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Briefing on Robotics Business

- Current Business Status and Growth Strategy -

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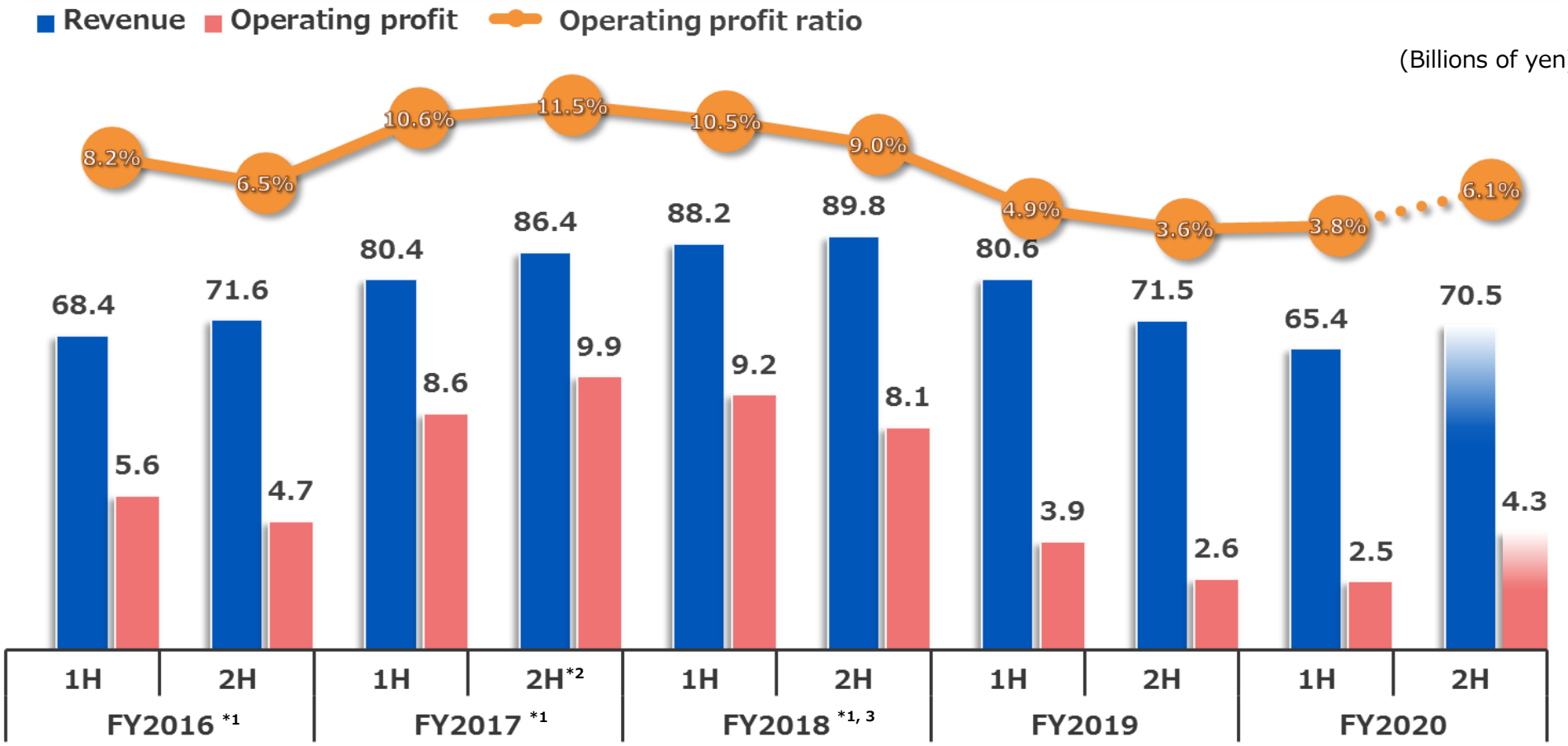
Performance of the Robotics Business

- **Performance improved through the 1H of FY2018 due to increased global investment demand, particularly in China.**
- **After that, we were faced with the influence of US-China trade friction and the spread of new coronavirus infection.**
- **In the 2H of FY2020, in addition to the recovery of the automobile market, investment in automation in the general industry is accelerating.**



