

DX Strategy Briefing

DX Strategy in the Medium-Term Plan

3 Pillars of the Digital Creation Period

Asahi Kasei Corp.
December 13, 2022

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01 DX Strategy and the 3 Pillars

02 Reinforcing Digital Foundations

03 Enhancing Management

04 Business Transformation

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01 DX Strategy and the 3 Pillars

02 Reinforcing Digital Foundations

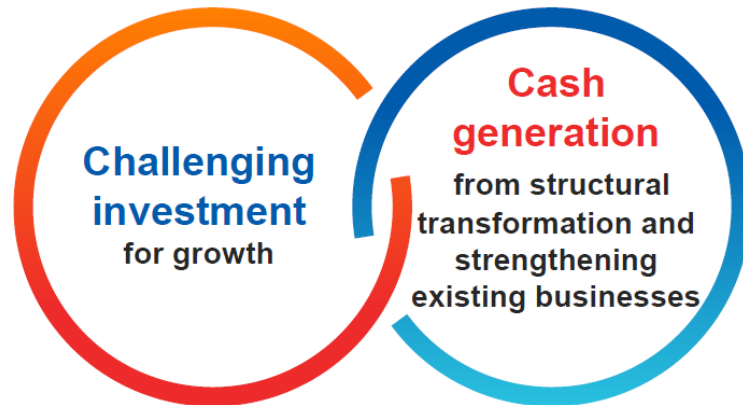
03 Enhancing Management

04 Business Transformation

Medium-Term Management Plan 2024 — Be a Trailblazer

To achieve both challenging investment for growth and cash generation from structural transformation under the basic guideline for business portfolio evolution, “digital transformation” is one of the key areas for transformation to strengthen the business platform

Basic Guidelines for Business Portfolio Evolution



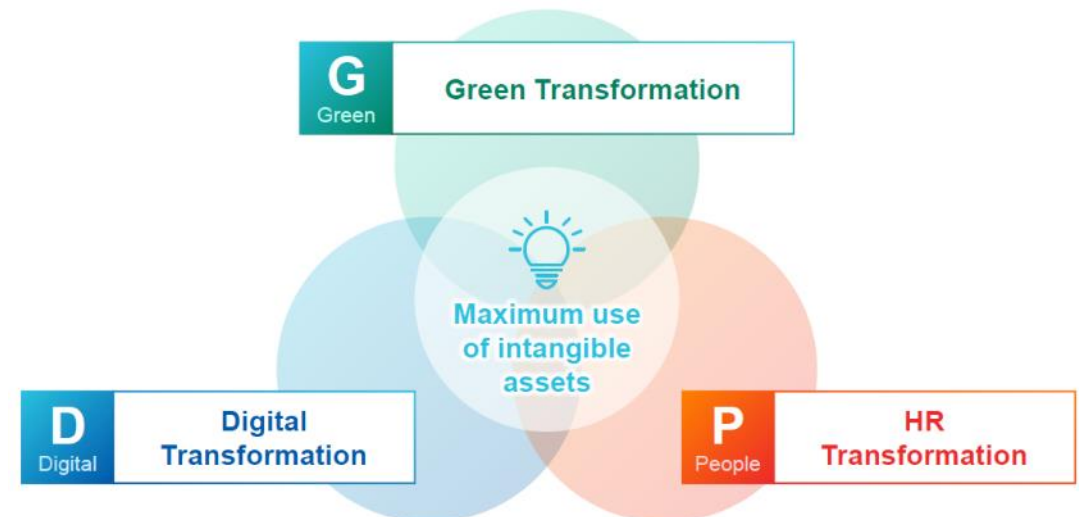
Speed

Asset light

High value-added

Importance of DX increases as a means to accelerate business portfolio evolution from the perspectives of speed, asset light, and high value-added

4 Key Areas for Transformation



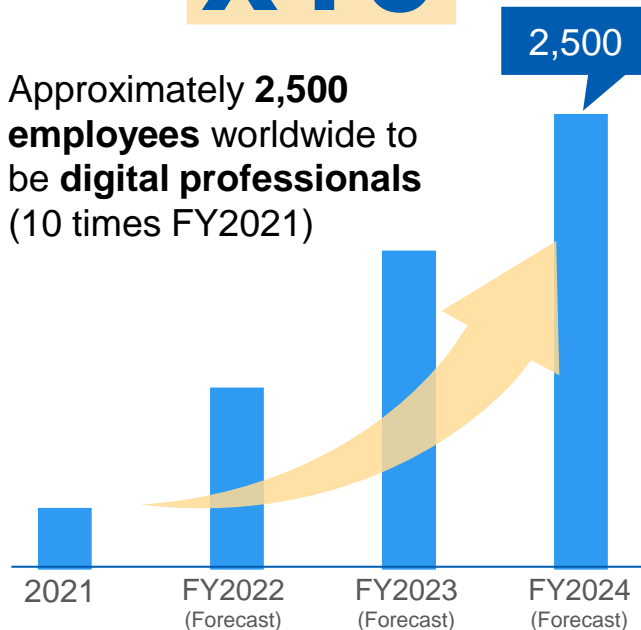
Fiscal 2024 targets: DX-Challenge 10-10-10

Each **steadily progressing** on track to fiscal 2022 target. Aiming to achieve **profit contribution ahead of schedule**.

Digital professionals

x10

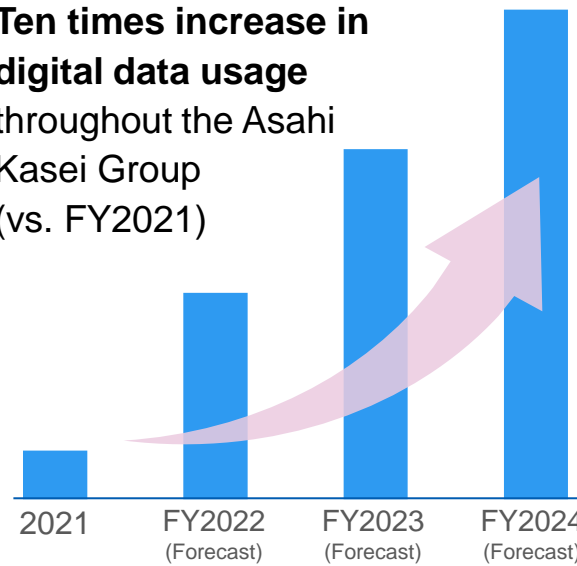
Approximately **2,500 employees** worldwide to be **digital professionals** (10 times FY2021)



Volume of digital data usage

x10

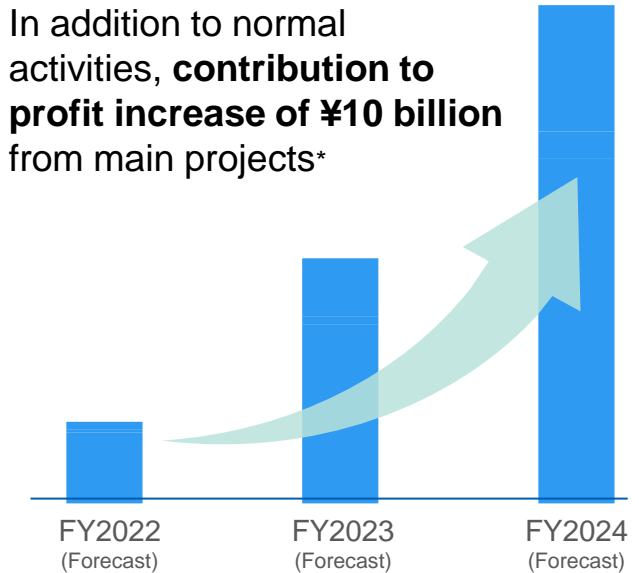
Ten times increase in digital data usage throughout the Asahi Kasei Group (vs. FY2021)



Profit contribution from main projects

¥10 billion

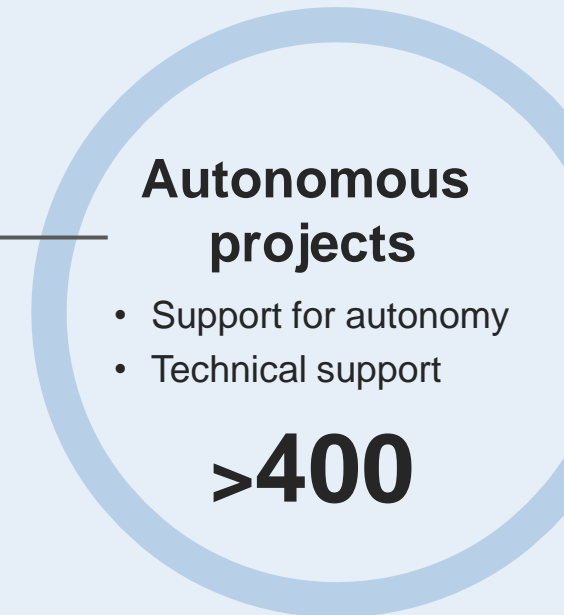
In addition to normal activities, **contribution to profit increase of ¥10 billion** from main projects*



Note: Total DX-related investment of ≈¥30 billion planned (IT investments and cloud usage fees for digital transformation)

