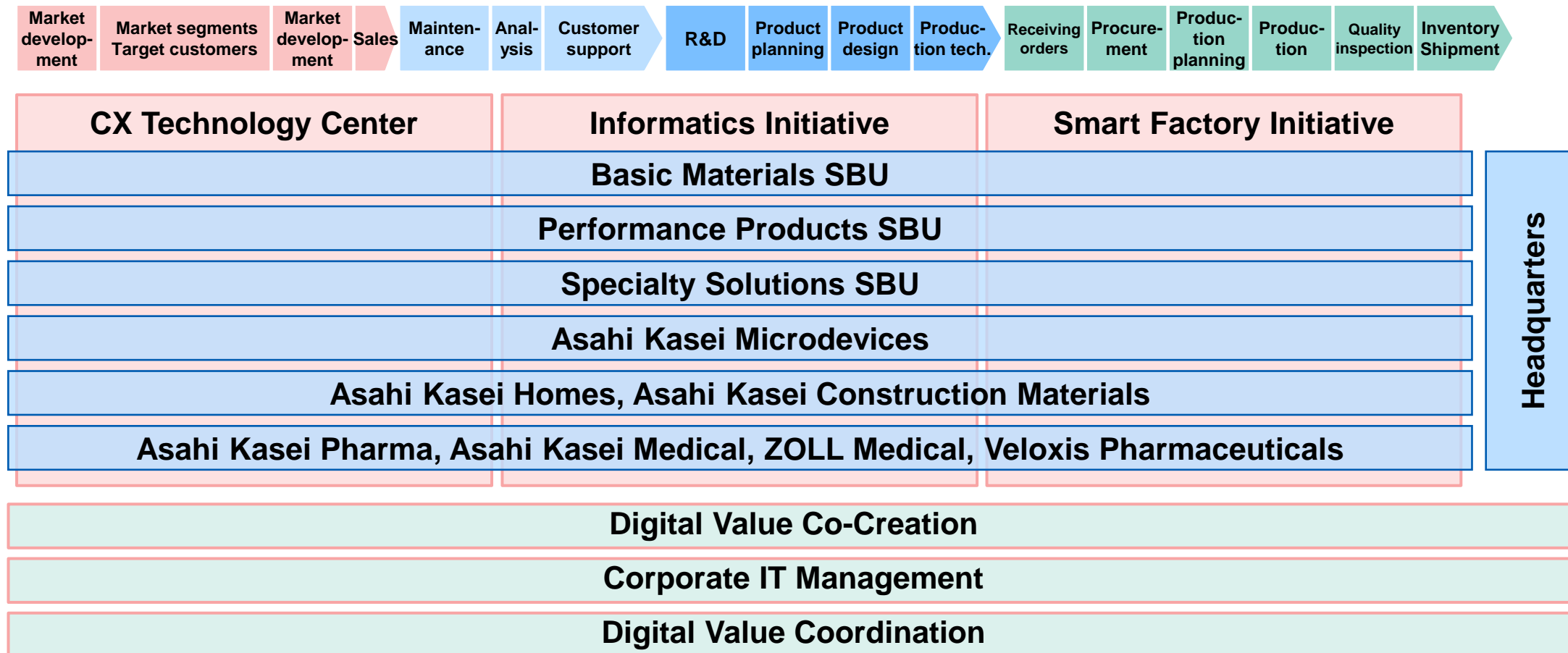
- Driving business model transformation and value creation by leveraging the Asahi Kasei Group's strength of diversity
- Entrenchment of DX in each business operation and the overall management of the Asahi Kasei Group
- Accelerating transformation by co-creation with digital technologies



\* Customer Experience

## Role each organization and enhanced coordination with business divisions

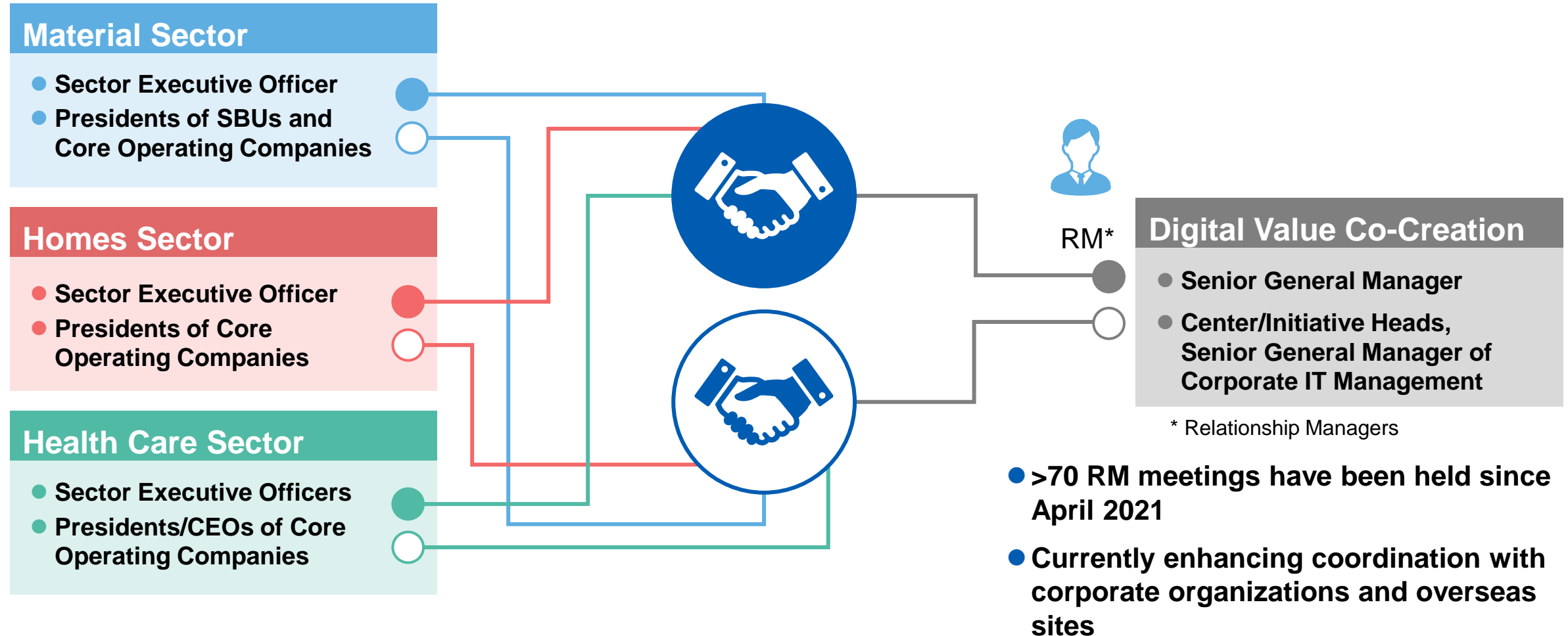
Three central organs aligned with the business value chain, and cross-sectional divisions to enhance coordination among them





## Enhancing coordination with business divisions

Assigning DX Relationship Managers to enhance coordination with business divisions and to formulate DX policy in accordance with business characteristics



