

Attracting Tomorrow



Business Strategy Meeting

May 11, 2017
TDK Corporation

- ◆ President and CEO **Shigenao Ishiguro**
- ◆ Senior Executive Vice President CEO of Electronic Components Business Company **Hiroyuki Uemura**
- ◆ Senior Vice President General Manager of Corporate Strategy HQ **Seiji Osaka**
- ◆ Senior Vice President CEO of Sensor Systems Business Company **Noboru Saito**
- ◆ Senior Vice President CFO of Electronic Components Business Company **Joachim Zichlarz**
- ◆ Corporate Officer General Manager of Electronic Components Sales & Marketing Group **Mitsuru Nagata**
- ◆ Corporate Officer General Manager of Finance & Accounting HQ **Tetsuji Yamanishi**
- ◆ Corporate Officer CEO of Magnetic Heads Business Company **Albert Ong**
- ◆ CEO of Energy Devices Business Company **Fumio Sashida**
- ◆ General Manager of Technology and Intellectual Property HQ **Dai Matsuoka**
- ◆ General Manager of Magnetic Sensor Business Group **Matthias Bopp**
- ◆ COO of Amperex Technology Limited **Joe Lam**

◆ Presentation

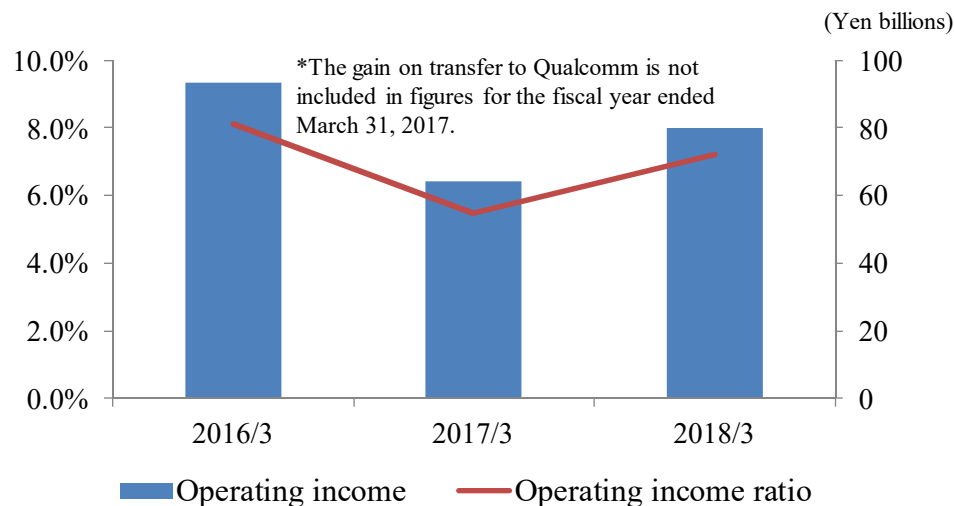
1. Corporate Strategy (Ishiguro)
2. Passive Components Business Strategy (Uemura / Zichlarz)
3. Sensor Business Strategy (Saito / Bopp)
4. HDD Head Business Strategy (Ong)
5. Energy Devices Business Strategy (Sashida / Lam)

◆ Q&A

Corporate Strategy

Shigenao Ishiguro
President and CEO

The current Mid-term Plan



	Fiscal 2018 target (current Med-Term target)	Fiscal 2018 plan (fiscal 2017 guidance)
Operation profit margin	Over 10%	7.2%
ROE	Over 10%	6.8%

◆ Differences between assumptions in the current Medium-Term Plan and results

■ Shortfalls and delays against earnings forecasts

- Earnings levels of passive components and rechargeable batteries
- Timing of earnings contributions from acquired companies

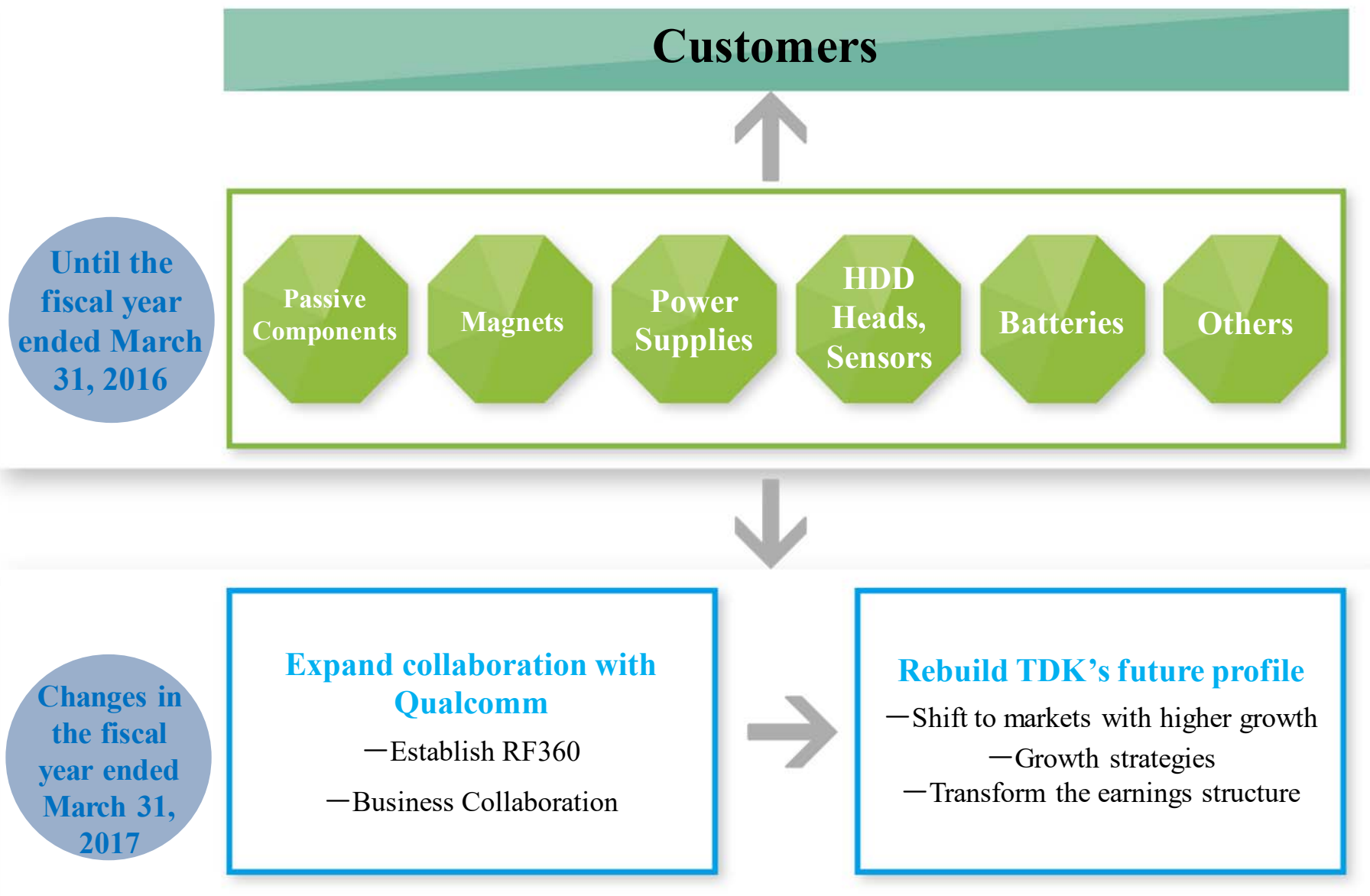
■ Measures that were not achieved

- Business acquisitions
- Certain strategic growth products

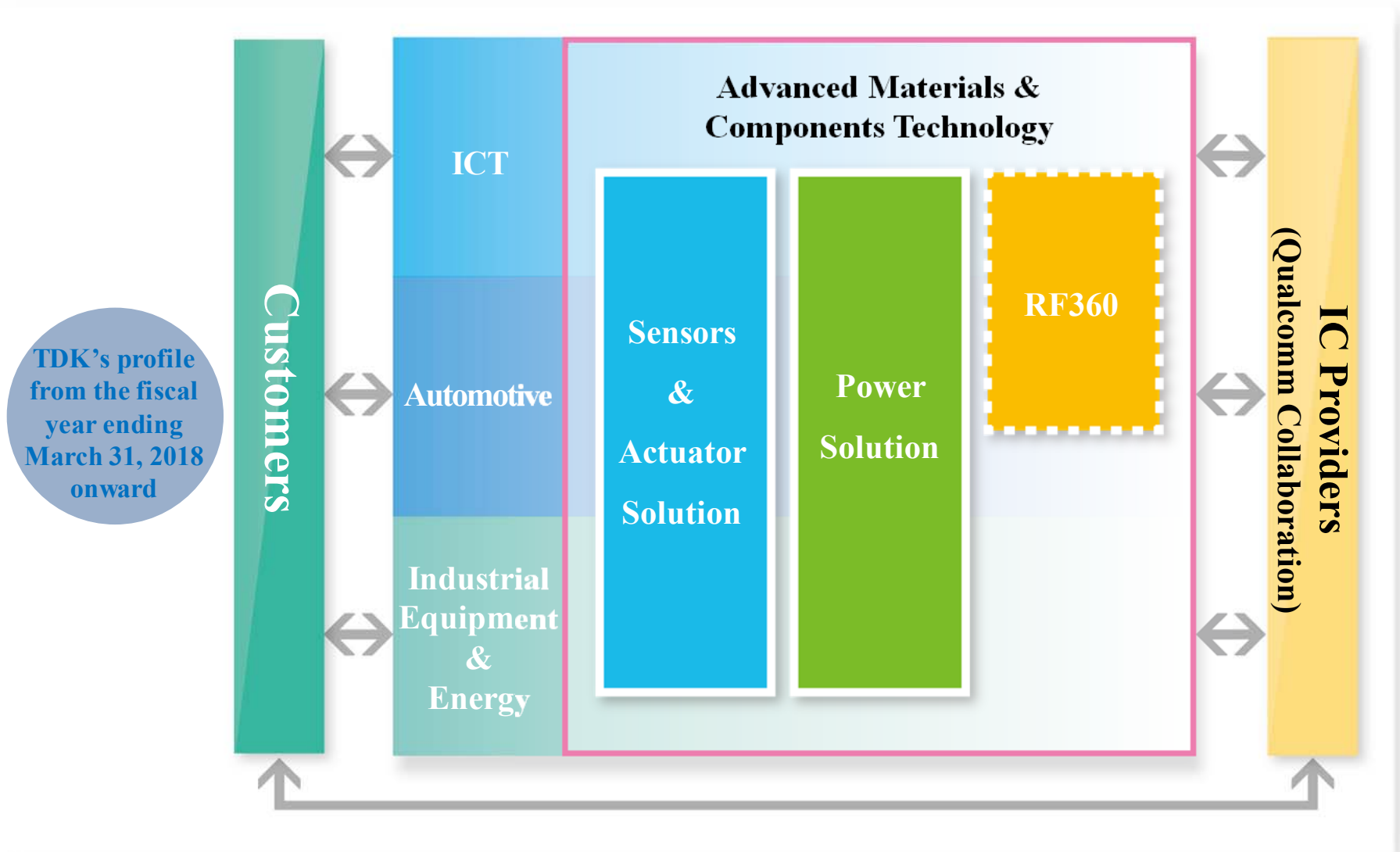
■ Delays in business restructuring

- Improved earnings in the magnet business

(Yen billions)	FY March 2017 Full Year Results	FY March 2018 Full Year Projections
Net sales	1,178.3	1,110.0
Operating income	208.7	80.0
Operating income margin	17.7%	7.2%
Income before income taxes	211.7	79.0
Net income	145.1	55.0
Earning per share (JPY)	1,150.16	435.82



Towards the next Mid-term Plan



- a. Boost the capabilities of the passive components and materials businesses
- b. Integrate and speedily launch the sensor business
- c. Rebuild and develop a platform for the energy-related business
- d. Maintain the long-term profitability of the HDD head-related business

a. Boost the capabilities of the passive components and materials businesses



1. Enhance Quality, Cost, Delivery (QCD) competitiveness by strengthening *Monozukuri* power
2. Successfully deliver high value-added products first to market by taking full advantage of the alliance with Qualcomm
3. Continue to tirelessly pursue smaller dimensions and lower height (Thin-film components & SESUB)
4. Fundamentally restructure the magnetic materials business, the origin of TDK's materials business

1. Achieve a borderless marketing and R&D structure by integrating the spread-out organization
2. Provide high-performance, high value-added sensing solutions by integrating IC technology and packaging technology with core sensing technologies and materials technologies
3. Expand the customer base for existing sensor products

c. Rebuild and develop a platform for the energy-related business



1. Provide the highest level of performance and reliability as a leading manufacturer of consumer battery products
2. Expand the entire range of energy-related product lineups by harnessing strengths derived from vertical integration starting from materials and components
3. Commence development of a platform for future business expansion

d. Maintain the long-term profitability of the HDD head-related business

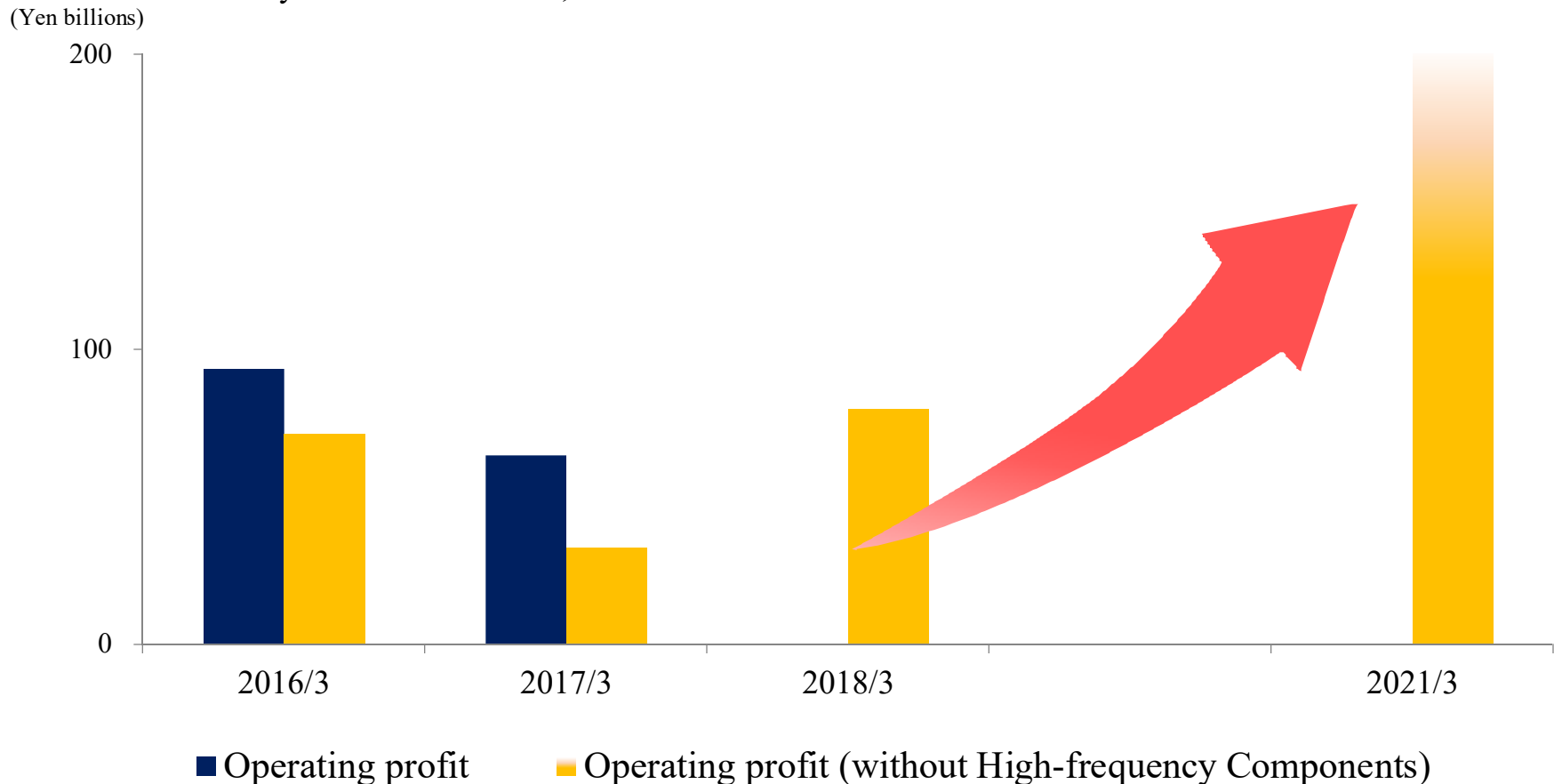


1. Continue to provide technologies needed by customers in a timely manner
2. Build a platform for executing lean operations
3. Improve the earning power of HDD suspensions and related businesses

Annual Operating Profit Results and Projections



- *1 The high-frequency components business (carved out in February 2017) is included only in figures for the fiscal years ended March 31, 2016 and 2017.
- *2 The gain on transfer to Qualcomm is not included in figures for the fiscal year ended March 31, 2017.