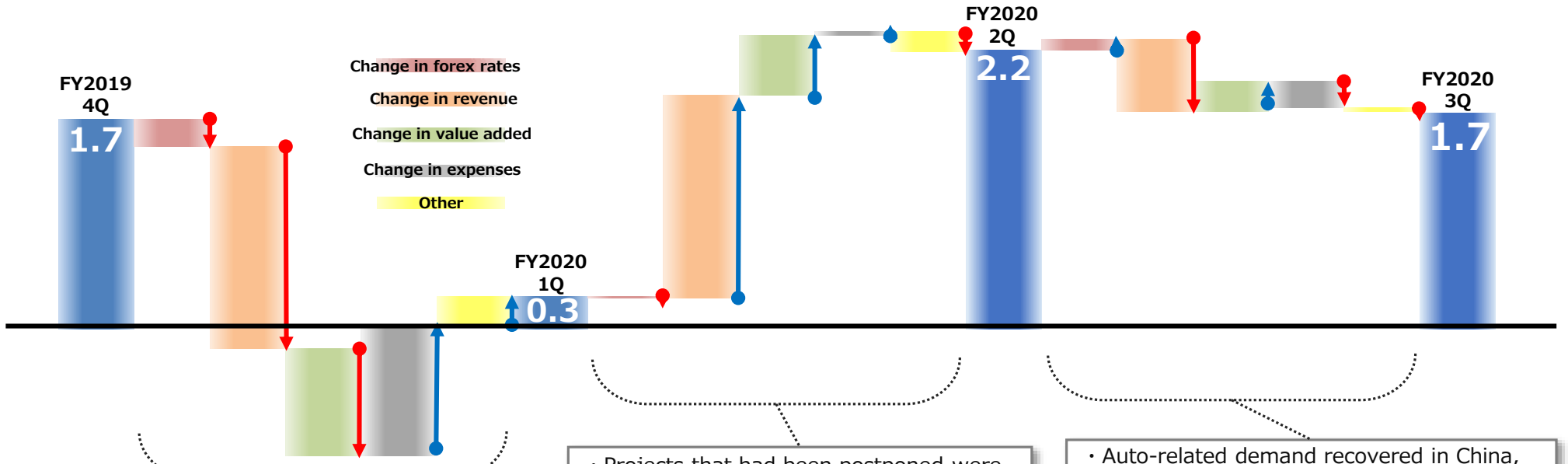
*1 Data up to FY2018 are based on Japanese GAAP (IFRS adopted in FY2019) *2 Reference data for the period from September 21, 2017 to March 20, 2018 due to the change in the fiscal year end
*3 Data reflecting the impact of the reclassification of segments conducted in FY2019

FY2020 Quarterly Operating Profit

- **While new coronavirus affected revenue significantly in 1Q, we stayed in the black through thorough expense control**
- **After 2Q, automobile-related demand has been recovering mainly in China. Profitability improved through continued expense control while revenue grew**

Breakdown of changes in operating profit (FY2019 4Q → FY2020 1Q → 2Q → 3Q)

(billions of yen)



・Revenue decreased due to the impact of the new coronavirus, which inhibited installation of robots.
・Value added decreased as capacity utilization deteriorated.
→**Stayed in the black by controlling expenses**

・Projects that had been postponed were recorded in revenue due to partial normalization of production activities.
・Capacity utilization and product mix improved
→**Generated profits without increasing expenses as revenue increased**

・Auto-related demand recovered in China, Europe, etc.
・Continued to control expenses
→**Achieved a profit level of FY2019 4Q of pre-corona crisis**

FY2020 4Q Outlook and Initiatives

- **FY2020 4Q Robotics results are expected to improve both in sales and profits, QoQ and YoY**