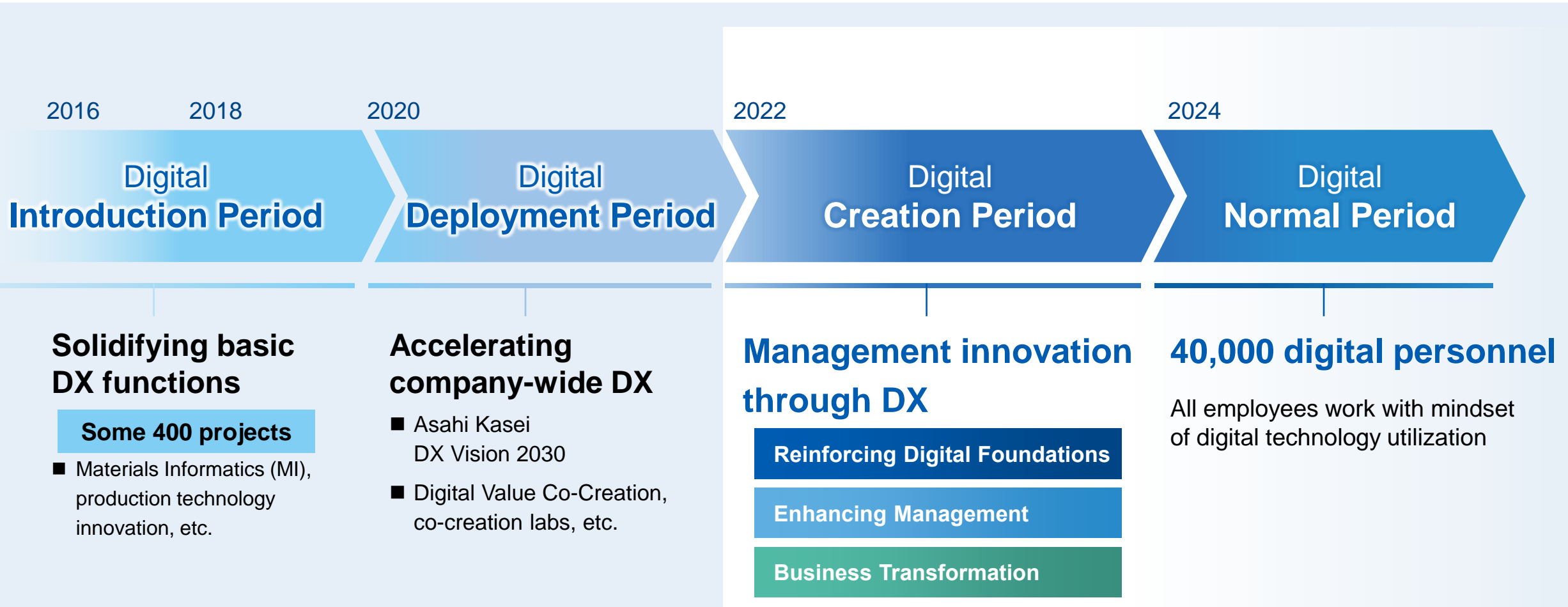
* 3-year total, including strengthening of existing businesses, new businesses, and enhancement of management platform

Categories of DX projects



Digital transformation roadmap

Digital Creation Period from 2022



3 pillars

of the
Digital Creation Period



Reinforcing
Digital Foundations



Enhancing Management



Business Transformation

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Key aspects

of Reinforcing Digital Foundations

■ **Fostering digital personnel**

■ **Agile development**

■ **Data utilization**

Fostering digital personnel

1. Digital utilizing personnel



Self-driven learning by all 40,000 employees



2. Digital professional personnel



Targeting 2,500 on-site personnel

Continuous formation of intangible assets by utilizing digital technology

Individual growth

Fostering personnel

Each individual proactively learning and gaining skills



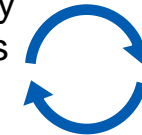
Organizational growth

Reforming culture

Connections among individuals to autonomously advance DX



Culture of co-creation



1. Digital utilizing personnel — fostering all 40,000 employees with DX Open Badge



Level 1
Employees* **25,852**



Level 2
20,845



Level 3
15,333



From President Kudo's message to employees:

"DX Open Badge is an important tool (nudge) for raising awareness and motivation"

"By raising digital literacy, sales, marketing, and manufacturing personnel can use the same vocabulary which enhances understanding and allows people to think together"

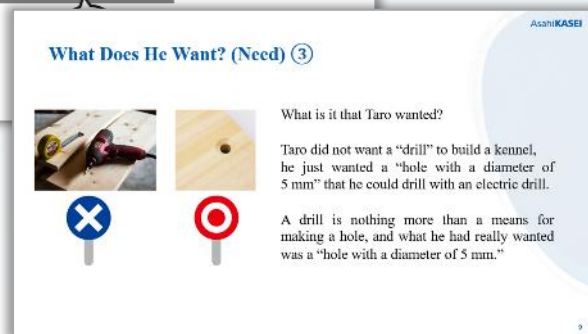
"I want this to happen in 2024 when we enter the Digital Normal Period. The DX Open Badge is for that purpose."



President Kudo

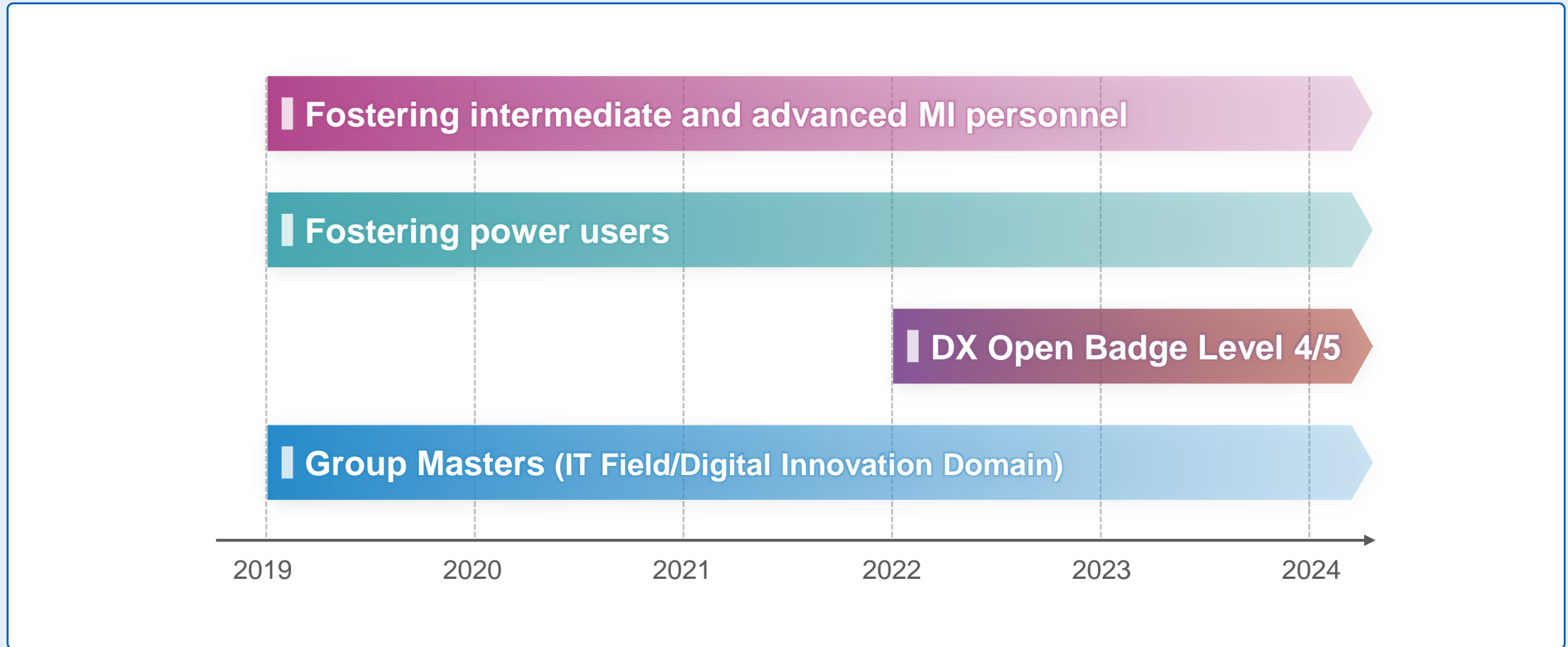
Chairman Kobori

Levels 1 to 3
completed



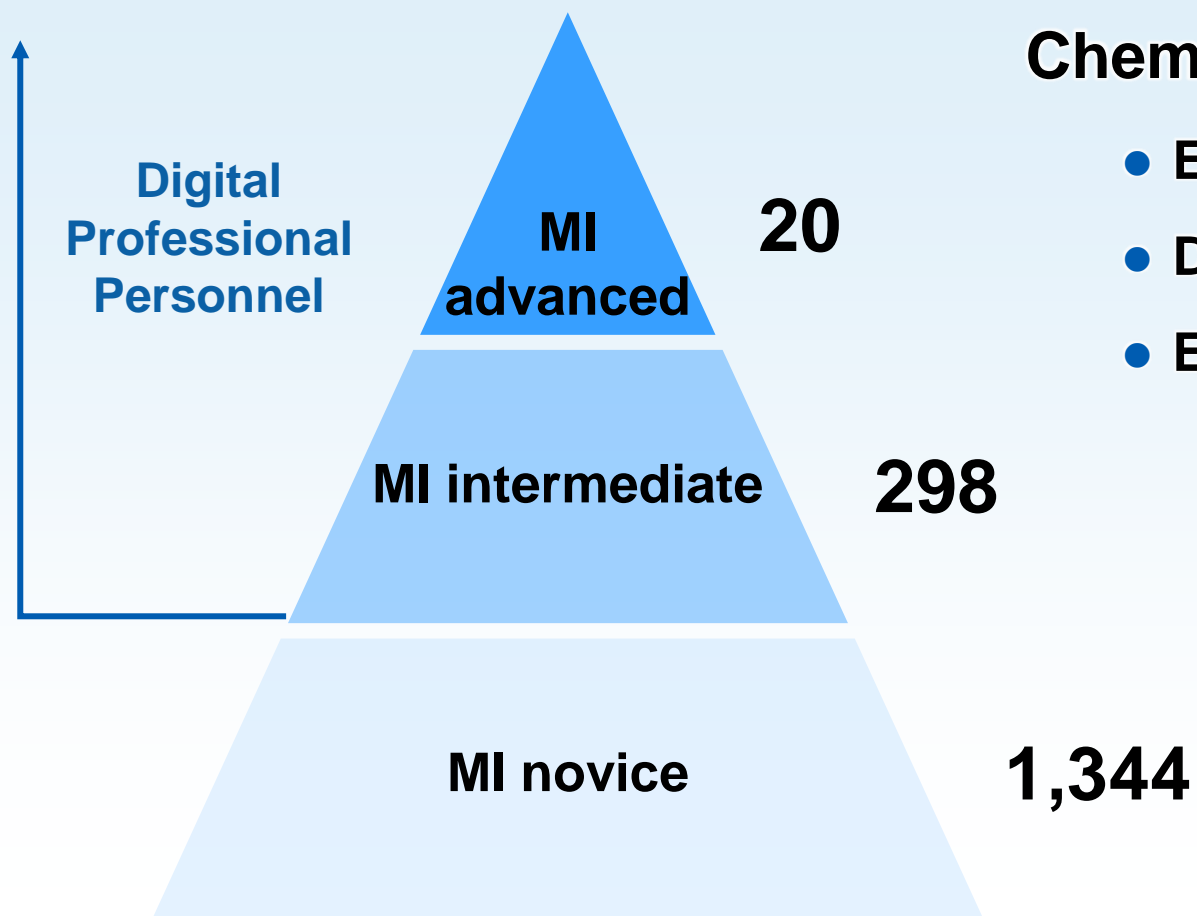
* Number of employees who have completed each level as of November 2022

