



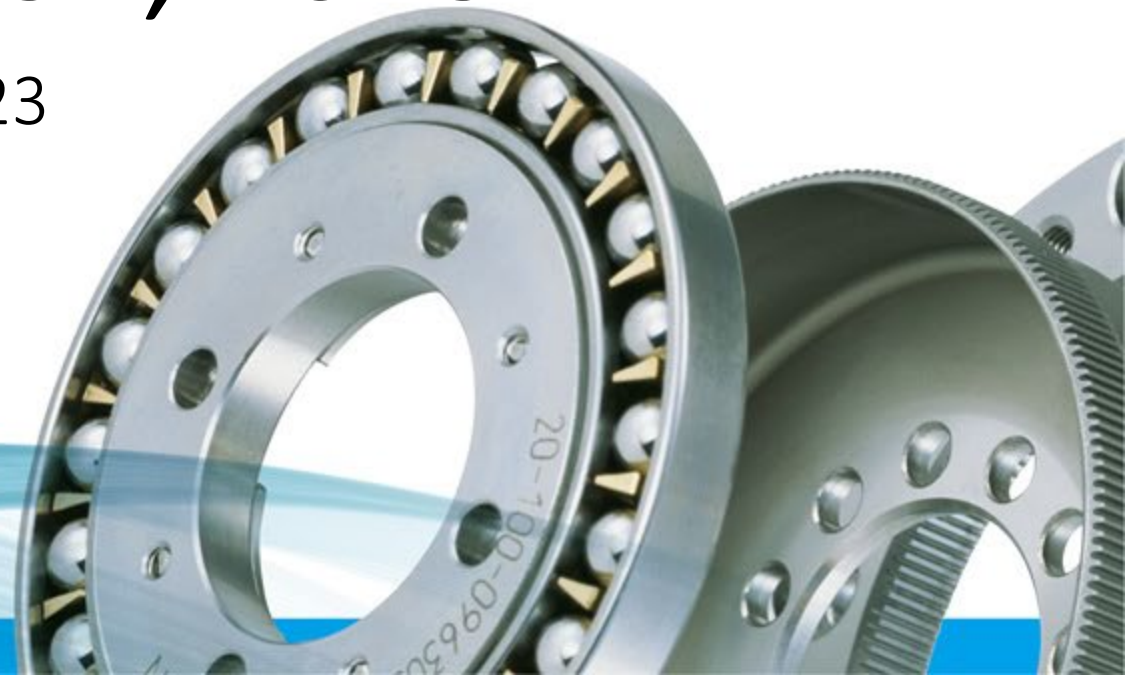
**Harmonic Drive Systems Inc.**

# **Harmonic Drive Systems Inc.**

## Financial Results for the Fiscal Year Ended March 31, 2023

May 19, 2023

This presentation contains forward-looking statements relating to expected future performance as of May 19, 2023. Such statements are based on the views and assumptions of company management and involve risks and uncertainties such as changes in the business environment that may cause the actual results to differ materially from expectations.



# Performance Summary for FY 2023/3

# Consolidated results for FY 2023/3 (versus original forecasts)

(millions of yen)

	Forecast (announced Feb 8, 2023)		FY 2023/3 (actual)		Vs. original forecasts	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	71,000	100.0	71,527	100.0	527	0.7
Operating income	9,800	13.8	10,224	14.3	424	4.3
Ordinary income	10,100	14.2	10,757	15.0	657	6.5
Net income	6,700	9.4	7,595	10.6	895	13.4
EPS (yen)	70.28	—	79.67	—	9.40	13.4

\*Net income refers to net income attributable to owners of parent.

# Consolidated results for FY 2023/3 (year-on-year change)

(millions of yen)

	FY2022/3		FY 2023/3		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	57,087	100.0	71,527	100.0	14,439	25.3
Operating income	8,739	15.3	10,224	14.3	1,485	17.0
Ordinary income	9,108	16.0	10,757	15.0	1,649	18.1
Net income	6,643	11.6	7,595	10.6	952	14.3
EPS (yen)	69.02	—	79.67	—	10.66	15.4
Capital investment	5,690	—	9,236	—	3,545	62.3
Depreciation costs	8,254	—	9,574	—	1,320	16.0
R&D costs	3,012	—	3,274	—	261	8.7

\*Net income refers to net income attributable to owners of parent.

\*Depreciation costs include depreciation cost of tangible assets and amortization cost of intangible assets and goodwill.

# Performance of main group companies in FY 2023/3

(millions of yen)

(millions of yen)

	Equity stake	Net sales		Net income	
		Amount	Year-on-year change (%)	Amount	Year-on-year change (%)
	Harmonic Drive Systems Inc.	—			
*2	HD Systems, Inc. (Harmonic Drive L.L.C.) (U.S.A)	100% (100%)			
	Harmonic AD, Inc.	100%			
*3	Harmonic Drive Systems (Shanghai) Co., Ltd.	100%			
*4	Harmonic Drive SE (Germany)	100%			

\*1 For overseas subsidiaries, the fiscal year ends December 31.

\*2 Exchange rates: FY 21/12 1USD = 109.80 yen, FY 22/12 1USD = 131.43 yen

\*3 Exchange rates: FY 21/12 1CNY = 17.03 yen, FY 22/12 1CNY = 19.48 yen

\*4 Exchange rates: FY 21/12 1EUR = 129.89 yen, FY 22/12 1EUR = 138.04 yen

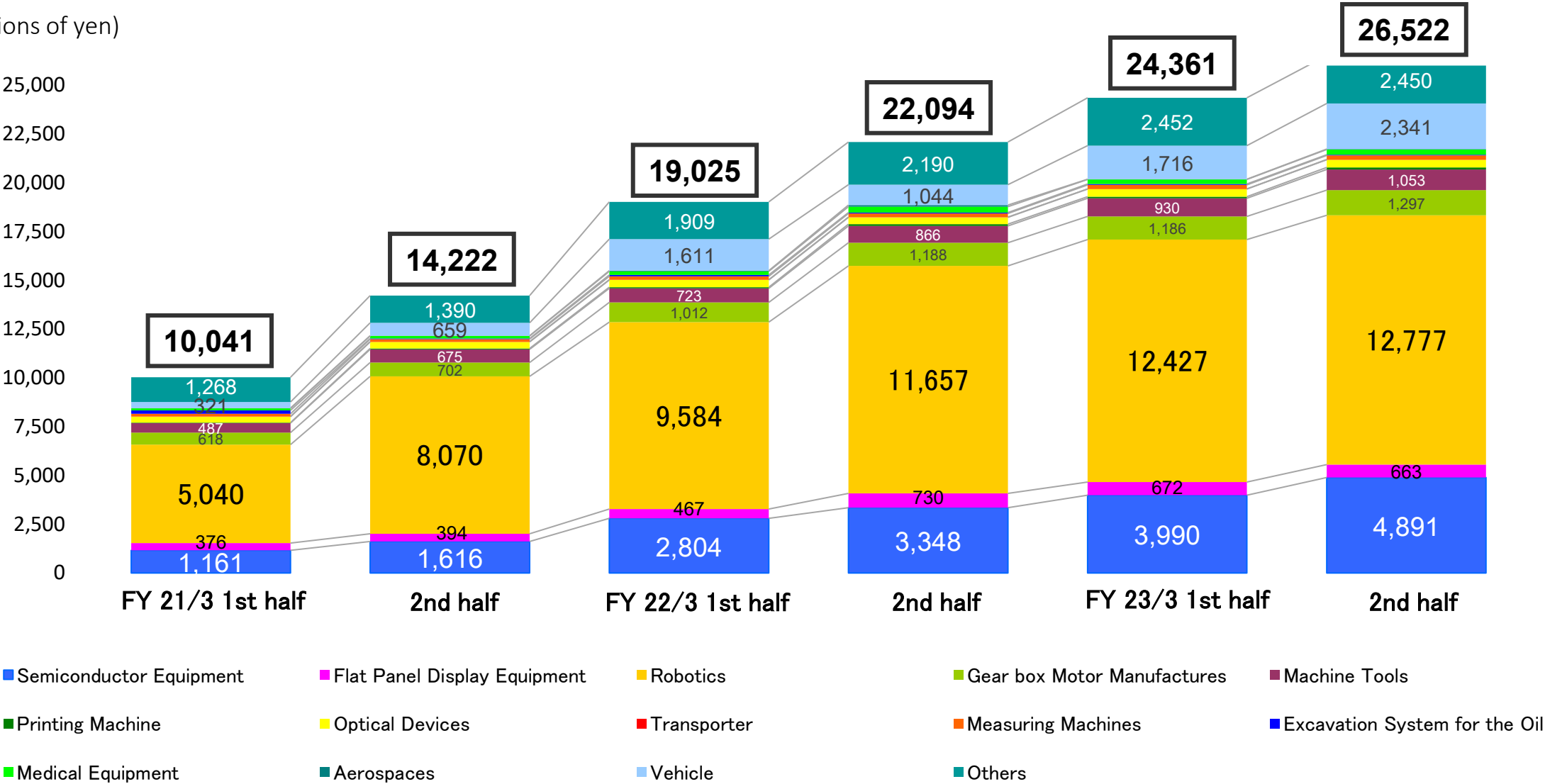
# Non-consolidated results for FY 2023/3(year-on-year change)

(millions of yen)

	FY 2022/3		FY 2023/3		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	41,120	100.0	50,883	100.0	9,763	23.7
Operating income	8,358	20.3	8,927	17.5	569	6.8
Ordinary income	8,702	21.2	9,378	18.4	676	7.8
Net income	6,545	15.9	6,880	13.5	334	5.1
EPS (yen)	68.00	—	72.17	—	4.17	6.1
Capital investment	4,589	—	7,557	—	2,968	64.7
Depreciation costs	3,502	—	4,408	—	905	25.8
R&D costs	2,251	—	2,430	—	179	8.0

