Harmonic Drive Systems Inc.

# Presentation on Business Results for the 1st-Half of Fiscal Year Ending March 31, 2016

November 18, 2015

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# Performance Summary

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# 1st-half consolidated results (versus original forecasts for the period)

(millions of yen)

| | Original forecasts (announced May 12) | | 1st-half FY ending Mar.31,2016 | | Vs. original forecasts for the period | |
|---|---|---|---|---|---|---|
| | Amount | Percent (%) | Amount | Percent (%) | Change | Rate(%) |
| Net sales | 14,400 | 100.0 | 13,919 | 100.0 | ▲480 | ▲3.3 |
| Operating income | 3,850 | 26.7 | 4,005 | 28.8 | 155 | 4.0 |
| Ordinary income | 4,150 | 28.8 | 4,034 | 29.0 | ▲115 | ▲2.8 |
| Net income | 2,700 | 18.8 | 2,594 | 18.6 | ▲105 | ▲3.9 |



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# 1st-half consolidated results (year-on-year change)

(millions of yen)

| | 1st-half FY ended Mar.31,2015 | | 1st-half FY ending Mar.31,2016 | | Year-on-year change | |
|---|---|---|---|---|---|---|
| | Amount | Percent (%) | Amount | Percent (%) | Change | Rate (%) |
| Net sales | 12,700 | 100.0 | 13,919 | 100.0 | 1,219 | 9.6 |
| Gross profit | 6,034 | 47.5 | 6,793 | 48.8 | 758 | 12.6 |
| Operating income | 3,633 | 28.6 | 4,005 | 28.8 | 372 | 10.2 |
| Ordinary income | 3,886 | 30.6 | 4,034 | 29.0 | 148 | 3.8 |
| Net income | 2,483 | 19.6 | 2,594 | 18.6 | 110 | 4.5 |
| EPS（yen）*2 | 27.11 | | 28.32 | | 1.21 | 4.5 |
| Capital investment *1 | 807 | | 1,599 | | 792 | 98.2 |
| Depreciation costs | 596 | | 698 | | 102 | 17.2 |
| R&D costs | 606 | | 691 | | 84 | 14.0 |

*1 Capital investment amounts are the amounts of tangible and intangible fixed assets acquired in the term.

*2 EPS calculated as if the October 1, 2014 share split (1:3) took place at the beginning of the previous fiscal year.



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# Performance of main group companies for 1st-half of fiscal year ending March 31, 2016

(millions of yen)

| | | Equity stake | Net sales | | Net income | |
|---|---|---|---|---|---|---|
| | | | Amount | Change(%) | Amount | Change(%) |
| | Harmonic Drive Systems Inc. | — | 11,848 | 4.2 | 2,478 | 11.9 |
| *1 *4 | HD Systems Inc. (Harmonic Drive L.L.C.) (U.S.A.) | 100% (51%) | 2,405 | 47.0 | *3 152 | 222.0 |
| | Harmonic AD, Inc. | 100% | 1,152 | 10.6 | 91 | 88.5 |
| *2 *4 | Harmonic Drive AG (Germany) | 36.8% | 5,181 | 2.1 | 103 | ▲88.2 |

Percent change(%) indicates increase or decrease from same period of previous fiscal year.

*1 Exchange rates: Jan. – Jun., 2014 1US$ = 102.47 yen, Jan. – Jun., 2015 1US$ = 120.23 yen
*2 Exchange rates: Jan. – Jun., 2014 1€ = 140.43 yen, Jan. – Jun., 2015 1€ = 134.17 yen
*3 Net income of US subsidiaries (consolidated) is after excluding minority interests.
*4 For overseas subsidiaries and affiliates, the fiscal year ends December 31.



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# 1st-half non-consolidated results

(millions of yen)

| | 1st-half FY ended Mar.31,2015 | | 1st-half FY ending Mar.31,2016 | | Year-on-year change | |
|---|---|---|---|---|---|---|
| | Amount | Percent(%) | Amount | Percent(%) | Change | Rate(%) |
| Net sales | 11,366 | 100.0 | 11,848 | 100.0 | 482 | 4.2 |
| Gross profit | 5,018 | 44.2 | 5,090 | 43.0 | 72 | 1.4 |
| Operating income | 3,135 | 27.6 | 2,988 | 25.2 | ▲146 | ▲4.7 |
| Ordinary income | 3,406 | 30.0 | 3,550 | 30.0 | 143 | 4.2 |
| Net income | 2,214 | 19.5 | 2,478 | 20.9 | 263 | 11.9 |
| EPS（yen）*2 | 24.18 | | 27.06 | | 2.88 | 11.9 |
| Capital investment *1 | 482 | | 1,153 | | 670 | 139.0 |
| Depreciation costs | 320 | | 405 | | 84 | 26.3 |
| R&D costs | 591 | | 685 | | 94 | 15.9 |

*1 Capital investment amounts are the amounts of tangible and intangible fixed assets acquired in the term.

*2 EPS calculated as if the October 1, 2014 share split (1:3) took place at the beginning of the previous fiscal year.



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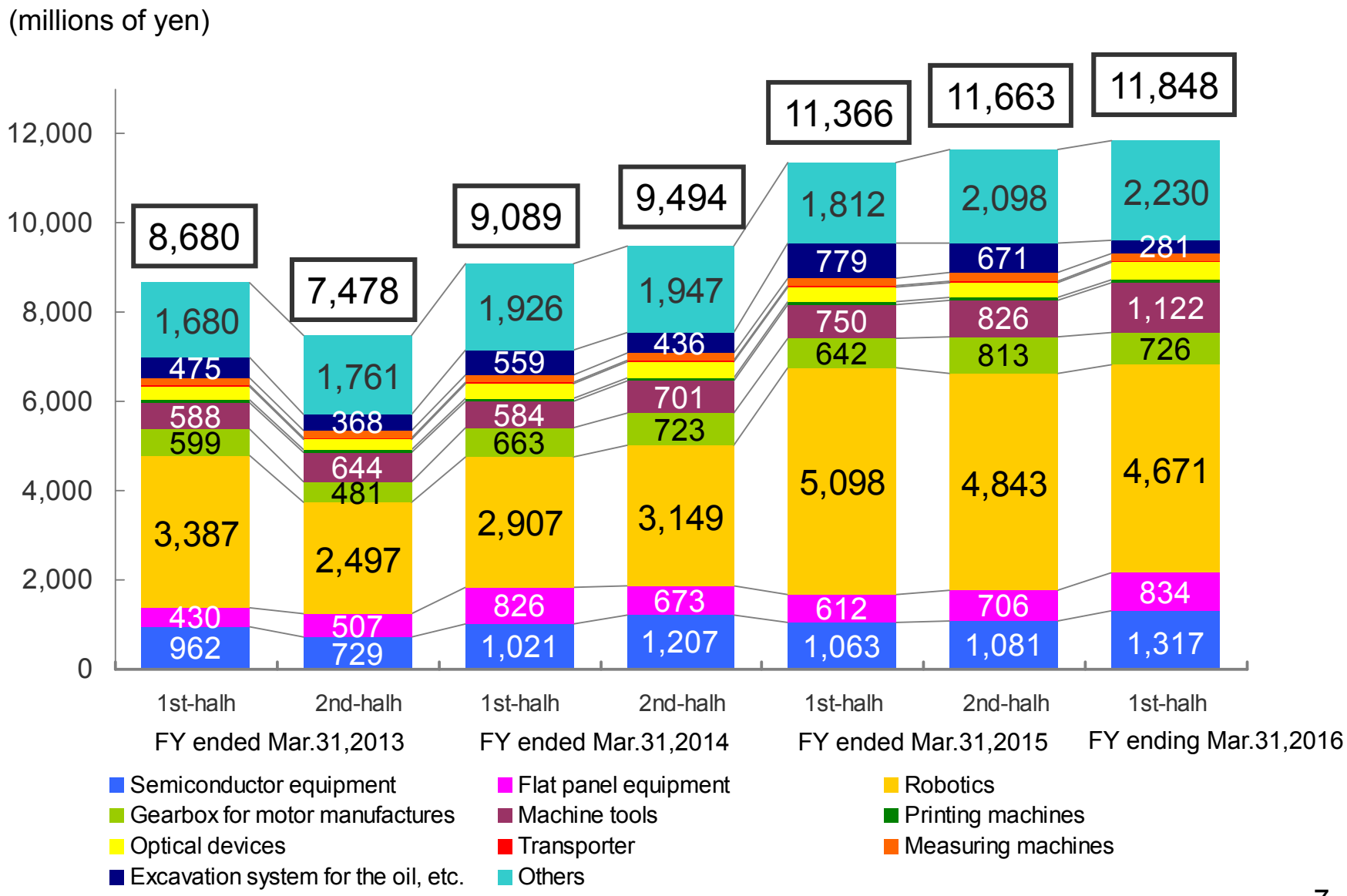
# Net sales by application (non-consolidated)



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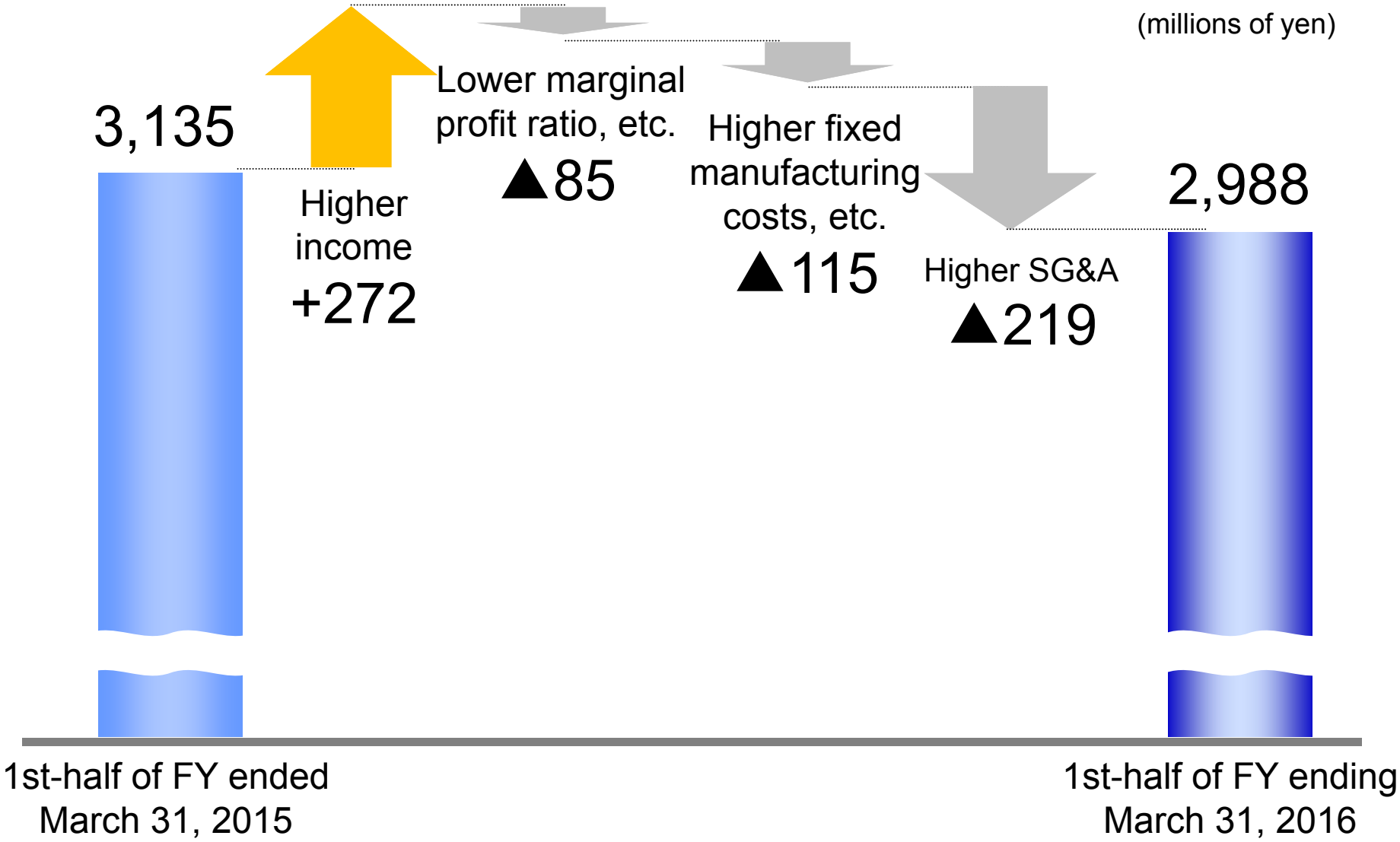
# Factors in year-on-year change in 1st-half non-consolidated operating income