2. Digital professional personnel — fostering 2,500 on-site personnel



Fostering Materials Informatics (MI) personnel

MI training from 2019 for chemistry and material researchers



Chemistry/material × digital personnel

- Experiment design
- Data accumulation strategy
- Equipment design



Note: Numbers of personnel as of November 2022

MI-platform (IFX-Hub) and MI training program

Providing **MI use environment, learning materials** and **support system**

- Easily accessible **use environment**
- **Highly practical** program aligned with R&D work
- Training with **actual problems in work**, obtaining skills connected with work results
- Close **support system**
- **Community building**, information sharing, collegiality, friendly rivalry

IFX-Hub

Easily accessed **from anywhere** by all employees



MI training program

Designed to be **immediately useful** for ordinary R&D work

1. Digital cleansing
2. Data visualization
3. Data analysis
4. Optimization
5. Experiment planning

- ✓ **Predicting material characteristics**
- ✓ **Searching materials**
- ✓ **Proposing experiment/ manufacturing conditions**

Forming communities centered on MI personnel

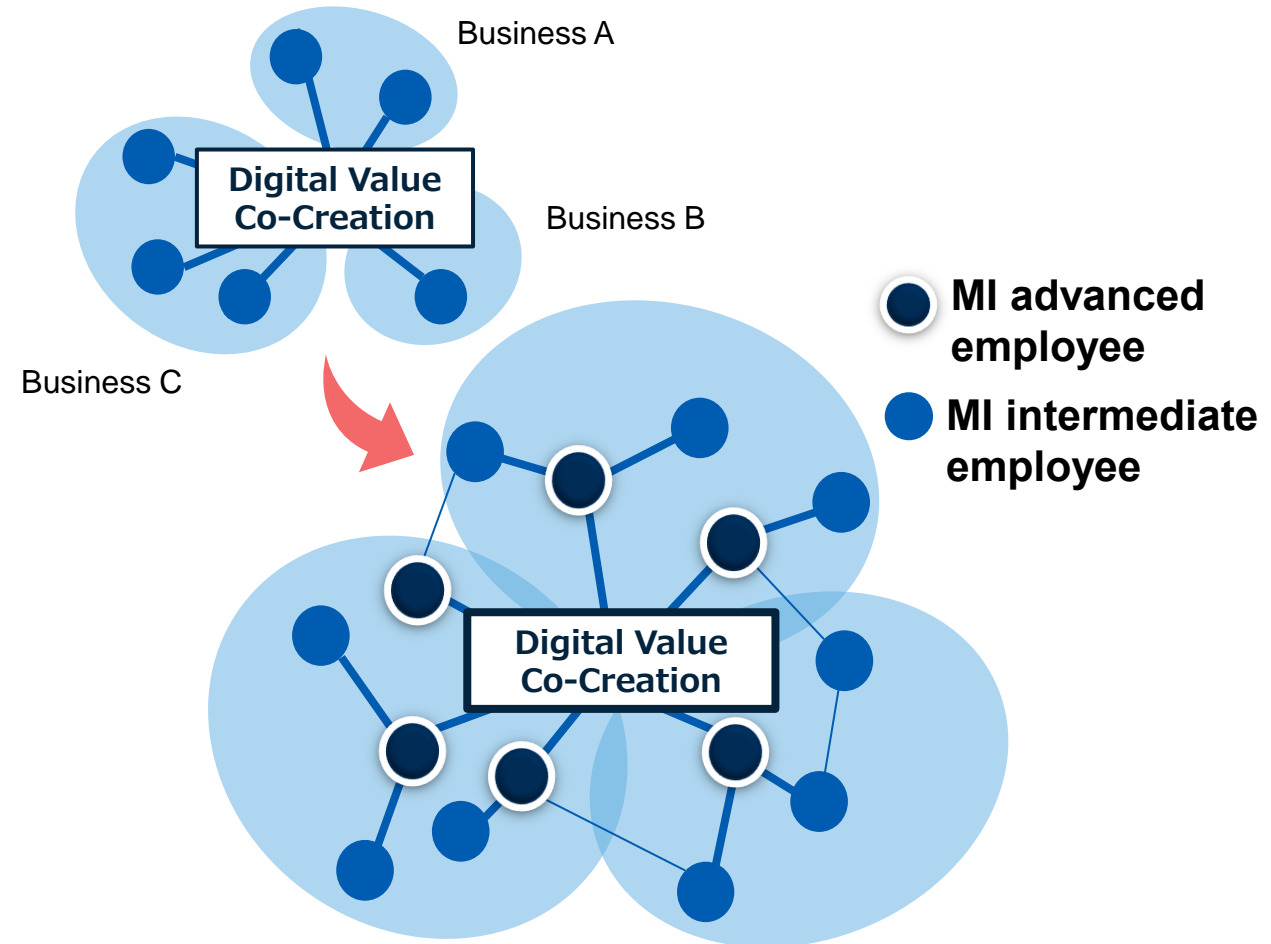
Each Strategic Business Unit (SBU) has formed an MI community. Autonomous increase and further acceleration of MI intermediate and advanced.

MI communities in SBUs

LI-100

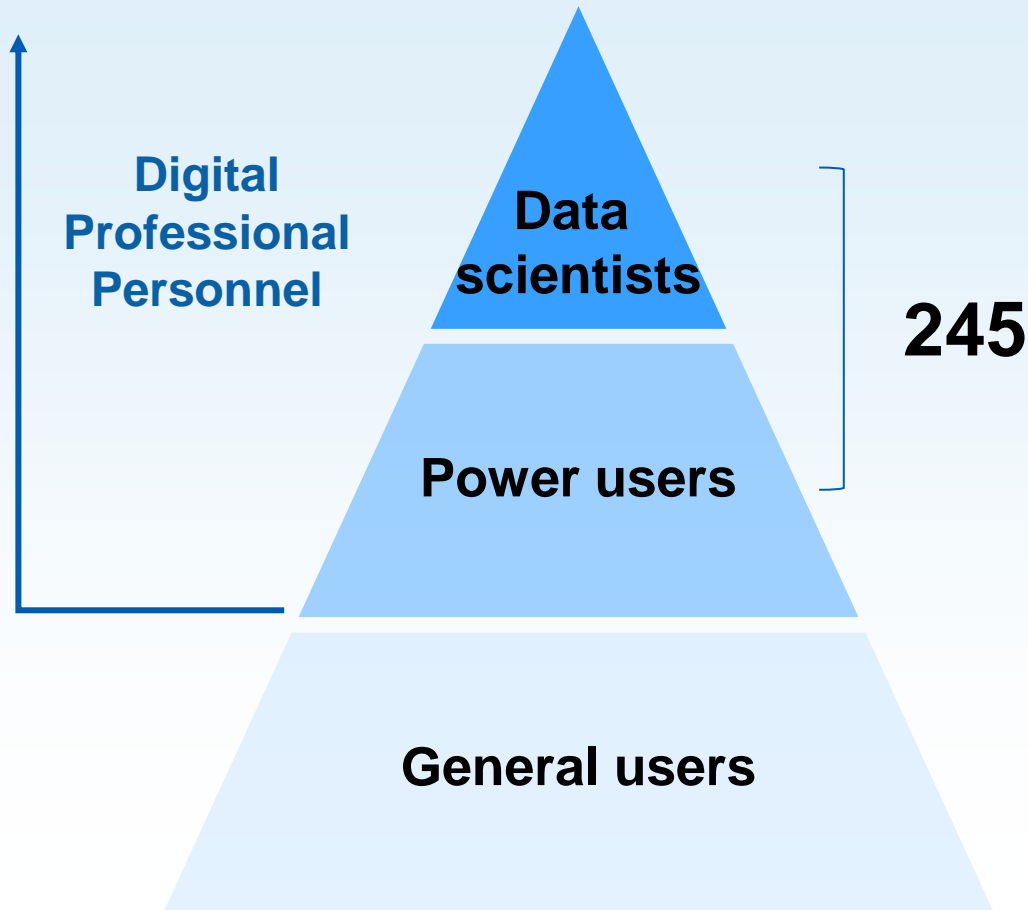
ES77.7

P-MI for Trailblazer



Fostering power users

Data analysis training from 2019 for production/manufacturing technicians



Production/manufacturing × digital personnel

- Quality control
- Detecting abnormalities
- Automation of inspection, etc.

Note: Number of personnel as of November 2022

Fostering power users

6-month practical data analysis training program using actual on-site subjects

3-party data analysis activity

Data analysis specialist
Data scientist (DS)

Raising DS technical ability

Gaining experience with
143 subjects from
actual on-site problems



On-site engineer
Power user (PU)