(Billions of yen)		FY2020 4Q Forecasts	FY2020 4Q Profit ratio	FY2020 3Q Results	FY2020 3Q Profit ratio	Changes (QoQ) Amounts	Changes (QoQ) %	FY2019 4Q Results	FY2019 4Q Profit ratio	Changes (YoY) Amounts	Changes (YoY) %
Revenue	Total	**101.0**		93.1		**+7.9**	**+8.5%**	101.2		**-0.2**	**-0.2%**
	Robotics	**36.3**		34.2		**+2.1**	**+6.0%**	35.6		**+0.7**	**+1.9%**
Operating profit	Total	**7.2**	**7.1%**	6.7	7.2%	**+0.5**	**+6.7%**	5.1	5.0%	**+2.1**	**+42.0%**
	Robotics	**2.6**	**7.0%**	1.7	5.1%	**+0.9**	**+50.0%**	1.7	4.7%	**+0.9**	**+55.2%**

Initiatives by Market and Field

Auto-related market	・Respond to next-generation manufacturing reforms in Japan, Europe, and the US. ・Capture aggressive capital investment demand by Chinese OEM manufacturers. We will also enhance our products targeting Tier 1 parts suppliers, and propose high-value-added systems that combines the i^3-Mechatronics concept to differentiate us from local SIers.
General industrial sector	・Capture demand for automation investment in growth markets such as new infrastructure* in China 【Growth market】 Next-generation communication standards '5G'-related, EV-related, 3C market such as PCs and smartphones, health equipment-related under coronavirus crisis
Semiconductor- and LCD-related markets	・Accelerate sales expansion with new products against the backdrop of increased demand for smartphones and data centers

*Initiatives led by the Chinese government to rapidly promote the digitization of industry in seven specific areas

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2. Progress and Issues in Mid- and Long-term Business Plans

①Market Environment of Industrial Robots

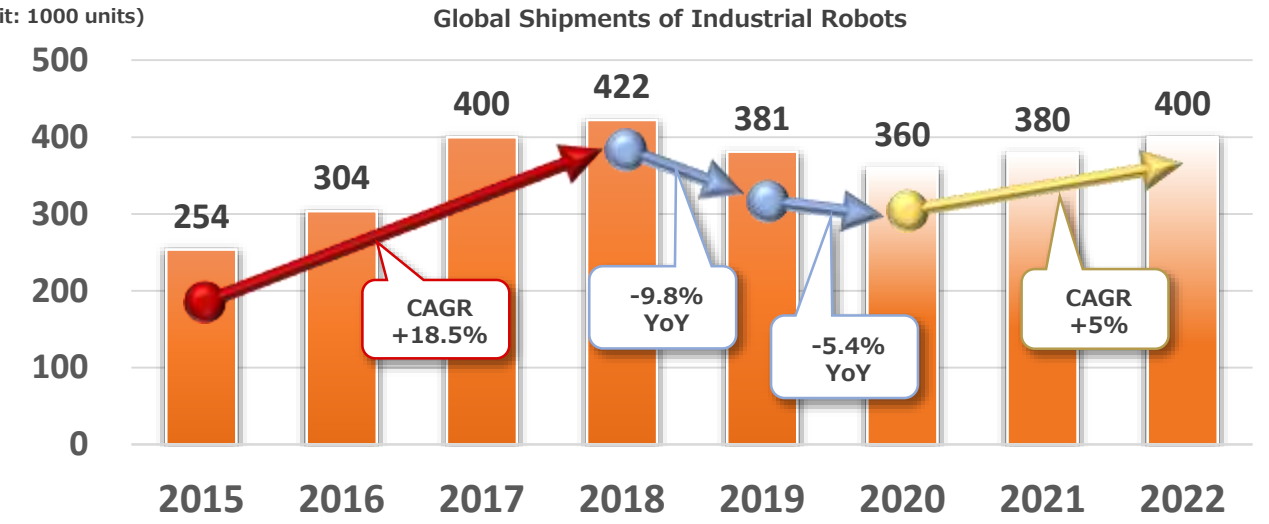
②Progress and results of Challenge 25 and future initiatives