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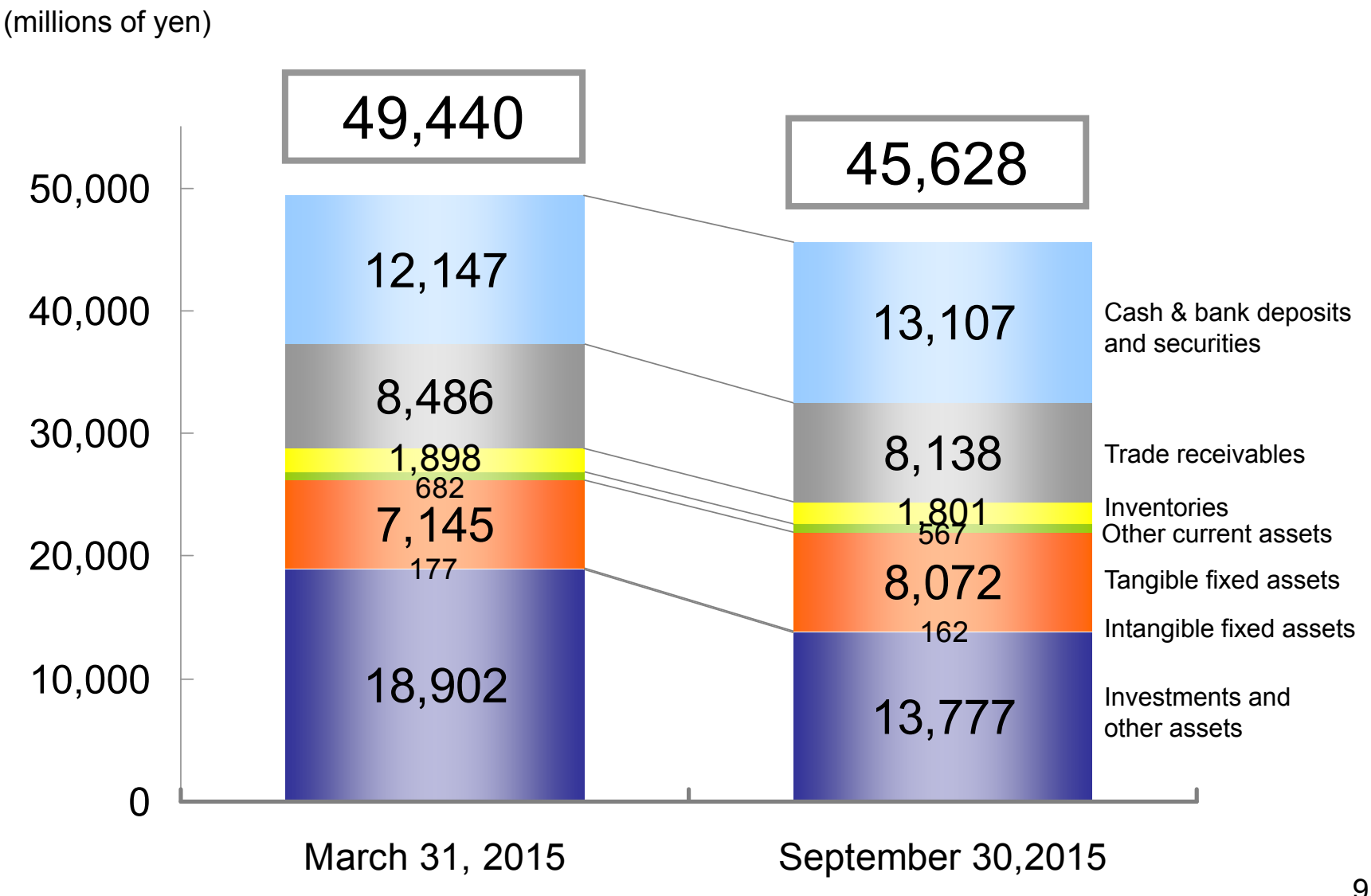
# Status of consolidated assets



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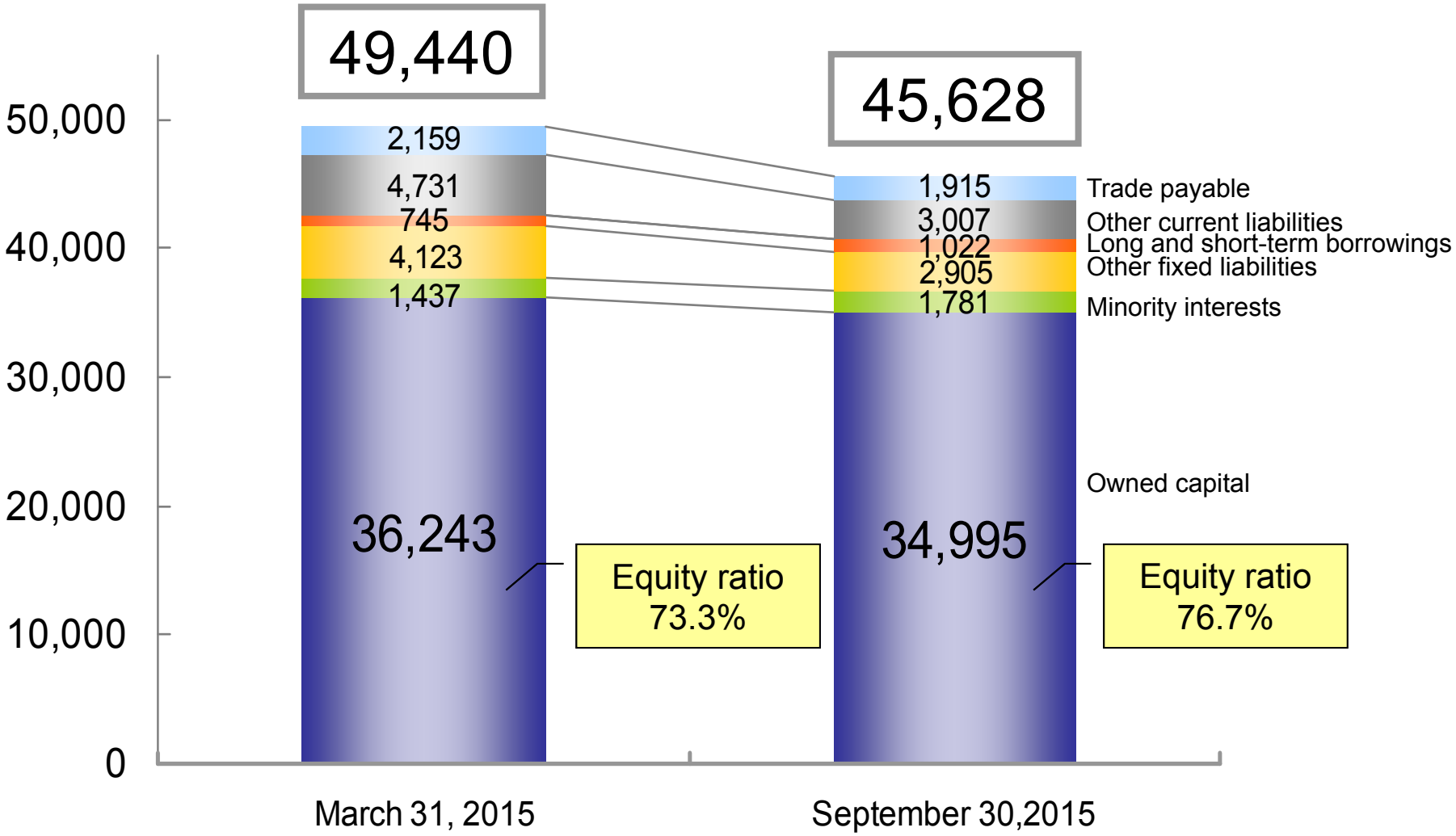
# Status of consolidated liabilities and net assets



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# Status of consolidated cash flows

| (millions of yen) | 1st-half of FY ended Mar.31,2015 | 1st-half of FY ending Mar.31,2016 |
|---|---|---|
| Cash flow from operating activities | 2,397 | 2,938 |
| Cash flow from investing activities | ▲639 | ▲1,795 |
| Cash flow from financing activities | 23 | ▲290 |
| Effect of exchange rate changes on cash and cash equivalents | ▲45 | 62 |
| Net increase (decrease) in cash and cash equivalents | 1,737 | 915 |
| Cash and cash equivalents at end of year | 8,621 | 10,645 |

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# Performance Forecast for Fiscal Year Ending March 31, 2016

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# Revised consolidated results forecast for fiscal year ending March 31, 2016

(millions of yen)

| | Original forecasts (announced May 12) | | Revised forecasts (announced Nov. 11) | | Vs. original forecasts | |
|---|---|---|---|---|---|---|
| | Amount | Percent (%) | Amount | Percent (%) | Change | Rate (%) |
| Net sales | 29,000 | 100.0 | 27,200 | 100.0 | ▲1,800 | ▲6.2 |
| Operating income | 7,800 | 26.9 | 7,100 | 26.1 | ▲700 | ▲9.0 |
| Ordinary income | 8,400 | 29.0 | 7,400 | 27.2 | ▲1,000 | ▲11.9 |
| Net income | 5,500 | 19.0 | 4,700 | 17.3 | ▲800 | ▲14.5 |



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# Consolidated performance forecast for fiscal year ending March 31, 2016

(millions of yen)

| | FY ended Mar. 31, 2015 | | Forecasts FY ending Mar. 31, 2016 | | Year-on-year change | |
|---|---|---|---|---|---|---|
| | Amount | Percent (%) | Amount | Percent (%) | Change | Rate (%) |
| Net sales | 25,951 | 100.0 | 27,200 | 100.0 | 1,248 | 4.8 |
| Operating income | 7,066 | 27.2 | 7,100 | 26.1 | 33 | 0.5 |
| Ordinary income | 7,525 | 29.0 | 7,400 | 27.2 | ▲125 | ▲1.7 |
| Net income | 4,833 | 18.6 | 4,700 | 17.3 | ▲133 | ▲2.8 |
| EPS（yen）*2 | 52.77 | | 51.31 | | ▲1.46 | ▲2.8 |
| Capital investment *1 | 2,475 | | 5,000 | | 2,524 | 102.0 |
| Depreciation costs | 1,305 | | 1,650 | | 344 | 26.4 |
| R&D costs | 1,309 | | 1,450 | | 140 | 10.7 |

*1 Capital investment amounts are the amounts of tangible and intangible fixed assets acquired in the term.