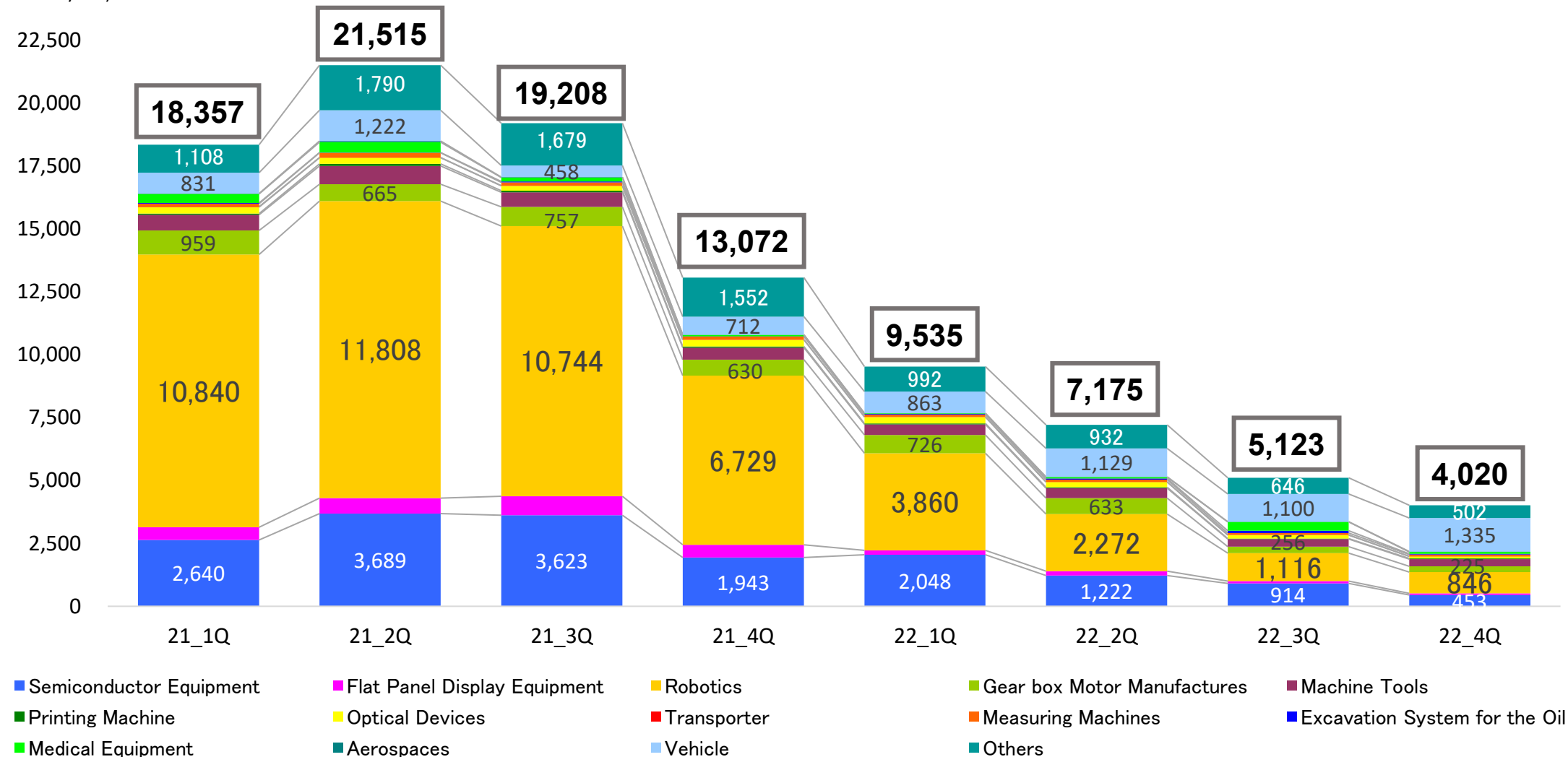
# Non-consolidated net sales by application (half-yearly)

(millions of yen)



# Non-consolidated bookings by application (quarterly)

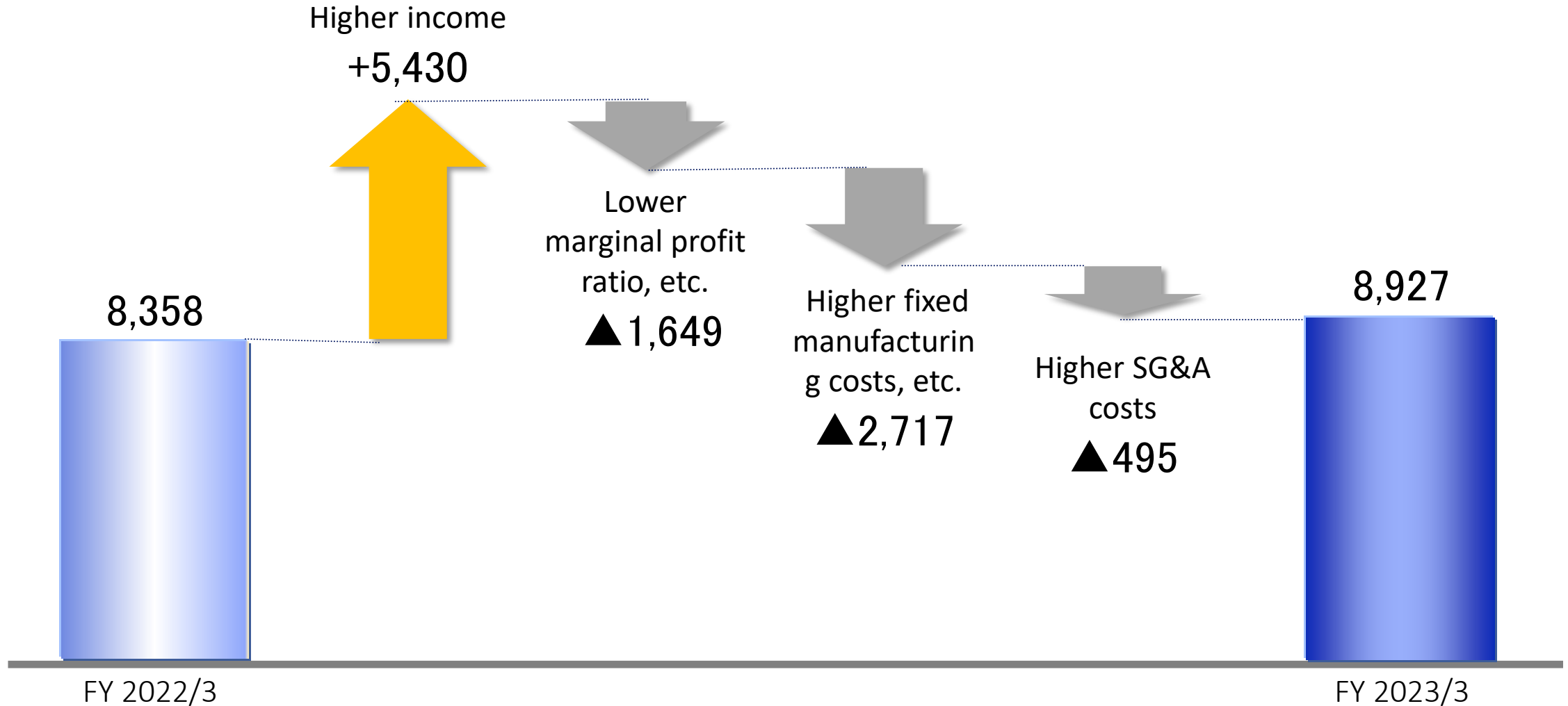
(millions of yen)





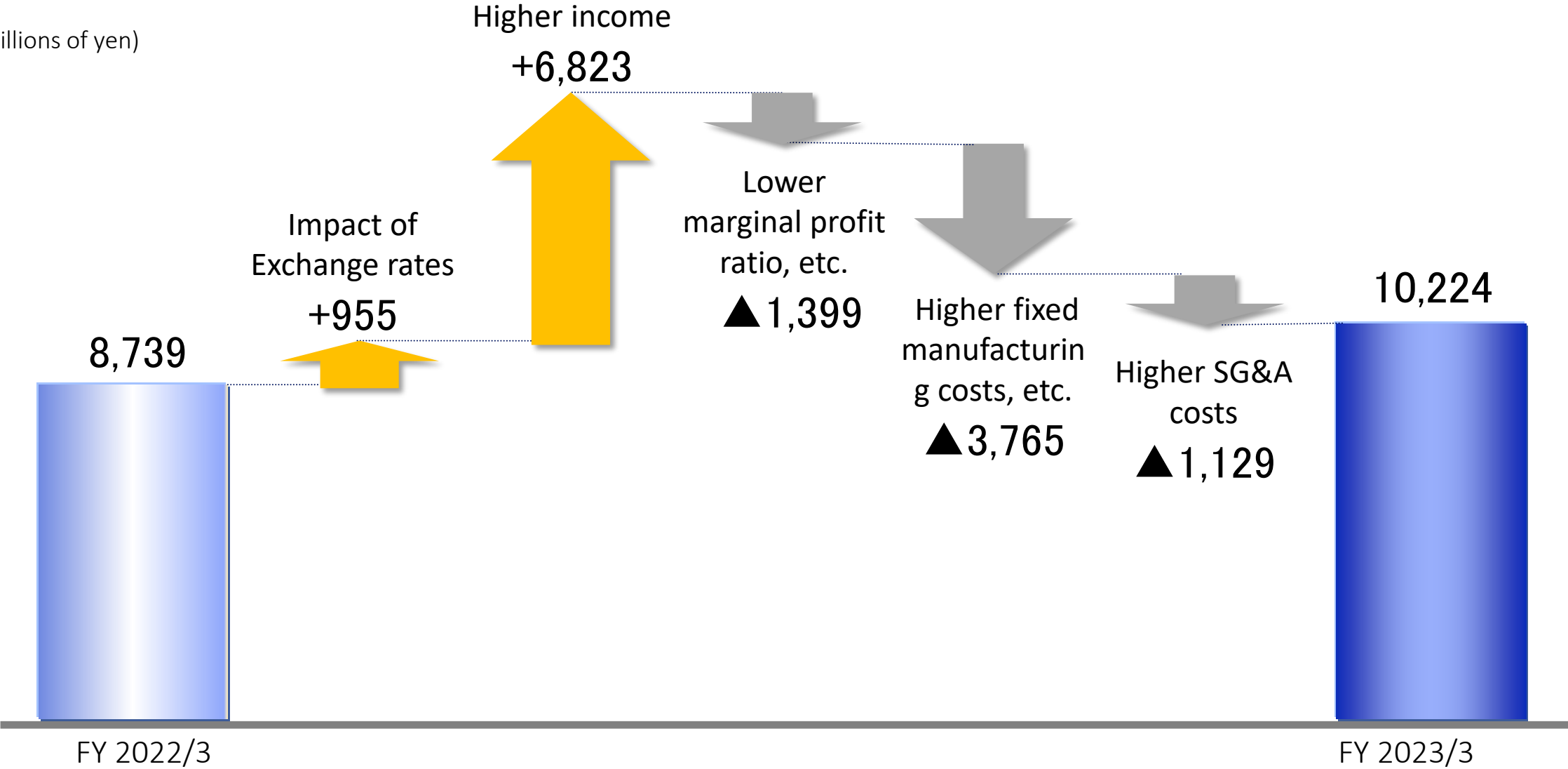
# Factors in year-on-year change in non-consolidated operating income (FY 2023/3)