Passive Components Business Strategy

Hiroyuki Uemura

Senior Executive Vice President

CEO of Electronic Components Business Company

Joachim Zichlarz

Senior Vice President

CFO of Electronic Components Business Company

- ◆ Sustainable growth and profit after the RF360 carve-out

Joachim Zichlarz

- ◆ Execute Monozukuri innovation & Product development of Next-generation electronic components with IC collaboration

Hiroyuki Uemura

- ◆ Sustainable growth and profit after the RF360 carve-out

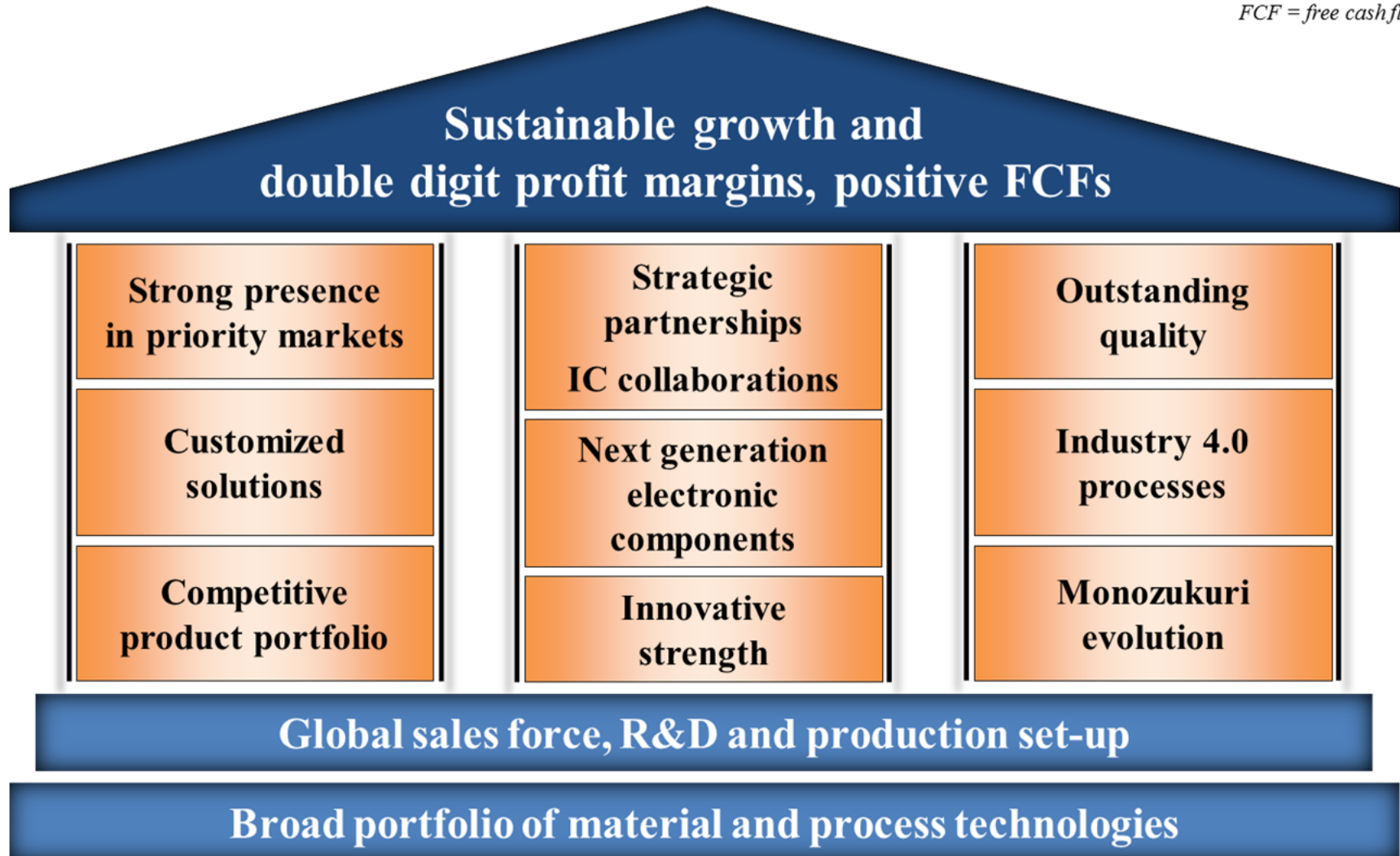
Joachim Zichlarz

- ◆ Execute Monozukuri innovation & Product development of Next-generation electronic components with IC collaboration

Hiroyuki Uemura

Our house of success

FCF = free cash flow



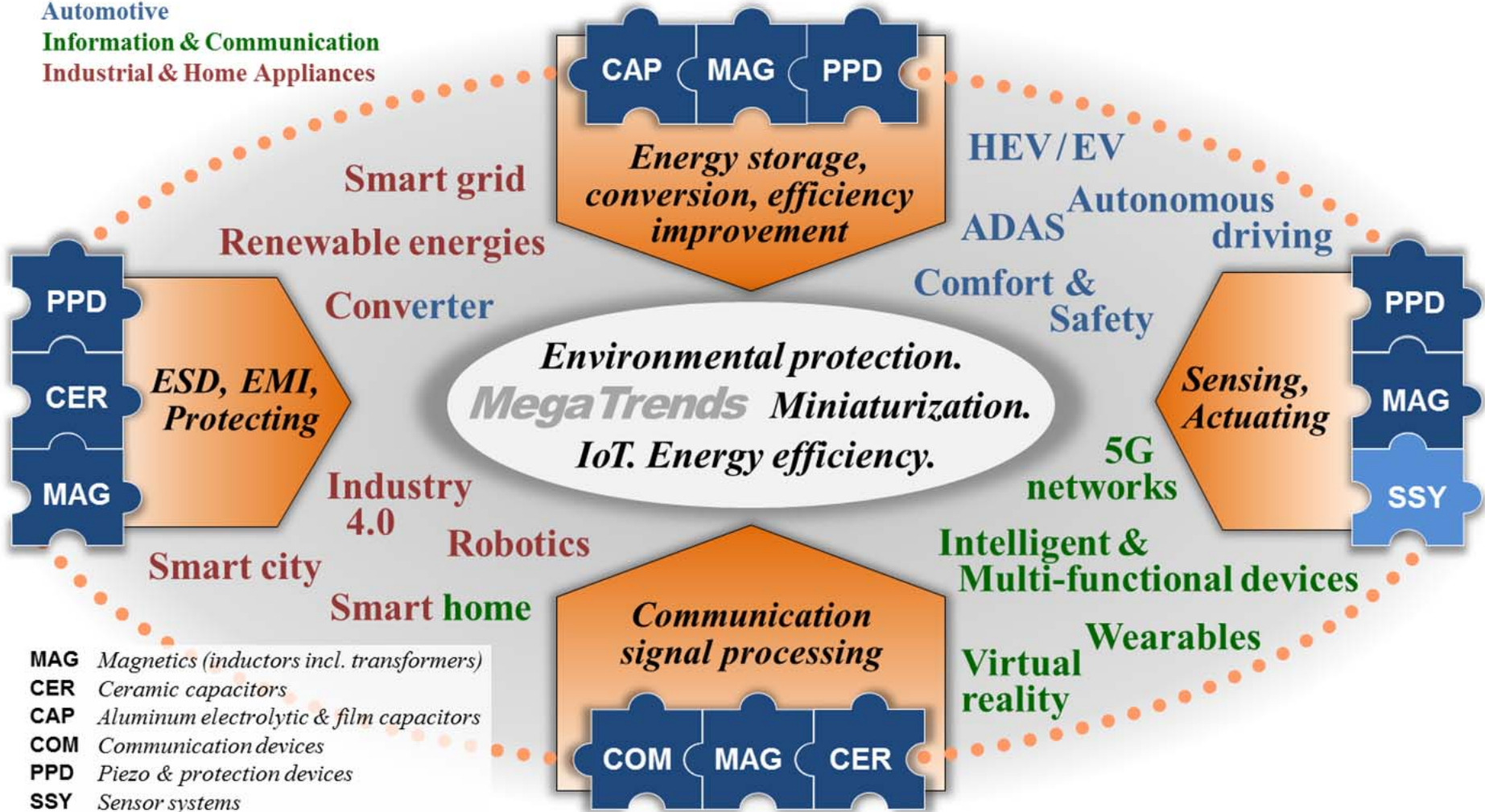
Our passive components support electronics mega trends

Priority markets & applications

Automotive

Information & Communication

Industrial & Home Appliances



- MAG** Magnetics (inductors incl. transformers)
- CER** Ceramic capacitors
- CAP** Aluminum electrolytic & film capacitors
- COM** Communication devices
- PPD** Piezo & protection devices
- SSY** Sensor systems

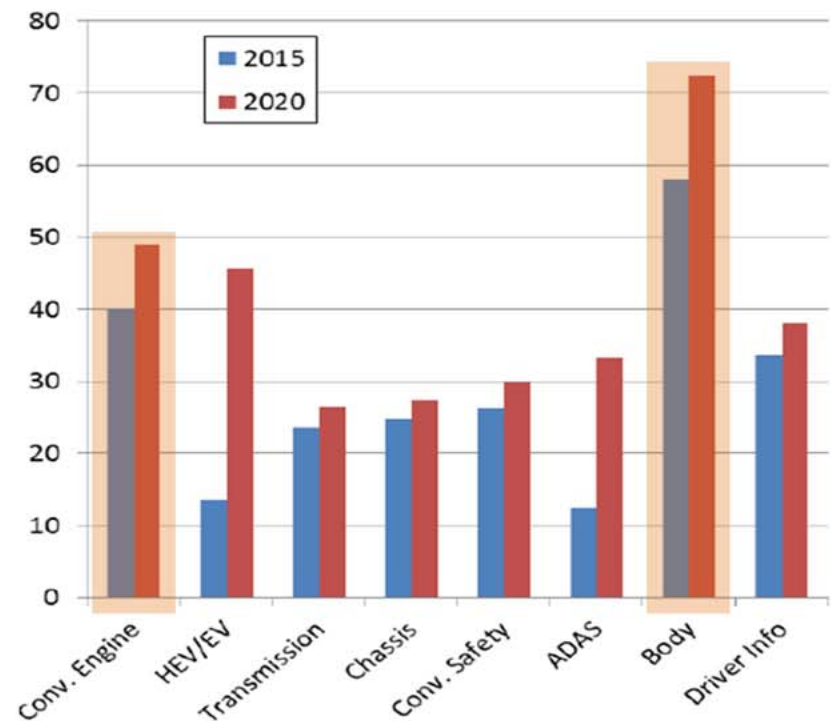
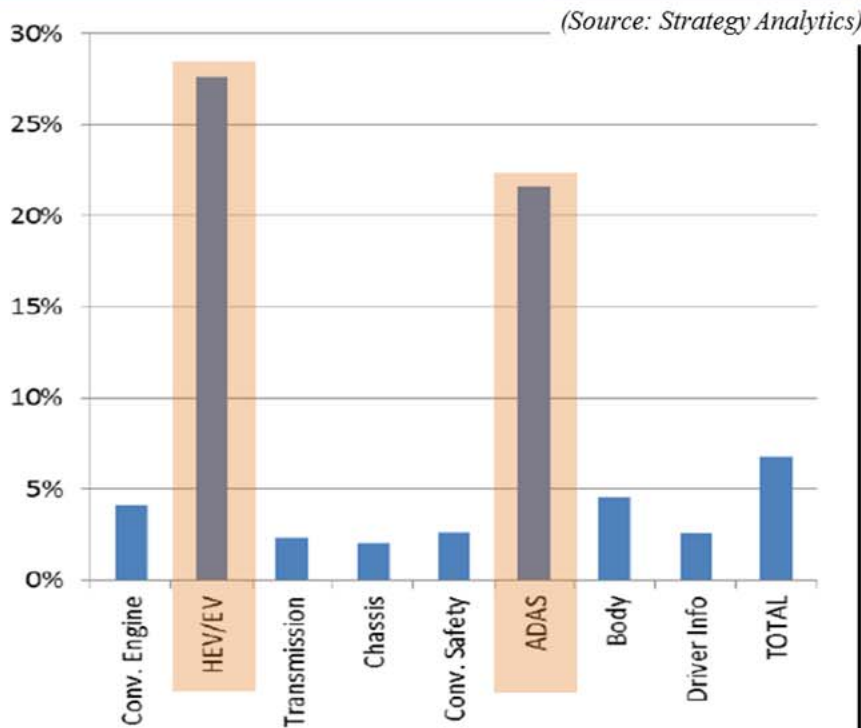


Priority market Automotive

➤ Market growth of xEVs and Advanced Driver Assistance Systems (ADAS) is very strong, while absolute demand for conventional engine, body and driver information remains big.

CAGR 2015 – 2020

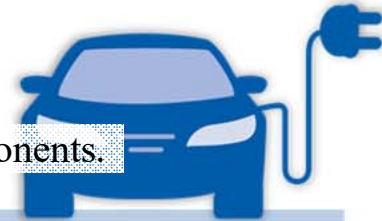
Electronic system demand in USD billion



TDK provides a comprehensive and competitive product portfolio for automotive applications and targets over-proportional growth.

Promising perspectives in eMobility

➤ TDK offers 4 key ‘system level’ products for e-mobility as well as many passive components.