Raising on-site
data analysis ability

Fostering **162**
PUs in 3 years

FY2019	FY2020	FY2021	FY2022
39	46	77	83

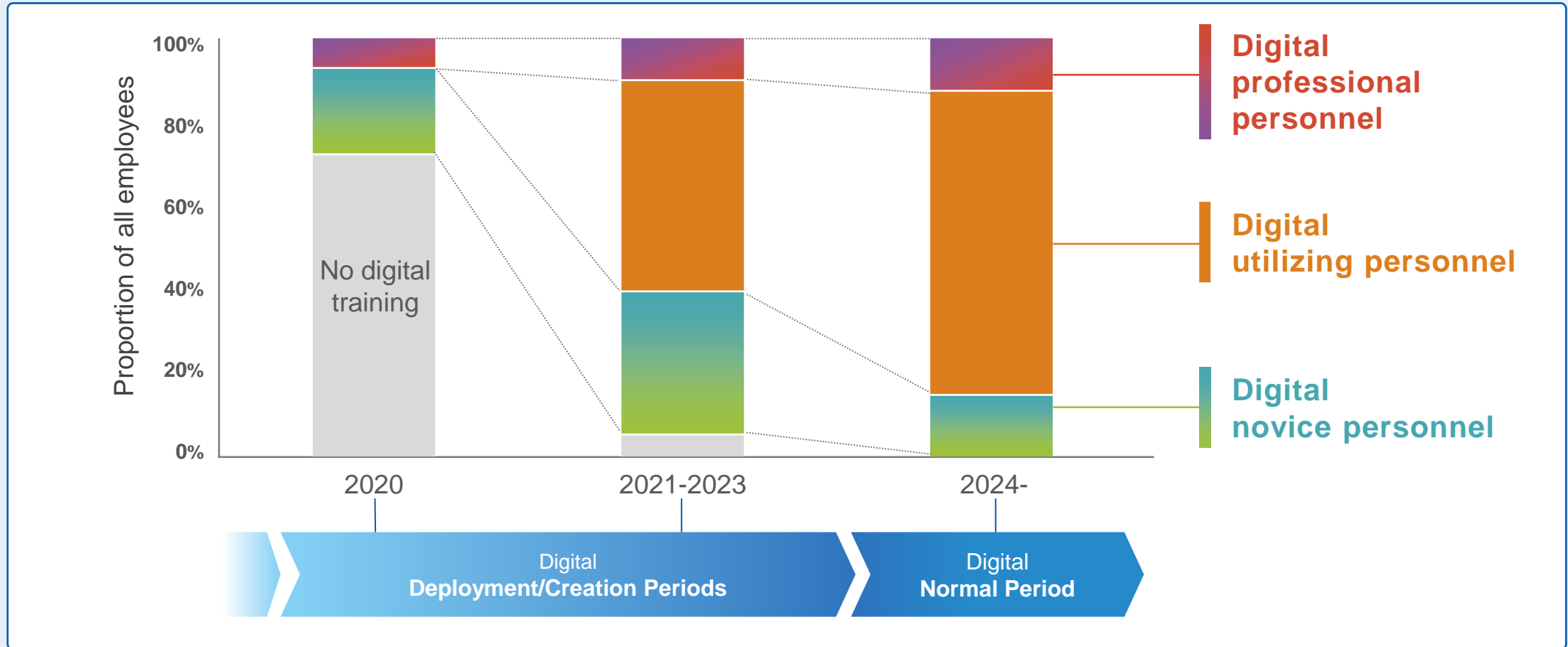
Experienced worker with thorough knowledge of the site
Advisor on rules and principles

Fiscal 2022

Started training at overseas sites
in addition to marketing personnel



Outlook for fostering digital personnel



Fostering digital personnel — overall design

DX Open Badge (program to foster 40,000 digital personnel) began in fiscal 2021.

Courses open to Level 3 with some exceptions. Level 4 and 5 courses being opened in succession.

		IT Domain Group Masters	Digital Innovation Domain Group Masters												
			Data-driven areas					Data platform development			Business design				
Digital professional personnel	Level 5 Thought Leader	IT (Lo/No Code)		MI (advanced)	Data scientist					Smart factory		Marketing & digital	Design thinking	Scrum	
	Level 4 Expert	IT (Lo/No Code)	IT (business system)	MI (intermediate)	Power user	App (API) development	Machine learning	DB	DPF	Smart factory		Marketing & digital	Design thinking	Scrum	BI visualization/analysis, BI technical
Digital utilizing personnel	Level 3 Experienced	Digital comprehensive	IT		Data analysis	Python	Machine learning	Data utilization		Industrial IoT development		Digital marketing	Design thinking	Agile development	BI basics/BI use
Digital novice personnel	Level 2 Skill		IT	Introduction to MI			Data science	Introduction to data use		Factory IoT		Marketing basics		Garage	
	Level 1 Knowledge		Introduction to IT			Introduction to AI				Introduction to IoT				Introduction to Garage	

Note: Darker colors indicate open courses

Supporting digital education of students

Nobeoka Technical High School

- Performed in May 2022
- DX Open Badge Level 1 and 2 courses



Tokyo Institute of Technology, Practice School

- Performed 4 times since 2019
- Doctoral degree students used MI etc. to propose solutions to actual problems at Asahi Kasei



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Key aspects

of Reinforcing Digital Foundations

- Fostering digital personnel
- Agile development**
- Data utilization

Permeation of agile development: Asahi Kasei Garage

“Garage” symbolizes the creation of innovation through digital technology

Garage



Design thinking



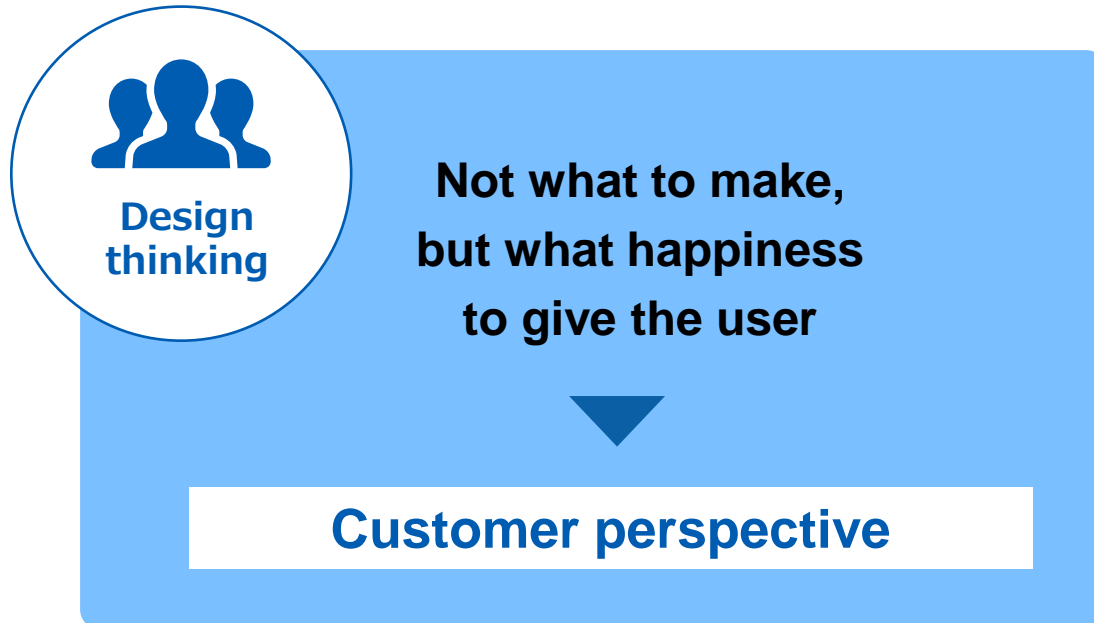
Agile development



Asahi Kasei Garage

Started “Garage” approach and support system to innovate with DX. Launched a team to execute and promote the co-creation of new value and services from products and know how in Asahi Kasei’s diverse fields of business.

Fundamental elements of Garage



Garage flow

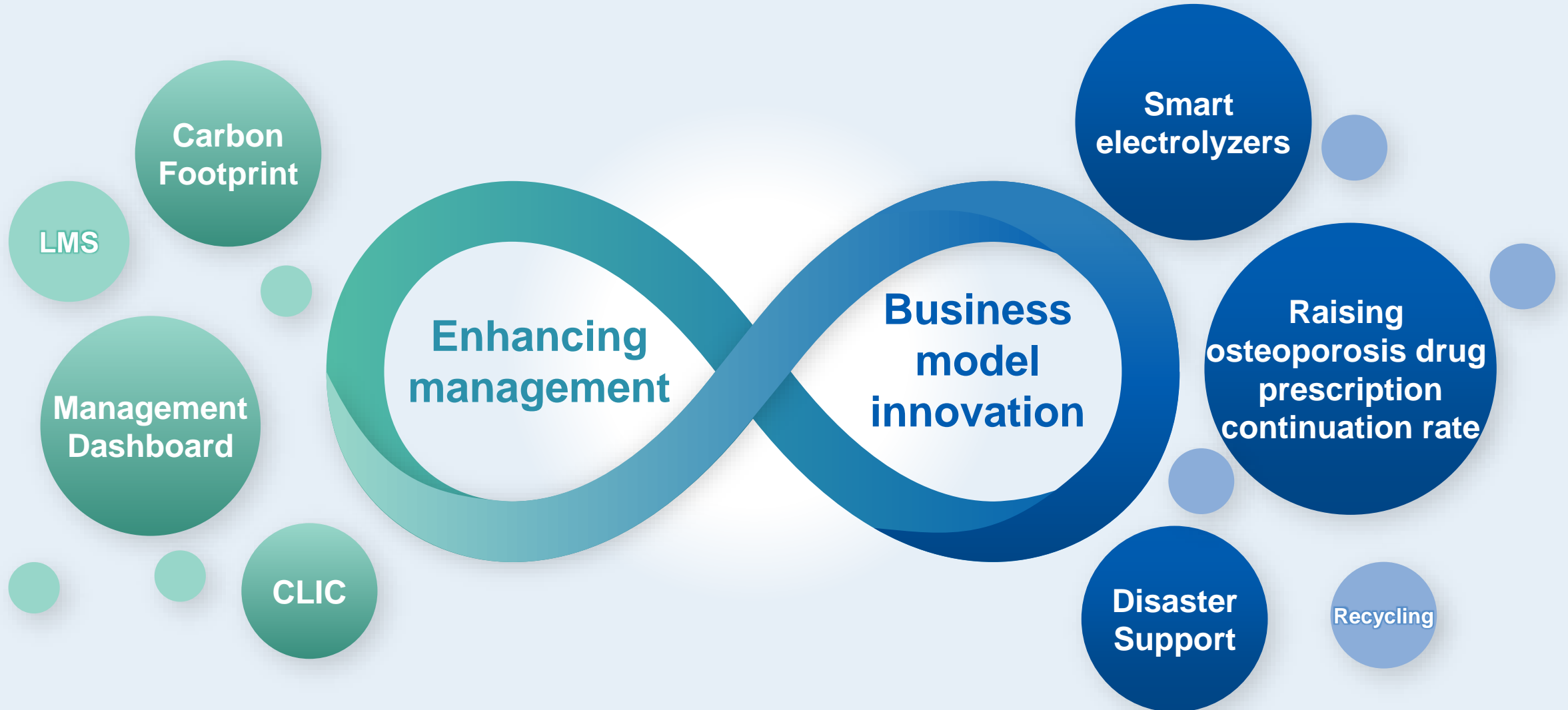
Aiming to create new value through three phases while co-creating internally and externally



Co

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

Asahi Kasei Garage subjects





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



Opened in Tamachi, Tokyo, January 2021

Opened in Nobeoka, Miyazaki, May 2022

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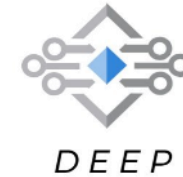
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- Fostering digital personnel
- Agile development
- **Data utilization**

Data management platform “DEEP”