(millions of yen)

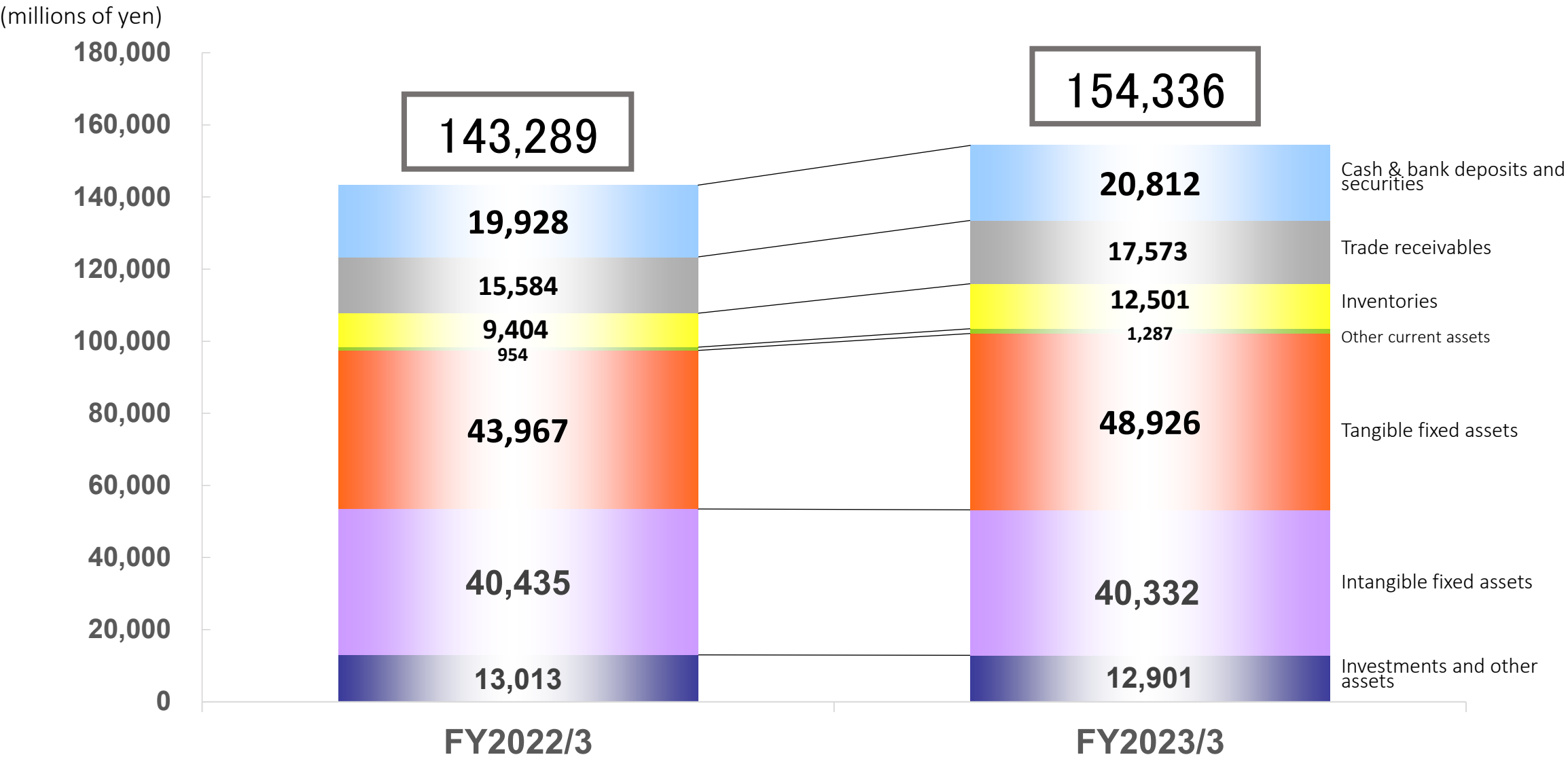


# Factors in year-on-year change in consolidated operating income (FY 2023/3)

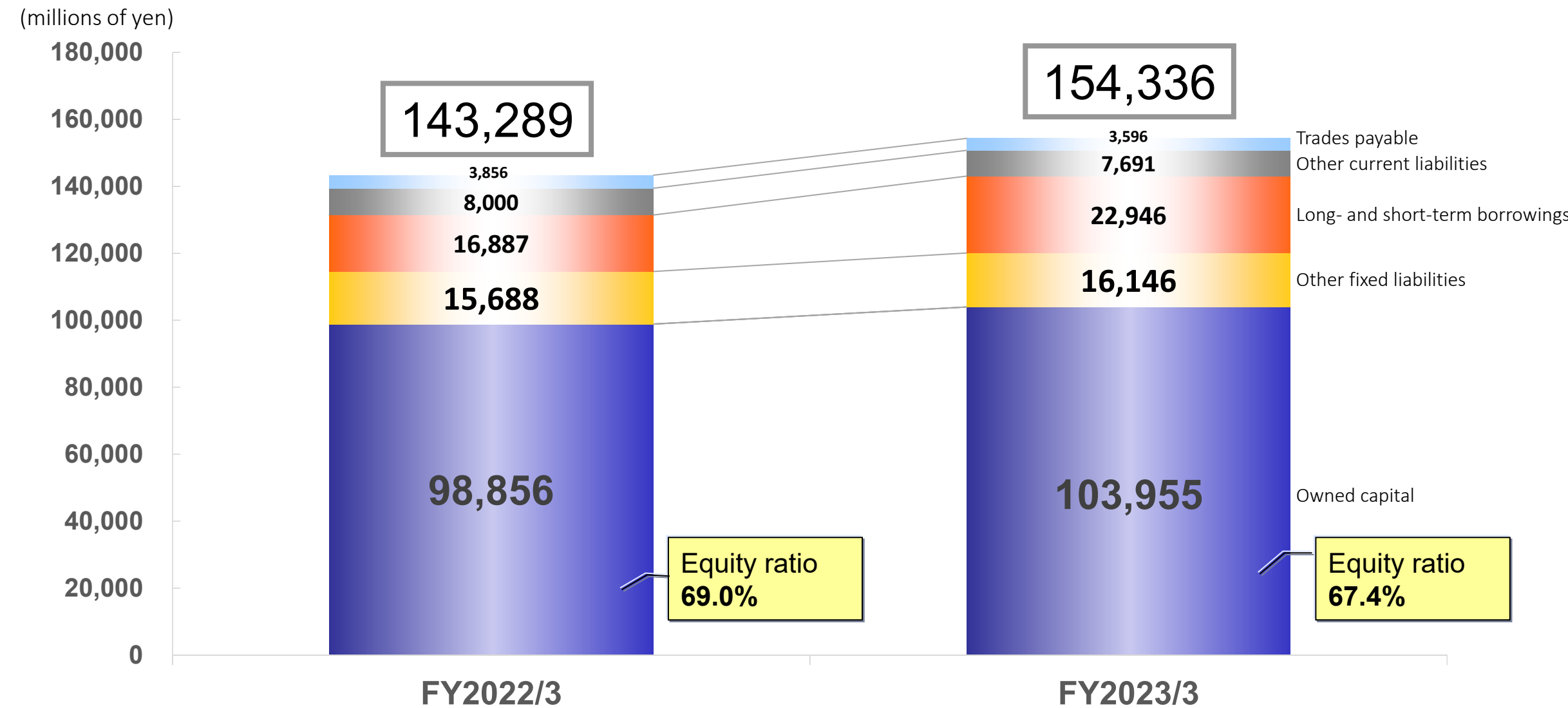
(millions of yen)



# Status of consolidated assets



# Status of consolidated liabilities and net assets



# Status of consolidated cash flows

(millions of yen)

	FY 2022/3	FY 2023/3
Cash flow from operating activities	9,881	10,850
Cash flow from investing activities	▲4,703	▲8,663
Cash flow from financing activities	▲6,663	▲1,599
Effect of exchange rate changes on cash and cash equivalents	256	567
Net increase (decrease) in cash and cash equivalents	▲1,229	1,154
Cash and cash equivalents at end of year	18,767	19,921

# Performance Forecasts for 1st-quarter FY 2024/3

# Consolidated performance forecasts for 1st-quarter FY 2024/3

(millions of yen)

	1st-quarter FY 2023/3		1st-quarter FY 2024/3 (forecasts)		Quarter-on-quarter change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	15,692	100.0	14,700	100.0	▲992	▲6.3
Operating income	2,126	13.6	800	5.4	▲1,326	▲62.4
Ordinary income	2,297	14.6	700	4.8	▲1,597	▲69.5
Net income	1,204	7.7	450	3.1	▲754	▲62.6
EPS (yen)	12.55	—	4.73	—	▲7.81	▲62.3

\* Assumed exchange rate for 1<sup>st</sup>-quarter FY 24/3 forecasts 1USD = ¥127.00 1EUR = ¥135.00 1CNY = ¥19.00

\*Net income refers to net income attributable to owners of parent.

# Consolidated CAPEX and R&D Expenses FY 2024/3

(millions of yen)

	FY 2023/3		FY 2024/3 (forecasts)		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Capital investment	9,236	—	7,300	—	▲ 1,936	▲ 21.0
Depreciation costs	9,574	—	9,600	—	25	0.3
R&D costs	3,274	—	3,500	—	225	6.9

\* Assumed exchange rate for 1<sup>st</sup> –quarter FY 24/3 forecasts 1USD = ¥127.00 1EUR = ¥135.00 1CNY = ¥19.00

\*Depreciation costs include depreciation cost of tangible assets and amortization cost of intangible assets and goodwill.