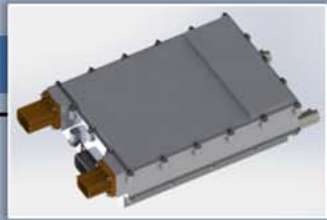


Systems level

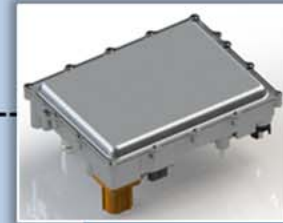
On-board chargers

Power grid

Wireless charging systems



High voltage battery



DC/DC converters

Inverters

Low voltage board net

Electric motor

Components level



Ceramic capacitors

Inductors (incl. transformers)

WPT coil packages

DC link capacitors

Aluminum capacitors

Sensors

Magnets

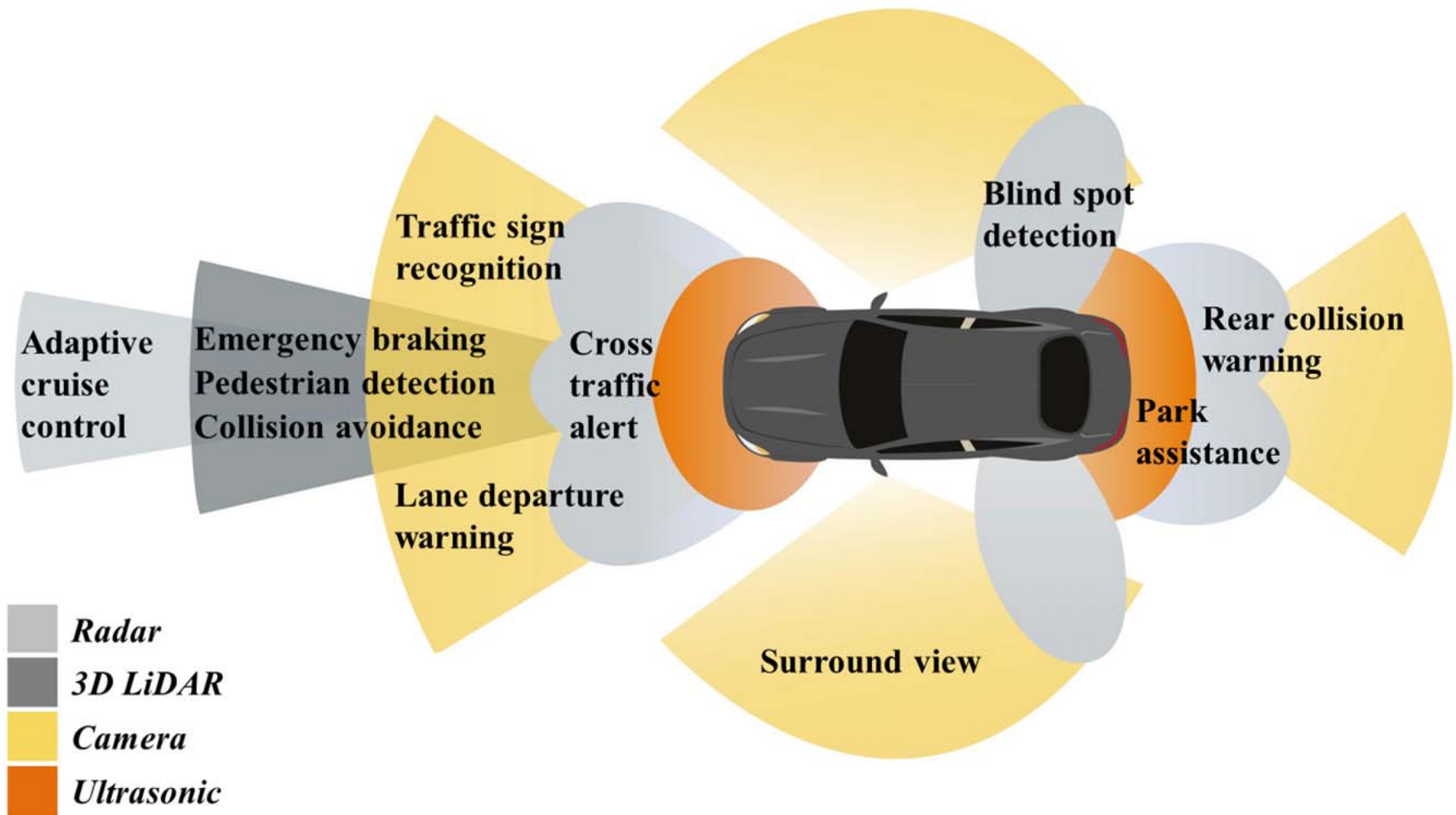
MegaCap

CeraLink

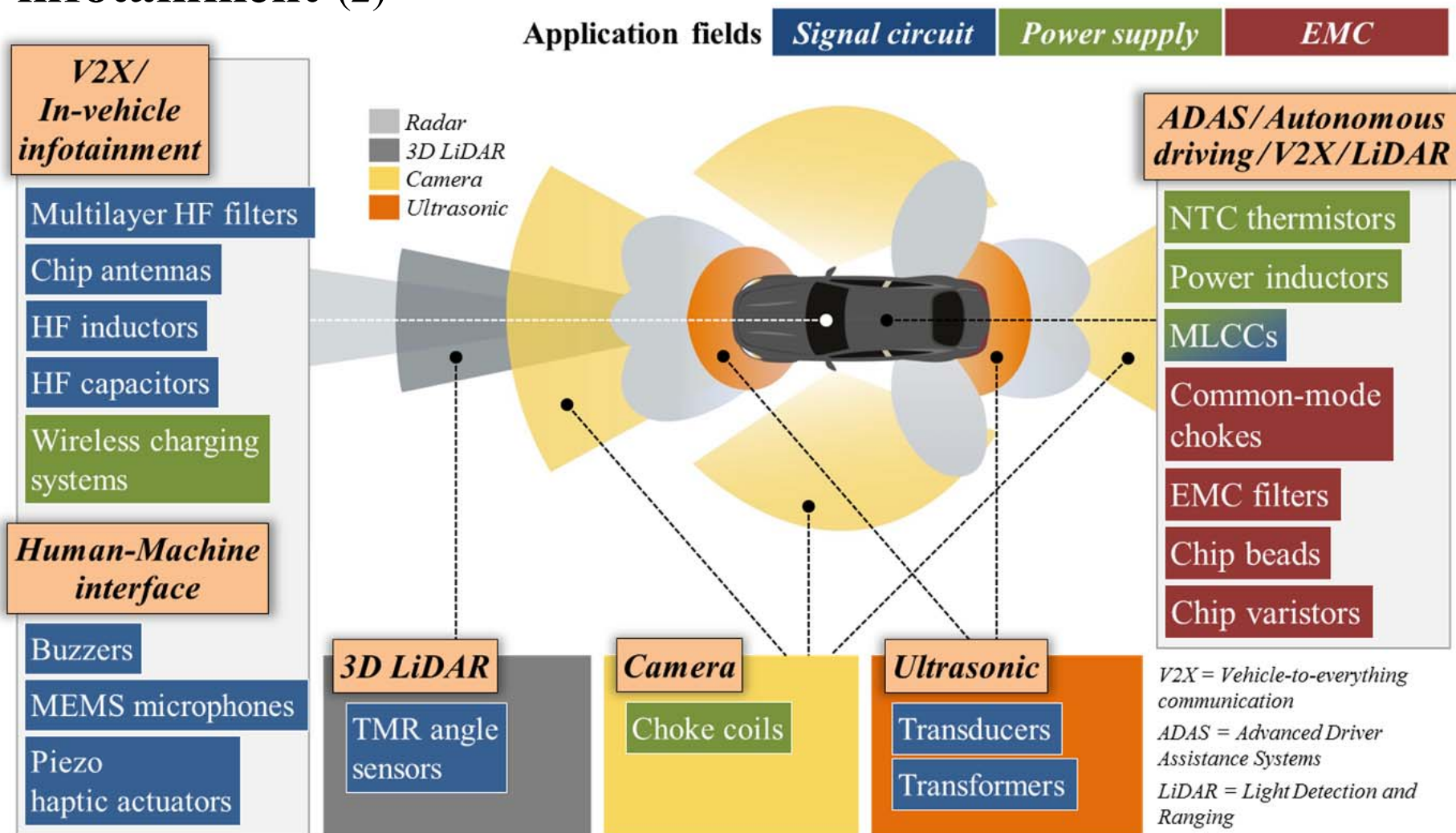
Growing demand for xEVs will fuel strong growth for passive components and systems from TDK.

Our comprehensive portfolio for ADAS and in-vehicle-infotainment (1)

ADAS = Advanced Driver Assistance Systems

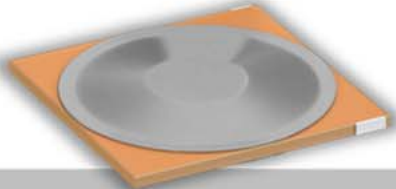
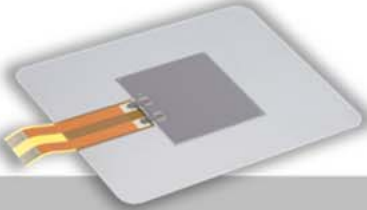


Comprehensive portfolio for ADAS and in-vehicle-infotainment (2)



Our haptic solutions – New dimensions in performance

➤ Based on our advanced multilayer piezo ceramics technology, TDK opens up new applications especially in the promising area of Human-Machine interfaces (HMIs).

PowerHap™	PiezoHapt™
	
Outstanding features	
<ul style="list-style-type: none"> • Highest displacement (up to 200 μm), force (up to 20 N) and acceleration (up to 15 g) 	<ul style="list-style-type: none"> • Lowest insertion height (0.35 mm)
<ul style="list-style-type: none"> • Extremely fast response time 	
Additional benefits	
<ul style="list-style-type: none"> • Power-saving solution • Flexible vibration patterns/customizable profiles 	



TDK has started sampling and has received a very positive market response.

Priority market Information & Communication (ICT)

➤ The total available market for TDK will double in the next 4 years. *(Source: TDK estimates)*

Key trends & drivers

Intelligent & Multifunctional

- Improved image quality, power storage, user interface
- Low-power cameras
- Advanced sensing for positioning and user ID

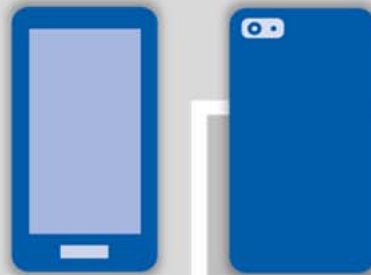
Evolution to 5G

- Higher data rates
- More and higher frequencies
- New antennas, user features, enabling technologies

Miniaturization

- Ever smaller, low profile
- Functional integration
- Lower power consumption

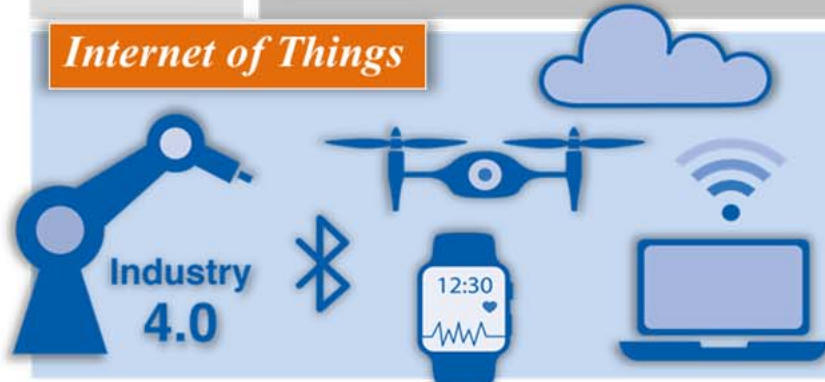
Smart functionality



Advanced communication systems



Internet of Things



TDK products (excerpt)

- Camera module actuators
- Optical image stabilizers
- Power inductors
- Sensors
- MEMS
- WPT systems

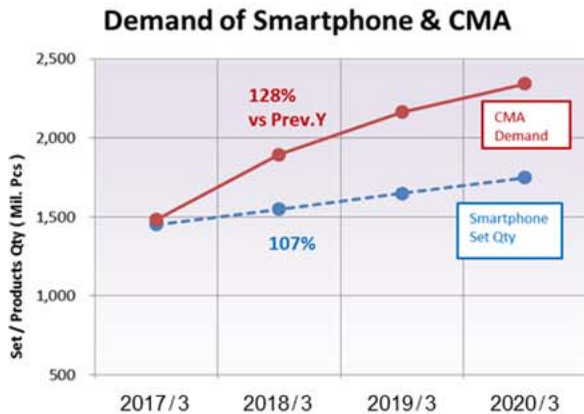
- RF antennas
- Filters, diplexers, couplers, baluns
- Thin-film devices
- EMC solutions

- HF & power coils
- Tunable capacitors
- Beads
- Embedding technologies

TDK provides a comprehensive and competitive product portfolio for ICT applications and targets over-proportional growth.

Example for our technological competence in key components for ICT: camera module actuators (CMAs)

➤ The requirements for autofocus speed & accuracy and image quality in smartphone cameras are rising.



CL VCA features

- Highly responsive
- High positioning accuracy
- Low power consumption

OIS features

- High control performance
- High displacement accuracy
- Good frequency response

Major applications





- Cameras in mobile phones
- Tablets
- Projectors

TDK lens actuators improve the performance of smartphone cameras.

Priority market Industrial

➤ The industrial markets offer good growth opportunities created by mega trends.

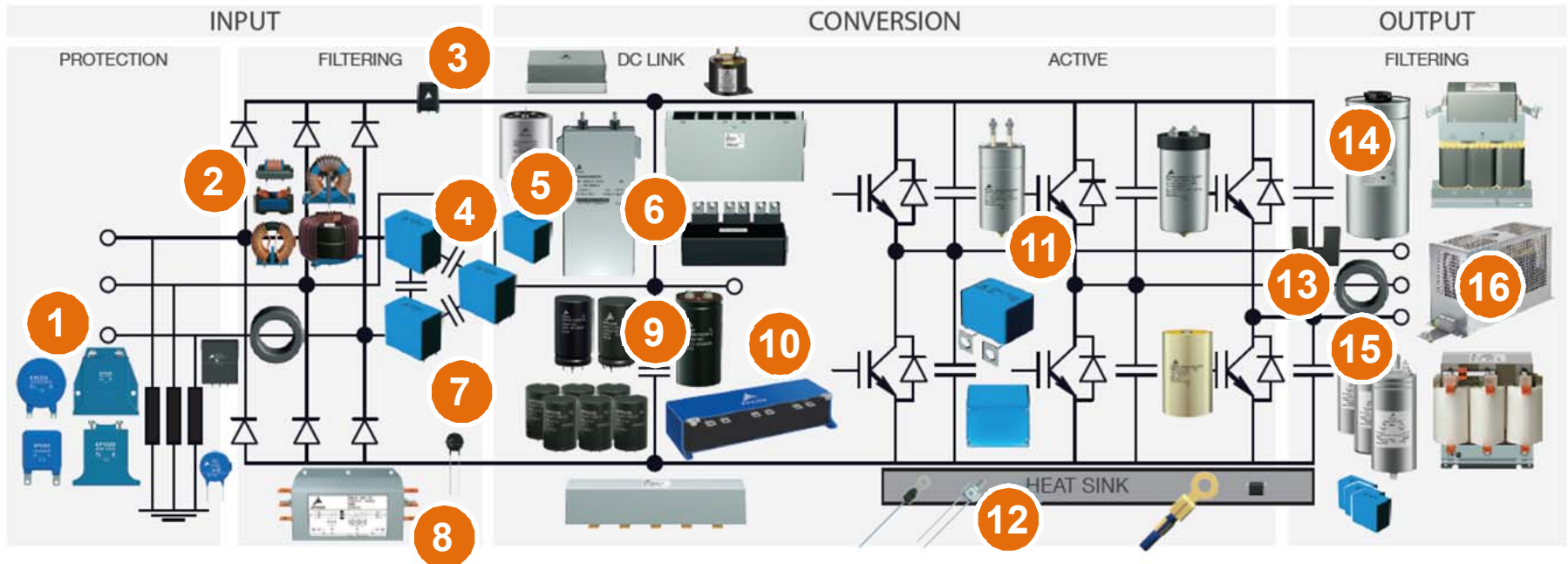
Important trends & drivers

Energy efficiency	Green energy	Smart grid	Smart manufacturing
<p>➤ Strong demand for energy efficient devices</p>  <p>➤ New generations of IGBTs and semi-conductors (GaN, SiC)</p>	<p>➤ Global energy demand constantly increasing</p> <p>➤ Strong demand for wind and solar power generation</p> 	<p>➤ Low-loss power transmission systems (HVDC High-Voltage Direct Current) and smart metering</p> <p>➤ Decentralized power generation with storage and buffering</p> 	<p>➤ Global trend towards smart manufacturing</p>  <p>➤ New applications for connectivity and sensing</p>

TDK is well established and delivers state-of-the-art solutions for Industrial. TDK targets to grow faster than the market.

Example for our strong position in key industrial applications: frequency converters

- Frequency converters are an integral part of energy efficient drives and other industrial applications and enjoy strong growth prospects. (9.4% per annum expected growth rate for 2016 – 2020 in USD; Source: Technavio 2017/1)
- TDK offers attractive and competitive solutions for frequency converters in more than 15 product groups.



TDK offers almost all required passive components.