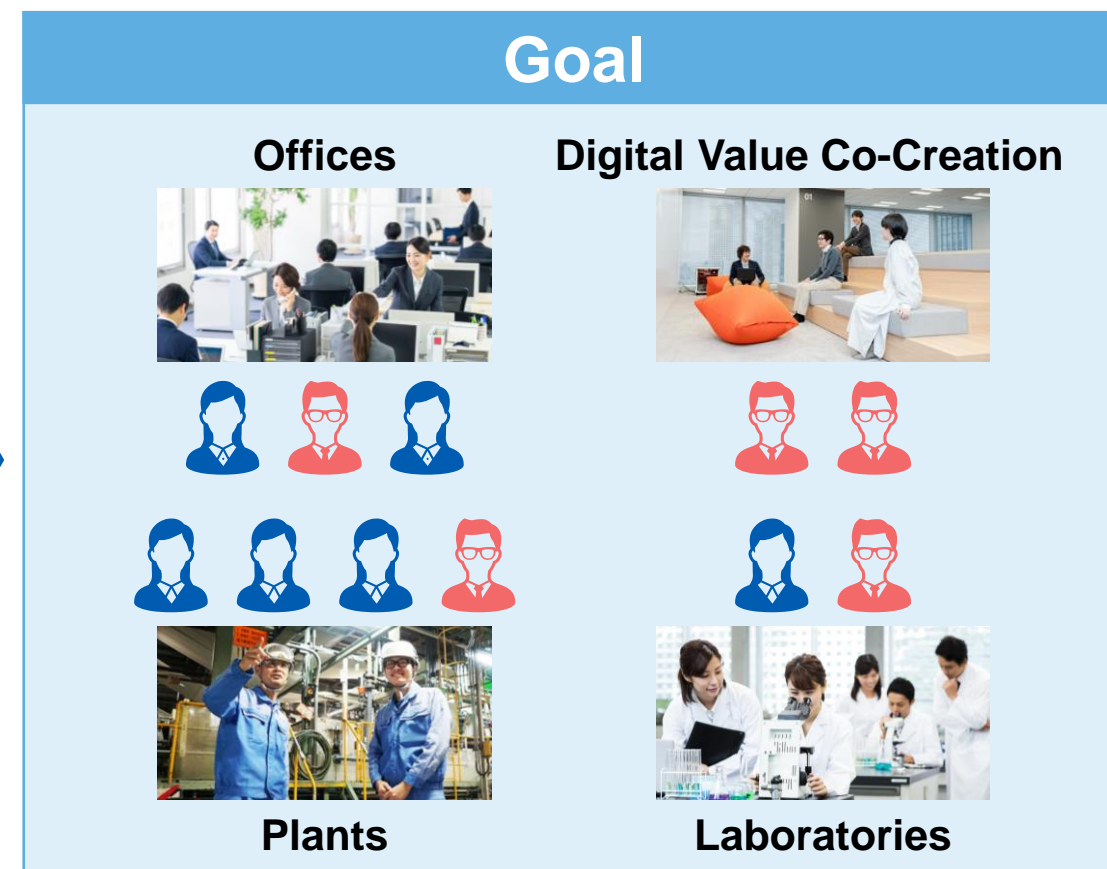
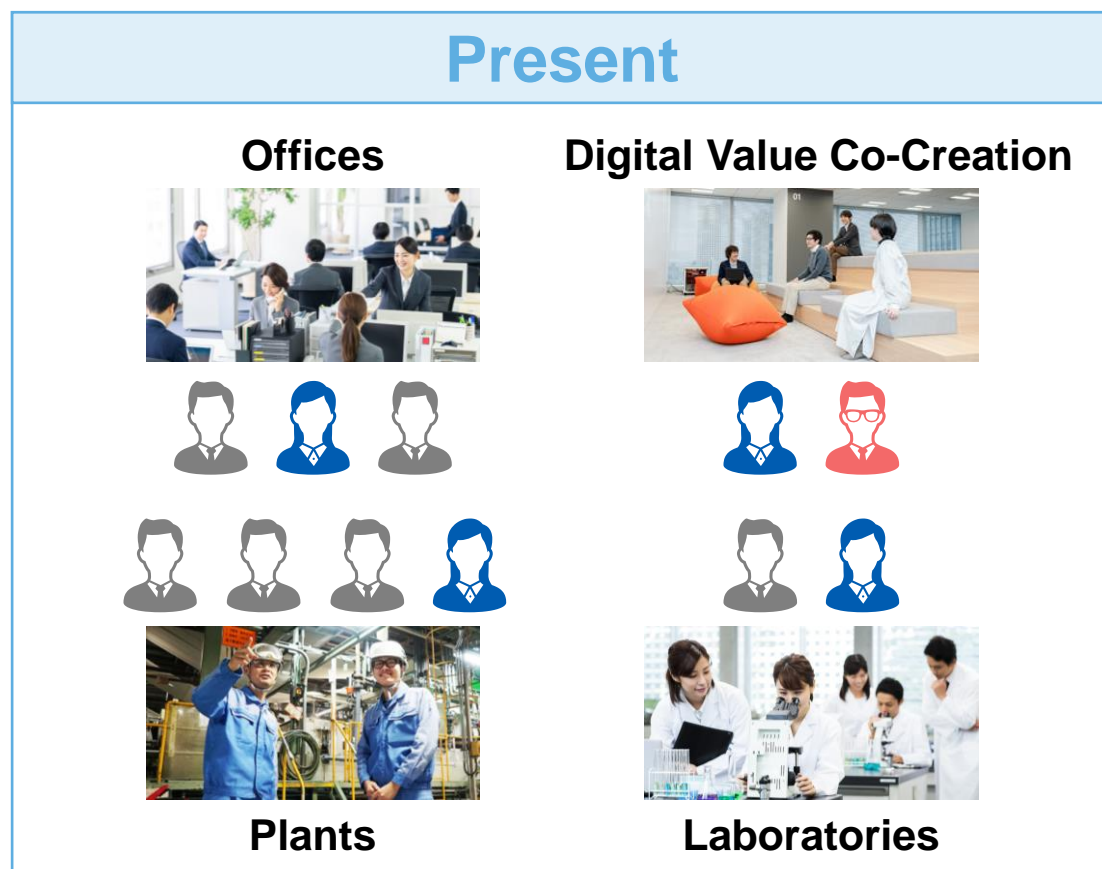
## Digital **Deployment** Period

- DX Vision
- Digital Value Co-Creation
- **40,000 digital personnel**
- DX example cases



# Fostering 40,000 digital personnel: targeting all employees

Advancing IT literacy of all employees and accelerating DX group-wide



Digital personnel



Digital specialists

# Asahi Kasei DX Open Badge

Using an e-learning system with original content, Open Badges are awarded to employees who pass each level

Open Badge: Certification conforming to international technical standard of IMS Global Learning Consortium

- Self-study program for all employees
- Badges can be affixed to LinkedIn profile, e-mail signature, business card, etc.



Level1  
**Knowledge**  
Novice level

15 minutes



Level2  
**Skilled**  
Intermediate level

1 hour



Level 3  
**Experienced**  
Target for all employees

A few hours



Level 4  
**Expert**  
True digital professional

Solving actual problems



Level 5  
**Thought Leader**  
Transformation driver

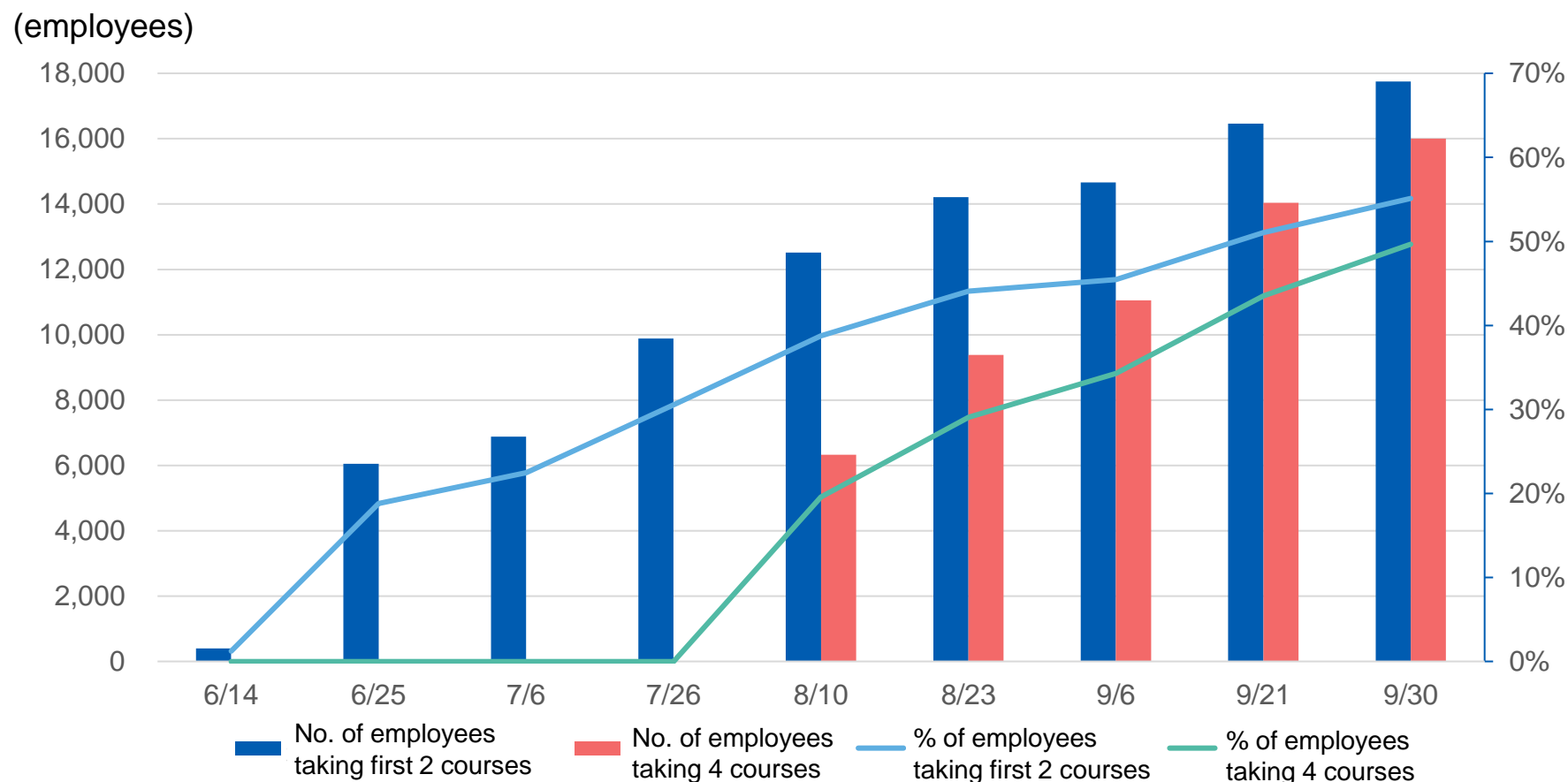
Recognized as  
Group Masters

**40,000** digital personnel  
targeted in 2023

# Asahi Kasei DX Open Badge: attainment of Level 1

Around a half of employees in Japan have attained Level 1

Courses introducing IT and AI were launched in June, and courses introducing IoT and Garage were launched in August in Japan (scheduled to start overseas in January 2022)



Targeting **32,208** employees  
(as of September 30, 2021)

% of employees taking first 2 course

**55.1%**  
(17,753 employees)

% of employees taking first 4 course

**49.7%**  
(15,999 employees)

## Comments from employees who finished Open Badge Level 1

Comments are posted on the intranet to motivate employees to learn



Material  
Sales

**Q1: Having completed the Asahi Kasei DX Open Badge e-learning course, do you have any comment or request?**

It was a good opportunity to learn the basics of DX in a short time during a break at work. If more contents are included in the next courses, it would help increase my knowledge of DX.