*2 EPS calculated as if the October 1, 2014 share split (1:3) took place at the beginning of the previous fiscal year.

*3 Assumed exchange rate for FY ending Mar.31, 2016 forecasts 1US$ = ¥120.00 € = ¥134.00



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# Forecasts of main group companies for fiscal year ending March 31, 2016

(millions of yen)

| | | Equity stake | Net sales | | Net income | |
|---|---|---|---|---|---|---|
| | | | Amount | Year-on-year change (%) | Amount | Year-on-year change (%) |
| | Harmonic Drive Systems Inc. | — | 23,000 | ▲0.1 | 4,100 | 0.9 |
| *1 *4 | HD Systems, Inc. (Harmonic Drive L.L.C) (U.S.A) | 100% (51%) | 4,800 | 40.5 | *3 270 | 110.3 |
| | Harmonic AD, Inc. | 100% | 2,250 | 7.0 | 150 | 54.1 |
| *2 *4 | Harmonic Drive AG (Germany) | 36.8% | 10,400 | 3.7 | 850 | ▲40.9 |

Percent change(%) indicates increase or decrease from same period of previous fiscal year.

*1 Exchange rates: Jan. – Dec., 2014 1US$ = 105.85 yen, Jan. – Dec., 2015 forecast 1US$ = 120.00 yen

*2 Exchange rates: Jan. – Dec., 2014 1€ = 140.42 yen, Jan. – Dec., 2015 forecast 1€ = 134.00 yen

*3 Net income of US subsidiaries (consolidated) is after excluding minority interests.

*4 For overseas subsidiaries and affiliates, the fiscal year ends December 31.



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# Non-consolidated performance forecast for fiscal year ending March 31, 2016

(millions of yen)

| | FY ended Mar. 31, 2015 | | Forecasts FY ending Mar. 31, 2016 | | Year-on-year change | |
|---|---|---|---|---|---|---|
| | Amount | Percent (%) | Amount | Percent (%) | Change | Rate (%) |
| Net sales | 23,029 | 100.0 | 23,000 | 100.0 | ▲29 | ▲0.1 |
| Operating income | 5,975 | 25.9 | 5,300 | 23.0 | ▲675 | ▲11.3 |
| Ordinary income | 6,340 | 27.5 | 6,000 | 26.1 | ▲340 | ▲5.4 |
| Net income | 4,063 | 17.6 | 4,100 | 17.8 | 36 | 0.9 |
| EPS（yen）*2 | 44.37 | | 44.76 | | 0.39 | 0.9 |
| Capital investment *1 | 1,456 | | 4,200 | | 2,743 | 188.4 |
| Depreciation costs | 756 | | 1,000 | | 243 | 32.1 |
| R&D costs | 1,296 | | 1,430 | | 133 | 10.3 |

*1 Capital investment amounts are the amounts of tangible and intangible fixed assets acquired in the term.

*2 EPS calculated as if the October 1, 2014 share split (1:3) took place at the beginning of the previous fiscal year.



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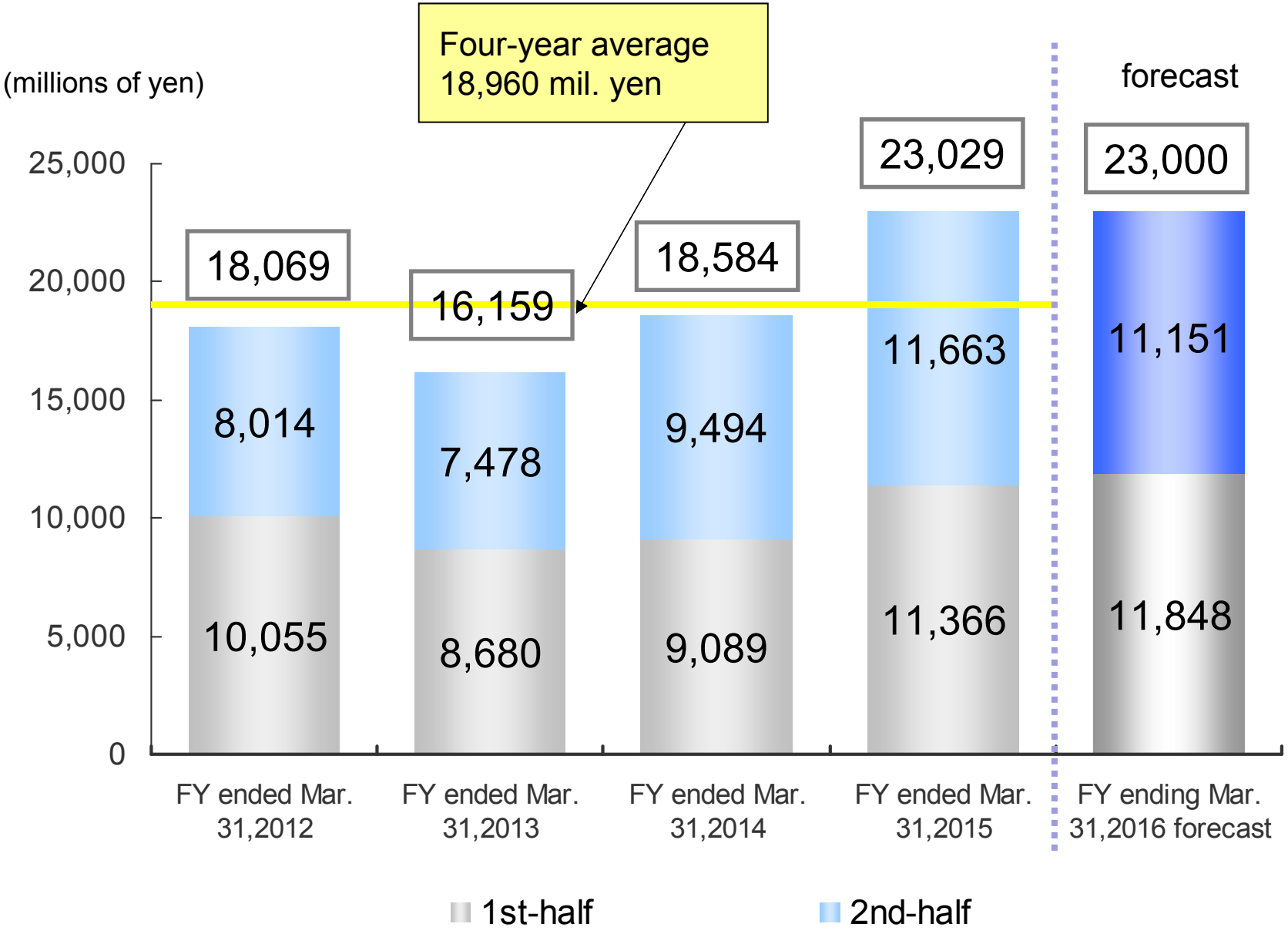
# Sales trend line (non-consolidated)



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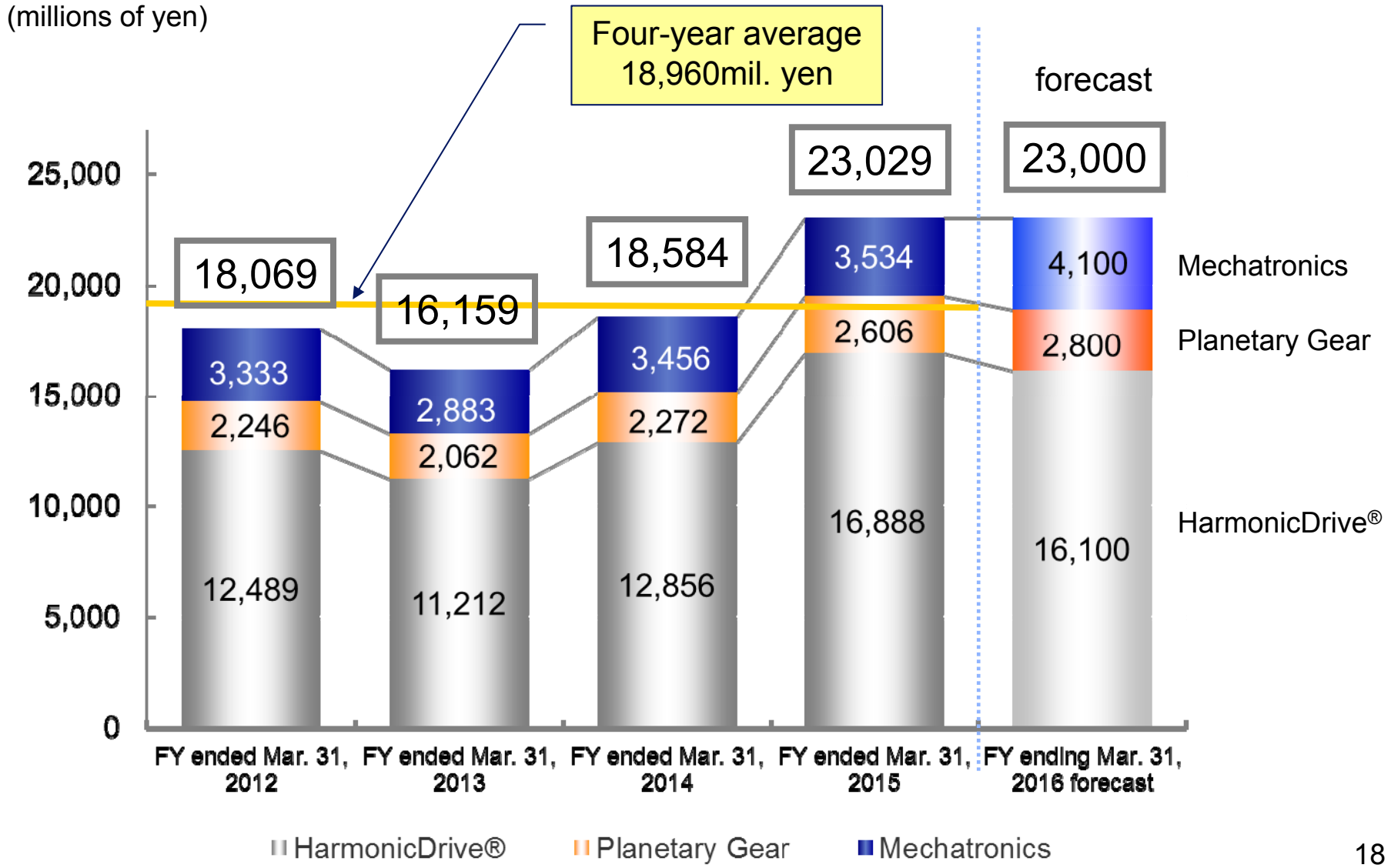
# Sales trend line by product (non-consolidated)