- ◆ Sustainable growth and profit after the RF360 carve-out

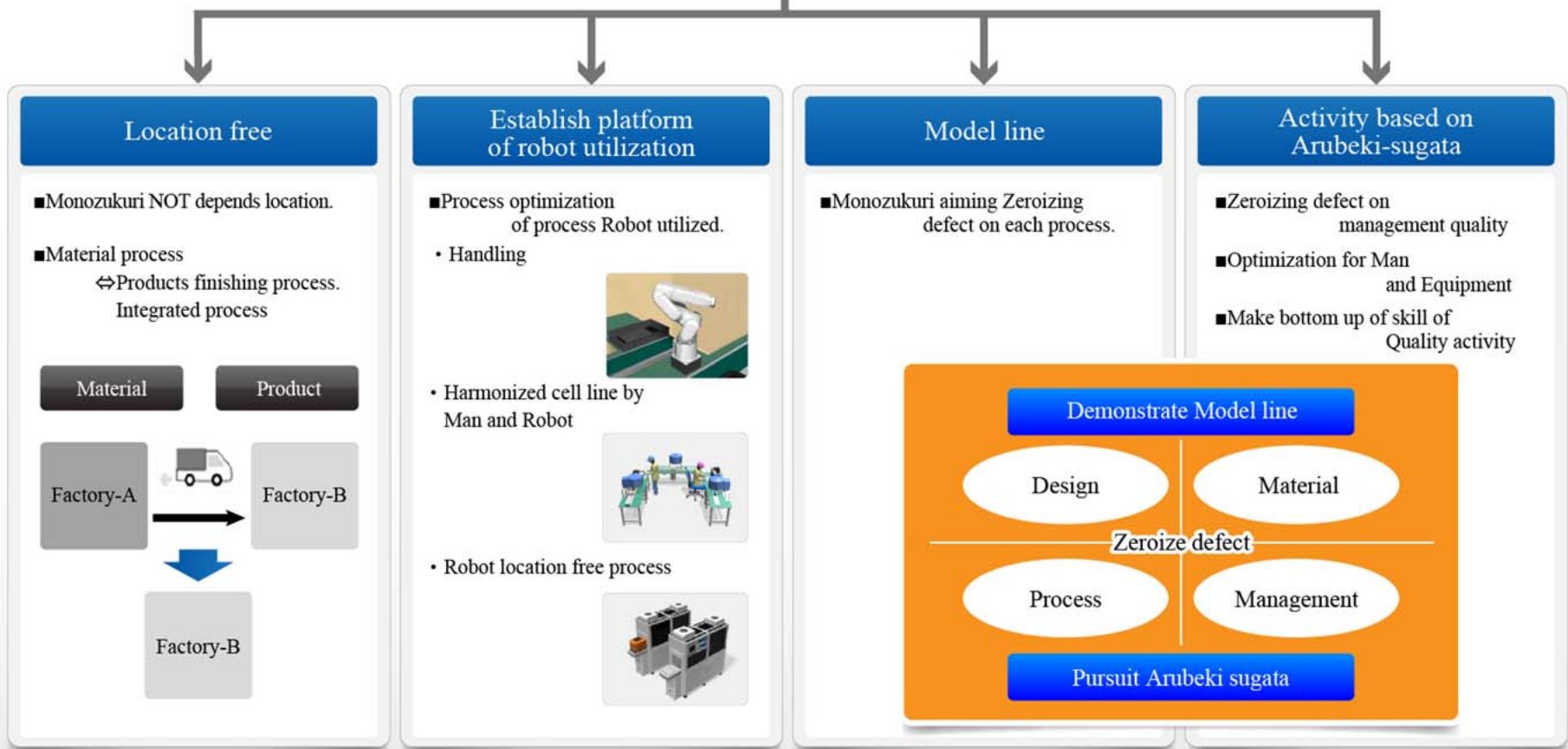
Joachim Zichlarz

- ◆ Execute Monozukuri innovation & Product development of Next-generation electronic components with IC collaboration

Hiroyuki Uemura

Pursuit TDK industry 4.0 + Zero defect

Monozukuri innovation based on the Arubeki-sugata concept



Market demand

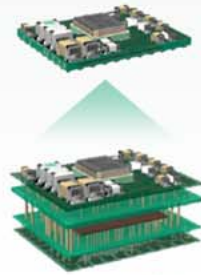
Responding to Modularization

Correspond to the requirement of High reliability/ High performance components

Next generation components

Module

- SESUB
 - Layout Flexibility
 - Miniaturizations
 - Integrated Package
 - High Performance
- Passive Module



Custom designed compo

- Inductor (Power/RF)
- Capacitor (MLCC/Thin-film)
- High frequency components

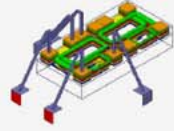


Improve module performance with customized passive components

Components made by New construction method and material

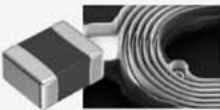
Optimized products for a Application

- Thin-film
 - HQ-IPD for RF Frontend Module



- Thin-film capacitor

- Plating
 - Power Inductor for Automotive



Zero defect

- Roll to Roll
 - WPT



Quick charge



- Applied method
 - High current Power Inductor
 - High-L Power Inductor





Business collaboration

Strengthen elemental technology for passive component in each area

(Material / Lamination / Thin-film / Wire wound / Assembling)