Launched in April 2022 in order to enable personnel in the Asahi Kasei Group to easily **search, link, and utilize data assets** throughout the Asahi Kasei Group

(DEEP: Data Exploration and Exchange Pipeline)

0 Platform contributing to more cases of data utilization

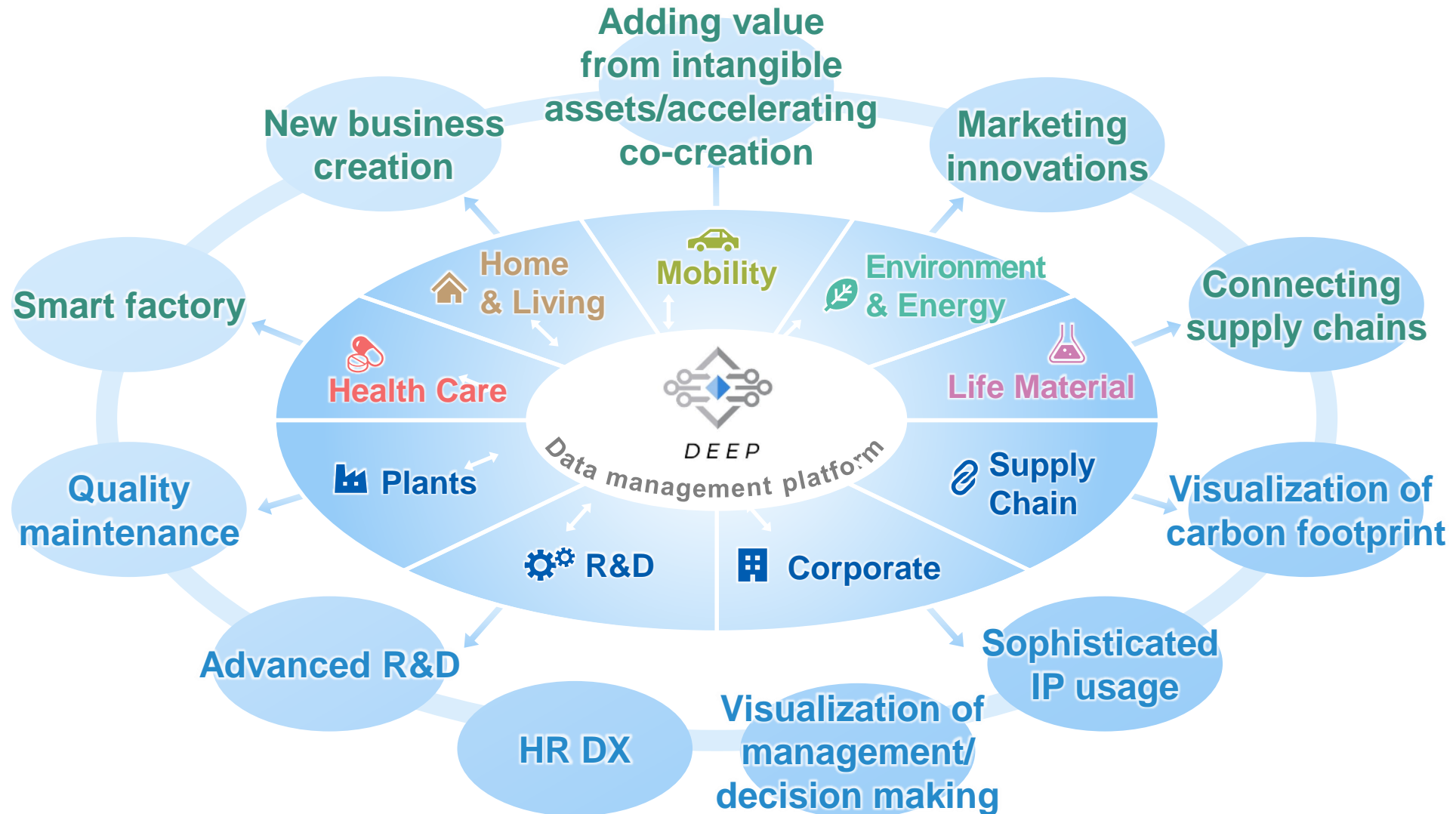


1 Raising the literacy of users

2 Strengthening data management and utilization functions

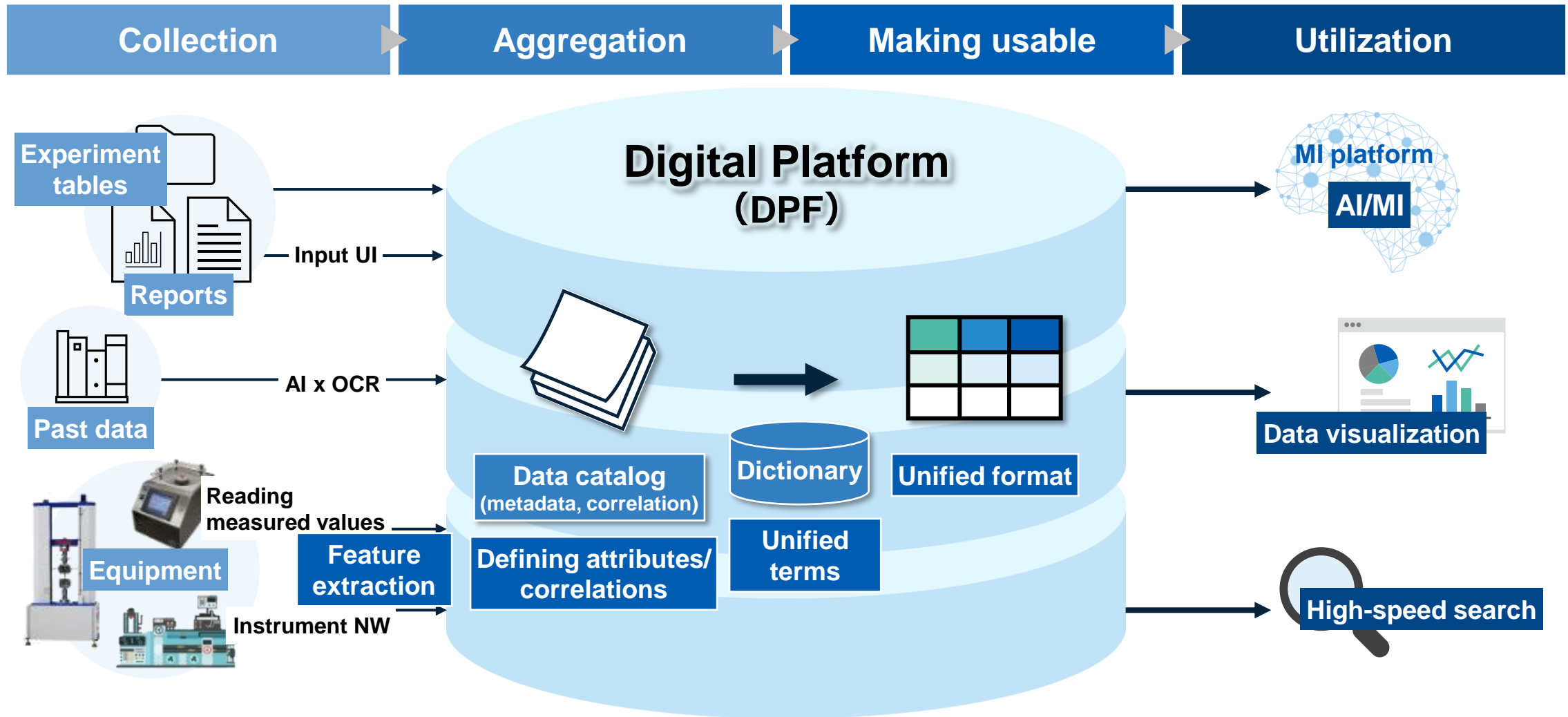
3 Raising efficiency of operation and development, enhancing governance

Data management platform “DEEP”



Enhancing data utilization with R&D digital platform (DPF)

Continuously gathering necessary data in usable form (for data integrity and use as an asset).
Immediately usable for MI or high-level analysis.



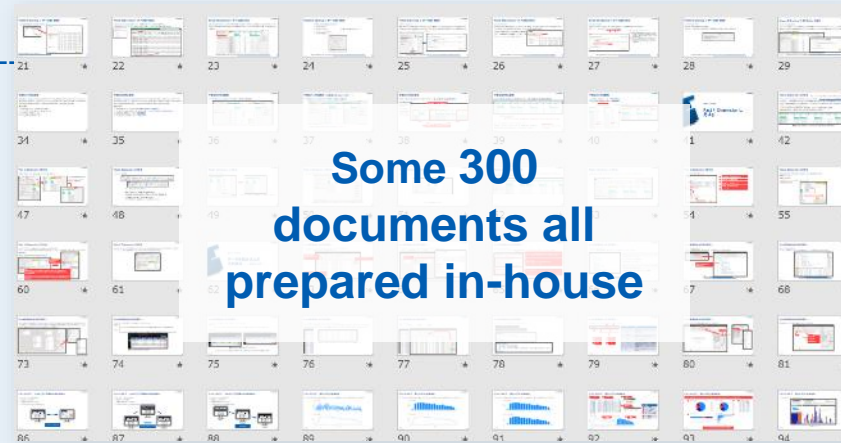
Data utilization with business intelligence (BI) tools

On-site personnel create their own dashboards, utilize them for daily problem solving

FY2021

BI tool training

- Training sessions (4 days total) taken by **250** people
- OJT (6 months) **50** people



FY2022

Those who had OJT become self-driven leaders

- Training sessions: **1,000** people
- OJT: **100** people



Plant/manufacturing: Operation of outsourced processing



Plant/accounting: Comparison of actual production vs. planned, by product



Plant/shift: Distribution of defect occurrence

DX community activity for the Digital Normal



CLIC

Web community to find the right person to ask, for personnel in departments seeking to accelerate a study or perform a new study.



Clovers

Venue for interaction among personnel using data analysis/statistical analysis. Results of data analysis training program, and technical knowledge, are managed and posted.



IFX-Hub

Platform for learning and using AI. Support provided for those who don't know where to start.

A web app was created by a former salesperson who had previously been unaccustomed to digital technology. Such cases are beginning to occur spontaneously.