③Initiatives to Increase Profitability

Market Environment of Industrial Robots

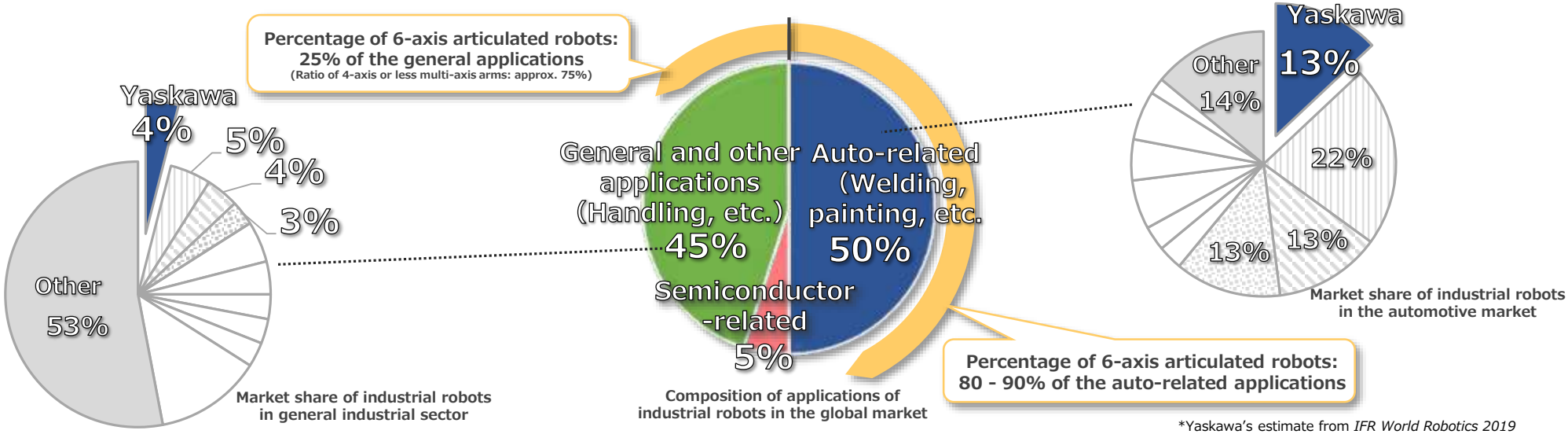
◆Outlook on global shipment units

- In 2020, due to the influence of the new coronavirus, all regions except China are expected to have negative growth of -10% to -20% over the previous year.
- Shipments are expected to return to pre-corona levels around 2022



Source: IFR World Robotics 2020 "All type shipments", forecasts for and after 2020 are Yaskawa estimates

◆Global market share analysis by application



*Yaskawa's estimate from *IFR World Robotics 2019*

Progress and Results of Challenge 25 and Future Initiatives

	Progress and Results	Future Initiatives
Initiative 1 **Expand orders in key markets (Automobile and general markets)**	■ **Automobile market** ・Proposing total solutions based on the i³-Mechatronics concept to respond to changes in production processes accompanying the shift to EVs and expansion of automated fields ■ **General market** ・Expanding robotics applications in the growing markets especially in China's 3C market	■ **Automobile market** ・Deploy differentiation strategy through realization of high added value such as improvement of welding quality through use of digital data ・Expansion of after-sales service business through predictive maintenance functions ■ **General market** ・Enhance solution proposal with YRM controller (tentative name) ・Strengthen collaboration with Chinese robot manufacturers
Initiative 2 **Expand product and technology areas by strengthening development capabilities**	■ **Development of new products** ・Expansion of the lineup of collaborative robots, semiconductor wafer transfer robots, small robots (payload less than 10 kg), etc. ・Market deployment of YASKAWA Cockpit, which aggregates and utilizes data ・Accelerated development of YRM controller (tentative name) for data-based cell control	■ **Development of new products** ・Develop next-generation robots that contribute to improving manufacturing efficiency and quality by supporting high-mix variable volume production through further data utilization ・Expand collaborative robots' lineup and improve usability ■ **Expansion of the technical domain** ・Realize the i³-Mechatronics concept through robot autonomy and the structuring of digital twin
Basic Policy 3 **Boosting production capacity and productivity in response to market expansion**	■ **Capacity expansion** ・Robot production began in Slovenia ・Rectification of production process due to completion of Changzhou 3rd plant in China ■ **Productivity improvement** ・Introduction of collaborative robots at Plant No.1 in Kitakyushu ・Introduction of Yaskawa Solution Factory Concept to plants in Japan and China (Changzhou)	■ **Productivity improvement** ・Reestablish global production capacity and optimizing production and cost structures ・Restructure production system in Japan and responding to volume fluctuations through automation and data utilization ・Integrate production lines and complete automation of commercial testing and painting processes