● Honjo East site

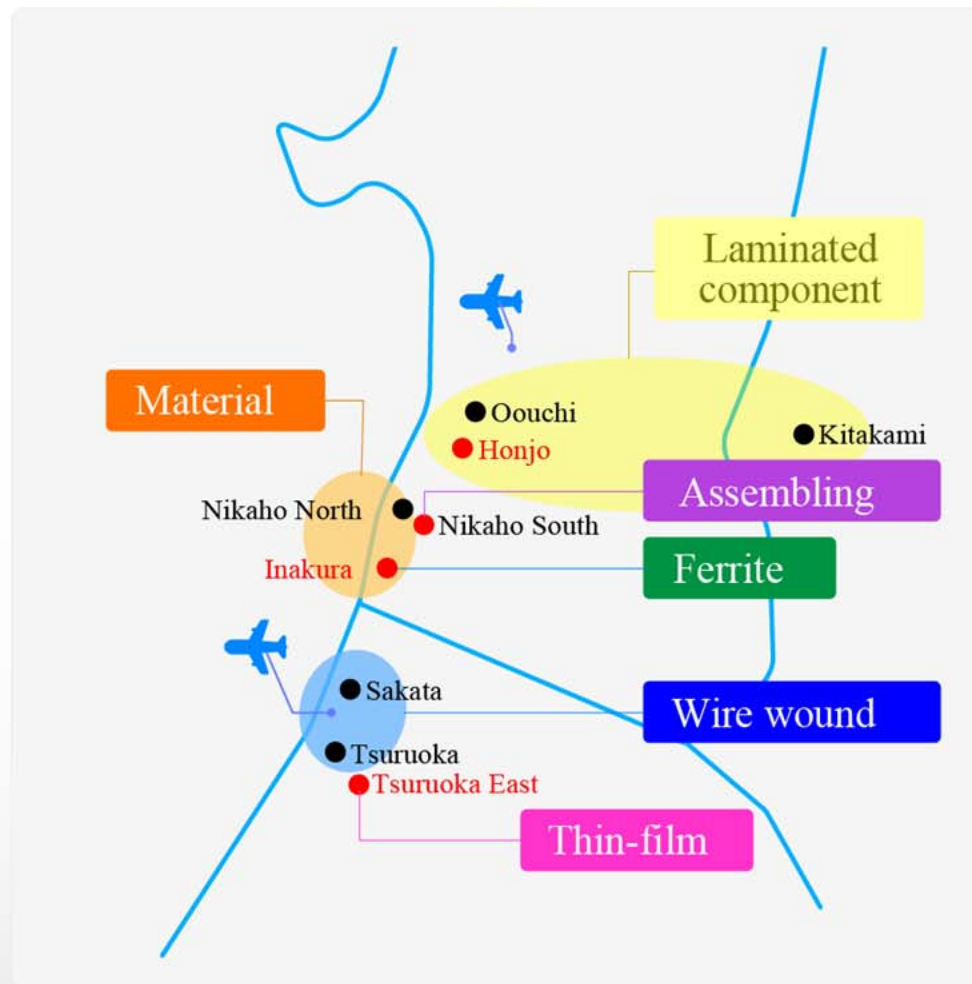


Floor area: 50,000 m²

● Inakura East site



Floor area: 15,000 m²



Sensor Business Strategy

Noboru Saito

Senior Vice President

CEO of Sensor Systems Business Company

Matthias Bopp

General Manager of Magnetic Sensors Business Group

◆ Sensor Business Strategy

Noboru Saito

◆ Magnetic Sensor Business Strategy

Matthias Bopp

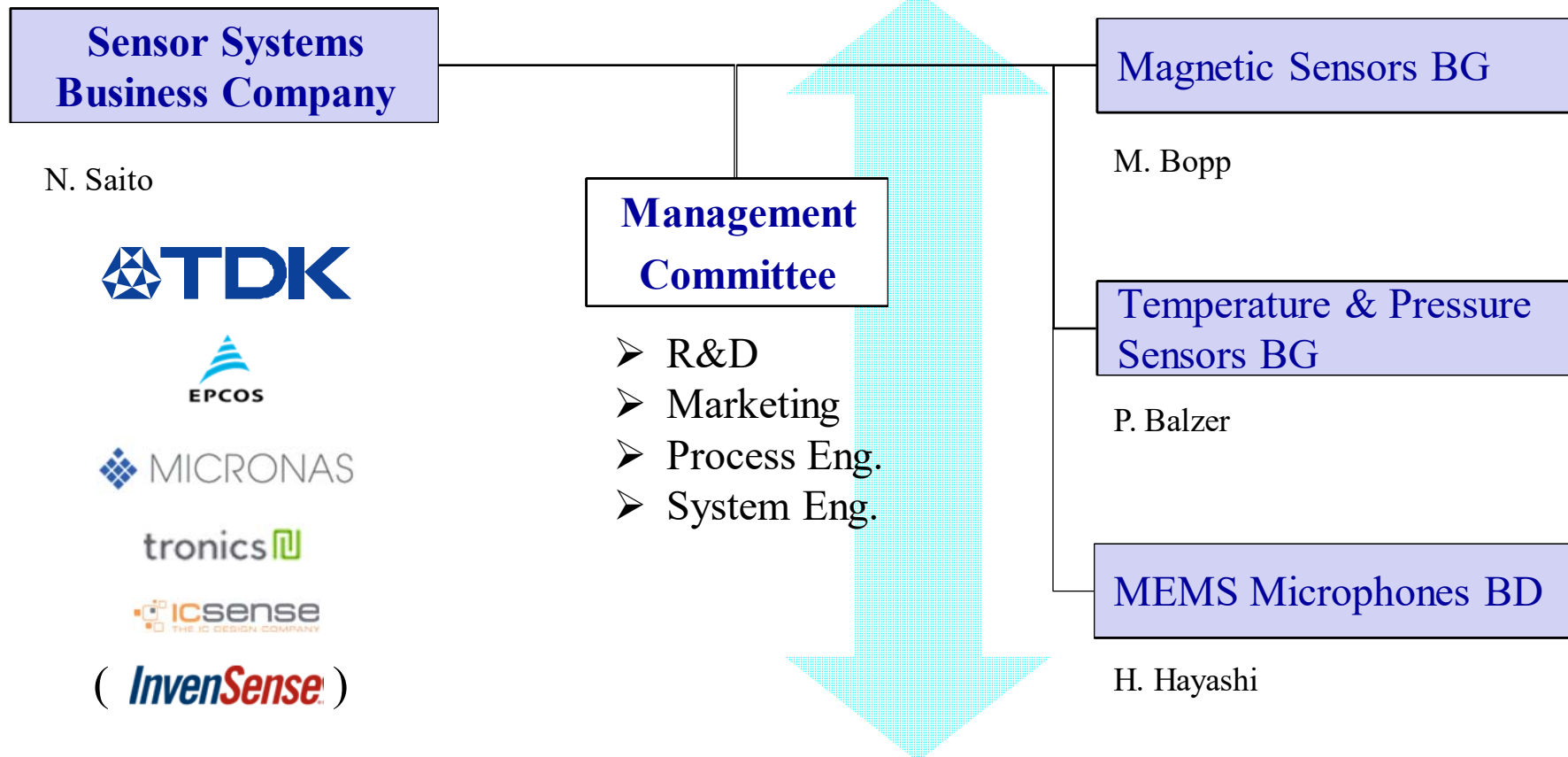
◆ Sensor Business Strategy

Noboru Saito

◆ Magnetic Sensor Business Strategy

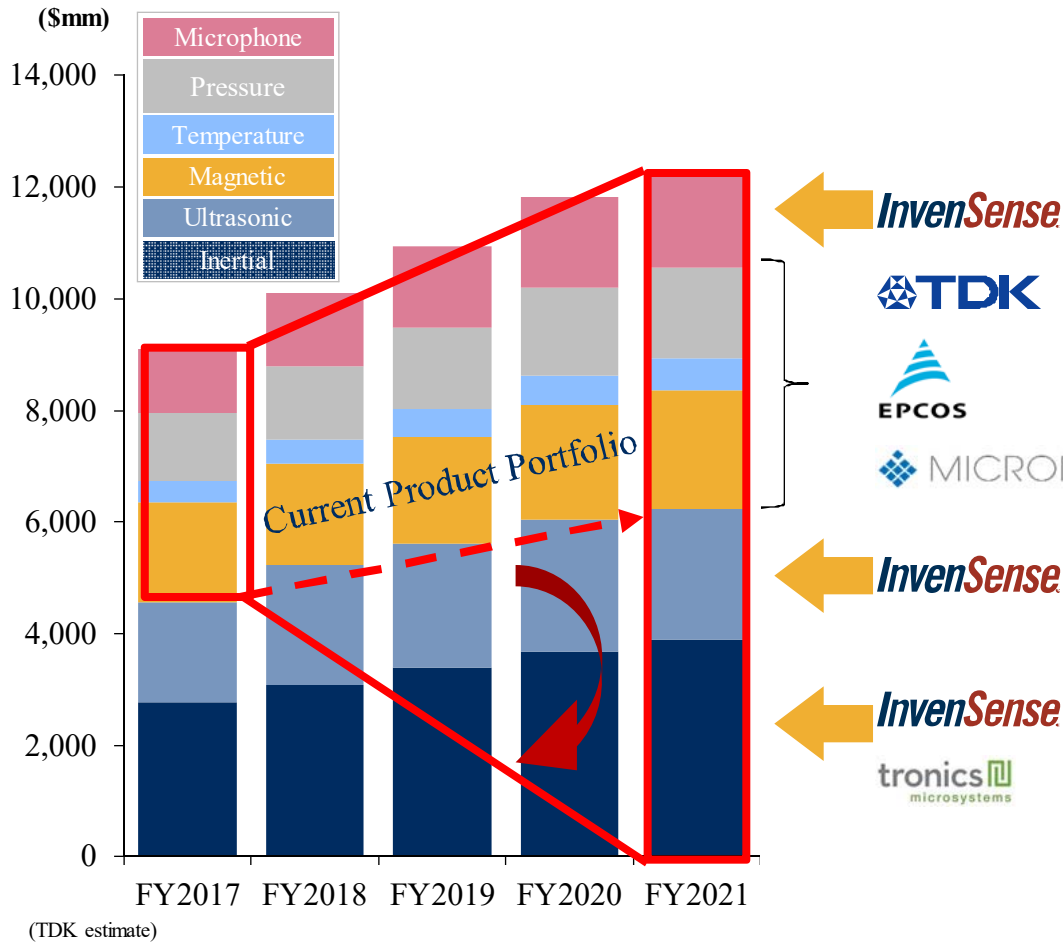
Matthias Bopp

Established since April 1st, 2017

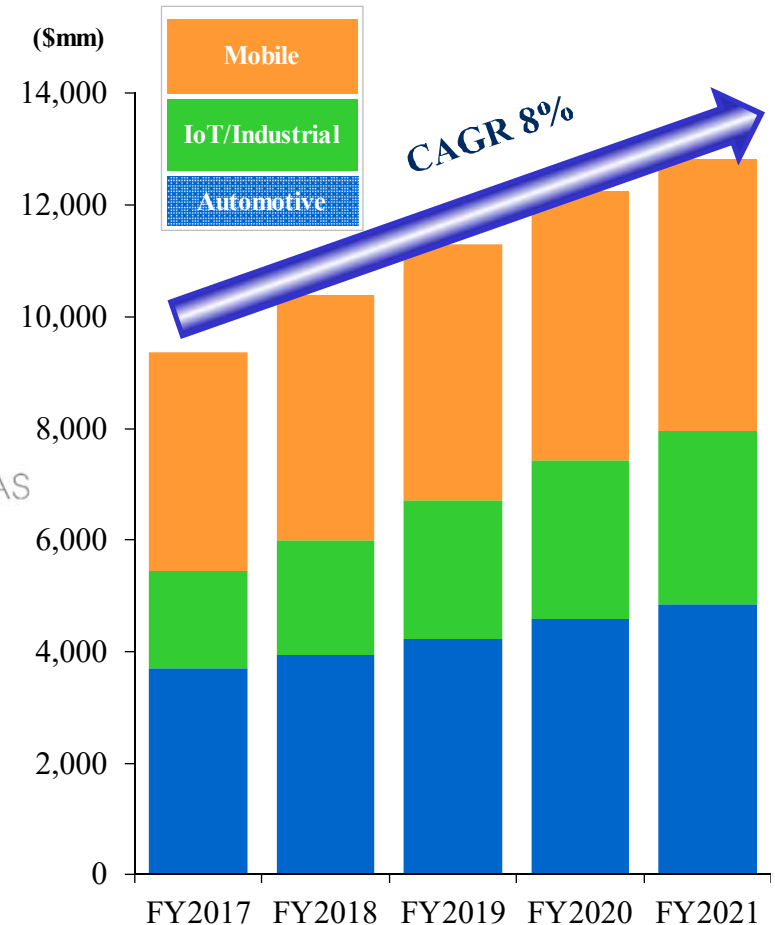


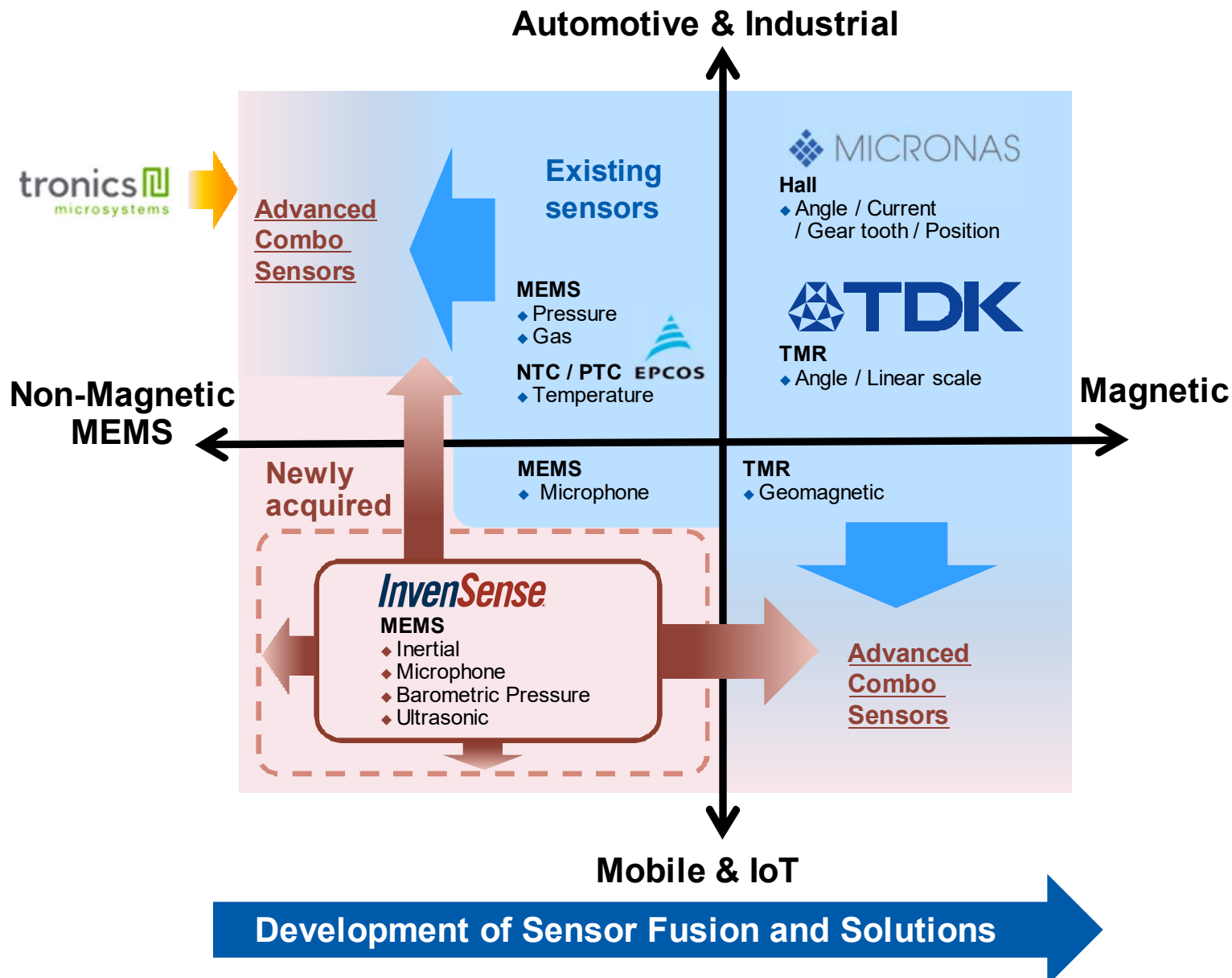
Global sensor demand forecast (non-optical)

By sensor type



By application

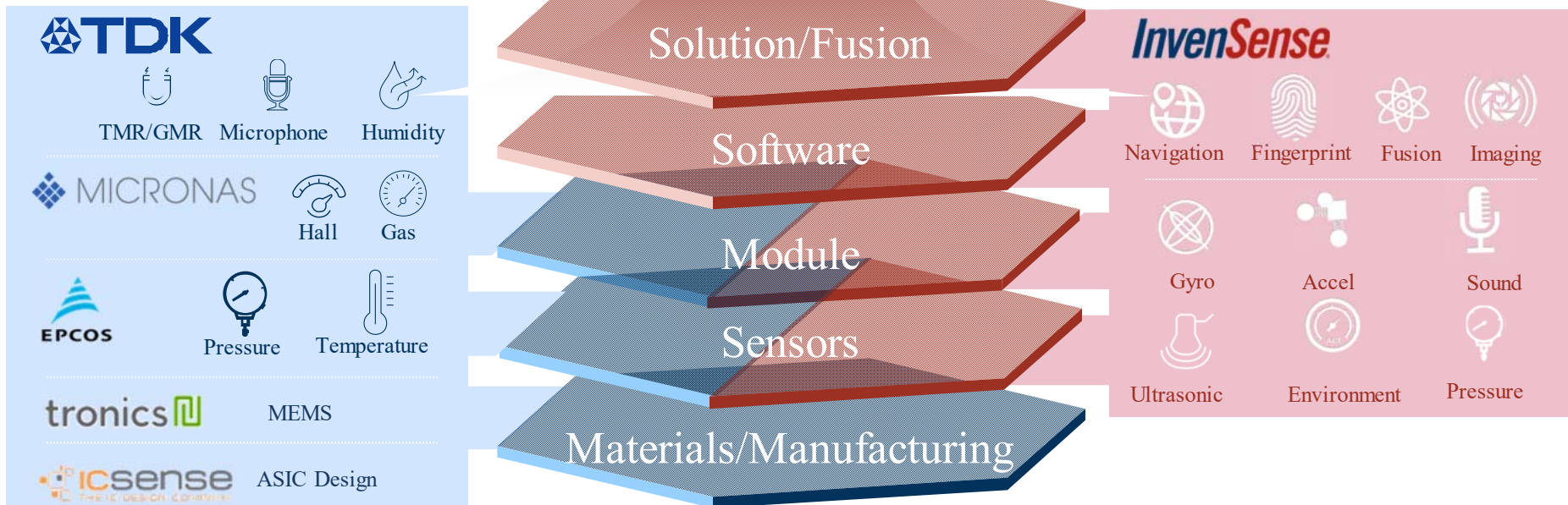




Be a World No.1 Sensor Solution Provider !

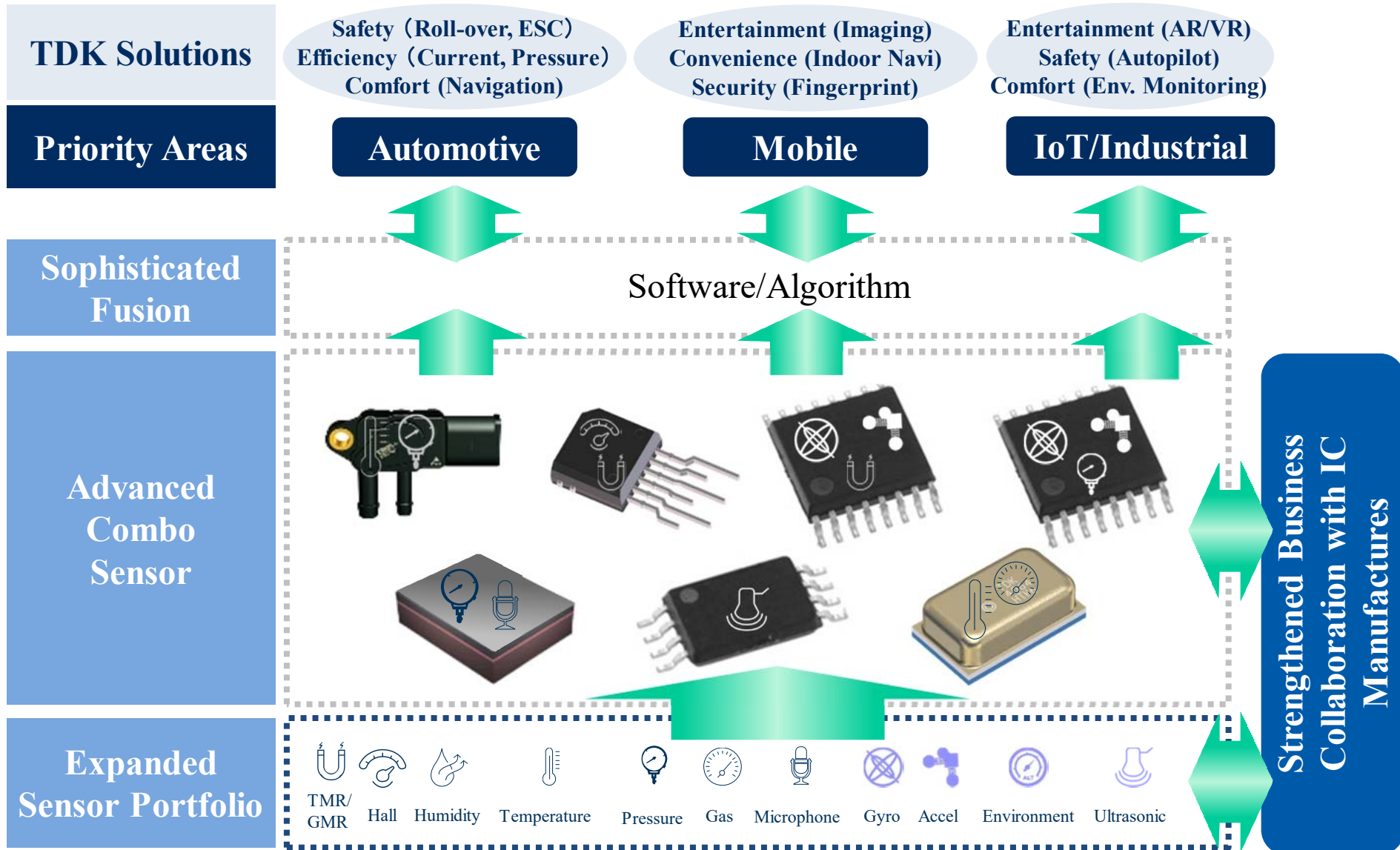


Customers & Partners



Contribute to culture and industry through Sensing Solutions

Synergy : Business Expansion Strategy



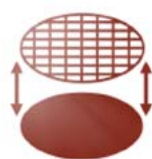
Take full advantage from in-house and external resources.

	MEMS Foundry	Packaging
Magnetic		
Temperature & Pressure		
MEMS Microphones		
InvenSense		