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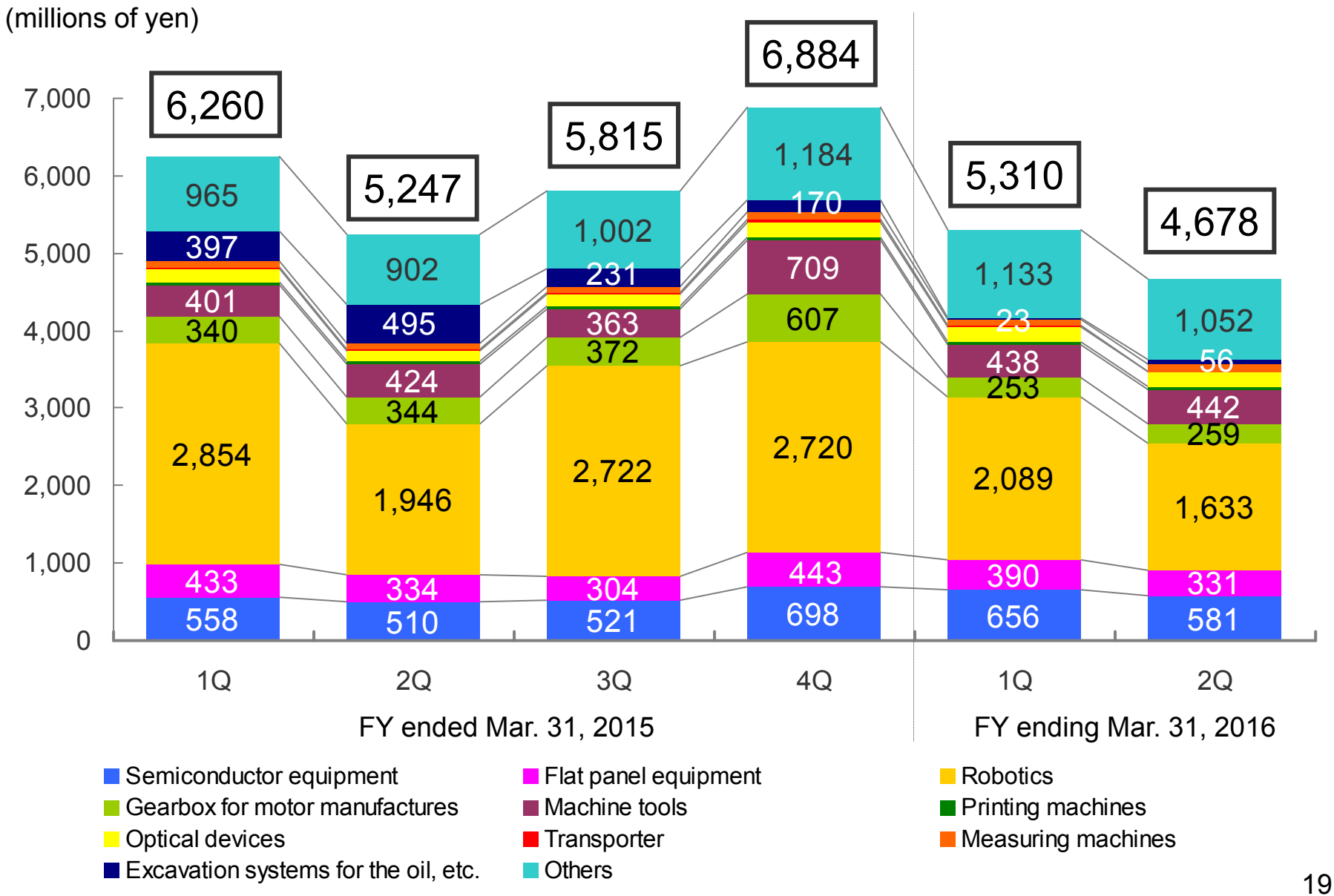
# Non-consolidated bookings by application (quarterly)



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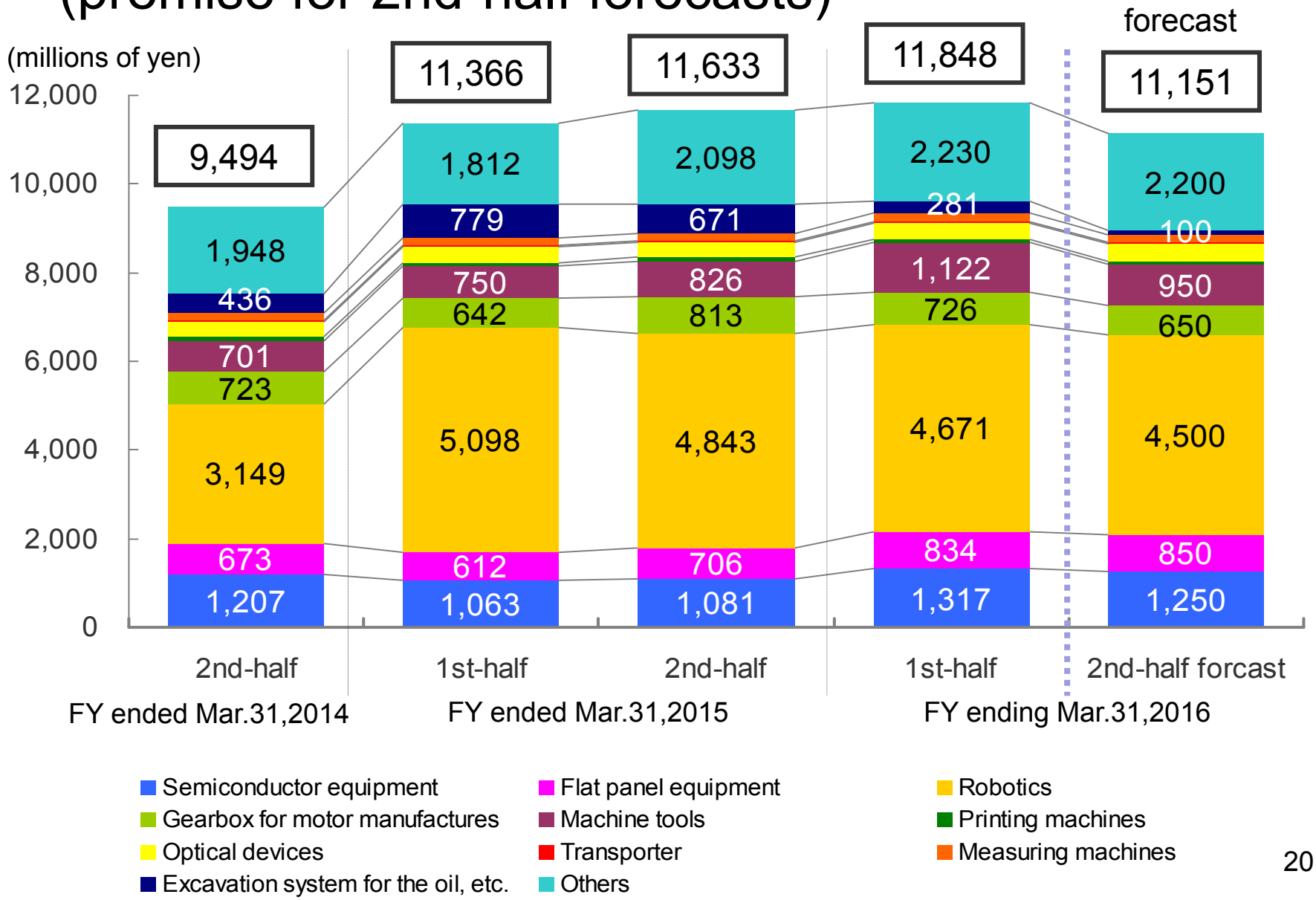
# Non-consolidated net sales by application (premise for 2nd-half forecasts)