Access to these in-house communities quadrupled in half a year

People connecting with one another, asking what they don't know
⇒ getting solutions

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Key aspects of Enhancing Management

- Management based on data
- Sustainability management
- R&D transformation
- Smart factory

Management based on data: Management dashboard

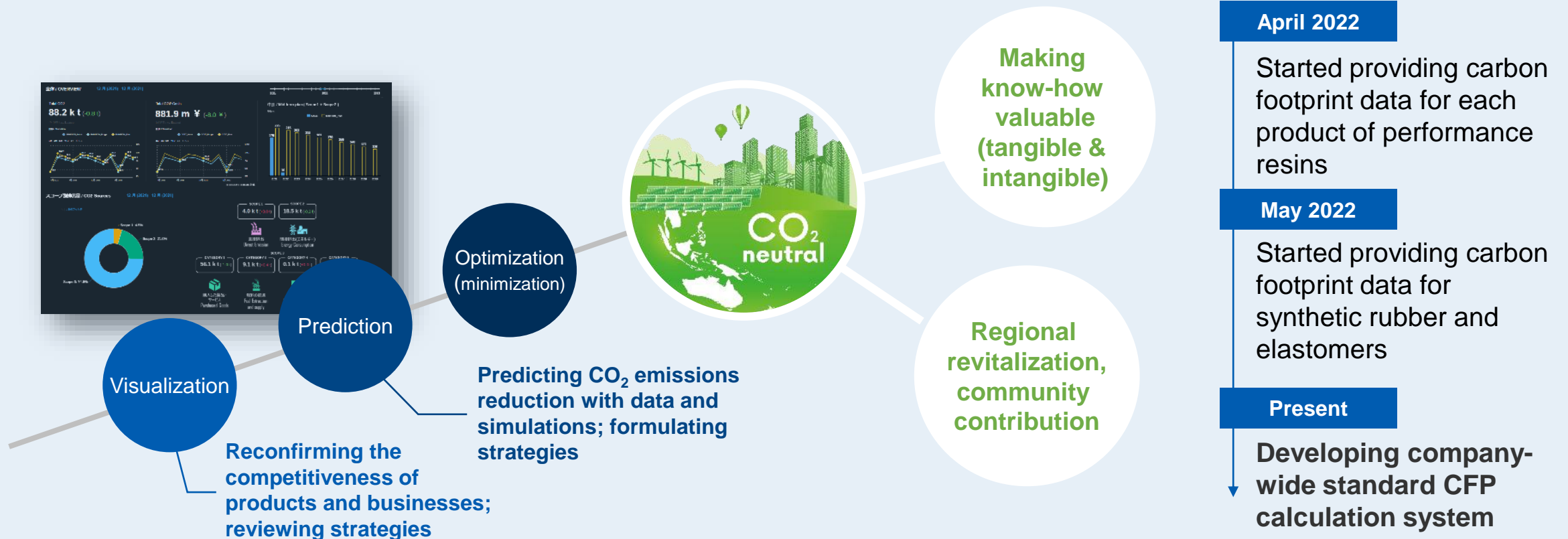
A platform that engenders sharing and empathy not only for visualization but also to grasp information from multiple perspectives for the enhancement and continuous evolution of management. Achieving more nimble management by viewing information from multiple perspectives through timely access to information rich in quantity and quality.



Adopted by many businesses, further adoption advancing

Sustainability management: Toward carbon neutrality

Identifying points for emission reduction by visualization of CFP, leading the industry with quick action at plants and business units

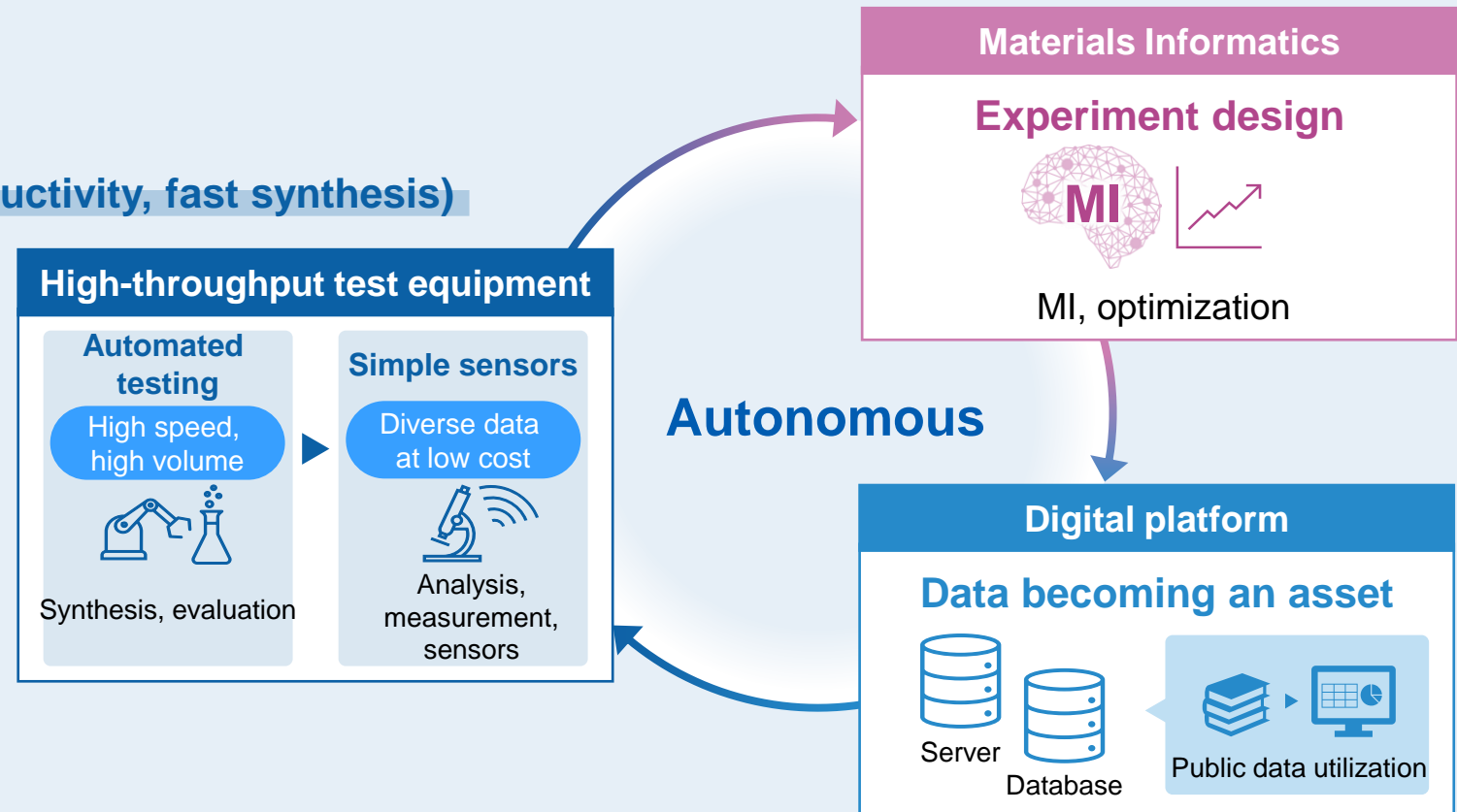


R&D transformation: Achieving vast increase in speed and innovative material development

Realizing exploring innovative new fields, dramatically shortening development time, and improving development efficiency.

Autonomous exploration is possible by **MI (brain)** and **High-throughput (high productivity, fast synthesis) test equipment (limbs)**

Possible to **explore vast spaces quickly and effectively** (targeting at least 20-fold increase in development speed)



R&D transformation — Examples of development by MI



Resin compounds



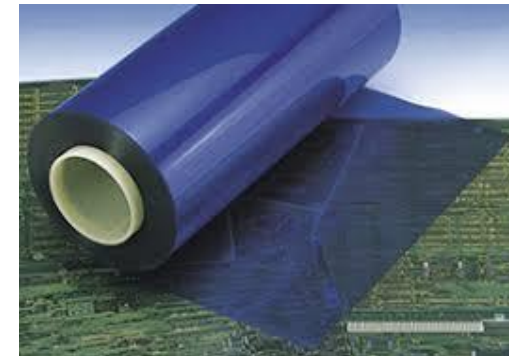
Catalysts



Synthetic rubber



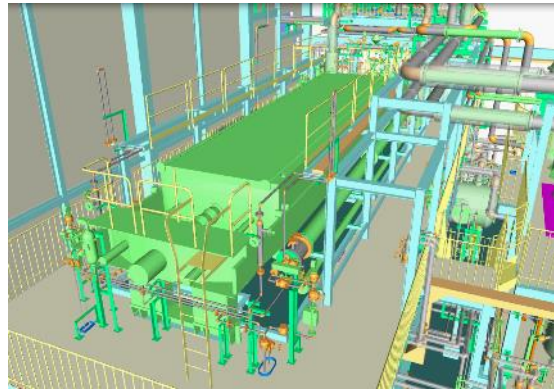
Virus removal filters



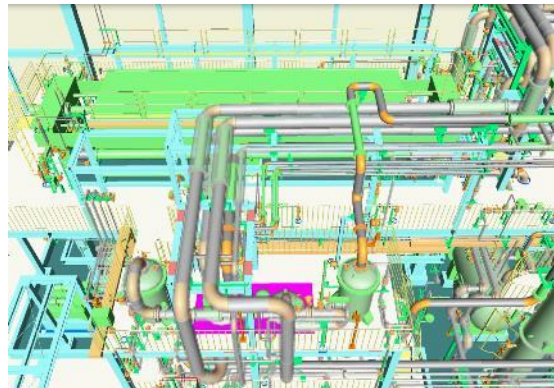
Photosensitive dry film

Smart factory: Factory transformation with digital twin

Achieving optimization of operation, advanced maintenance, remote control, and reduced operator workload