**Q2: What do you think of DX, and what do you expect from it?**

The Level 1 is the basics, but for more advanced levels it would be better to introduce more concrete examples of how to apply DX in our work (in my case, sales activity).



Healthcare  
Researcher



Material  
Sales Manager



Homes  
HR Manager



Affiliated company  
Engineer



Material  
Division General Manager



Affiliated company  
HR development



Healthcare  
Staff



Electronics  
Engineer



Healthcare  
Development engineer



Affiliated company  
Production Leader



Healthcare  
Accounting Chief



Hideki Kobori  
President

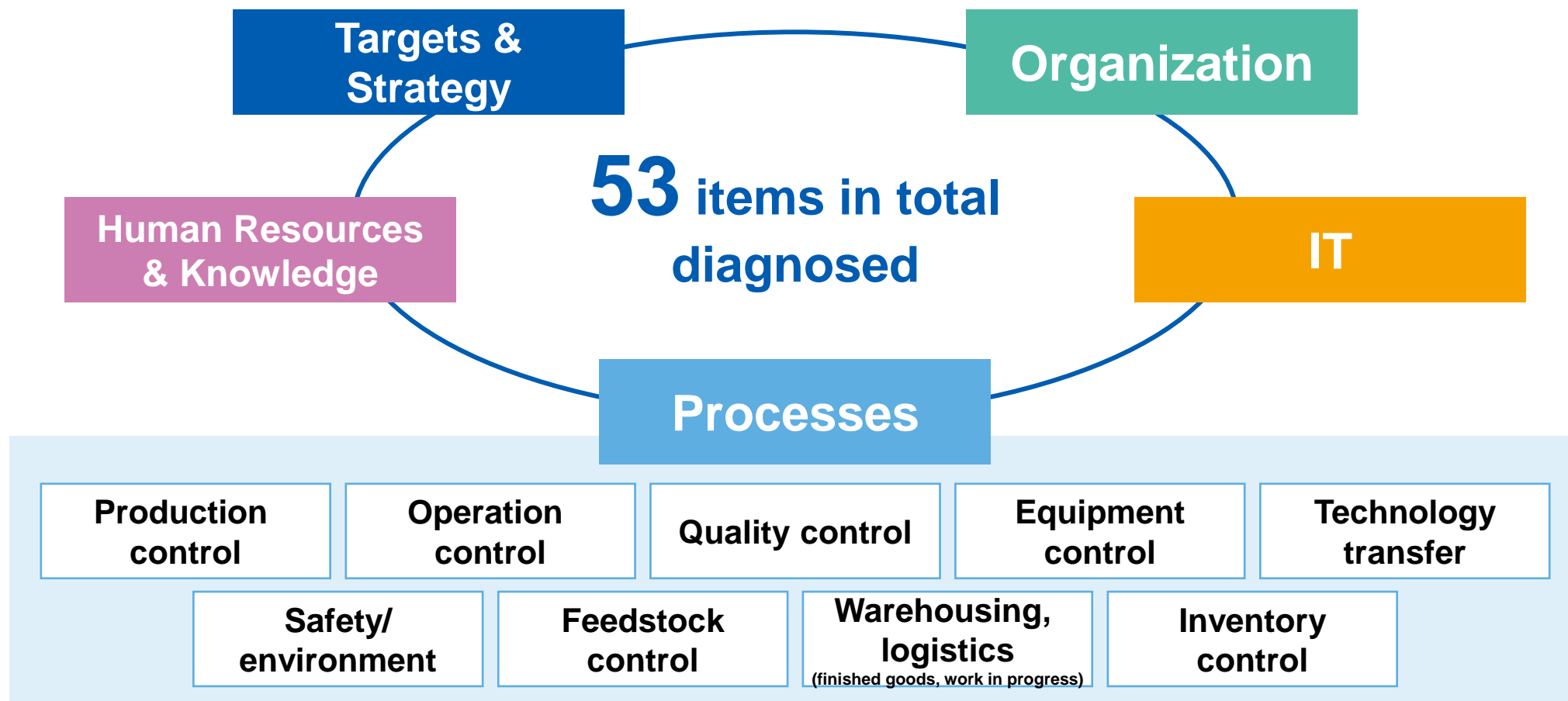
I've completed both  
Level 1 and Level 2.

## Digital **Deployment** Period

- DX Vision
- Digital Value Co-Creation
- 40,000 digital personnel
- **DX example cases**

## Diagnosing smart factory achievement levels

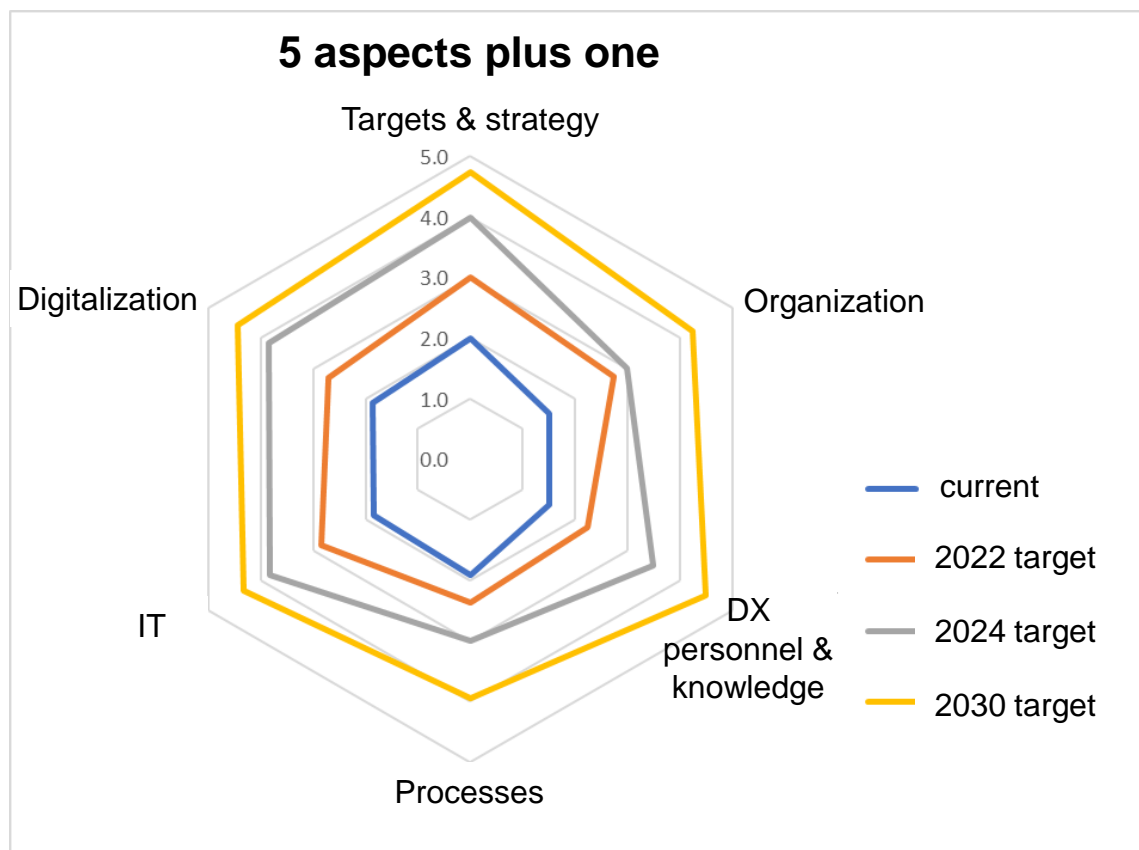
Using Asahi Kasei original smart factory achievement diagnosis model, current status is evaluated on a 5-point scale in the 5 aspects of “Targets & Strategy,” “Organization,” “Human Resources & Knowledge,” “Processes,” and “IT”