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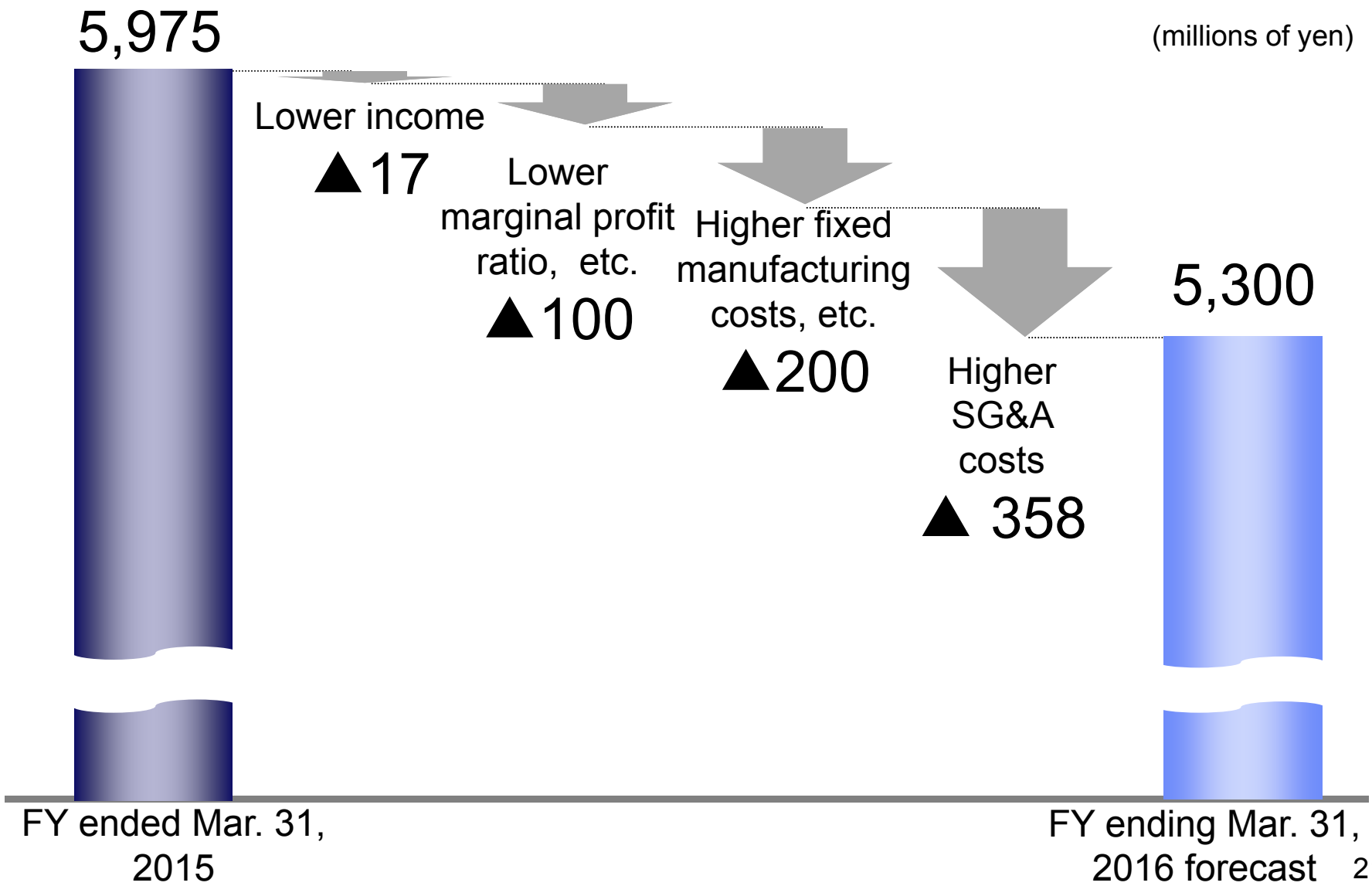
# Factors in year-on-year change in non-consolidated operating income (fiscal year ending March 31, 2016 forecast)



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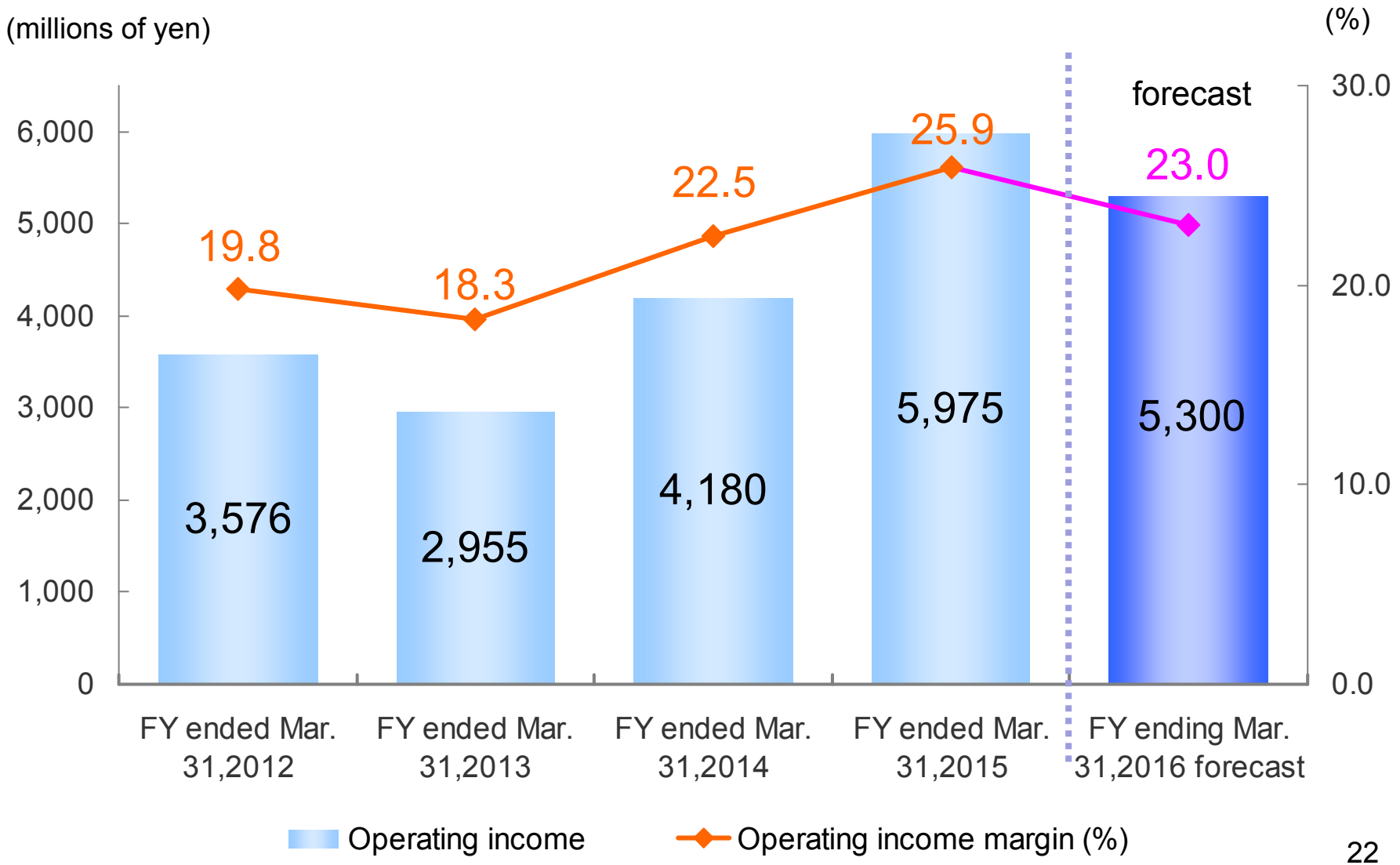
# Trends in operating income (non-consolidated)



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# Future Outlook

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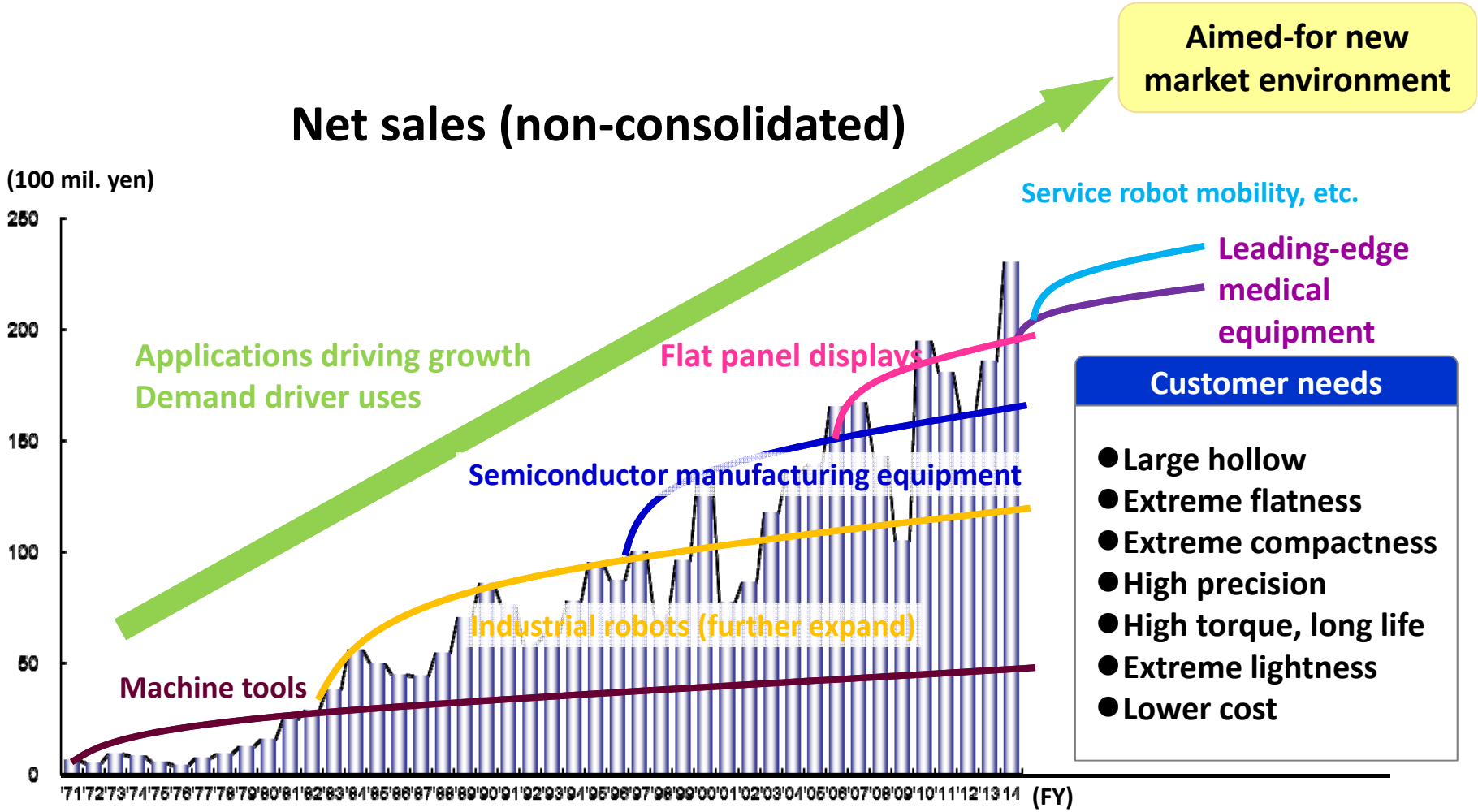
# Our Growth Trajectory



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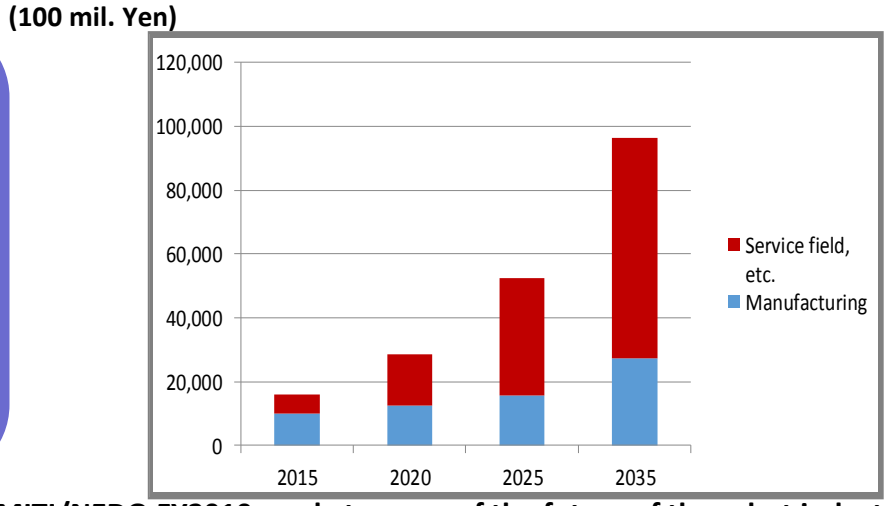
# Robot Industry Classifications

| Classification | | Use | Reduction gear requirements |
|---|---|---|---|
| I. Industrial robots | Industrial robots | Making things on the factory floor | High precision, high reliability |
| | Co-bots | | Low cost? |
| II. Service robots | Professional robots | Medical, nursing care, rehabilitation, logistics, resource extraction | Compact, light weight, flat, high precision |
| | Consumer robots | Consumer electronics, hobbies, toys | Low cost |

Source: IFR and KDDI Research Institute with our additions

Many different nations, companies, and research institutions have high hopes for expansion of the robot industry.