Initiatives to Increase Profitability

➢ Enhancement of production capabilities

■ Optimizing global capacity balances

・Create a lean manufacturing system to reduce costs and improve capacity utilization

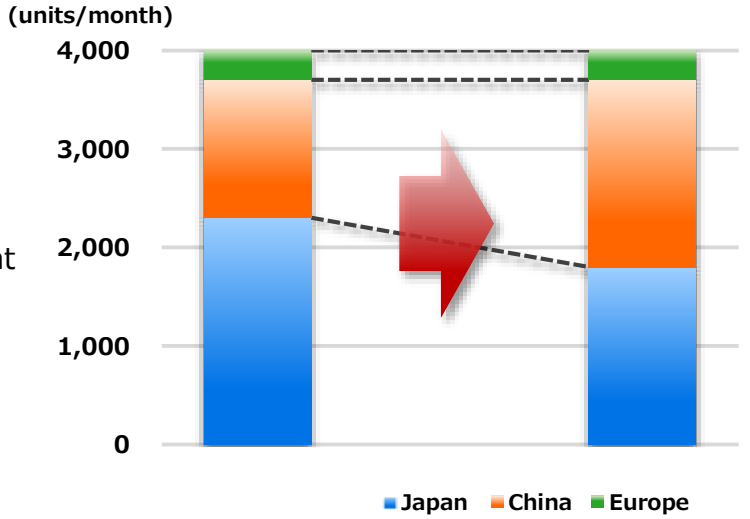
■ Construction of highly efficient production lines through operation-free

・Production control process is standardized and further efficiency improvement is aimed at by automation and labor saving

■ Realization of a production system that can flexibly respond to fluctuations in production volume

・Integration of production lines and complete automation of commercial testing and painting processes

Image of optimizing the balance of global capacity



➢ Enhancement of sales capabilities

■ Creating business opportunities through integrated sales and service operations

・Strengthen proposal capabilities through synergy effects from the acquisition of a service and engineering subsidiary and aim for a highly profitable structure

■ Implementation of regional strategy

Japan	・Respond to the “manufacturing reform" of automobile OEM manufacturers ・Accelerate sales expansion through new products in the semiconductor and food markets
Europe	・Strengthen approaches to automobile manufacturers by leveraging the strengths of local production
Asia	・Expand sales to major local manufacturers through the i^3-Mechatronics proposal ・Responding to the shift to EVs in new technological fields

North America	・Strengthen measures in the logistics market
China	・Capture new demand in growth markets such as 3C and 5G-related industries ・Acquire positions in the growing semiconductor market

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3. Growth Strategy
①Evolution of Robotics Solutions
②i³-Mechatronics Concept

Evolution of Robotics Solutions (1/2)

Robotics applications continue to expand

Imitation of humans' movements

Golf swing robot

Pursuit of new robotics applications

MotoMINI

Enhanced "easy to use"

- Installation without safety fences
- Simplification of teaching
- Improved flexibility in placement and mobility