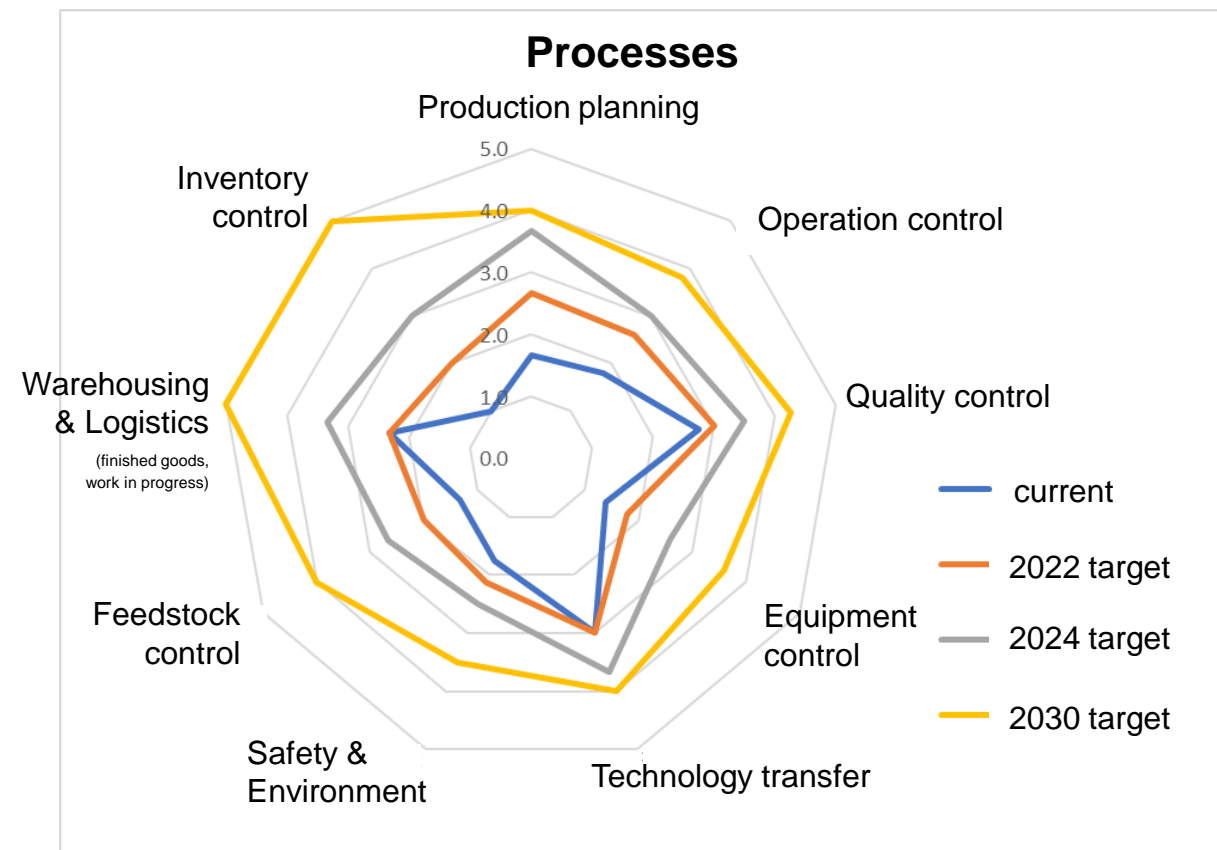
# Diagnosing smart factory achievement levels

Diagnosis completed for **83** of the 88 targeted factories around the world, formulating medium-term targets according to factory characteristics

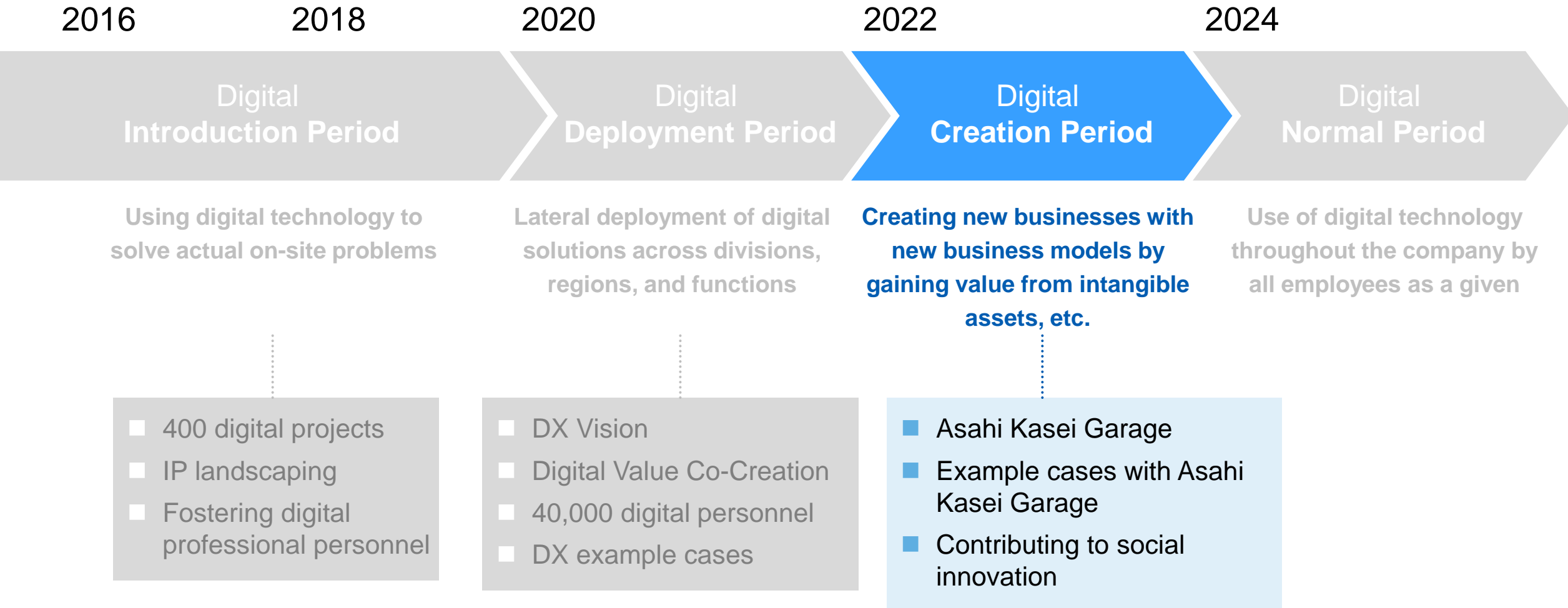
## Overall current score and medium-term targets



## Current score and medium-term targets by process



# Digital transformation roadmap





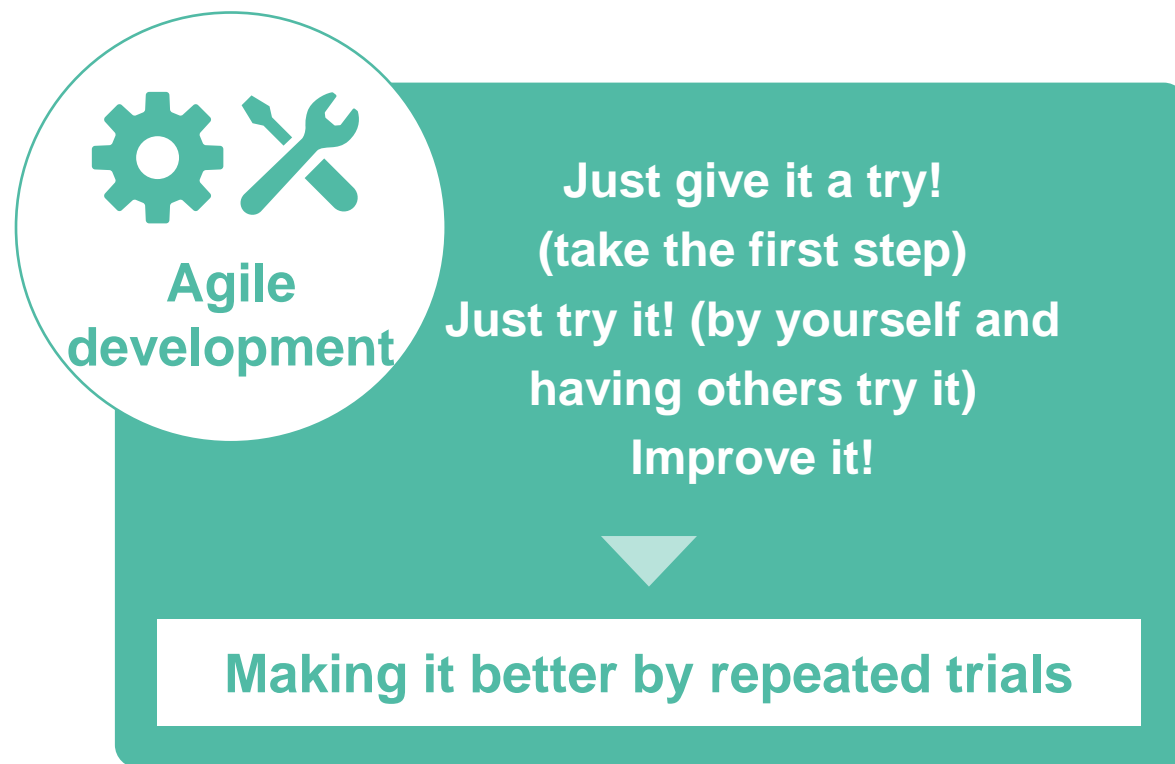
## Digital **Creation** Period

- Asahi Kasei Garage
- Example cases with Asahi Kasei Garage
- Contributing to social innovation