MEMS/ASIC Design	Software

MEMS

Packaging



In-house

Unique Wafers

Unique Packaging

External

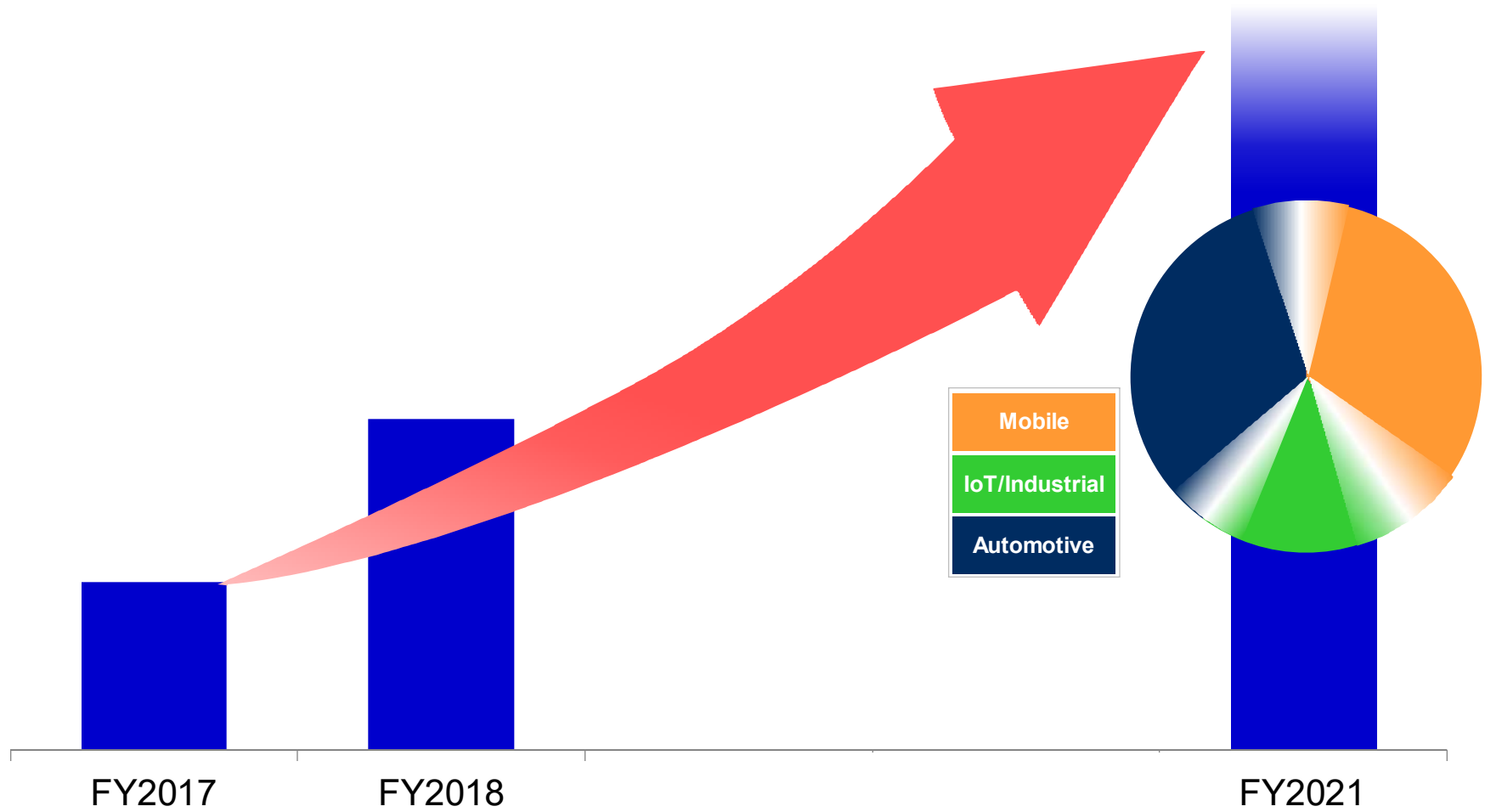
Standard Wafers

Standard Packaging

Existing

Synergy

Sensor Business Sales Target



◆ Sensor Business Strategy

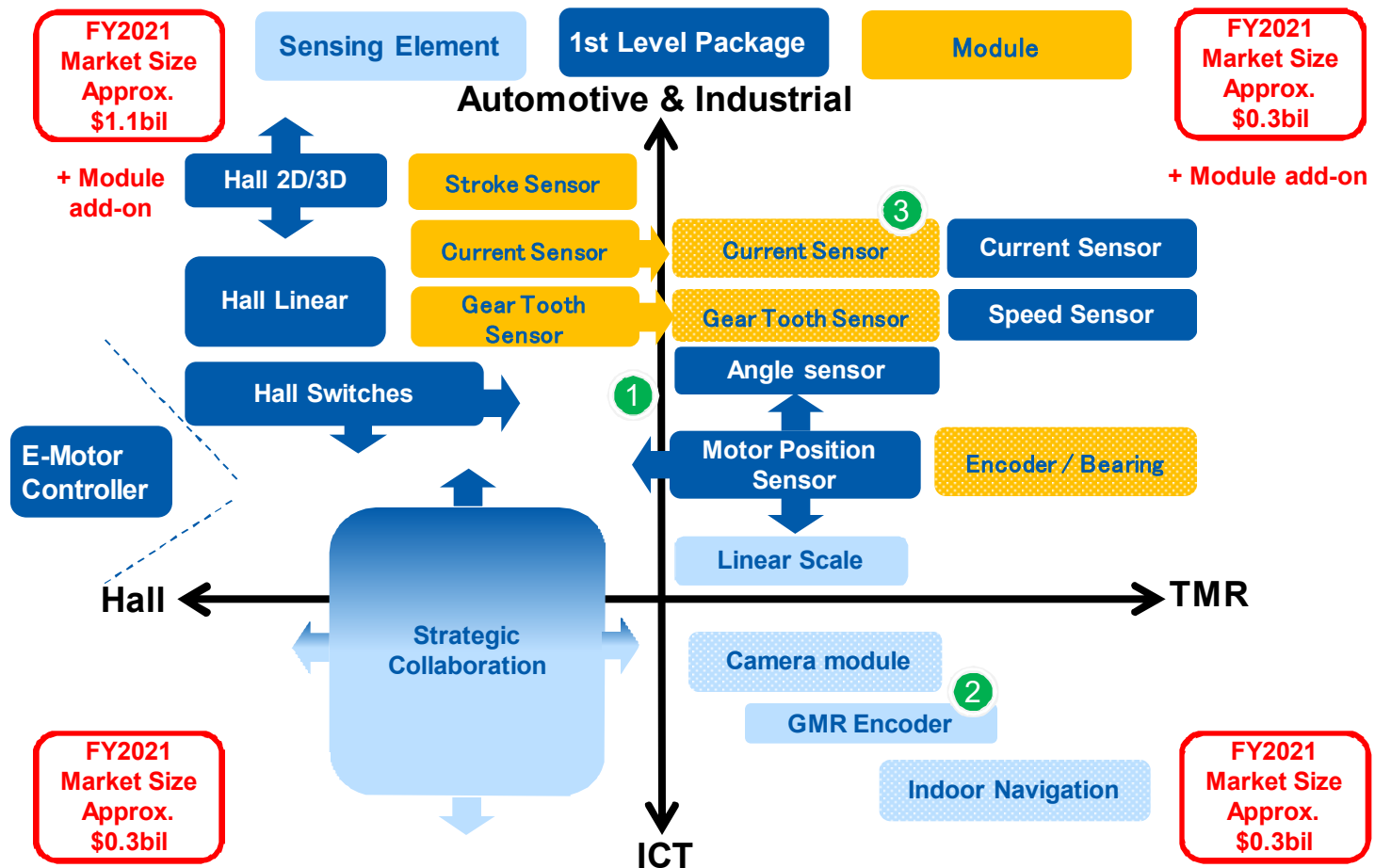
Noboru Saito

◆ Magnetic Sensor Business Strategy

Matthias Bopp

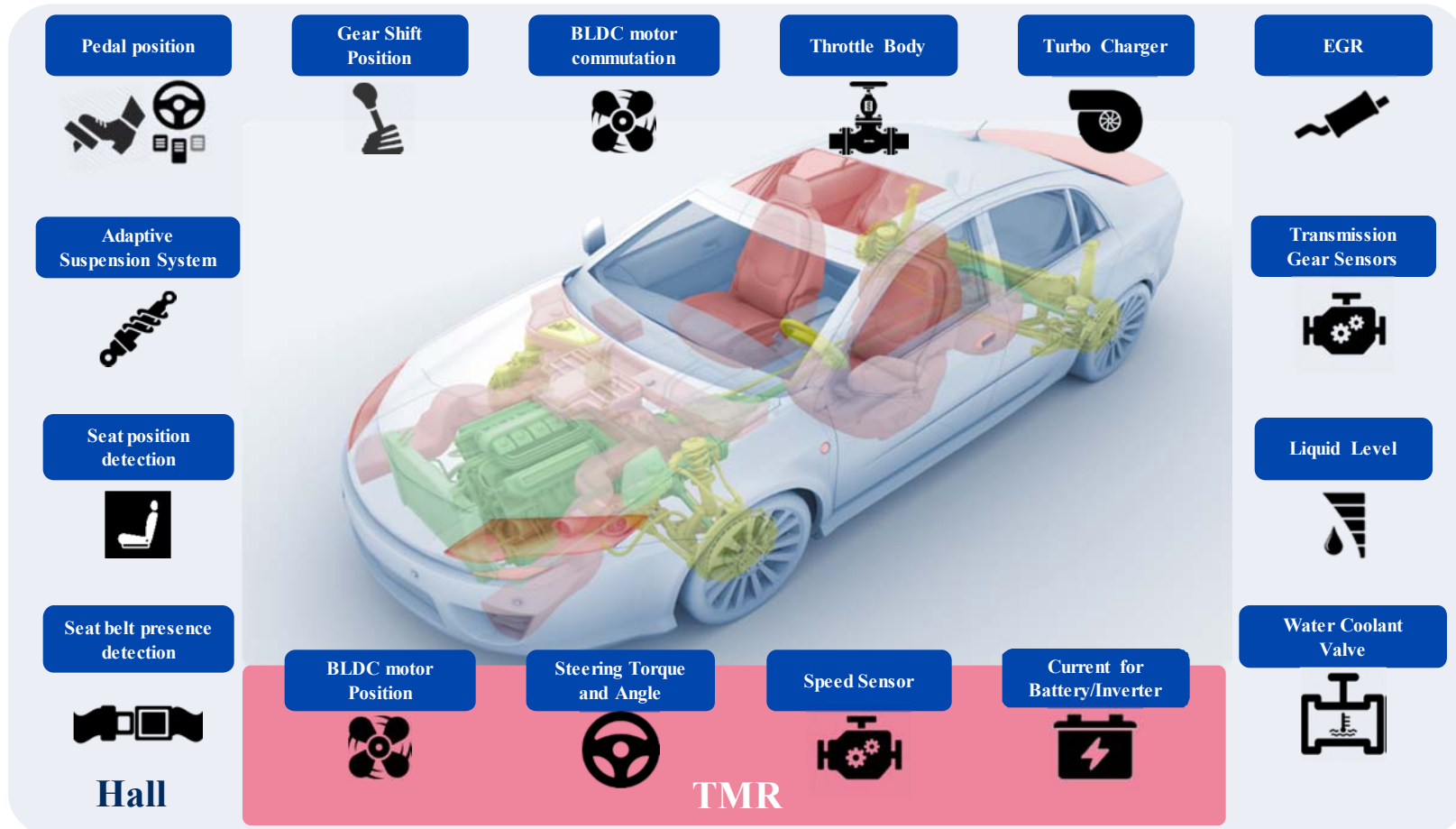
Business Expansion Strategy

- ① Expand business in Automotive market by HALL and TMR technology (and combinations)
- ② Penetrate ICT market and dominate the presence of the TMR technology in the market.
- ③ Develop further vertical integration by deploying Modules with TMR and Hall sensors.



Strengthened ASIC Design Capabilities with

Focus Applications for Magnetic Sensors



- ◆ Combined technology portfolio enables new applications and offers more flexibility to our customers.
- ◆ Long term strategy based on new large platform developments
- ◆ Faster penetration of TMR in the automotive market
- ◆ Short term growth opportunities in ICT (e.g. sensors for camera modules & indoor navigation)

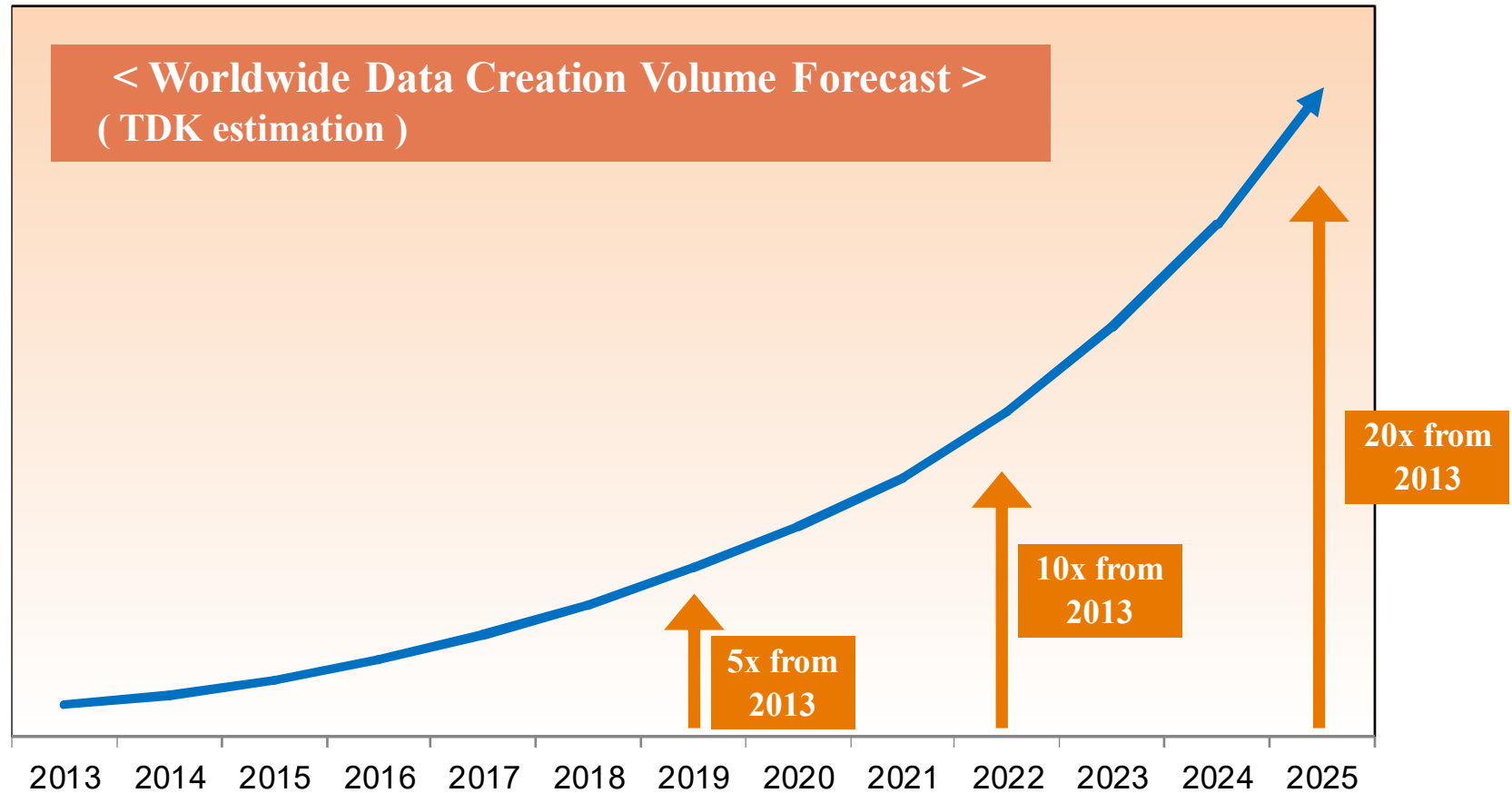


HDD Head Business Strategy

Albert Ong

Corporate Officer

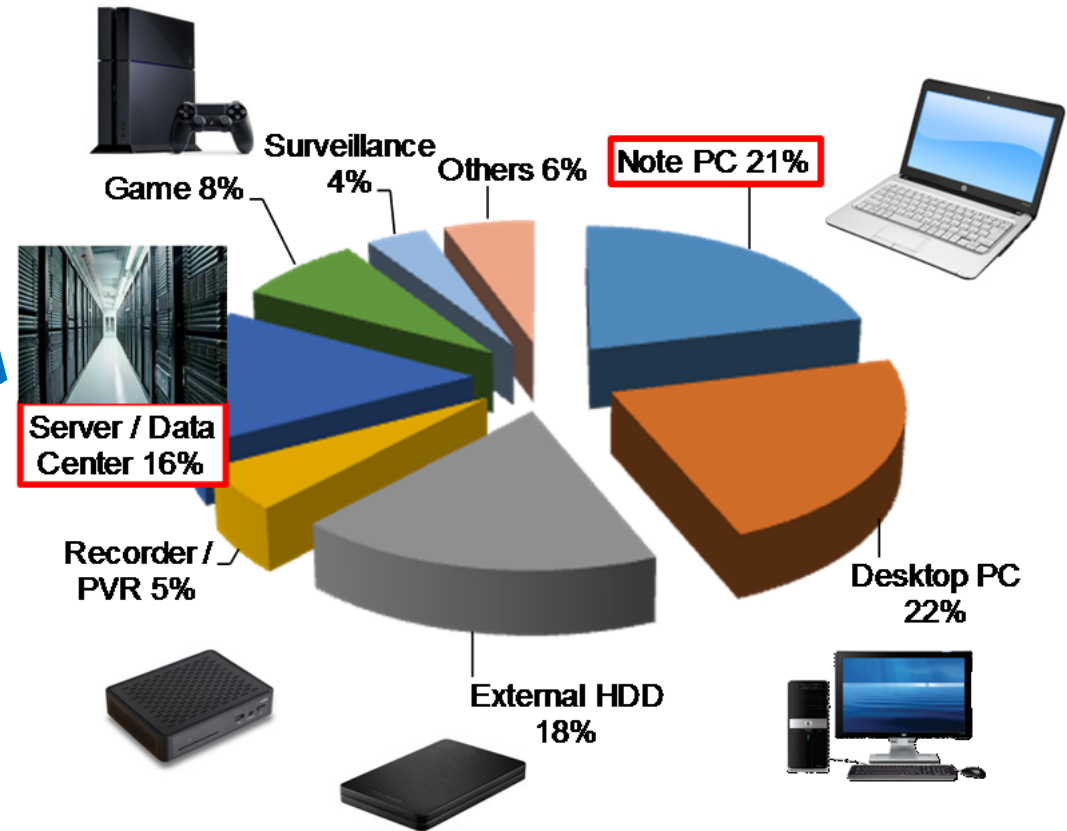
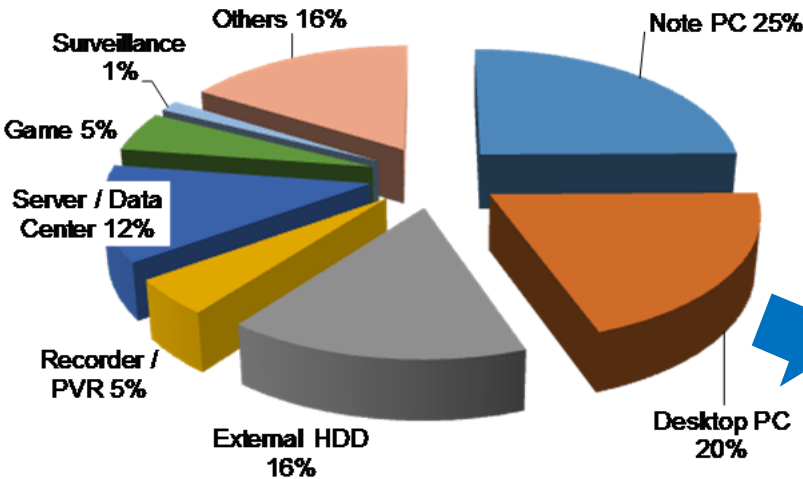
CEO of Magnetic Heads Business Company



- **Worldwide data creation volume will be significantly increasing, due to Cloud computing growth and spread of IoT.**