Collaborative robot HC 10 DT

General industry

Automotive

Transfer

LCD and semiconductor transfer robots

Picking, packing, palletizing robot

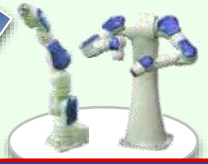
Biomedical

Analysis pretreatment robot cell

Self-Propelled dual-arm robot

Dual-arm robot for biomedical application

Multi-skill



7-axis, dual-arm robot

Visual technique

Force sensing technique

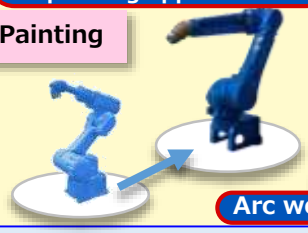
Assembly

Expansion of skills

- Use of various sensors
- Improvement of work tools

Robots optimized for painting application

Painting



Arc welding

Spot welding

Welding

Laser welding

Seven-axis robot

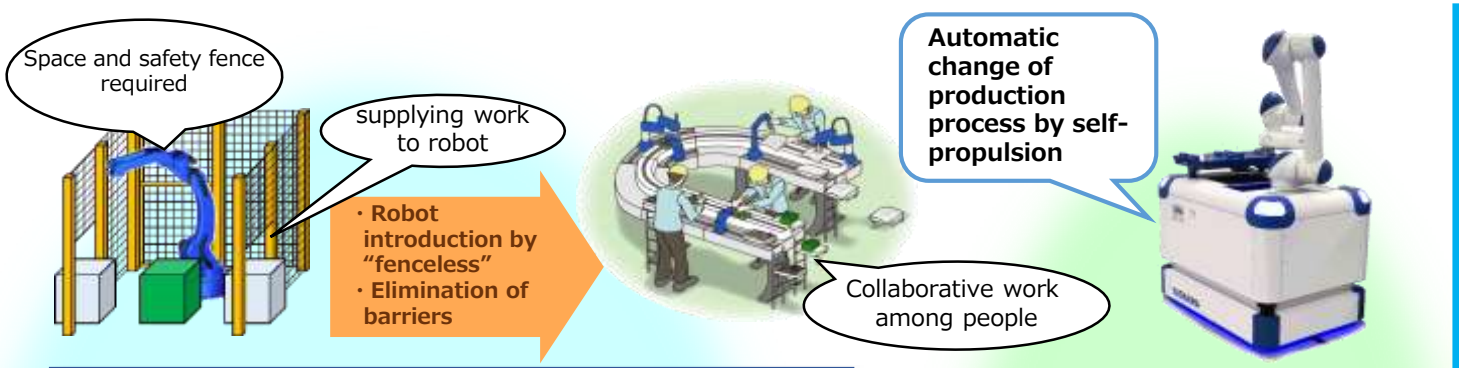
High Productivity = Accuracy, High Volume, High Speed

Multitasking, Flexibility, and Interaction

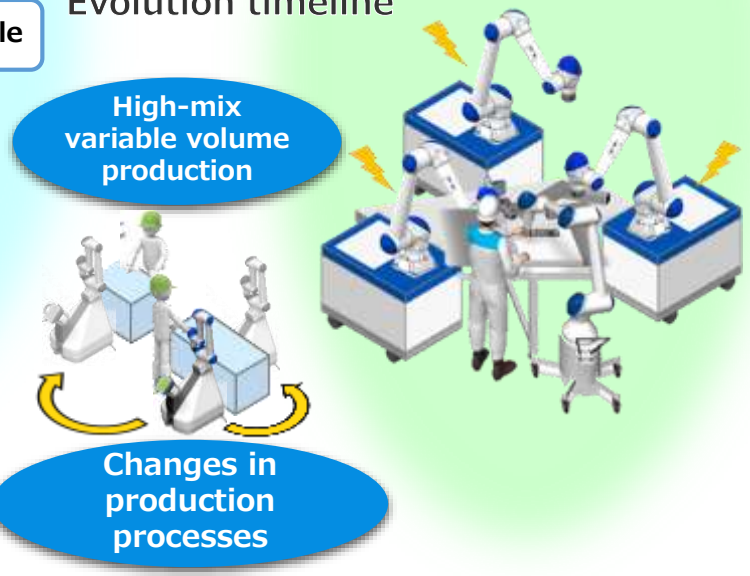
Ability required of the robot

Evolution of Robotics Solutions (2/2)

Evolution to improve process flexibility



Movement by a hand-cart



Evolution to autonomy

Epansion of autonomous capacity with IoT and AI

Autonomous self-running

- Modifying work processes

Automatic generation of motion (teaching-free

- Automatic generation of motion paths
- Automatic generation of tasks based on the state information

Guarantee of work quality

- Estimation of work quality by operation data
- Inspection by audio and image

Responding to changes over time

- Change of operating parameter
- Prediction of robot failure

Completion of a given task

i³-Mechatronics Concept (1/2)