Source: MITI/NEDO FY2010 market survey of the future of the robot industry



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# Drivers of Further Growth

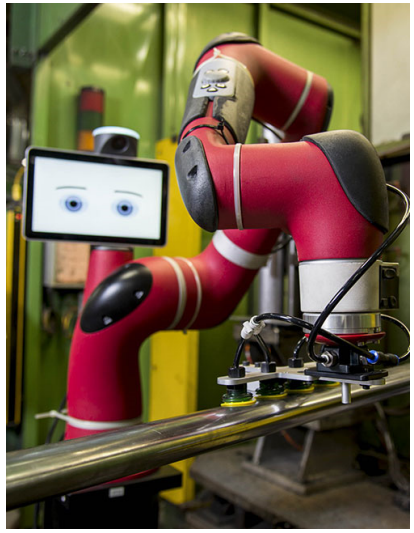
## Emerging of the market for collaborative robots (“co-bots”)

Start-up firms

- Universal
- Rethink
- LifeRobotics

Entry of leading makers

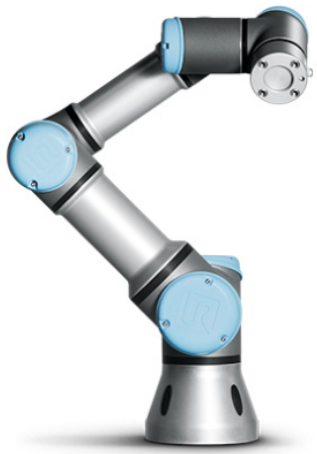
**Japan/Europe**
leading robot makers



From Rethink Robotics website

From Life Robotics website

**Superiority of co-bots**
1. Safety (no need for barrier)
2. Shorter teaching time
3. ・・・・



From UNIVERSAL ROBOTS website



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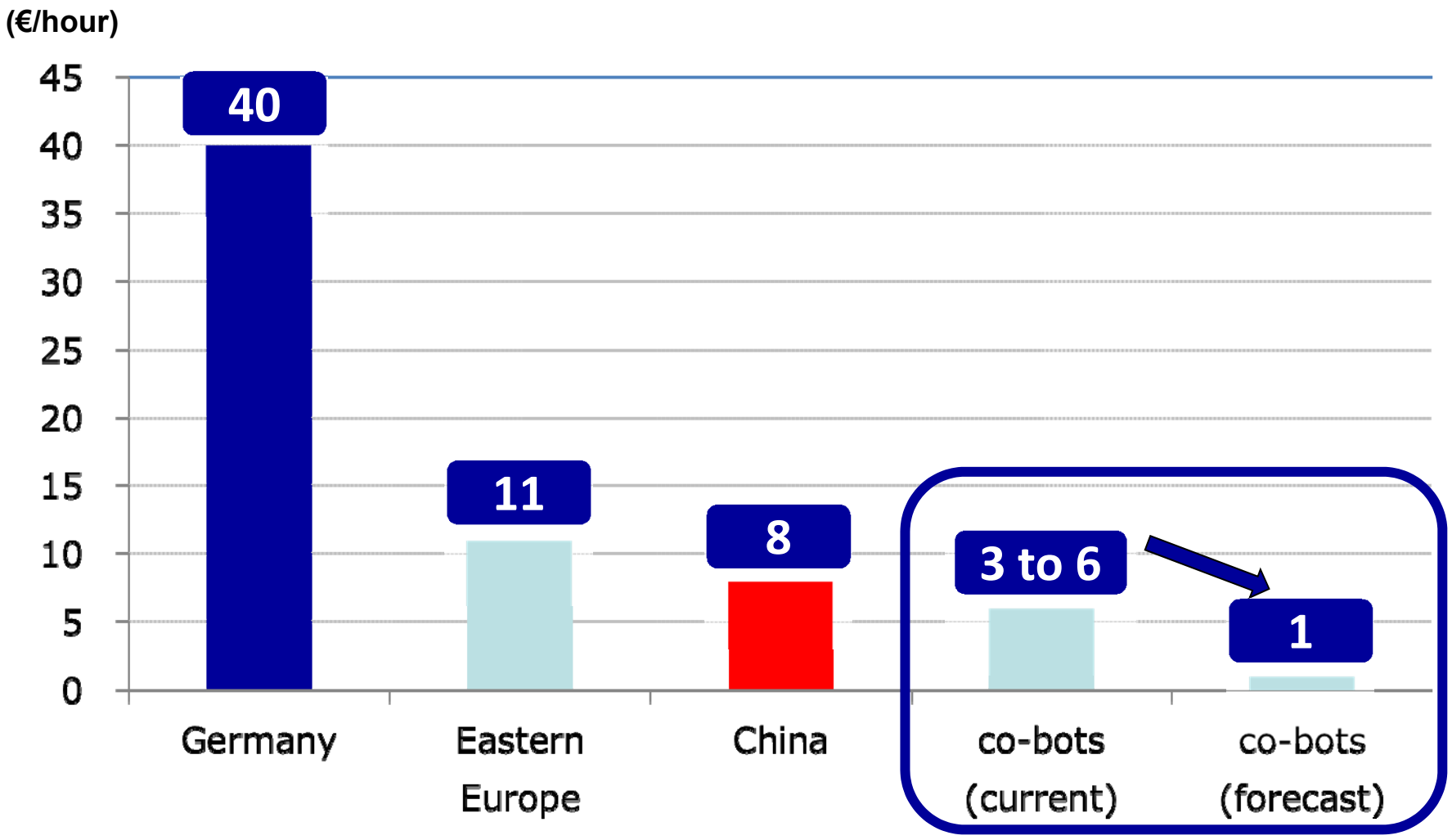
# Co-bots vs. Labor Costs




Based on Barclays report



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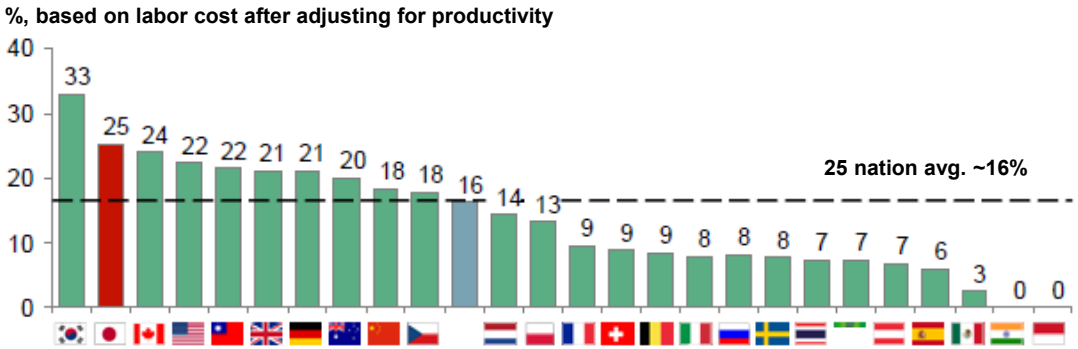
# co-bots Market

Rate of labor cost reduction due to rapid expansion of industrial robot use
The more economically developed a country, the higher its labor costs, raising expectations for robot introduction.

Fig. 1: Rate of labor cost reduction with rapid expansion of industrial robot use (2014 vs. 2025)




| Scenario | S. Korea | Japan | Canada | USA | Taiwan | U.K. | Germany | Australia | China (Note) | Czech Repub. | 25 nation avg. | Thailand | Poland | France | Switzerland | Belgium | Italy | Russia | Sweden | Netherlands | Brazil | Austria | Spain | Mexico | India | Indonesia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aggressive | 47 | 40 | 35 | 32 | 33 | 30 | 41 | 39 | 34 | 35 | 30 | 24 | 26 | 30 | 29 | 27 | 26 | 14 | 25 | 24 | 23 | 22 | 19 | 7 | 0 | 0 |
| Conservative | 21 | 15 | 12 | 10 | 12 | 10 | 6 | 6 | 9 | 5 | 8 | 8 | 4 | 6 | 6 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 1 | 0 | 0 |

By 2025, robots are expected to handle 23% of tasks that can be automated.