# Non-consolidated performance forecasts for 1st-quarter FY 2024/3

(millions of yen)

	1st-quarter FY 2023/3		1st-quarter FY 2024/3 (forecasts)		Quarter-on-quarter change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Net sales	11,608	100.0	8,000	100.0	▲3,608	▲31.1
Operating income	2,108	18.2	200	2.5	▲1,908	▲90.5
Ordinary income	2,425	20.9	2,350	29.4	▲75	▲3.1
Net income	1,359	11.7	2,300	28.8	940	69.1
EPS (yen)	14.17	—	24.19	—	10.03	70.8

\* Assumed exchange rate for 1<sup>st</sup>-quarter FY 24/3 forecasts 1USD = ¥127.00 1EUR = ¥135.00 1CNY = ¥19.00

# Non-consolidated CAPEX and R&D Expenses FY 2024/3

(millions of yen)

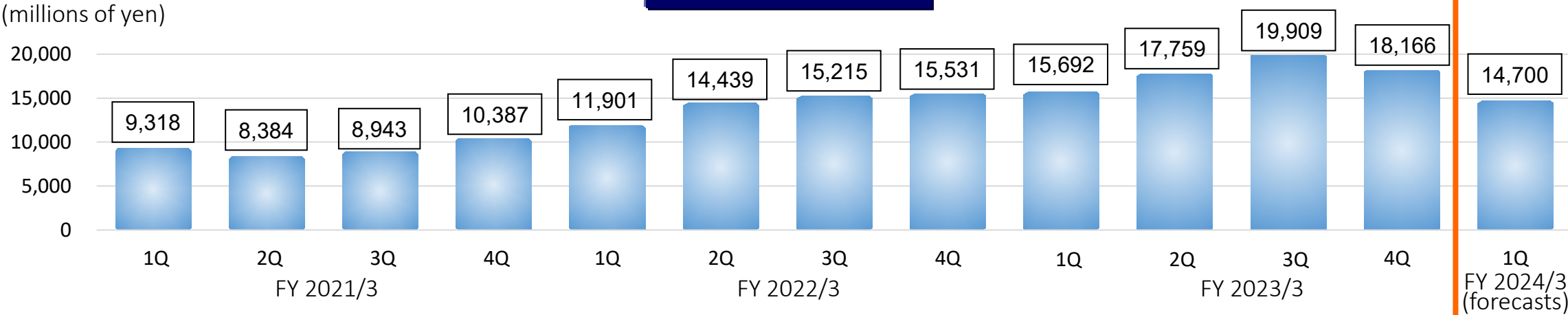
	FY 2023/3		FY 2024/3 (forecasts)		Year-on-year change	
	Amount	Percent (%)	Amount	Percent (%)	Change	Rate (%)
Capital investment	7,557	—	4,800	—	▲2,757	▲36.5
Depreciation costs	4,408	—	4,700	—	291	6.6
R&D costs	2,430	—	2,500	—	69	2.9

\* Assumed exchange rate for 1<sup>st</sup> –quarter FY 24/3 forecasts 1USD = ¥127.00 1EUR = ¥135.00 1CNY = ¥19.00

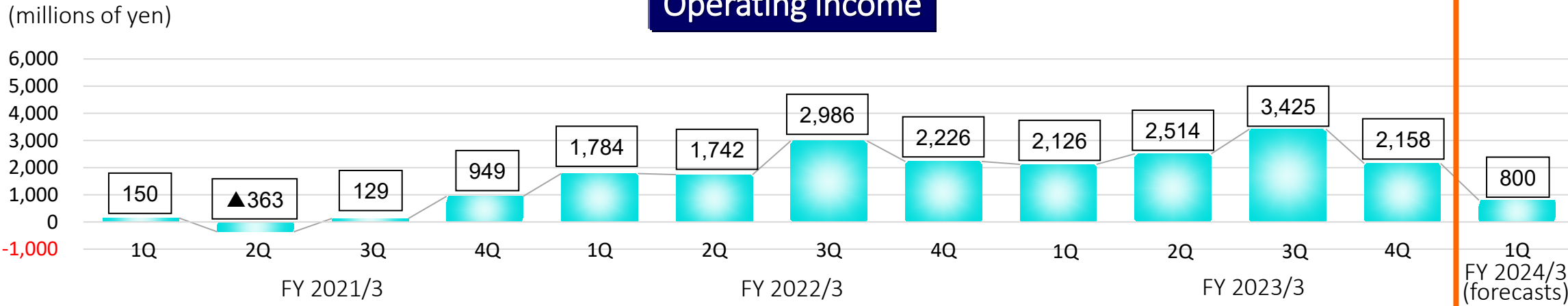
\*Depreciation costs include depreciation cost of tangible assets and amortization cost of intangible assets and goodwill.

# Consolidated net sales & operating income (quarterly)

## Net sales



## Operating income

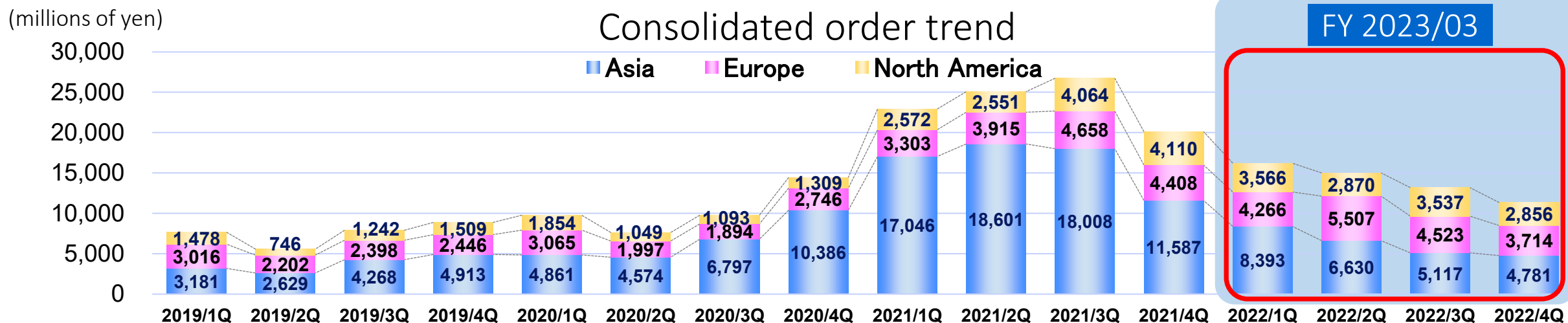


# Future Outlook

# 1. Our operating environment

# 1-1. Demand for HDSI's products

- Decline in domestic orders: Inventory adjustment due to advance orders placed in FY 2022/03
- Difficult to forecast when inventory held by distributors and customers will be exhausted



## Asia

Demand for small 3C-oriented robots has decreased due to a slowdown in the Chinese market, though signs of partial recovery are becoming visible

## Europe

The effects of the Ukraine conflict have been minimal, and as capital investments have continued, demand has remained consistently stable

## North America

Order intake for sectors such as semiconductors, medical, and amusement have shown robust trends



Harmonic Drive Systems Inc.