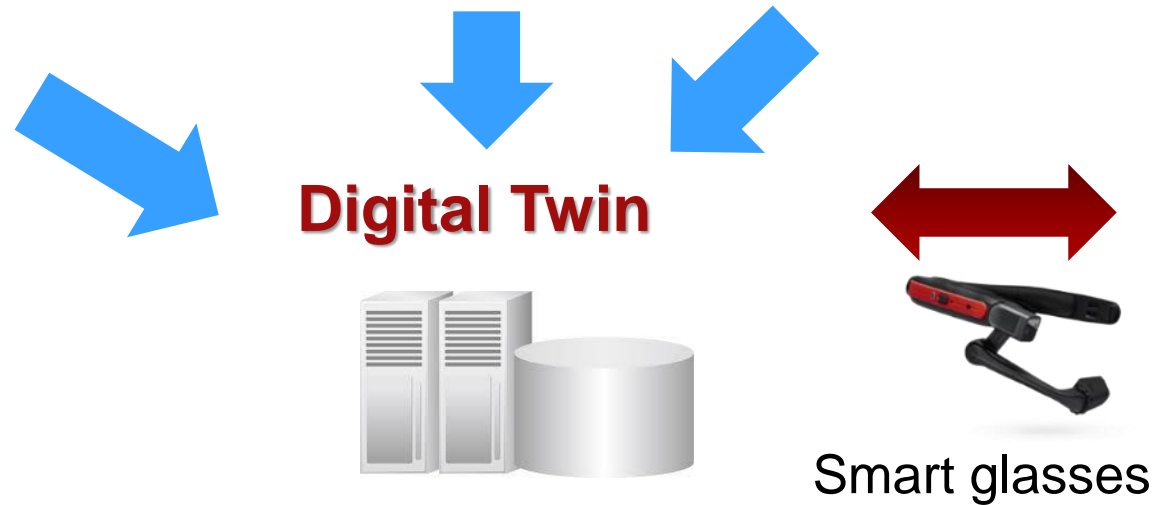
3D model



Process data



Manuals



Digital Twin

Smart glasses



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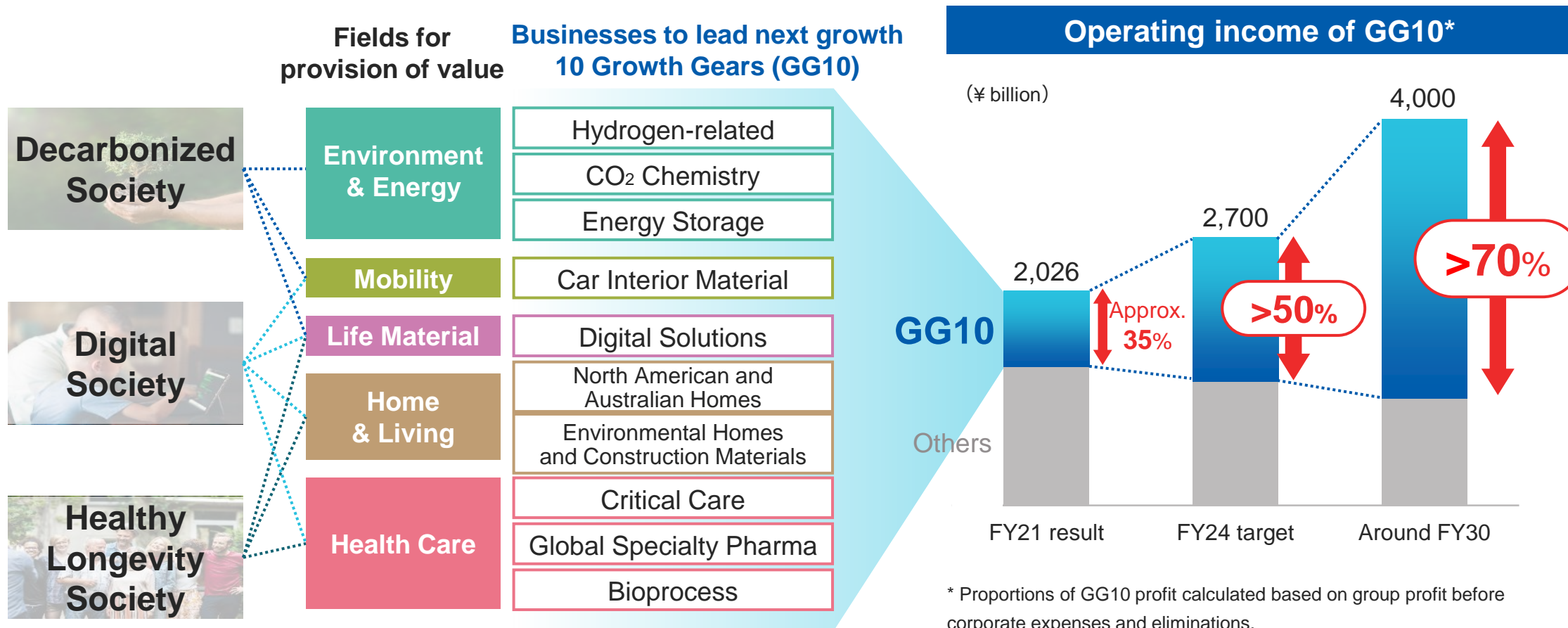
Key aspects

of Business Transformation

- **GG10**
- **Business model transformation**
- **New businesses**
- **Business co-creation**

10 Growth Gears (GG10) that will drive future growth in the MTP

Contributing to 10 Growth Gears (GG10) through new business creation, marketing innovations, smart factory, etc. from the perspective of business transformation by DX



Hydrogen-related | Digital twin of the large-scale alkaline water electrolysis system

Achieving optimization of operation, advanced maintenance, and remote monitoring by digital twin of process equipment

Businesses to lead next growth
10 Growth Gears (GG10)

Hydrogen-related

CO₂ Chemistry

Energy Storage

Car Interior Material

Digital Solutions

North American and
Australian Homes

Environmental Homes
and Construction Materials

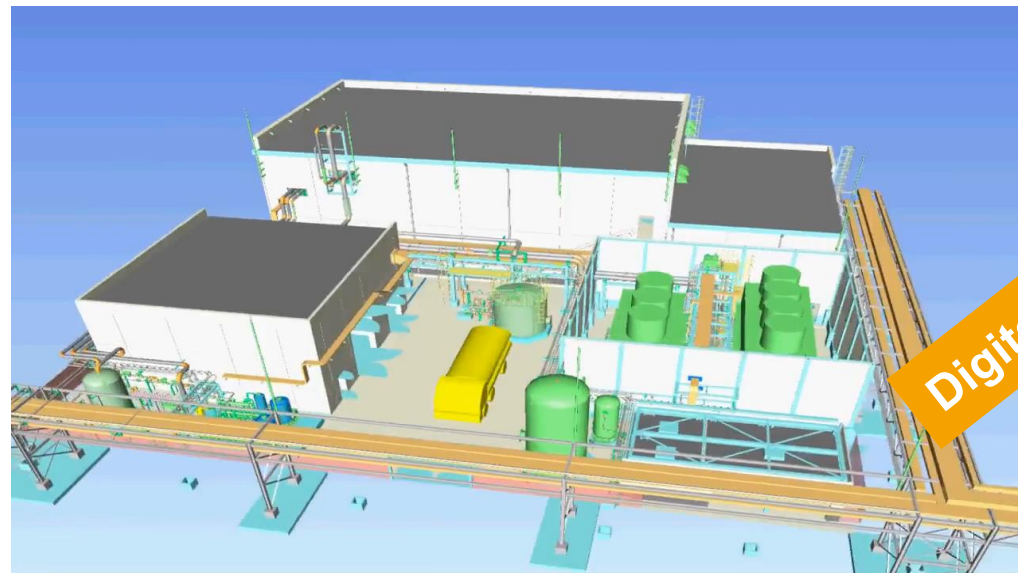
Critical Care

Global Specialty Pharma

Bioprocess

Using 3D model to reducing on-site workload in management of water electrolysis system operation

FHER
FUKUSHIMA
HYDROGEN
ENERGY
RESEARCH
FIELD



Digital twin

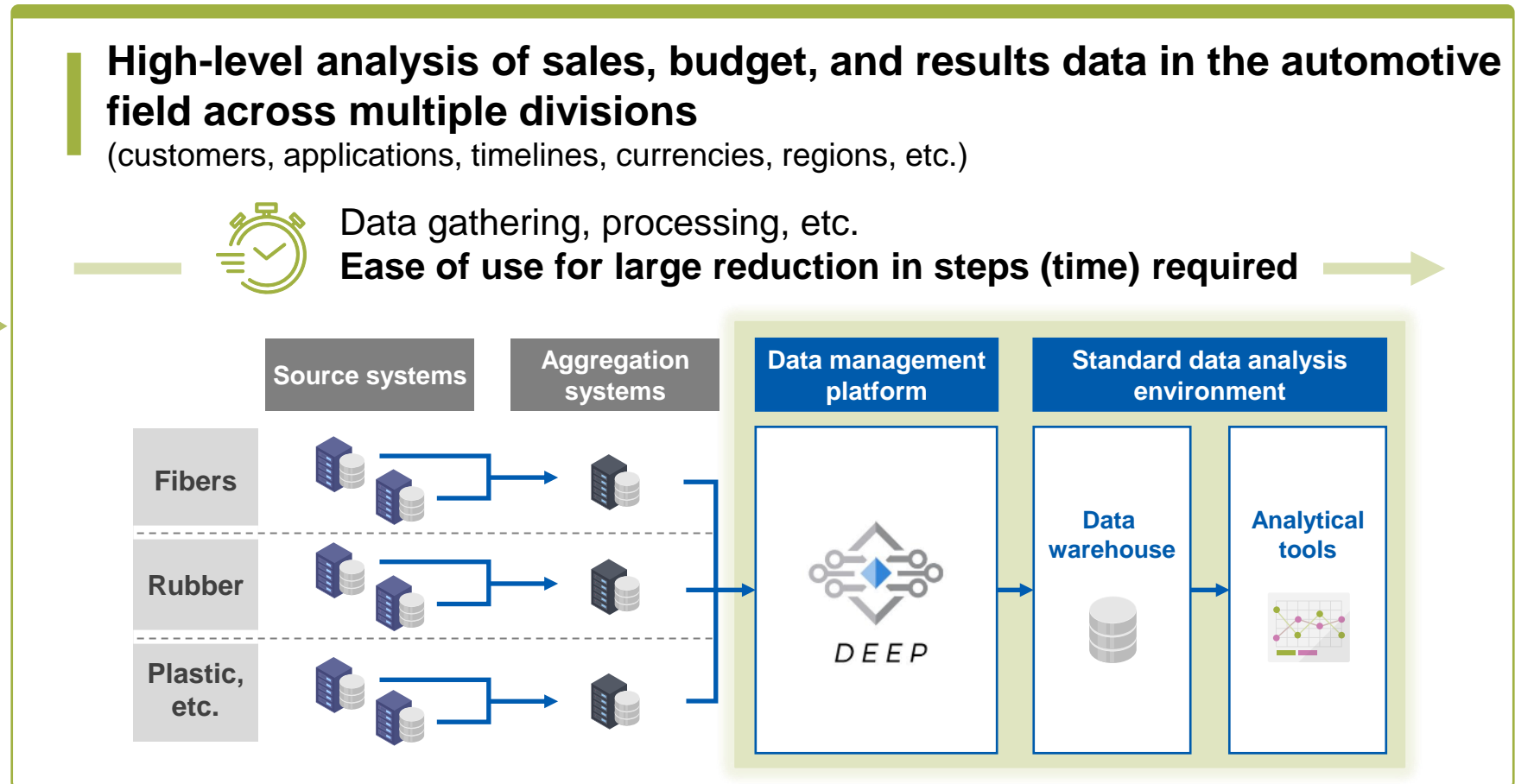
Note: Japan's New Energy and Industrial Technology Development Organization (NEDO) project
"Hydrogen social construction technical development project/Hydrogen energy system technical development/Technical development concerning business model construction and the large-scale actual proof of a re-energy use hydrogen system"