# Asahi Kasei Garage

Launching a team to execute and promote the “Garage” approach to innovate with DX, co-creating new value and services from products and know-how in Asahi Kasei’s diverse fields of business

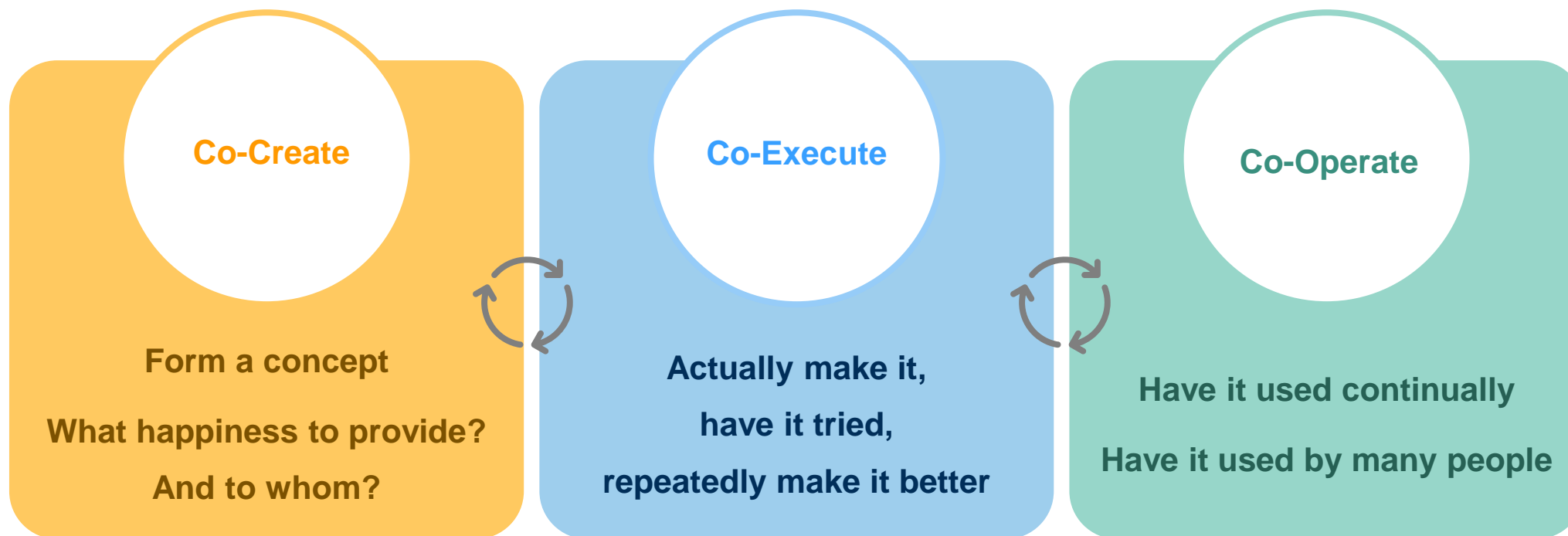
## Fundamental elements of Garage



The IBM Garage is currently applied to various projects, with plans to establish an autonomous in-house system going forward.

# Garage flow

Aiming to create new value through three phases while co-creating internally and externally

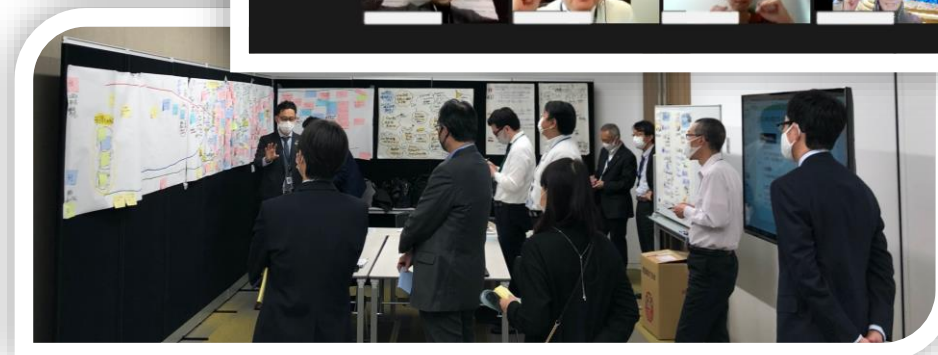
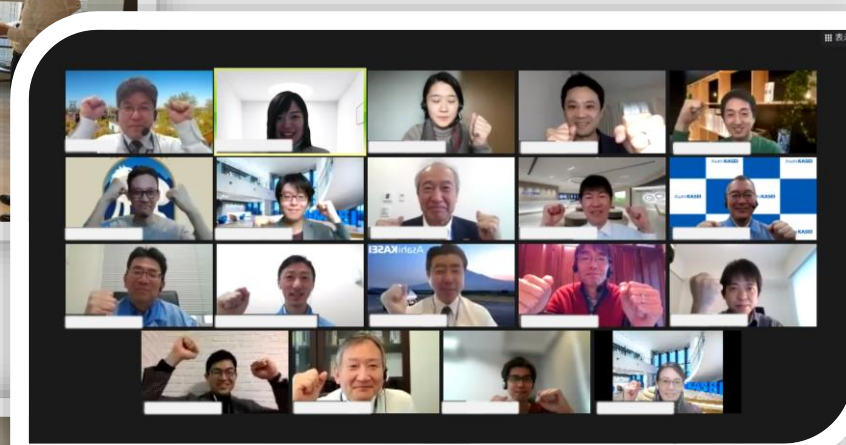


Co

Across generations and positions.  
Across the boundaries of organizations and entities.  
Together with various companions.

# Scenes of co-creation by Garage

Imagining an exciting future with various members regardless of ages and job titles



## Digital **Creation** Period

- Asahi Kasei Garage
- **Example cases with Asahi Kasei Garage**
- Contributing to social innovation

# Fostering culture of using data

Data management platform for the Asahi Kasei Group is being prepared as an infrastructure enabling easy access to data by anyone at any time; promoting data use by sharing portal site with dashboard utilizing various data