Note: Data for Yangtze River Delta
Source: STAN Bilateral Trade Database, U.S. Bureau of Labor Statistics, BCG analysis
THE BOSTON CONSULTING GROUP

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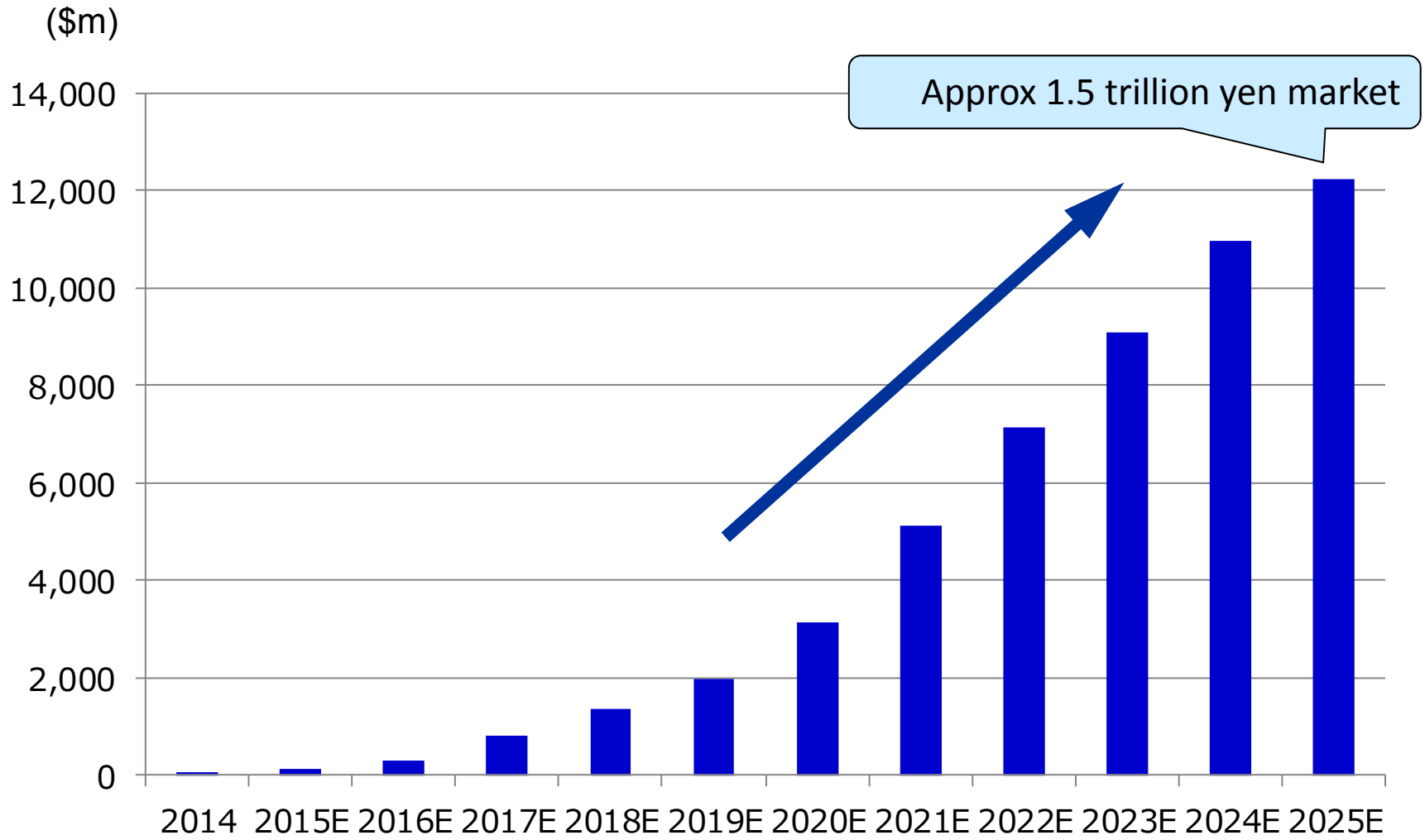
# co-bots Market Growth Forecast




**From Barclays report**



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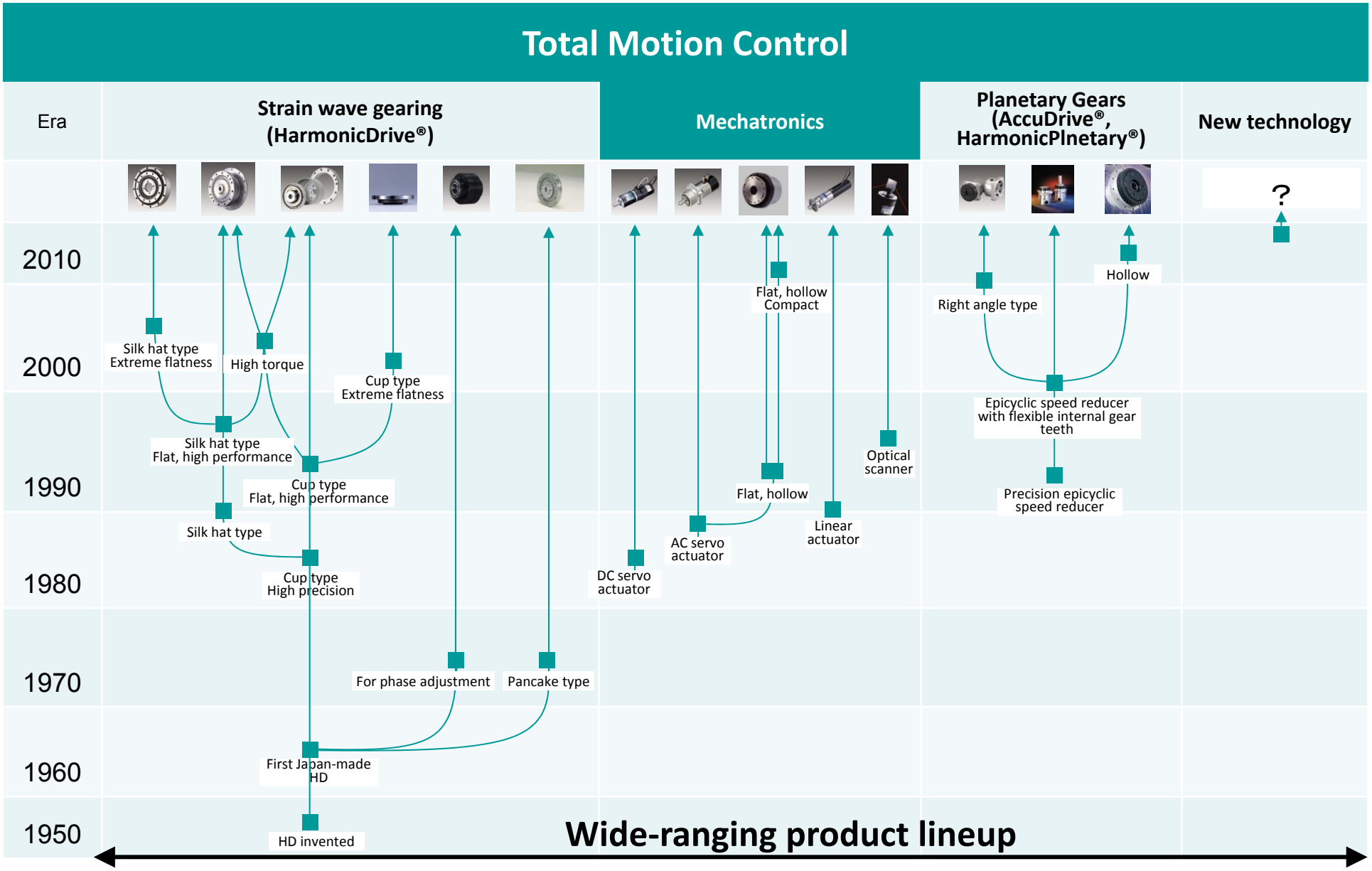
# Lineage of New Product Development

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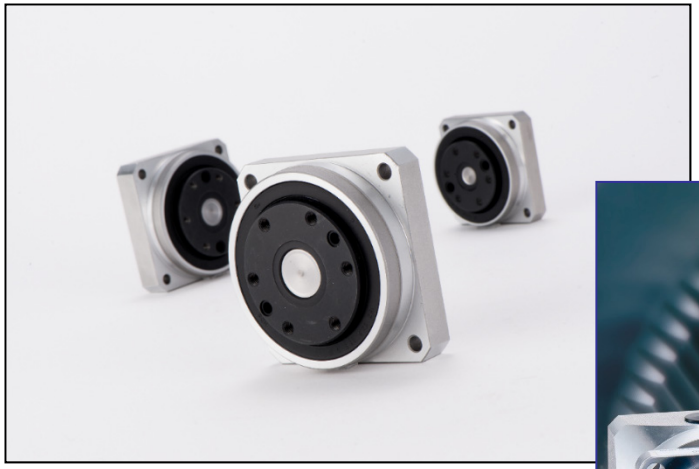
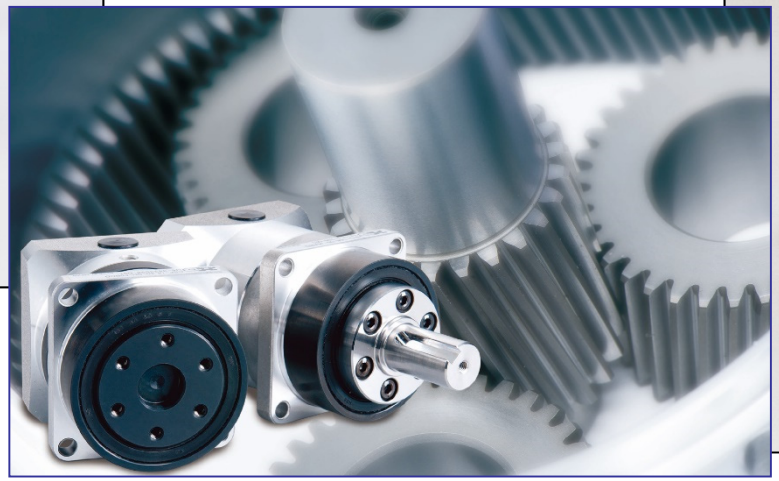
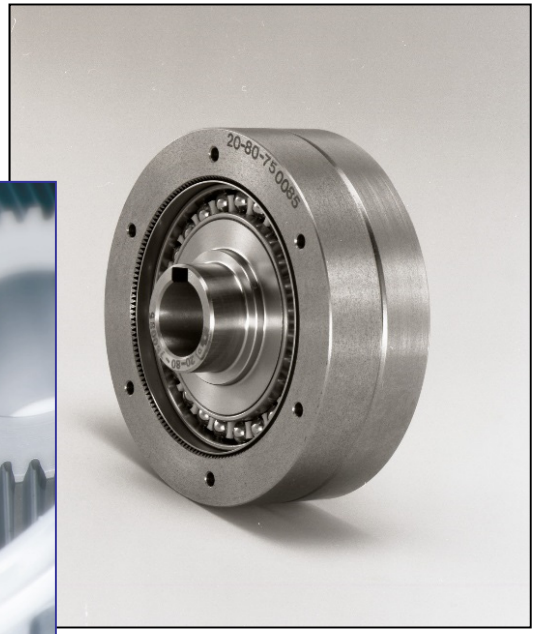
# New Products: Environment of existing products and aims







**Market for small, lightweight portable robots**

- Collaborative robots (co-bots)
- Service robots
- AGV (Automatic Guided Vehicles)



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# Research and Development Enabling the Future