Car Interior Material | Marketing innovation

Built platform to aggregate sales data in the automotive field across multiple divisions, **achieved visualization using BI.** Achieved **enhanced marketing activity using the data.**

Businesses to lead next growth
10 Growth Gears (GG10)

- Hydrogen-related
- CO₂ Chemistry
- Energy Storage
- Car Interior Material** >>>
- Digital Solutions
- North American and Australian Homes
- Environmental Homes and Construction Materials
- Critical Care
- Global Specialty Pharma
- Bioprocess



Digital Solutions | Innovation in glass fabric production

Significant contribution to a stronger business through **improved yield** in the manufacturing process and **greater productivity** in the inspection process

Businesses to lead next growth
10 Growth Gears (GG10)

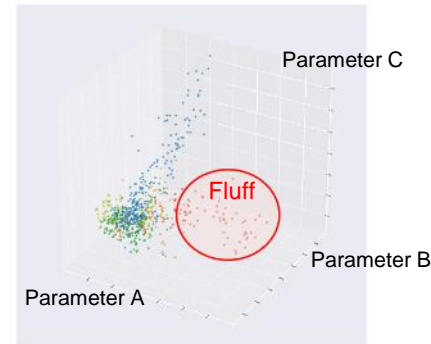
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Weft fluff defects

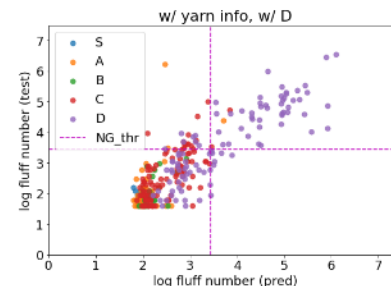
Identifying cause, elucidating mechanism, taking countermeasures

Advanced data analysis used to **identify the cause of weft fluff defects** which had been an issue for many years and **take countermeasures**



Prediction model monitoring

By **installing MLOps** performance of the weft fluff defect prediction model is maintained, and suppression of occurrence is continuing



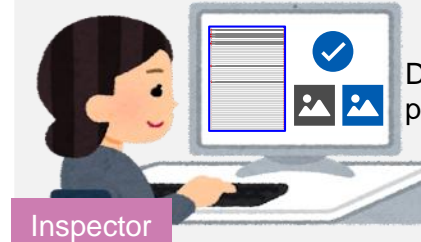
Greater productivity in the inspection process

Inspection process became a bottleneck due to higher inspection requirements and difficulty in securing sufficient inspectors

Achieved **more efficient inspection** by agile development of inspection app



Inspectors' defect judgment assisted by AI image classification technology



Inspector

Defect judgment in product inspection

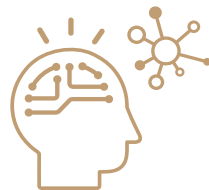
Environmental Homes and Construction Materials | Bolt fastening management system

A proprietary bolt fastening management system was developed for the installation of solar panels that are essential for environmental homes. **Raised efficiency of installation** at a time of increased material and labor costs.

Businesses to lead next growth
10 Growth Gears (GG10)

- Hydrogen-related
- CO₂ Chemistry
- Energy Storage
- Car Interior Material
- Digital Solutions
- North American and Australian Homes
- Environmental Homes and Construction Materials**
- Critical Care
- Global Specialty Pharma
- Bioprocess

Digital technology



Impact wrench

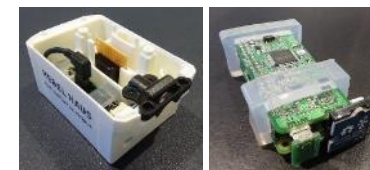


Significantly improved the quality and efficiency of bolt fastening with a bolt fastening management system using sound. Judgment accuracy of 98.7% in 0.1 second.

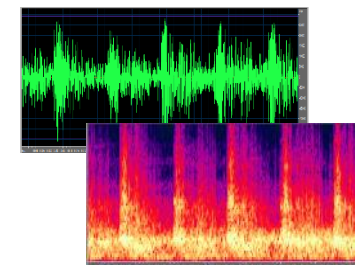
Process reduced to
1/3



Hardware



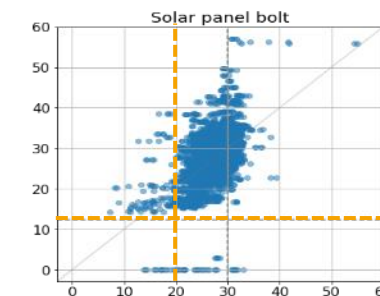
Algorithm



Platform



Highly accurate judgment



Garage subject | Raising osteoporosis drug prescription continuation rate

In co-creation with Asahi Kasei Pharma, simulation study is being performed using the Garage methodology to raise the continuation rate of osteoporosis drug administration

Framework to communicate with patients and provide support to families and healthcare providers



+

Customer
experience
design

Feedback
from
customers

Aligned with patients' feelings and behavior
**Osteoporosis treatment
continuation support service**



Improving patients'
experience

Contributing to
continuous
improvement of
osteoporosis therapy

Garage subject | Smart electrolyzer

Designing a service contributing to higher efficiency and safety **focused on the sentiment and behavior of on-site personnel** in addition to **data from sensors installed on electrolyzers combined with preventive maintenance function**



Customer experience design

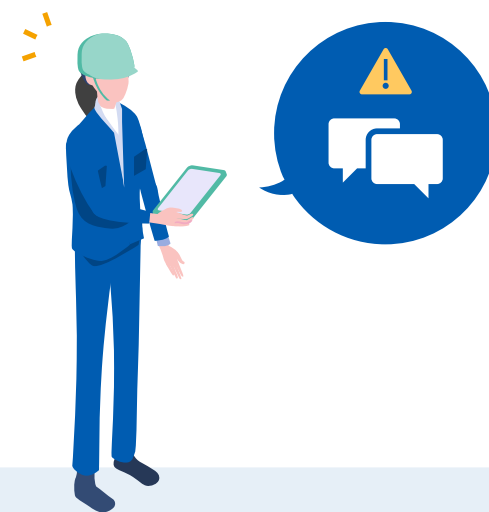
The text is centered within a light blue circular graphic. Above the text is an icon of two hands shaking, and below it is a circular arrow icon.

Feedback from customers

The text is centered within a light green circular graphic. Above the text is an icon of two people talking, and below it is a circular arrow icon.

In accord with on-site personnel's high regard for safety

Communication app to use when abnormality occurs



New business | Akliteia anti-counterfeiting platform

Platform to prevent the distribution of counterfeit goods achieved with **blockchain technology**
(launched October 2022)



Anti-counterfeit label

Registering product information



Product labeling



Scanning with a special device



1 Shipment verified

2

3

4

5 Distribution verified



Manufacturer



Warehouse



Consumer



Receipt of anti-counterfeit labels

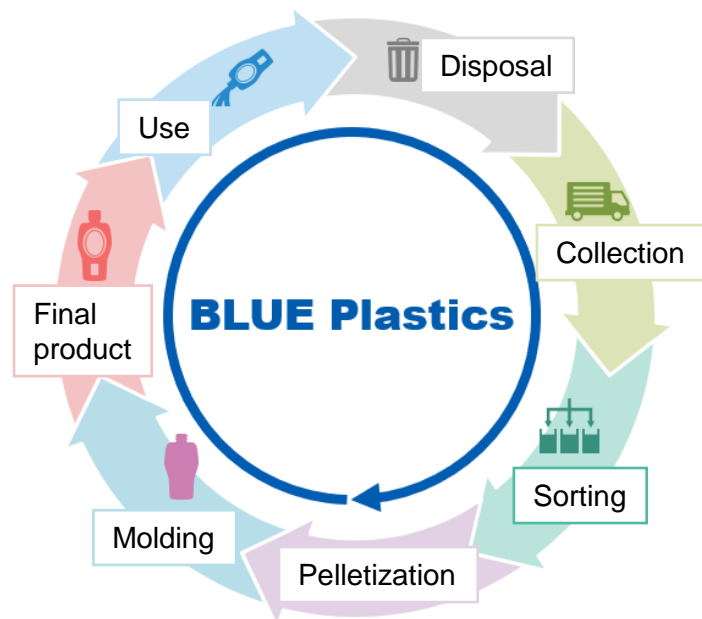


Scanning a label

Authenticity verified at each point,
counterfeits excluded from the supply chain

Possibility for new business | BLUE Plastics

Developing digital platform promoting circularity of plastic resources utilizing blockchain technology



Creating a culture of recycling

Recycling certification

Achieved with digital platform

1. Small-scale demonstration trial

Collaboration with Toyama Kankyo Seibi Co., Ltd., Mebius Packaging Co., Ltd., LION Corporation, and IBM Japan, Ltd.

Prototype app was used. **Change in consumer behavior** was observed, including greater **willingness to purchase** and **continuous participation in recycling activities** due to feeling of **trust and contentment** with the recycled products.

Survey results

Was it **effective to continue and make a habit of** bringing recyclable plastic bottles to the recycling bin at the store?

Effective
76.6%

Do you want to purchase products after seeing the rate of recycled plastic?

Want to purchase
85.3%

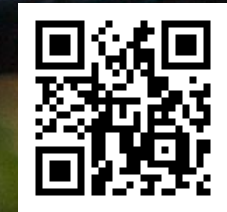
2. Demonstration trial at a convenience store

AsahiKASEI ×  × 

Conducting a demonstration trial with participation of general consumers at FamilyMart convenience store. Consumers can **view the progress of the bottles throughout the recycling chain**.



**DX Vision conceptual video
“World Without a Path”**



<https://youtu.be/vFmYc4KreeQ>

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.



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.”