## Dashboard



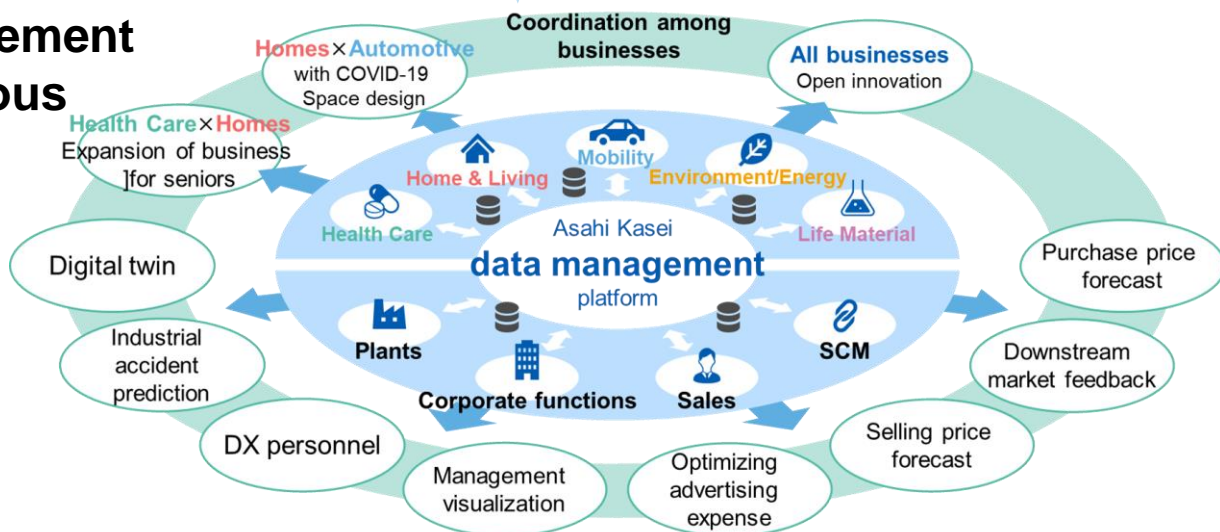
## Portal



Using the “like” button to promote data usage



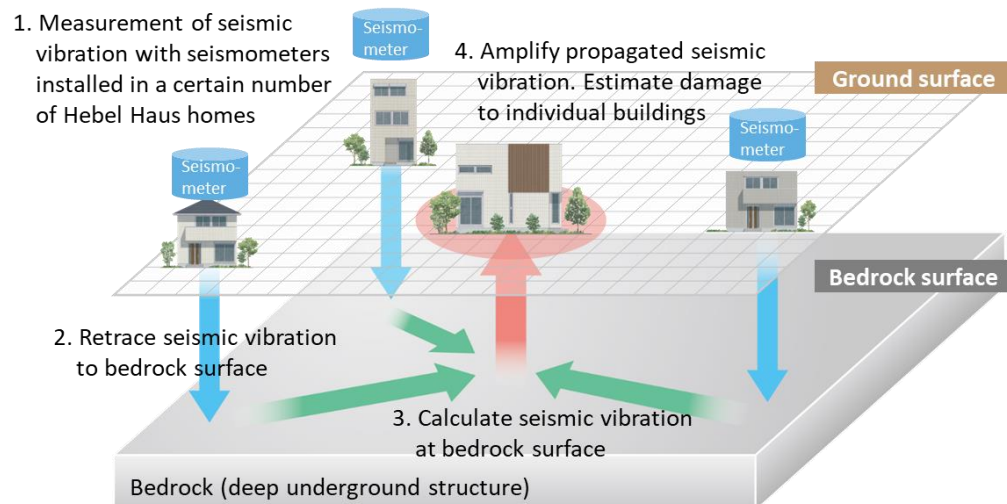
## Unified management of various data



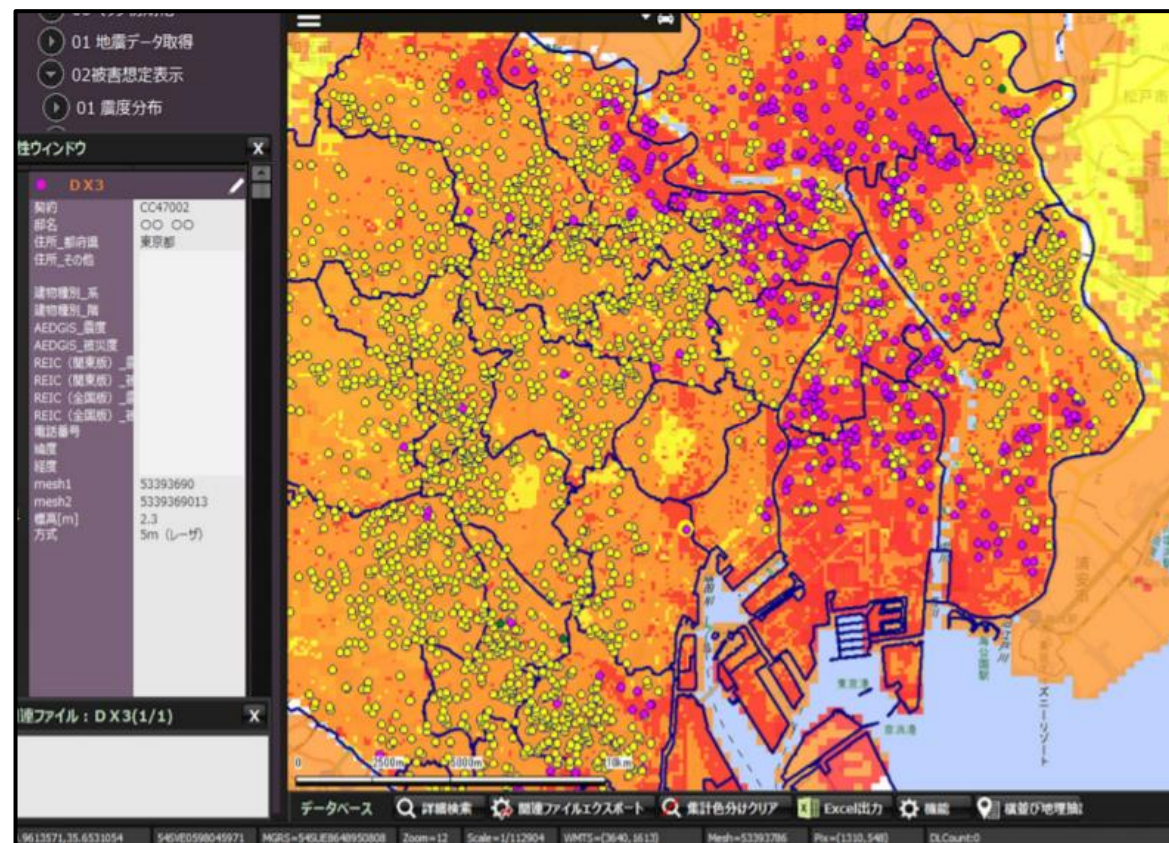


# Advanced disaster prevention system using seismometers and bedrock data with building structure data

Utilizing seismometers installed on Hebel Haus and original bedrock data obtained through joint research\* with building structure data to prevent and alleviate disasters



## IoT disaster prevention information system LONGLIFE AEDGiS



\*Joint research with National Research Institute for Earth Science and Disaster Resilience

Trial operation began in August 2021

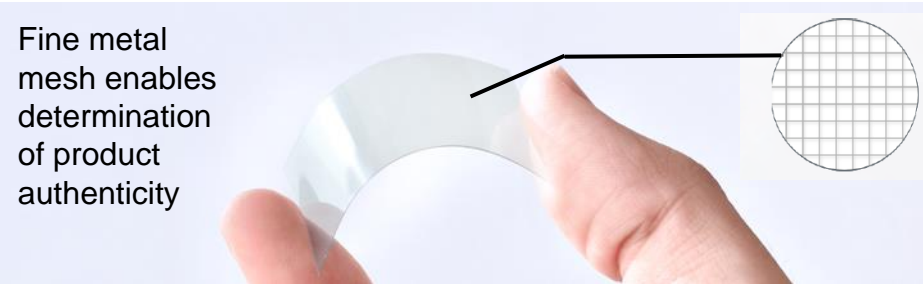
## Digital **Creation** Period

- Asahi Kasei Garage
- Example cases with Asahi Kasei Garage
- **Contributing to social innovation**

## Achieving supply chain where only genuine products are delivered to end users

Using fine processing technology and digital technology to prevent influx of counterfeit goods, ensuring only genuine articles reach consumers

### Irreproducible authenticity



Fine metal mesh enables determination of product authenticity

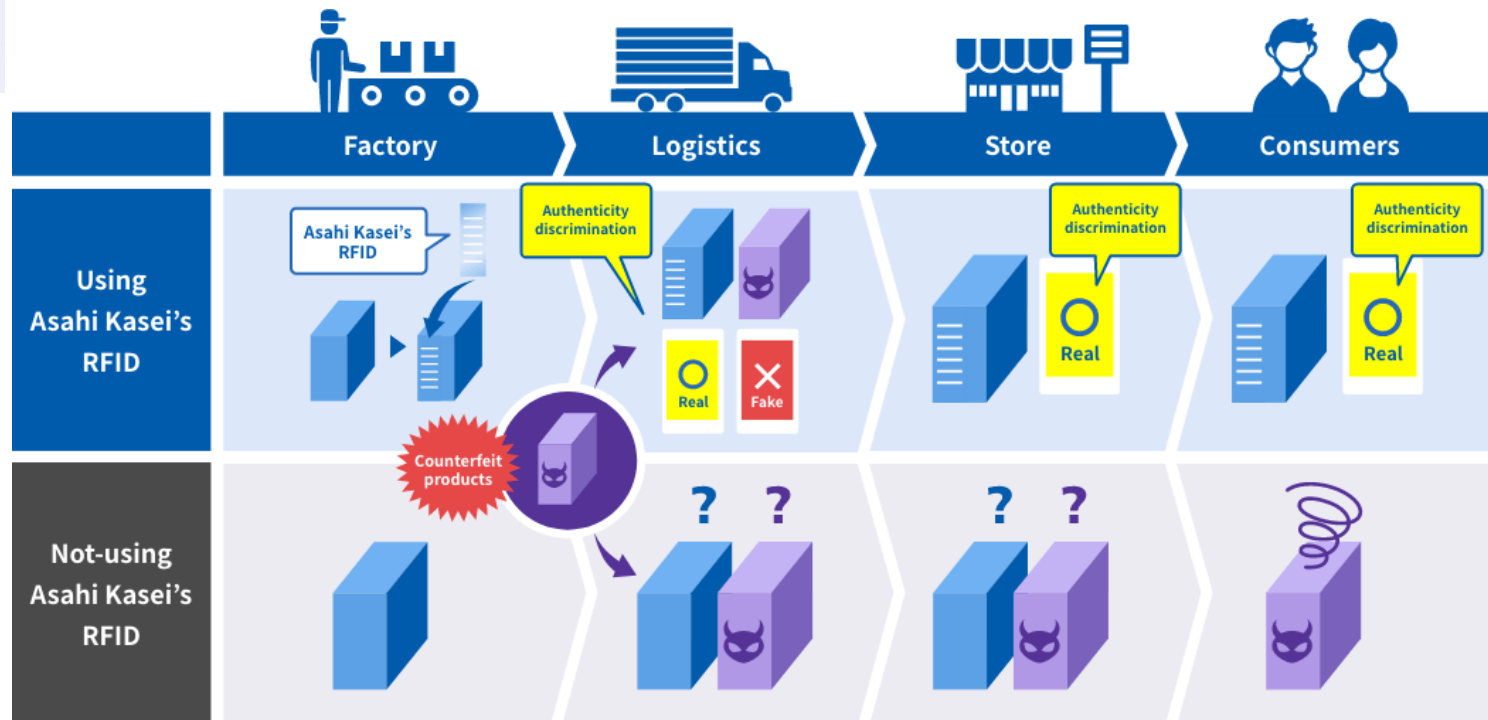
(tracing service using RFID function under development)