< CY2014 >

< CY2016 >

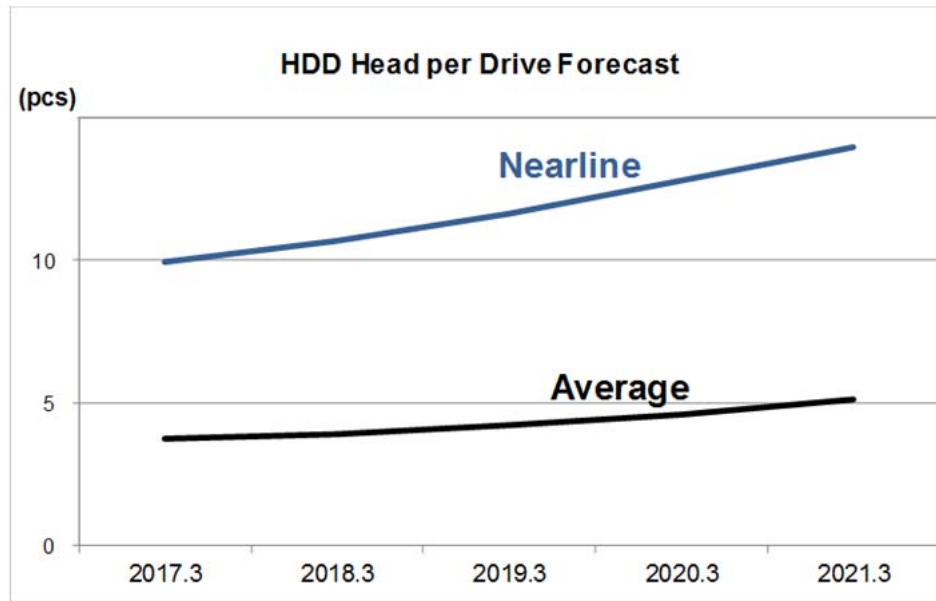


- Declining for Note-PC market
- Increasing Server/Data Center use

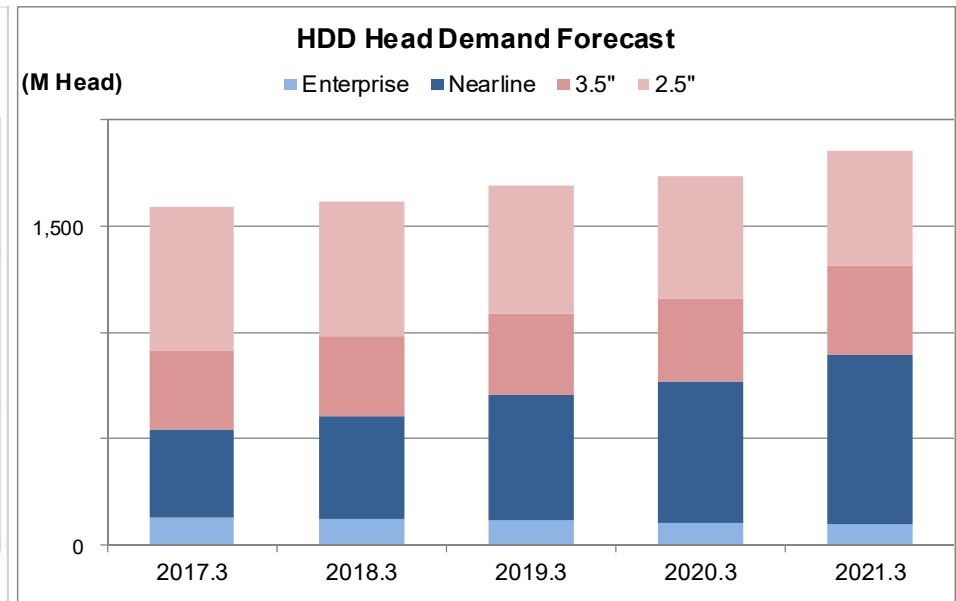
TDK's estimation

□ HDD Head Market Outlook

- 1) HDD shifts to High capacity market. Number of heads per HDD will be increasing. Especially Nearline HDD.
- 2) HDD head market will be steady.



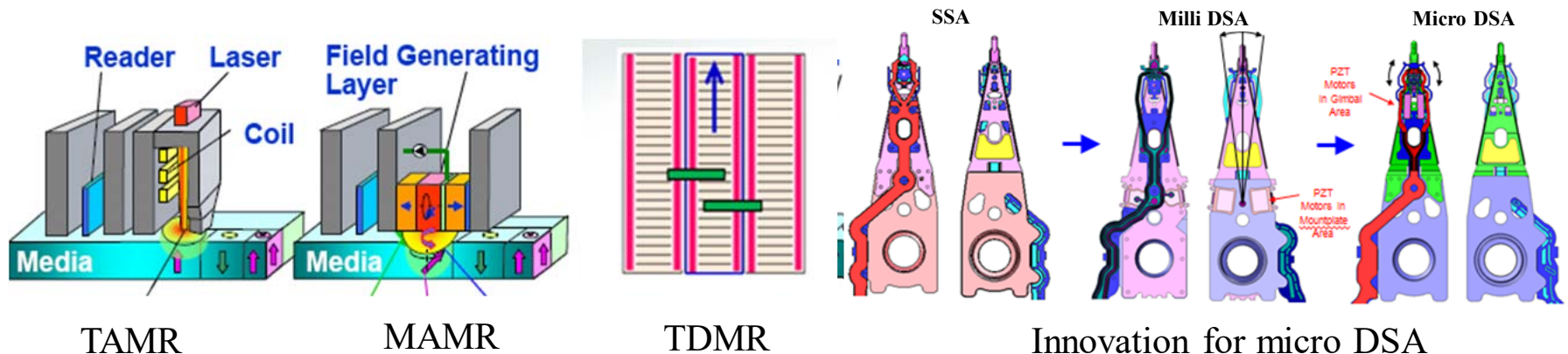
TDK's estimation



TDK's estimation

Changes and technology innovation of HDD industry

- Continuous R&D and improvement activities for HDD/HDD Head.
 - Needs multi disk and multi head technology for high capacity HDD.
 - Thermal assist (TAMR) & Microwave Assisted Head (MAMR)
 - Two dimension Magnetic Recording (TDMR)
 - Micro dual stage actuator (Micro DSA)
- TDK leads on HDD Head technology development and will fully support growing Near-Line / Datacenter.



- **Integrate Hutchinson's HDD suspension operation / technology, and maximize synergy .**

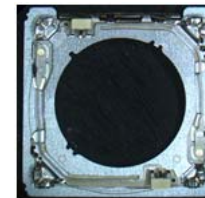
- **Promote vertical integrated HDD suspension business with advanced component technology & process automation.**
- **Improves suspension value chain.**
 - ➔ **Contribute to the HDD industry through Advanced technology.**
- **Leverage Hutchinson's innovative technologies: Additive Metal Deposition, precision components and SMA technology for cameras.**
 - ➔ **Apply HDD Suspension component technologies for micro electronic components in ICT market.**



Multiple layer circuits
by additive deposition



High density, thin micro coil by
additive deposition

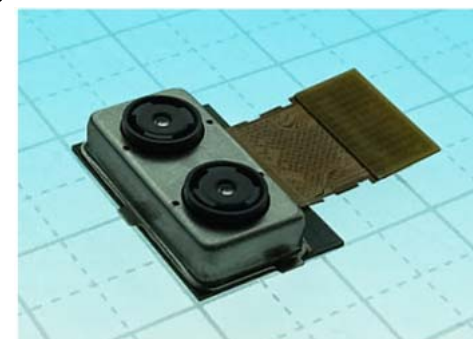
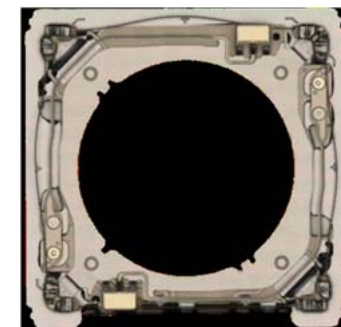
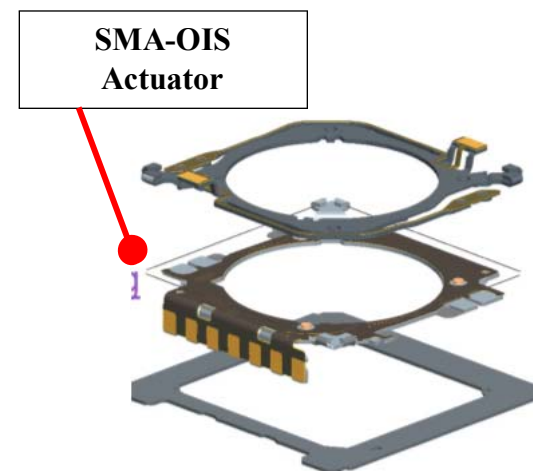


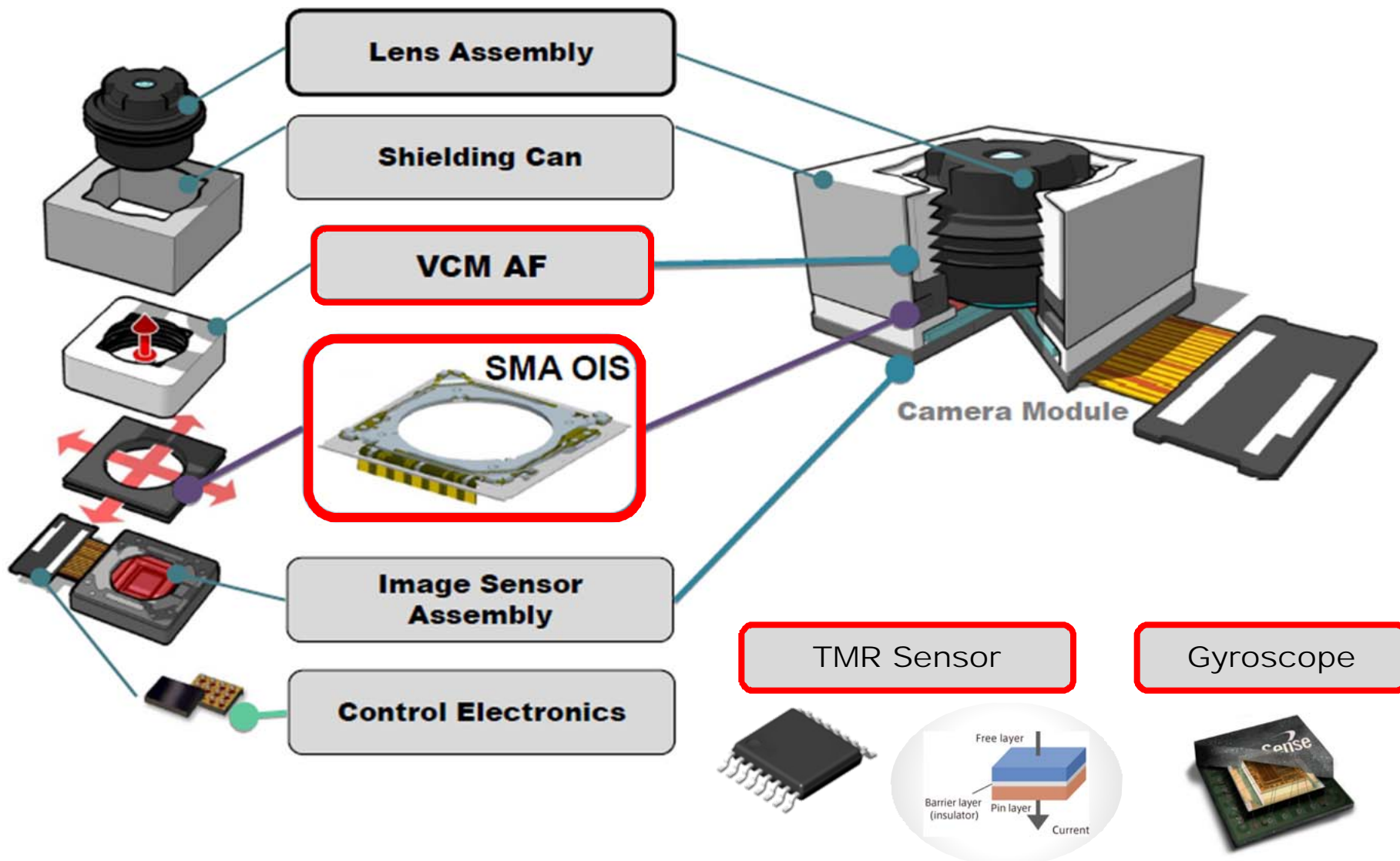
SMA (Shape Memory Alloy)
Optical Image Stabilizer



➤ Camera Module Business in ICT Market (Shape Memory Alloy Technology for OIS)

- Easier to implement Automation process.
- Leverages existing HDD suspension process, components and technology
- Enables lower module (AF + OIS) height. (3.0 mm thickness, Other types are 3.2-3.5mm) and Larger lens size for same footprint
- Lower power consumption (2-5x less than VCM), and low heat dissipation
- Inherent position sensing through resistance of SMA wire. Does not need position sensors
- No magnetic influence benefits Dual Camera applications
- Auto Focus applications under development





Energy Devices Business Strategy (Rechargeable Batteries Business)

Fumio Sashida

CEO of Energy Devices Business Company

Joe Lam

COO of Amperex Technology Limited

◆ Energy Device Business

- Stage 1 : FY06-17
- Stage 2 : FY18-

Fumio Sashida

◆ Target market and application for Stage 2

Joe Lam

◆ Energy Device Business

- Stage 1 : FY06-17
- Stage 2 : FY18-

Fumio Sashida

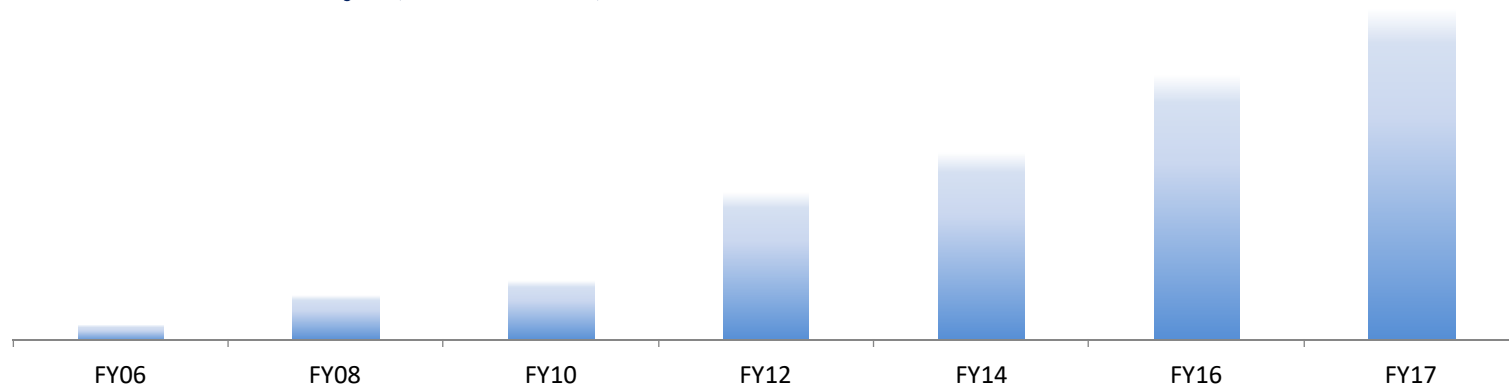
◆ Target market and application for Stage 2

Joe Lam

Stage 1 (FY06-17)

- ◆ Our Product : Pouch cell battery (from niche to main product)
- ◆ Target Market : ICT
- ◆ Application : Blue tooth, MP3, Smartphone, Tablet, Notebook,...
- ◆ Our strength : Speed and flexibility to catch up dynamism of ICT industry and customer needs

Revenue history (FY06-17)



Stage 2 (FY18-)

◆ Overall Strategy

- Invest next generation technology for higher reliability and safety
- Perpetual technology innovation

◆ Target Market /Application:

① ICT : Smartphone, Tablet, Notebook, ...

⇒ Realize higher growth than market average to build solid foundation

[Opportunity]

- ✓ Replacement from prismatic cell
- ✓ Development of new emerging countries

② Non-ICT & Industrial

- Drone, AR/VR, Robots, AGV, ESS/UPS, Power Tool, ...