## 2.Trends in Main Fields of Application

## 2-1. Factory automation robot market forecast

Labor  
shortages

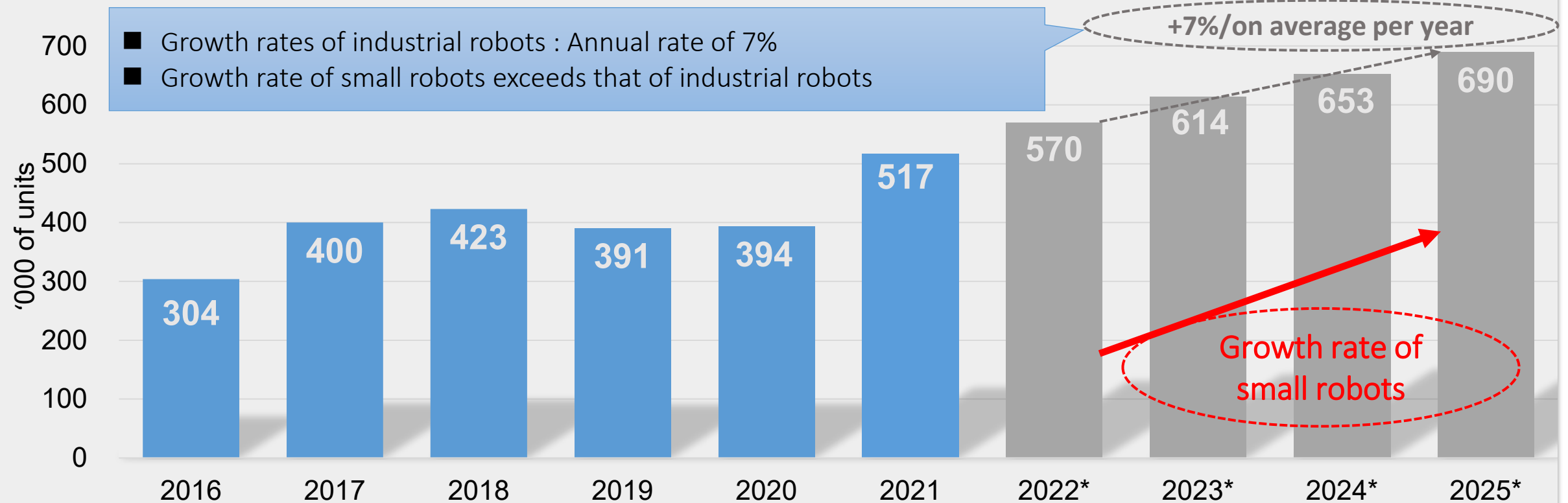


Post-COVID  
new normal

Automation demand  
Labor-saving demand

Market  
expansion

Annual installations of industrial robots 2016 -2021 and 2022\* - 2025\*



Source: compiled by the Company based on IFR World Robotics 2022



# 2-2. Collaborative robot market forecast

Resolve labor shortages  
Enhance corporate  
competitiveness

Orientation towards  
autonomy through AI  
development

Automation  
Labor-saving

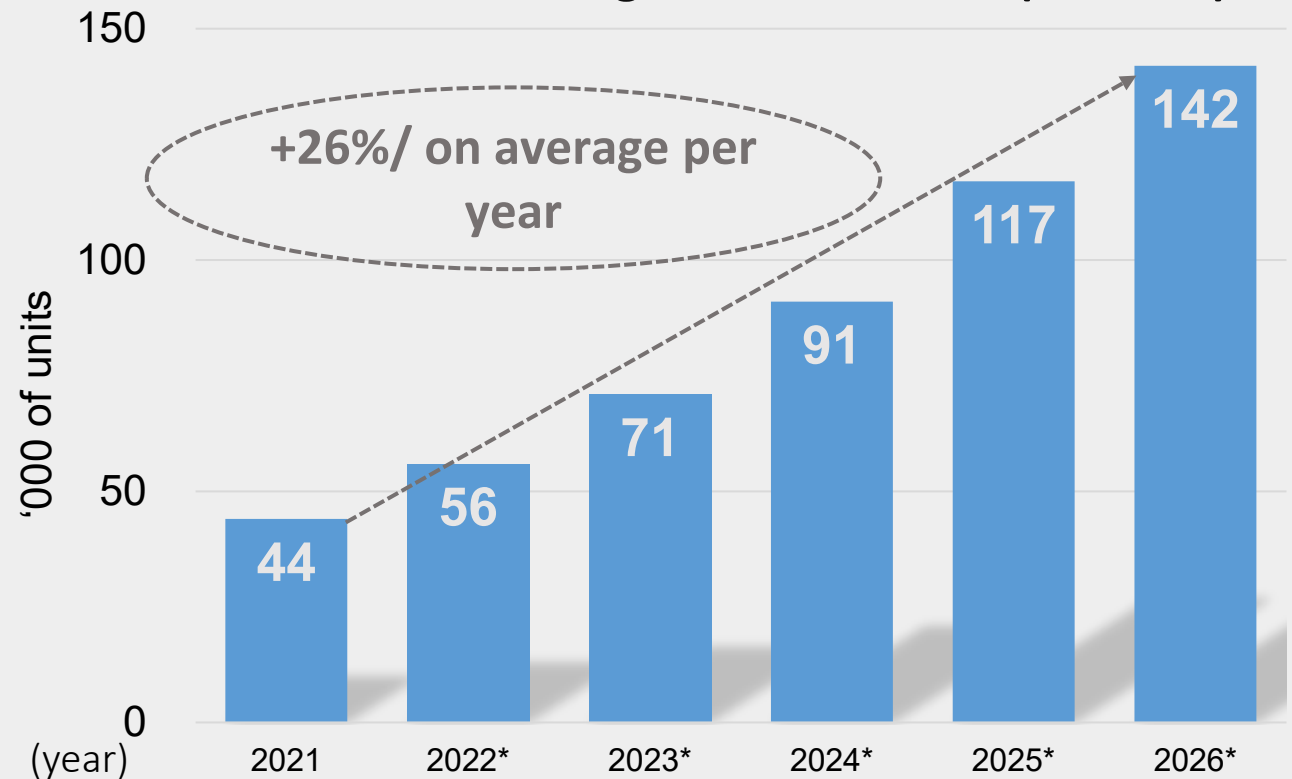
Market expansion

- Labor management strategies: Application expected even for tasks that can be completed by a single individual
- Through the utilization of AI, operations will become simpler, even for beginners
- Production nationalism: A shift away from reliance on China



Courtesy of NEURA Robotics GmbH

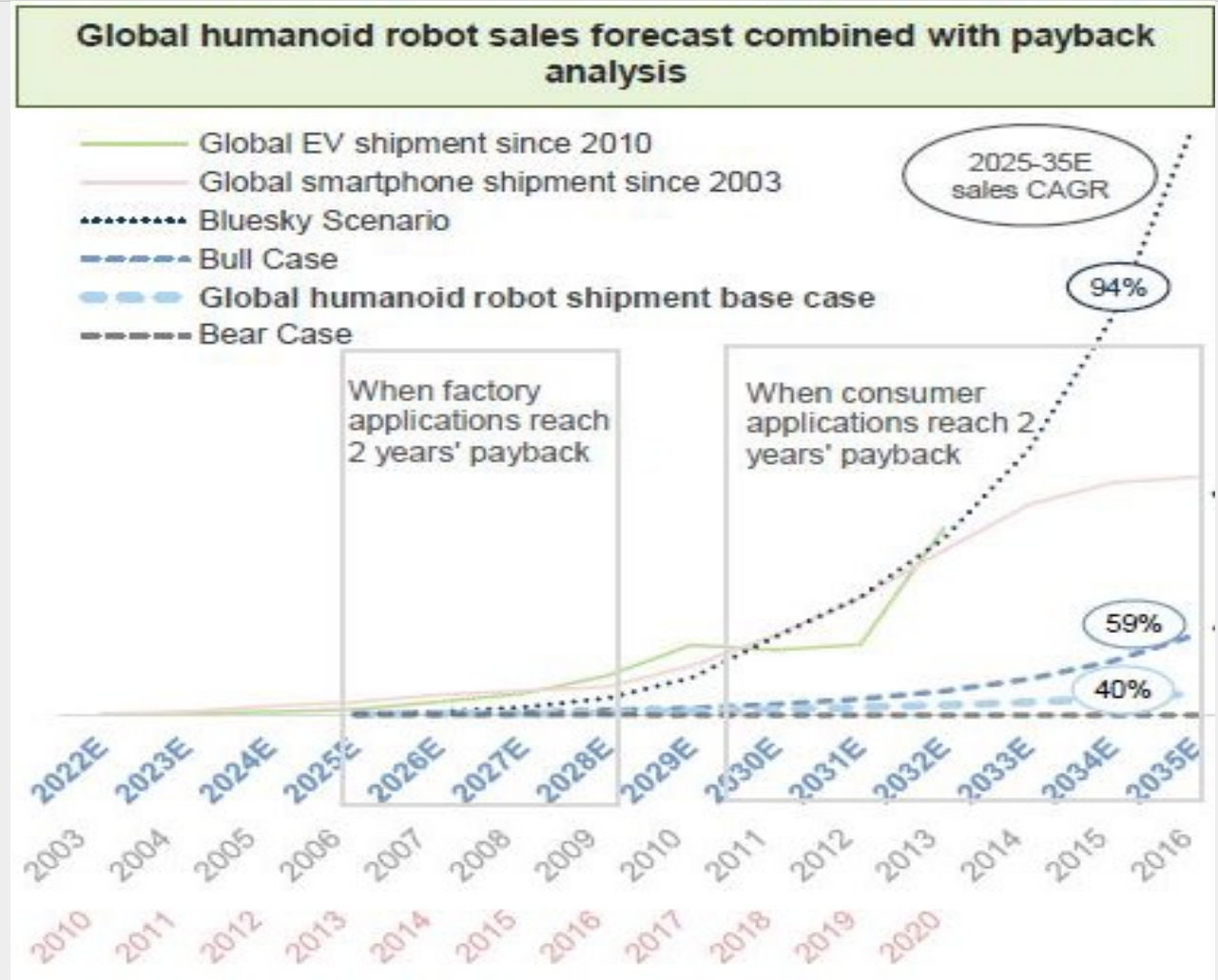
**Collaborative robot global market size(forecast)**



Note: Figures for 2022 are estimates, figures for 2023 and beyond are forecasts, based on the number of units shipped by manufacturers  
Source: Compiled by the Company based on "Survey on the Global Market for Collaborative Robots (2023)" published by Yano Research Institute Ltd. on March 01, 2023

# 2-3. Anticipating growing demand for humanoid robots

- Full-fledged industrial applications
  - Tesla has unveiled its “Optimus” robot
  - Saudi Arabia plans to deploy humanoid robots in its Smart City Project
- Relentless pursuit for superior human motion
- Difference from co-bots: “Humanoid Hand”
- Despite the high technical and cost barriers, the ultra-compact speed reducers, which are our strength, are indispensable for humanoid robots



Source : The Goldman Sachs Group, Inc. “Global Automation\_ The investment case for humanoid robots”

## 2-4. Semiconductor equipment and Automotive

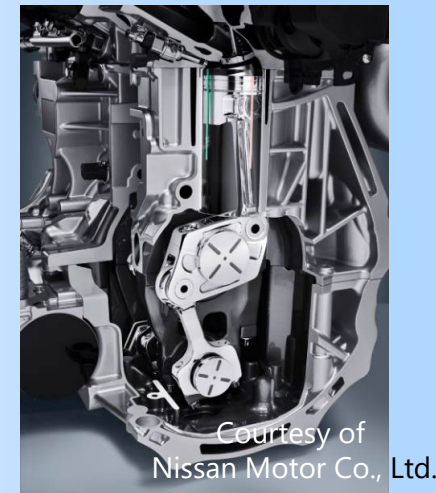
### Semiconductor equipment

- Although demand is slowing, we are closely monitoring the timeframe for rebound in anticipation of large-scale investments over the medium to long term
- As long as technological advancement continues, semiconductor demand will grow
- US-China conflict ➡ Various governments are backing their own semiconductor industries
  - US: Provides production and developmental aid via the CHIPS and Science Act
  - Japan: Semiconductor factories to be constructed in Hokkaido and Kumamoto
  - China: Pursuing a policy of domestic semiconductor production



### Automotive: Used in variable compression ratio (VCR) engines

- Semiconductor shortages are keeping production volume flat
- Achieved improvements in ease of installation, fuel economy, and quietness at high speeds
- This will become the center of Nissan's next-generation engines
- Also used for e-POWER in exclusive power generator engines

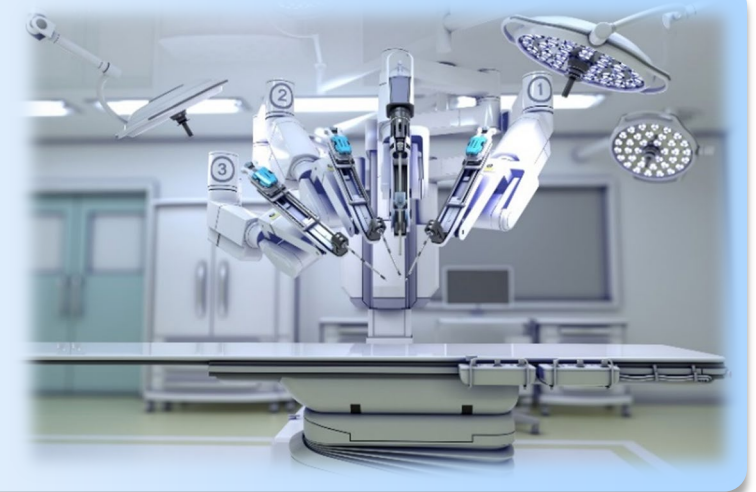




# 2-5. Medical and health care

## Surgical robots

- Top medical equipment manufacturers from Japan, the US, and Europe have entered the market
  - ➡ With the broadening of therapeutic areas, the market is anticipated to expand further
  - ➡ Advancements in communication speeds (from 5G to 6G) are expected to facilitate remote surgeries
- The major manufacturers of surgical robots in Japan, the US, and Europe, being rise to oligopoly by our products