High transparency allows label to be affixed on printed package

## Service launch scheduled for summer 2022

Using blockchain technology to prevent data forgery



# Achieving circular economy

**B**lockchain **L**oop to **U**nlock the value of the circular **E**conomy

Developing digital platform promoting circularity of plastic resources utilizing blockchain technology

Recycling certificate

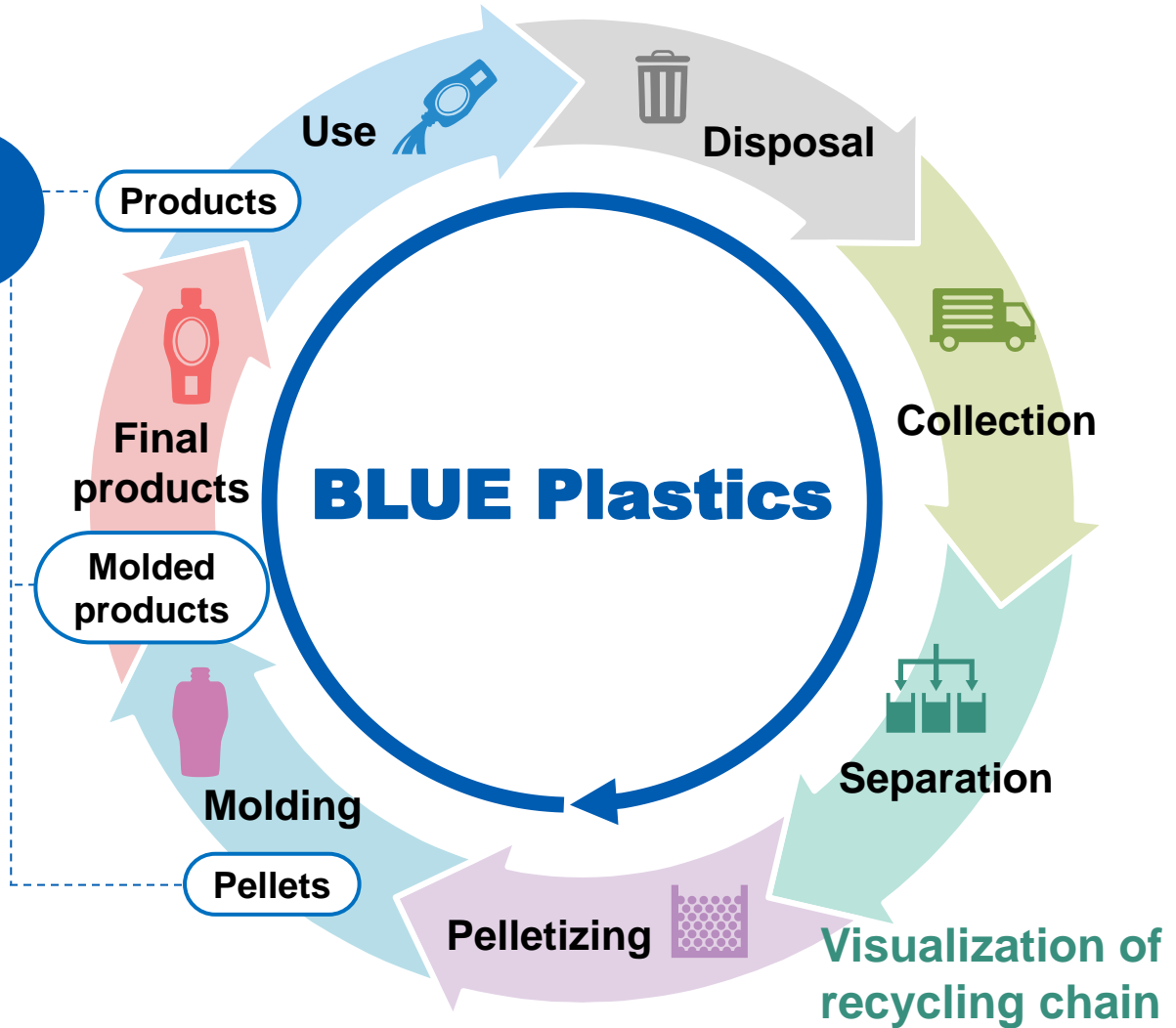
Brand new (left), recycled (right)



Plastic recycling app






Changing consumer behavior





# Creating an ecosystem across industries

<b>1</b> Recycling companies	 <b>富山環境整備</b> Toyama Kankyo Seibi Co., Ltd.
<b>2</b> Resin manufacturers	<b>AsahiKASEI</b>
<b>3</b> Molding processors	 <b>Mebius Packaging Co.,Ltd.</b>
<b>4</b> Brand owner	今日を愛する。 
<b>5</b> Products	<b>Toiletries</b>



ここからみんなではじめよう、  
プラスチックの資源循環

## BLUE Plastics Salon

### BLUE Plastics Salon

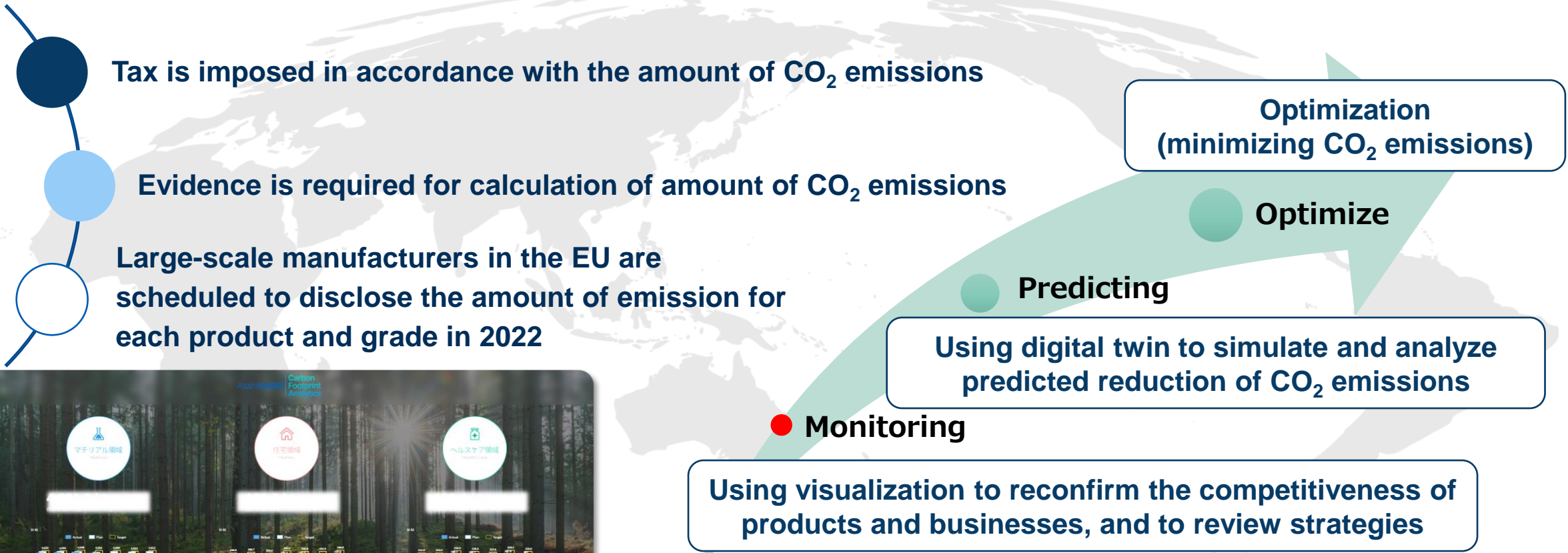
Launched in October 2021

Manufacturers (automotive, electrical, pharmaceutical, coloring material, containers, chemicals, etc.), engineering companies, consultants, software companies, etc.