**Germany**
**Harmonic Drive AG**

**US**
**Harmonic Drive LLC**

**Basic research**

**Materials development**

**Production technology development**

**Durability testing**



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# Boosting Collaboration

Collaboration with other companies

MITSUBISHI ELECTRIC 三菱電機
Changes for the Better

2013.6
Mitsubishi Electric
MELSERVO J4 + SHA-M

Panasonic

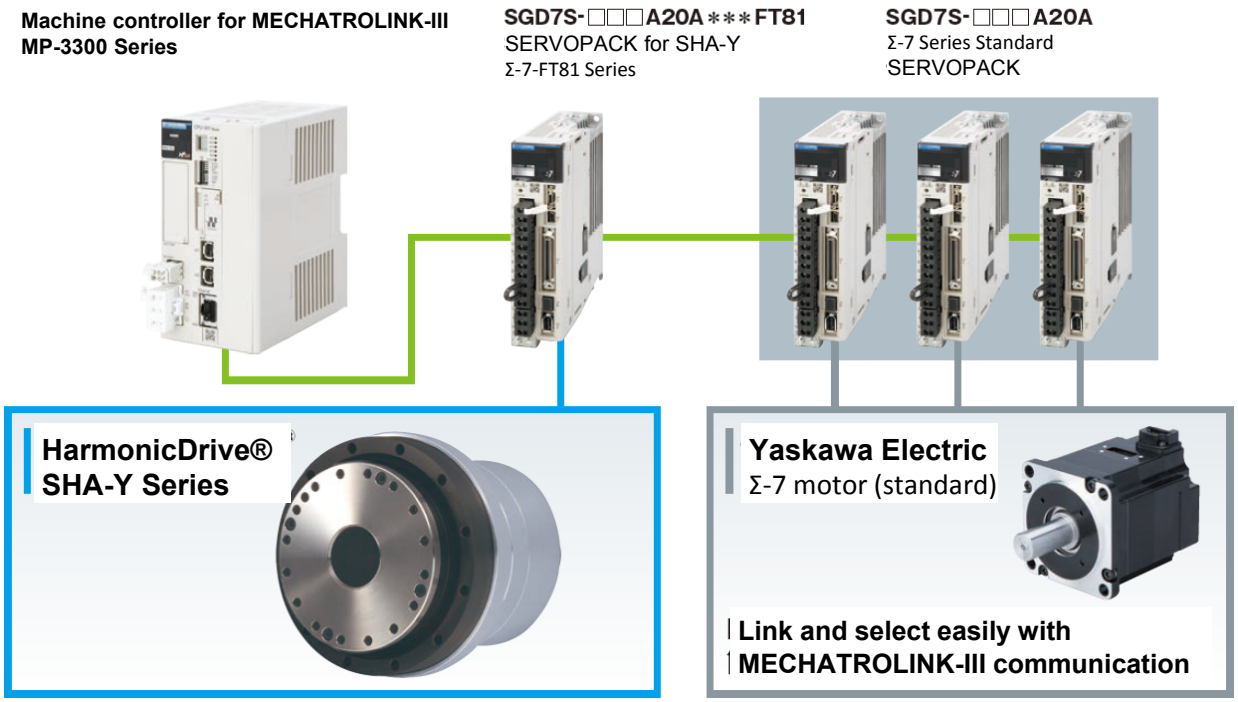
2014.7
Panasonic
MINASA5 II/A5 II Series + SHA-P

YASKAWA

2015.8
Yaskawa Electric
Σ-7 Series + SHA-Y

**Can be combined with Σ-7 Servopack and SHA-Y**

**Illustration of MECHATROLINK-III System**




**Rotation accuracy similar to that of direct drive!**
**Incorporated readily in MECHATROLINK-III system**

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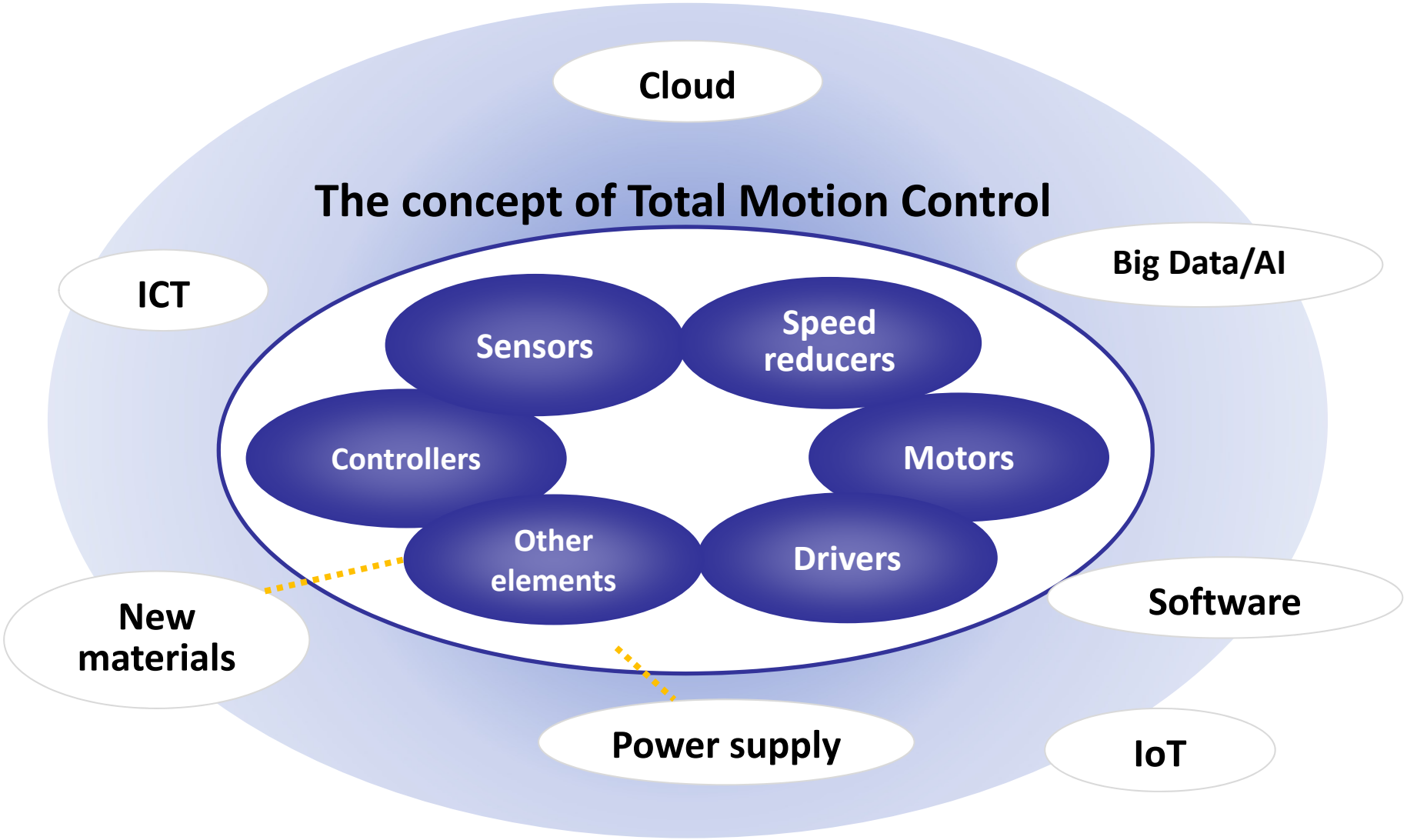
# Total Motion Control and Relation to New Core Technologies



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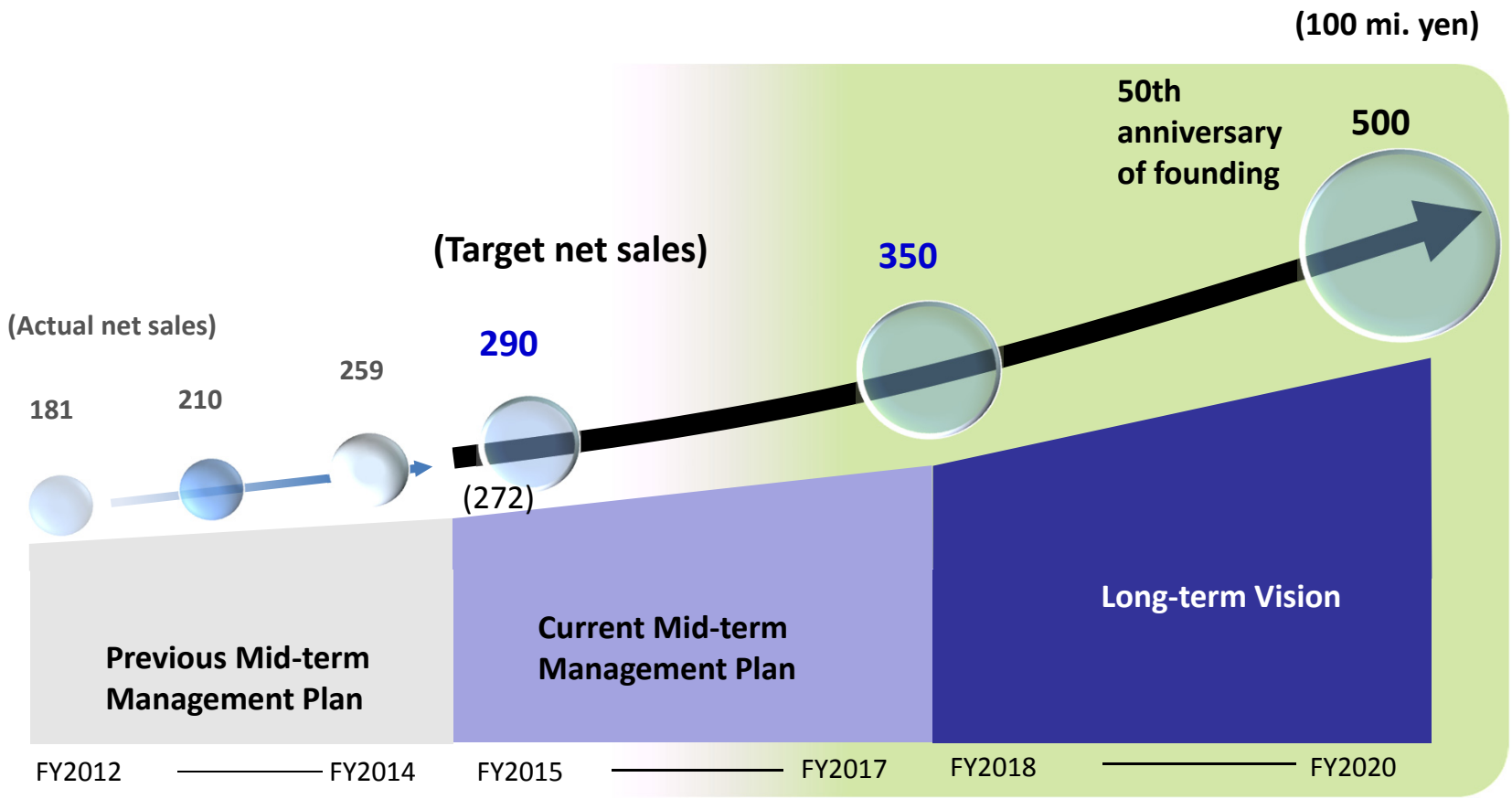
# Visualization of Growth Trajectory

## On to a new growth stage



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The performance targets and other numerical data presented herein are forecasts based on information available to the HDS Group at the time this material was prepared, and are subject to the influence of uncertainties including those in the economic and competitive environment. Actual performance may therefore differ materially from the forecasts given in this material.

Harmonic Drive Systems Inc.

For more information:

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