## Other potential healthcare applications



### Medical equipment

- Specimen analysis/test equipment/PCR test applications



### Exoskeleton

- Moving into a phase of practical adoption with expanded insurance coverage and subsidies



### Electric wheelchairs

- Autonomous driving enhances convenience

# 3. New Applications

# 3-1. Robots for Infrastructure Inspection

## Float Arm: A snake-like robot arm designed for infrastructure inspection (Hibot Corporation )

- Multi-articulated robot arm, enabling maintenance and inspection in confined or elevated spaces without the need for scaffolding, such as in petrochemical plants
- Companies like BASF and Mitsui Chemicals have implemented Float Arm in their operations
- Members of the DeepStar®\* consortium have also opted for its adoption
- The reasons for selecting HarmonicDrive® include:
  - Reliable performance even in harsh environments
  - Broad operational range (5 meters) while maintaining a lightweight design (35kg)

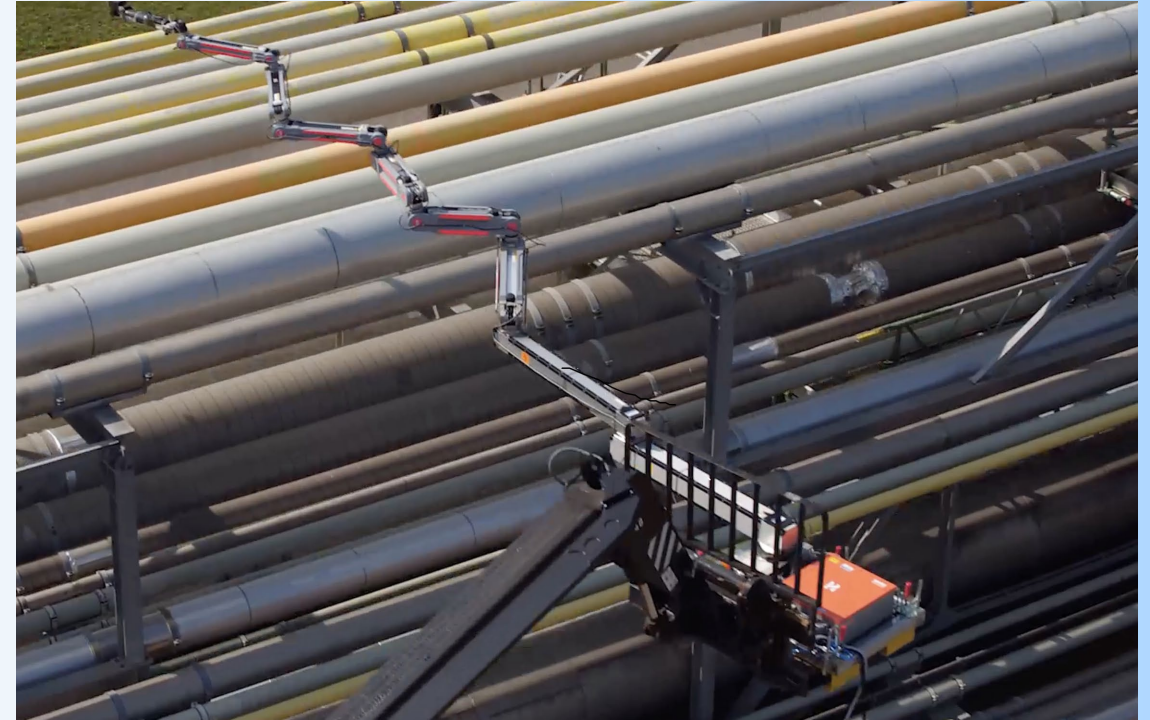


Photo credit: Hibot Corporation

\*DeepStar® is an international offshore technology development consortium comprising “upstream” companies including Chevron (US), ExxonMobil (US), Shell (UK), and Petrobras (Brazil) that are engaged in the exploration, development, and production of offshore oil and natural gas around the world, and companies, universities, research institutes, and other organizations that provide products and services to these upstream companies.

# 3-2. Aviation and Space

## 3-2-1.eVTOL (Electric Vertical Take-Off and Landing aircraft)

- Multiple our products are used in critical systems of eVTOL
- “EXPO 2025 OSAKA, KANSAI, JAPAN” is set to kick off the experimental commercial operations of eVTOL
- eVTOLs are anticipated to become increasingly common as an eco-friendly method of short-distance travel
- What about large aircraft?





## 3-2-2. Space: Lunar Exploration with Manned, Pressurized Rover

Joined research to develop a steering unit as part of the Manned Pressurized Rover joint research project (FY2019–2021) led by the Japan Aerospace Exploration Agency (JAXA) and Toyota Motor Corporation





# 3-2-3. Marketing and Public Awareness Activities

## Exhibited at the concurrent exhibition of the Japan Society for Aeronautical and Space Sciences (one of the largest in Japan)

- 66th Space Sciences and Technology Conference (Held from November 1-4 at Kumamoto Castle Hall)
- Presented our proven record of product adoption and corresponding technologies
- The event was attended by 63 individuals, including researchers and developers from various universities and corporations



Concurrent exhibition

## Exhibited at the 2023 International Space Industry Exhibition (Held from February 1-3 at Tokyo Big Sight)

- Showcased our proven track record in the space-related market
- Delivered a presentation themed "Exploring the Current State and Future Prospects of Tribology in Wave Gear Systems Designed for Space" (with 49 attendees)
- A total of 220 people visited our booth

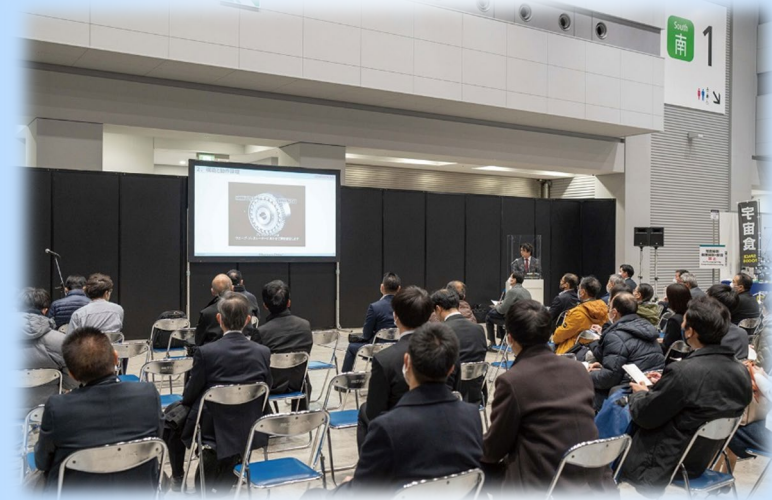
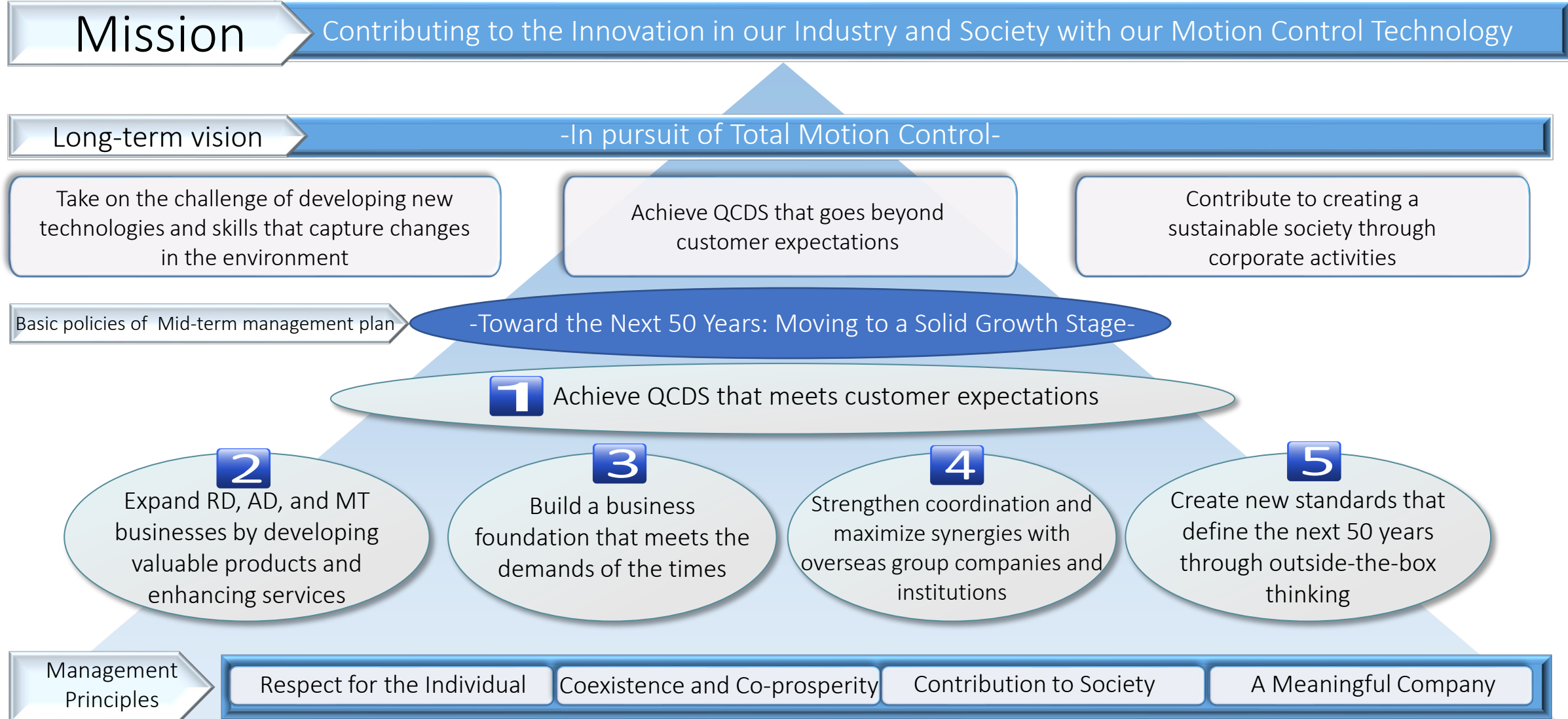