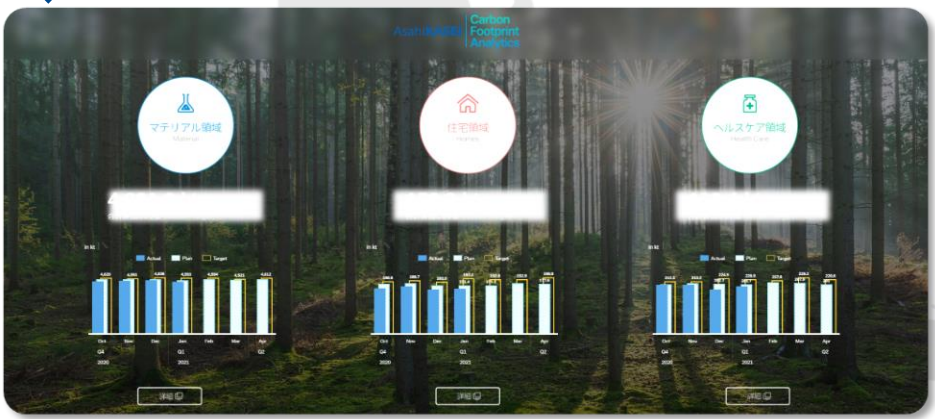
Currently **16** companies participating

# Minimizing carbon footprint

Visualizing carbon footprint → prediction → minimizing CO<sub>2</sub> emissions by optimization



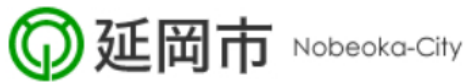
- Tax is imposed in accordance with the amount of CO<sub>2</sub> emissions
- Evidence is required for calculation of amount of CO<sub>2</sub> emissions
- Large-scale manufacturers in the EU are scheduled to disclose the amount of emission for each product and grade in 2022





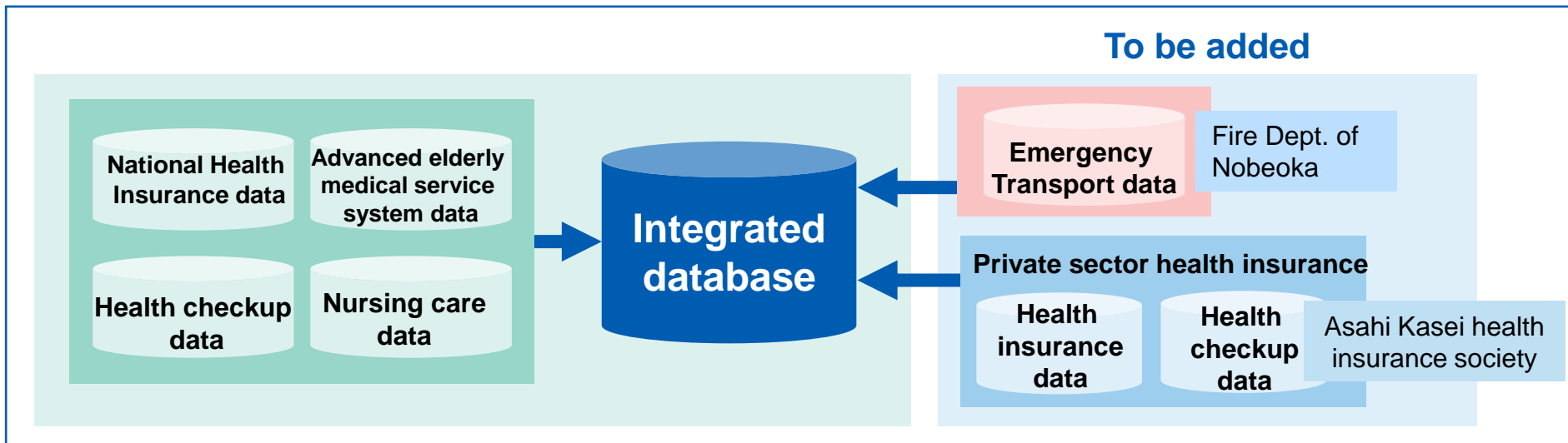
## Aiming to make Nobeoka a city of healthy longevity where people can walk by themselves to the age of 100

Working with Nobeoka City, the cradle of Asahi Kasei and the first municipality enacting an ordinance on “Protecting Community Health Care” to realize healthy longevity by reducing incidents of bone fracture due to osteoporosis, which is costly to society



Integrated database formed through agreement between Nobeoka City and the National Cerebral and Cardiovascular Center

### Integrated database schematic



## Asahi Woods of Life where fireflies fly

LPWAN\* technology is used to preserve the environment by real-time sensing of environmental data such as humidity, ground temperature, and weather

The Asahi Woods of Life was created within the Fuji plant grounds in 2007 as an ecotope to preserve various local organisms and their ecosystem

\* Low-power wide-area network

### Asahi Woods of Life (Fuji, Shizuoka Prefecture)



### Flying fireflies



# Digital transformation roadmap

2016

2018

2020

2022

2024

## Digital Introduction Period

Using digital technology to solve actual on-site problems

- 400 digital projects
- IP landscaping
- Fostering digital professional personnel

## Digital Deployment Period

Lateral deployment of digital solutions across divisions, regions, and functions

- DX Vision
- Digital Value Co-Creation
- 40,000 digital personnel
- DX example cases

## Digital Creation Period

Creating new businesses with new business models by gaining value from intangible assets, etc.

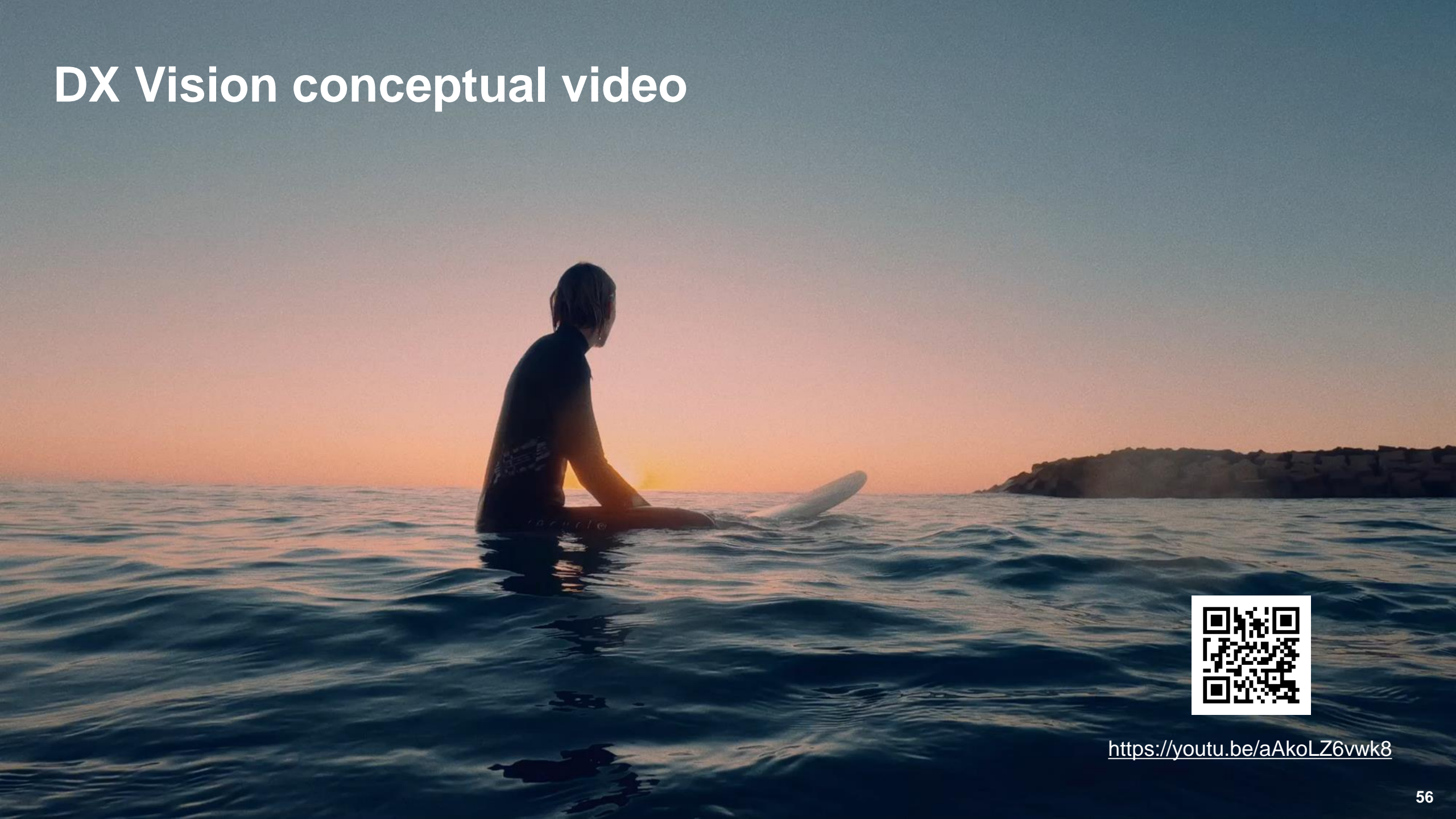
- Asahi Kasei Garage
- Example cases with Asahi Kasei Garage
- Contributing to social innovation

## Digital Normal Period

Use of digital technology throughout the company by all employees as a given



# DX Vision conceptual video



<https://youtu.be/aAkoLZ6vwk8>

# AsahiKASEI

## *Creating for Tomorrow*

### THE COMMITMENT OF THE ASAHI KASEI GROUP:

To do all that we can in every era to help the people of the world make the most of life and attain fulfillment in living.

Since our founding, we have always been deeply committed to contributing to the development of society, boldly anticipating the emergence of new needs.

This is what we mean by “Creating for Tomorrow.”