⇒ Utilize unique characteristic of punch cell to capture business opportunity in the market

[Challenge]

- ✓ To provide value-added products to provide solution to customers
- ✓ Higher requirement of product reliability and safety

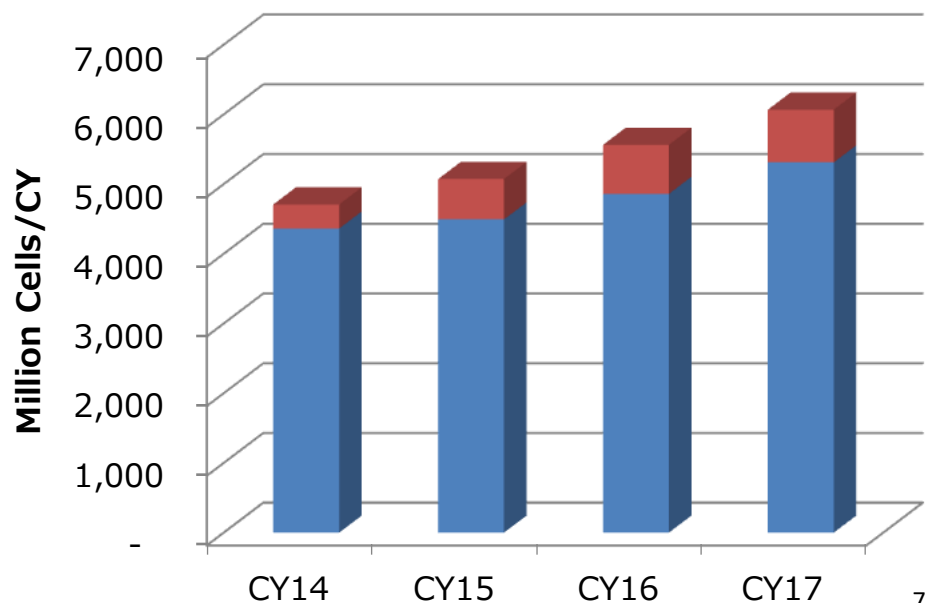
◆ Energy Device Business

- Stage 1 : FY06-17
- Stage 2 : FY18-

Fumio Sashida

◆ Target market and application for Stage 2

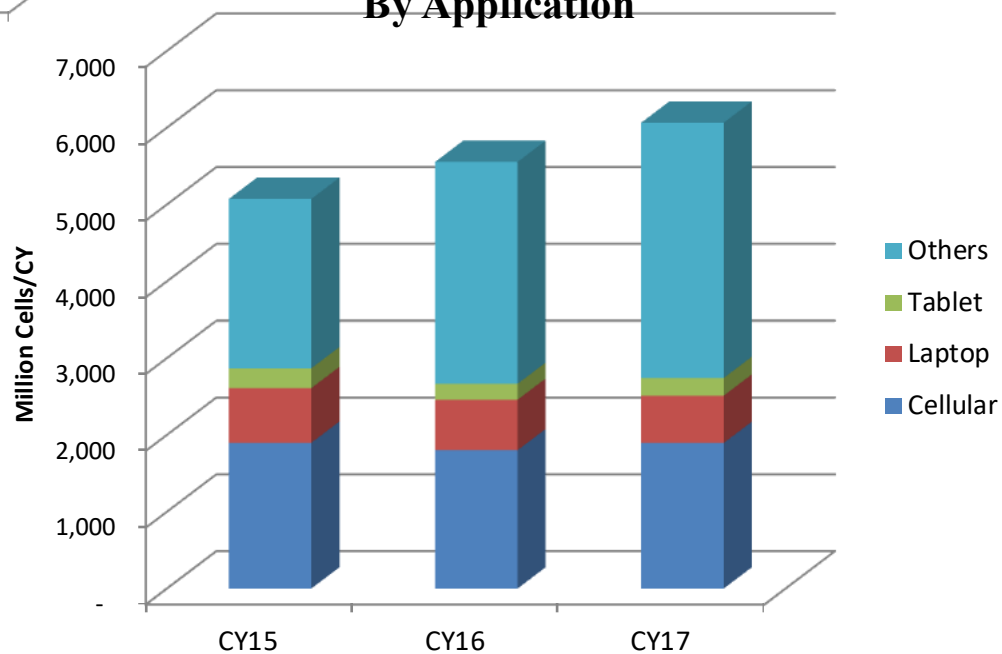
Joe Lam



Healthy growth of ATL & industry

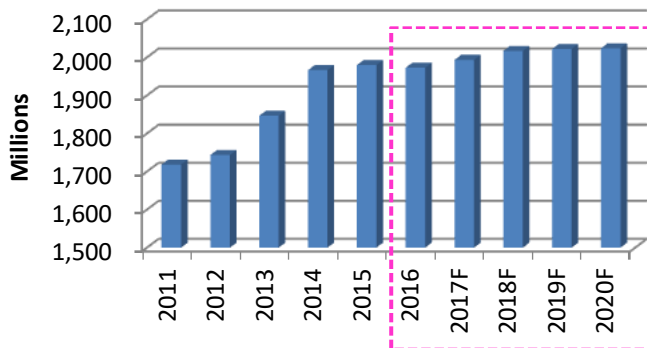
■ ATL
■ Others

By Application

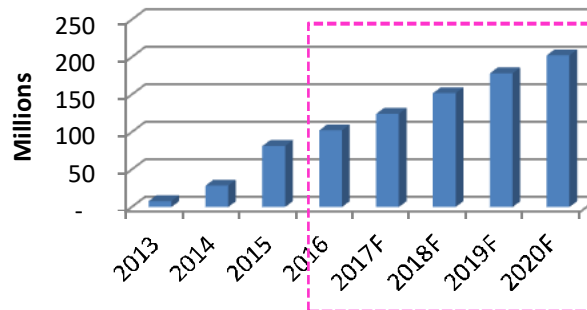


Data Source: B3 Report 2017
(including cylindrical and prismatic)

Smartphone (Maturing)

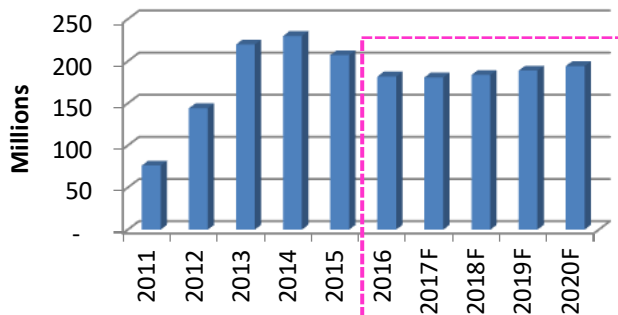


Wearable (Fast Growing)

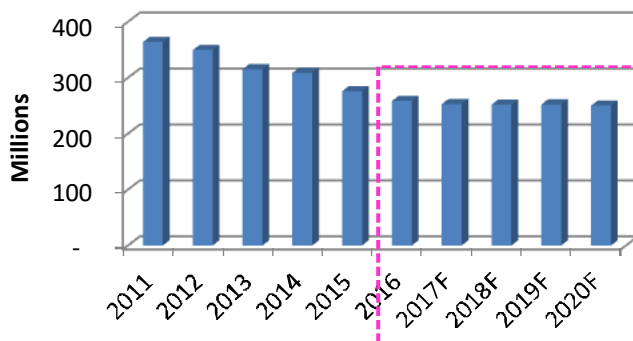


Source: IDC 2017 (including cylindrical and prismatic)

Tablet (Recovering)

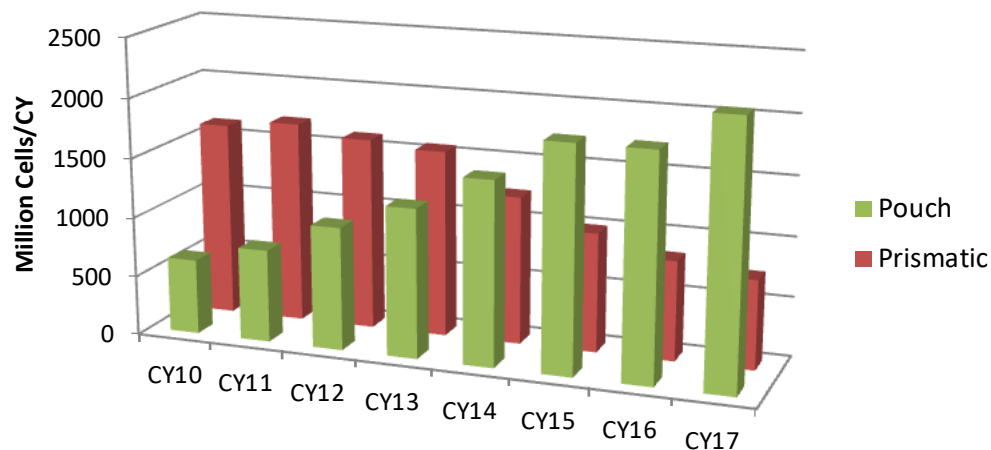


Laptop (Stabilizing)

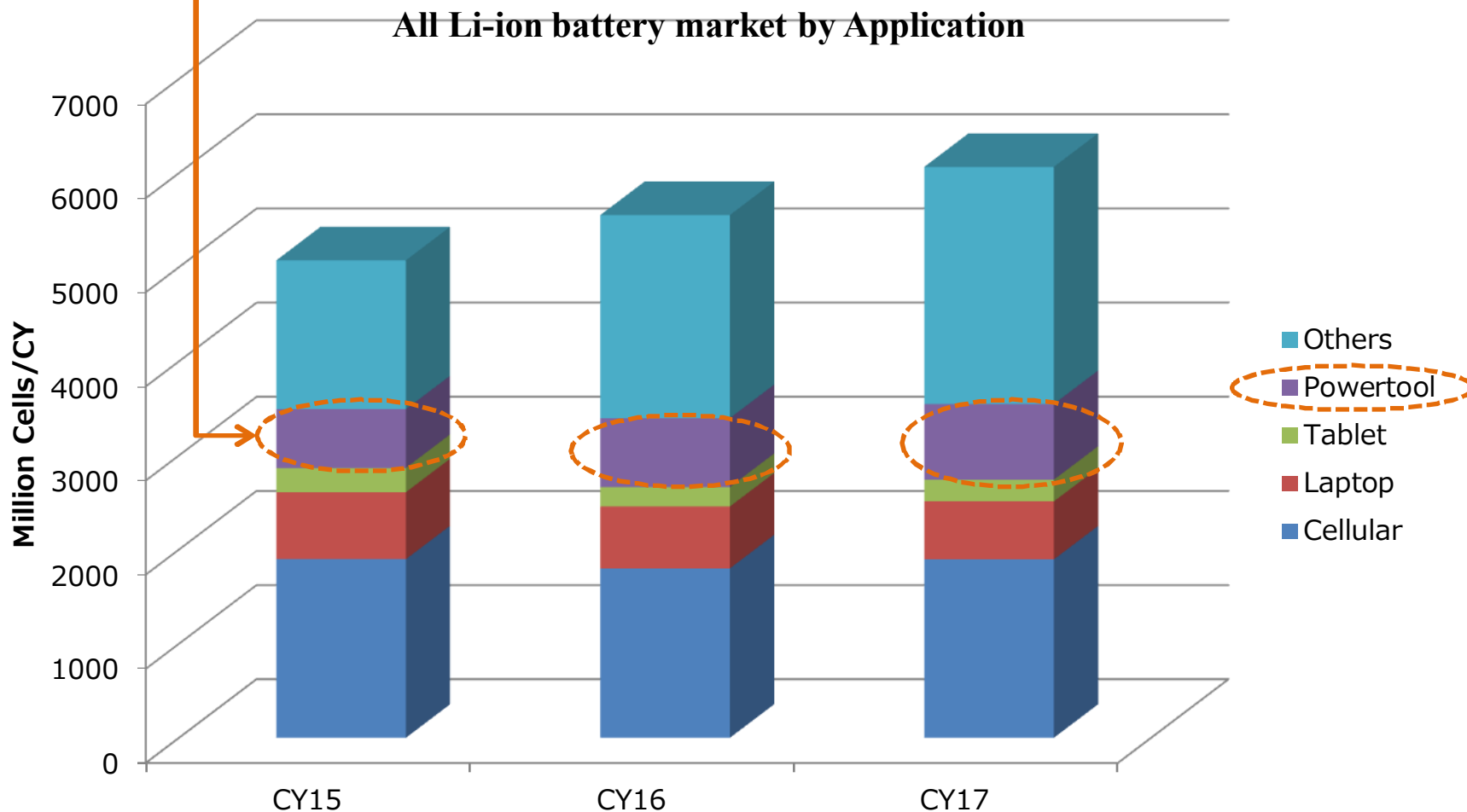


Li-ion battery market by Type

Source: B3 2017



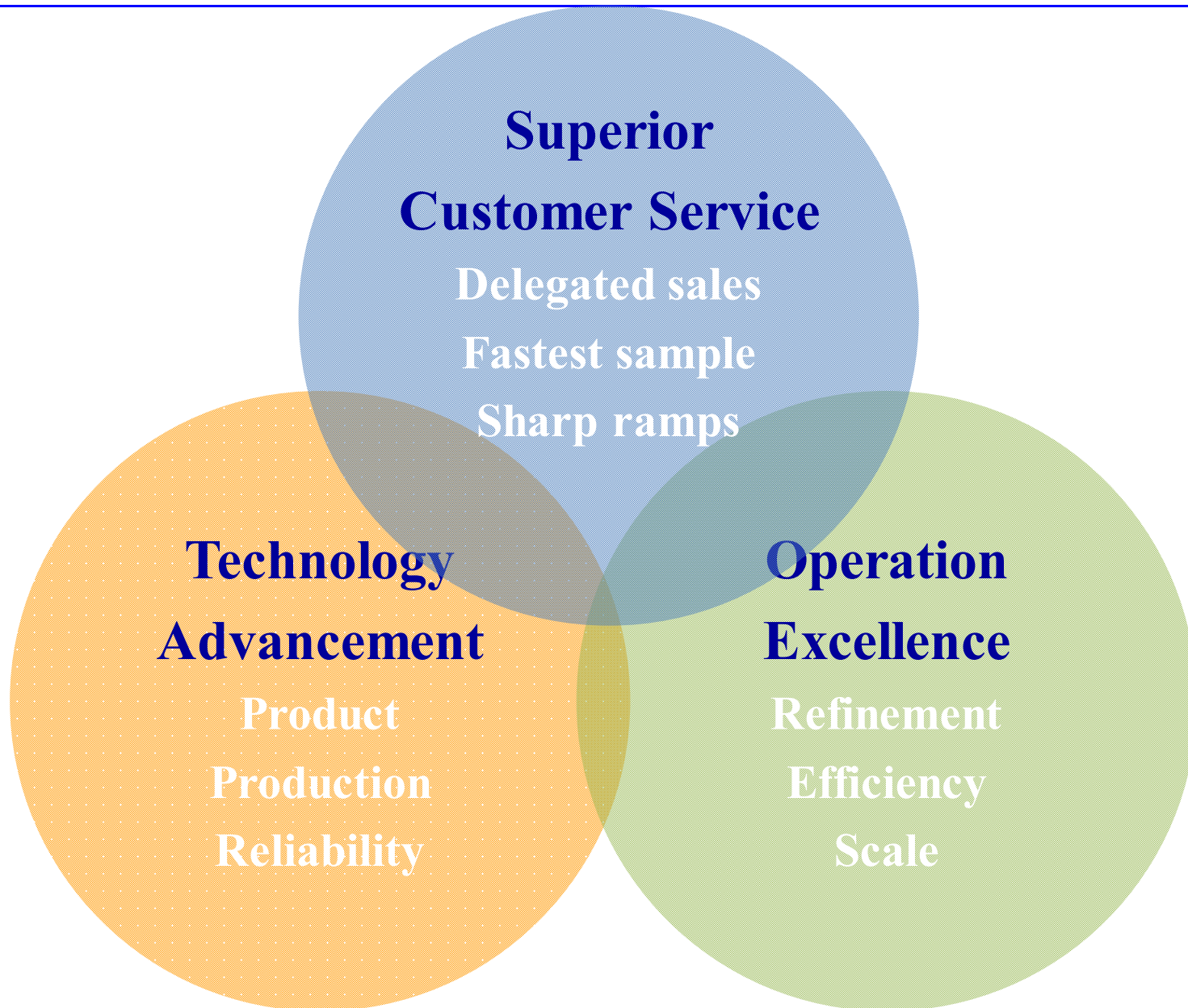
Power tool market as big as Laptop



Data Source: B3 Report 2017 (including cylindrical and prismatic)

Market	Status	Application	Growth Path
CE	Existing/ Mature	Smartphone Laptop Tablet	Replace prismatic organically
CE/ Consumer/ Industrial	New/ Emerging	AR/VR Drone Robots	New product development
Consumer/ Industrial	Existing/ Mature	AGV ESS/UPS	New product development
Consumer/ Industrial	Existing/ Mature	Power Tool Garden Tool Floor Care	New product development





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