Photo of lecture

# 4. Progress of Mid-term Management Plan

(FY 2021 ~ FY 2023)

# 4-1. Mission, Long-term vision and Basic policies of Mid-term management plan



## 4-2. Opportunities for Long-term Growth

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External  
environment  
(growth  
opportunities)

- The shrinking labor force contributes to a sustained demand for industrial robots
- Growing consciousness of economic security globally propels the establishment of semiconductor supply chains, reflected in increased investment in semiconductor equipment
- Efforts towards carbon neutrality are reshaping strategic initiatives, including the manufacture of eco-friendly products
- Application areas are expanding : medical, space, e-VTOL, amusement, **humanoid robots**, and beyond



## 4-3. Increasing production capacity and enhanced productivity at Ariake Plant

- Completed investment to expand production capacity at Ariake Plant:  
total investment of 6.5 billion yen
- Promoting DX within the plant



Introduction  
of AGV



Increased production capacity

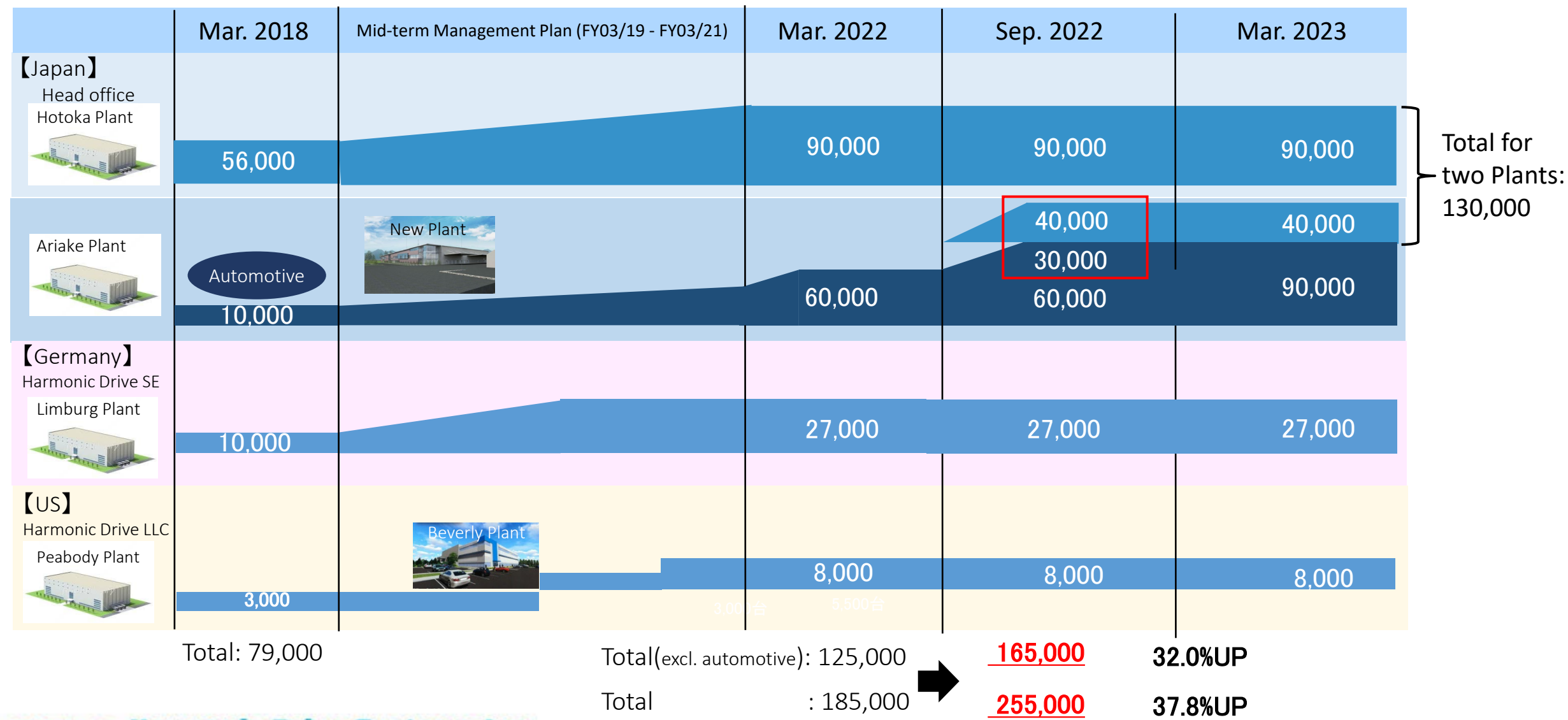
Additional 70,000 units

(Industrial: 40,000 units; Automotive: 30,000 units)

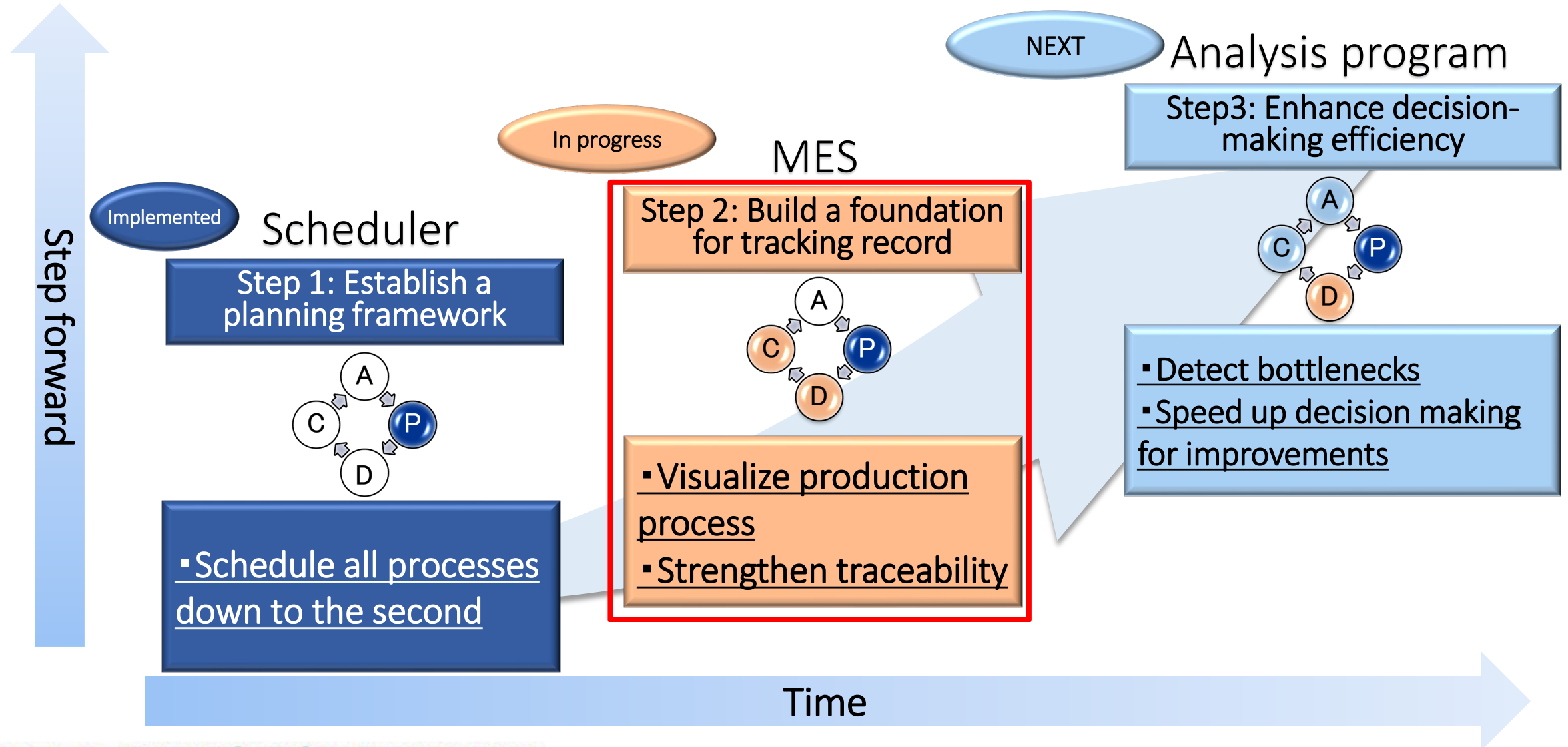
Increased productivity

Improve automation and save labor  
(more than doubled the productivity per  
employee from the previous line)