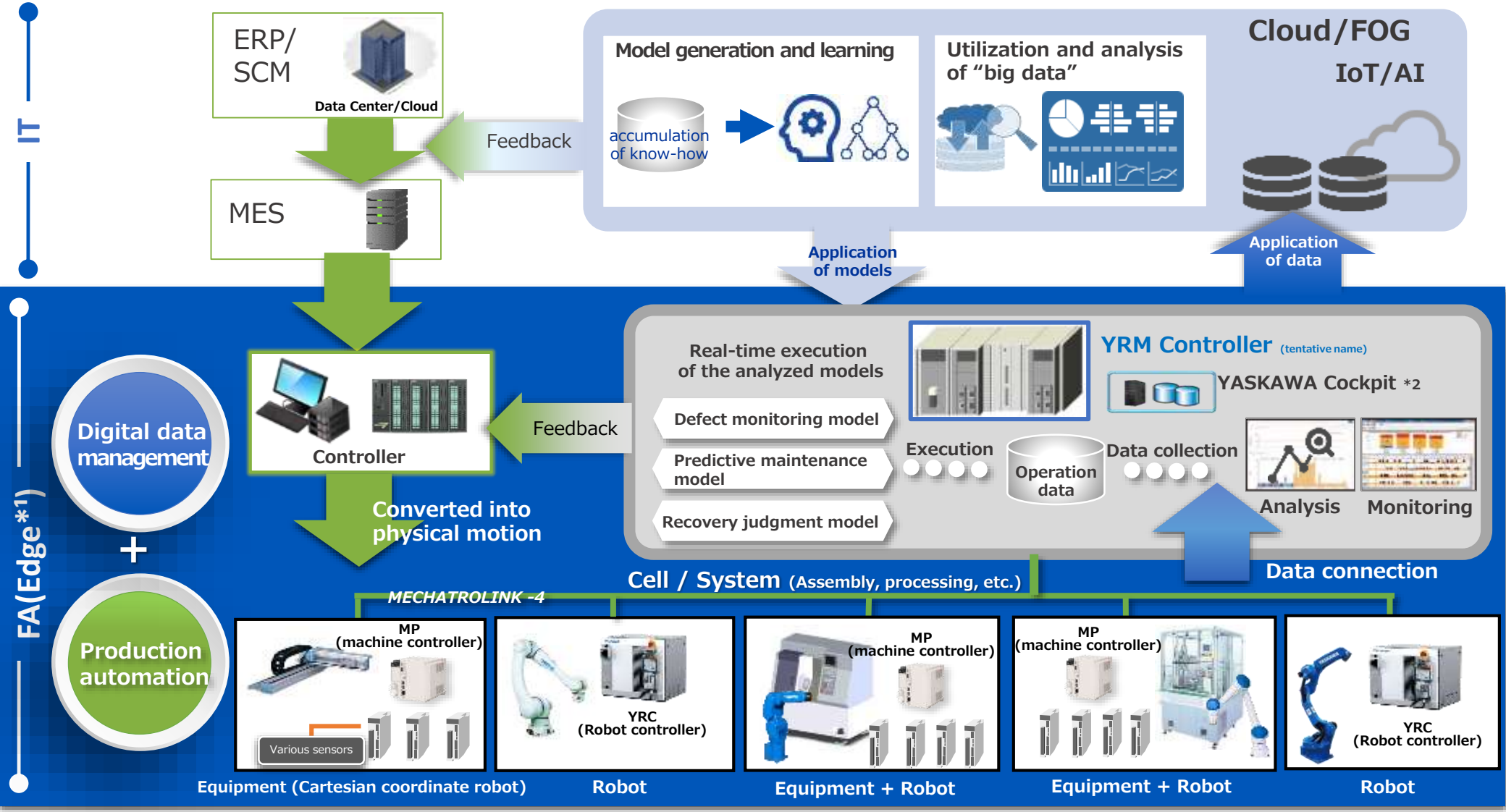
i³-Mechatronics

integrated
intelligent
innovative

Advances in Mechatronics though digital data management

Realize revolution of industrial automation

i³-Mechatronics Concept (2/2)



*1: Edge is an information processing field for data analysis and feedback that require real-time performance at production sites or factories.
*2: A software that able to collect, store, and analyze real-time data on equipment and devices at production sites.

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