# 4-4. Increasing Production Capacity (Units Produced Per Month)



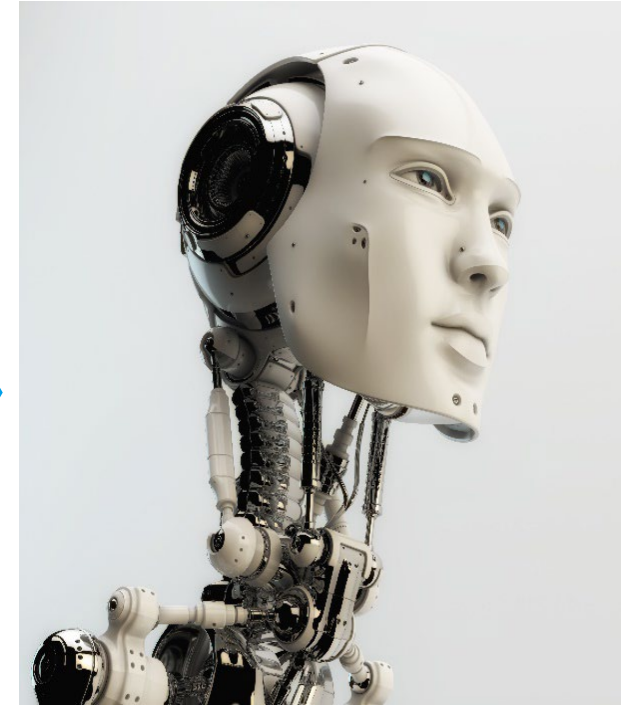
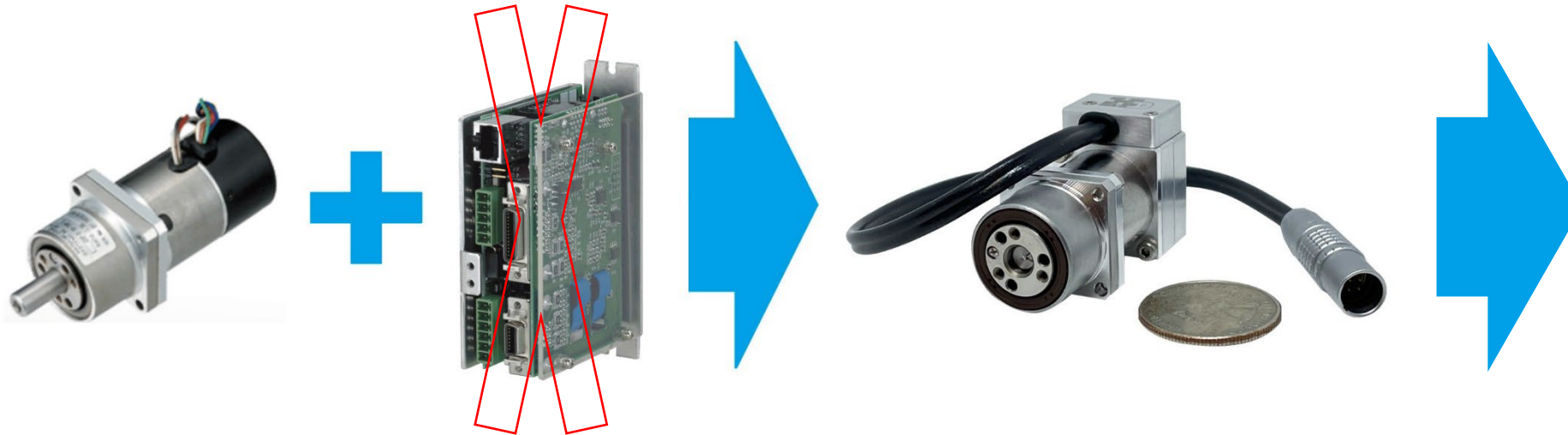
# 4-5. QCDS Enhancement through Factory Digitalization



## 4-6. Developing Valuable Products and Services

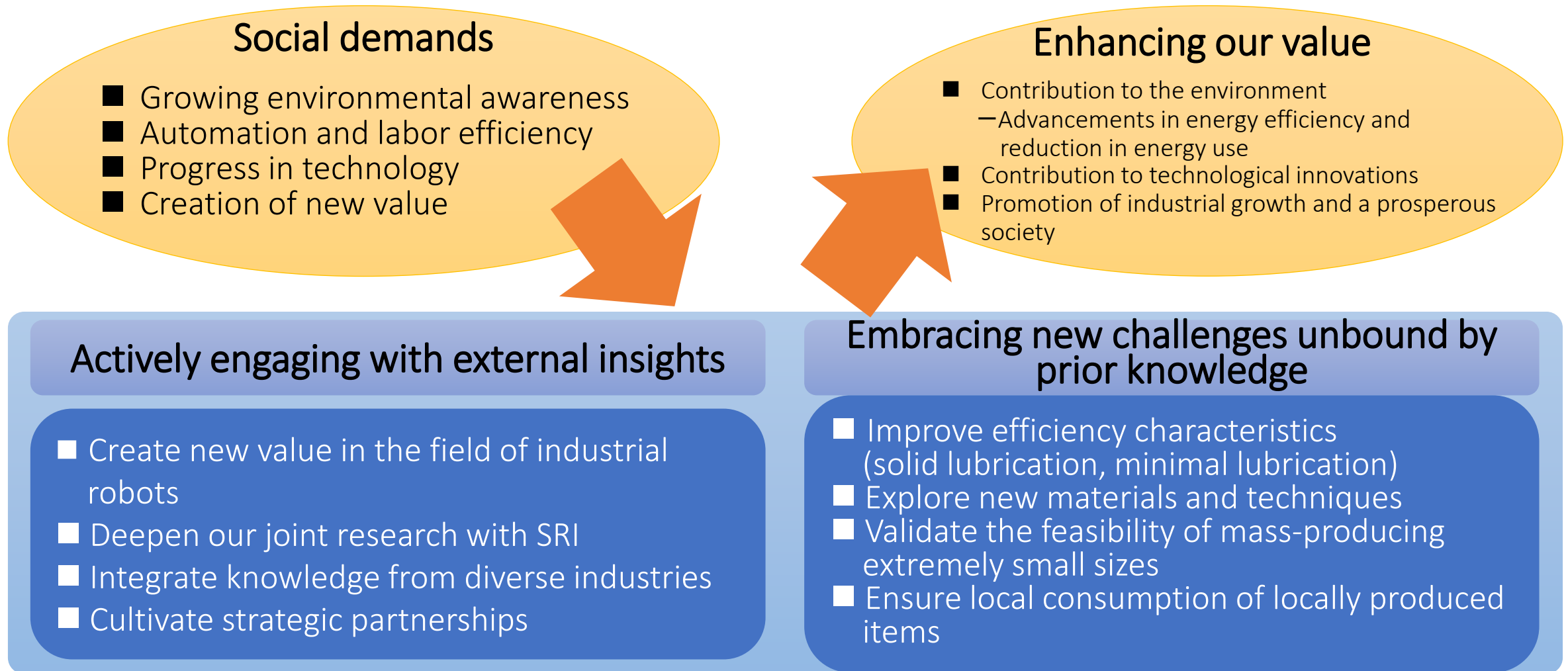
### RSF-5B-IDT Supermini Actuator (Developed by Harmonic Drive LLC)

- This ultra-compact actuator utilizes size 5 and integrates a servo driver, eliminating the need for an external driver
- Its streamlined, compact design combines several cables into one
- It has been implemented in diverse settings, ranging from amusement to semiconductor manufacturing equipment





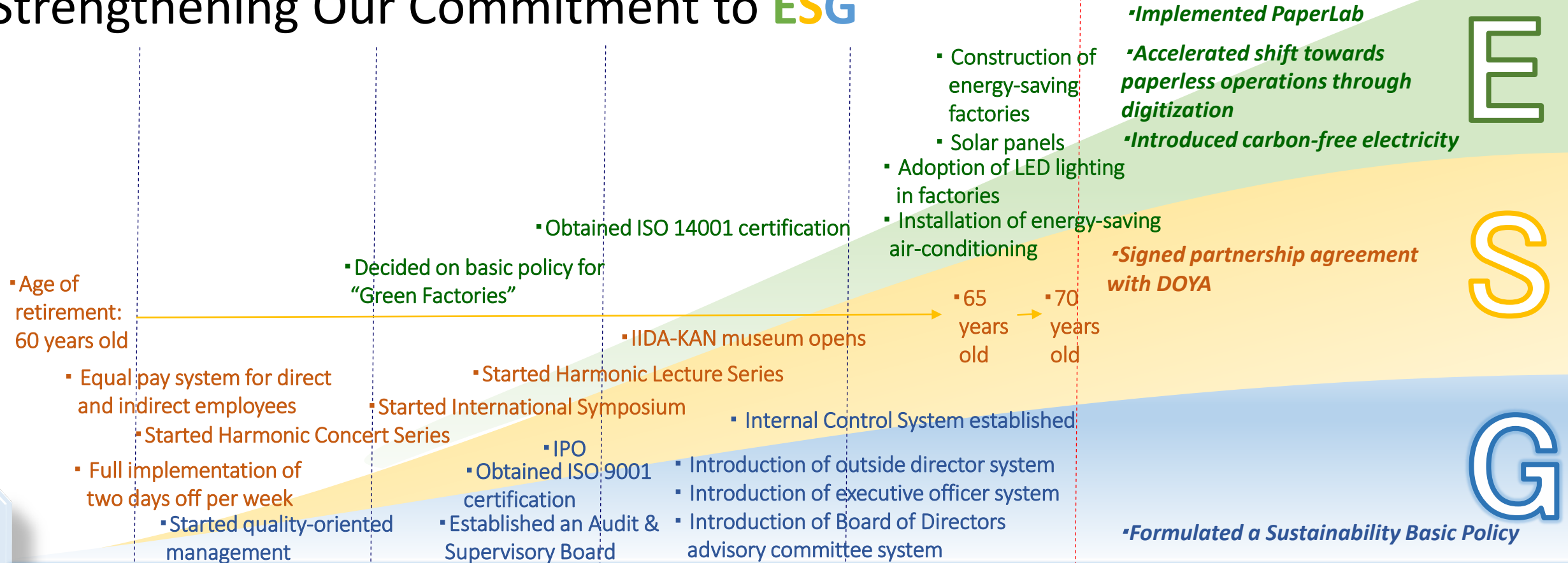
## 4-7. The Next 50 Years: Innovative Thinking Inspired by Our Unique Worldview



# 4-8. Our path to sustainability

1970 ..... 1980 ..... 1990 ..... 2000 ..... 2010 ..... 2020 ..... 2050

## Strengthening Our Commitment to ESG



Charter of Corporate Behavior  
Management Philosophy

# 4-9. Activities borne from strong employee awareness

## Achievements in FY 2022 Aligning with ESG & SDGs

(from April 1, 2022)

Ariake Plant: Complete transition to CO2-free electricity generated by using water from Azumino City



[Lecture Appearances] Conducted lectures at Kawagoe Girls' High School, National Institute of Technology, Oyama College, and National Institute of Technology, Nagano College



[Implementing PaperLab] Contributing to the SDGs by recycling used paper within our company to produce new paper





**Harmonic Drive Systems Inc.**

## Topics in FY 2022

April: Introduced CO2-free power at Ariake Plant

June: Harmonic Drive SE obtained the ISO50001 certification

October: CSF-ULW won the Good Design Award

October: Won the Grand Prize at the Monodukuri Grand Prize Nagano 2022

January: Hold the 37th Harmonic Concert  
(in Azumino City, Nagano Prefecture)

March: Donated 10 million yen in aid in response to a major earthquake that originated in the southeastern part of Turkey



**GOOD DESIGN  
AWARD 2022**

