Semiconductors Segment

Executive Vice President
Sony Corporation

Representative Director and President
Sony Semiconductor Solutions Corporation

Representative Director and President
Sony Semiconductor Manufacturing Corporation

Terushi Shimizu

1. Business Environment
2. Long-Term Business Strategy
1. Business Environment

Worldwide Image Sensor Shipments (Revenue Basis)

New Area
- Automotive: No change in the speed of growth of the ADAS market
- Factory Automation: Growth market in the mid to long term
- Security: Stagnant market from late FY18 to early FY19; Expect recovery in FY19

Mobile Area
- Market expansion from multiple lens and large sized sensors
- Steady adoption of sensing products although the pace of market growth is slower than expected

AV Area
- No change in expansion of high-end sensor market

※Source: Sony
Mobile Market Growth: Smartphone Units x Multiple Lens x Larger Size

- **Approximately 15%**
  - Average Annual Increase in Multiple Lens Adoption
- **Approximately 20%**
  - Average Annual Increase in Sensor Size

**Smartphone Multiple Lens Adoption Rate**

**Smartphone Sensor Optical Size**

*Source: Sony’s Forecast*

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Toyota Corolla Sports vehicle with Sony’s sensor was awarded the top score in the automatic braking tests for night-time pedestrians (1st half of FY18)

Alarm Sound

Brake!

TOYOTA  DENSO
Automotive Initiatives

- Achieve quality and functionality for automotive - high sensitivity, high resolution, and capable of reducing LED flicker while maintaining high dynamic range

Recent initiatives
Automotive image sensor space

- Able to integrate large amounts of raw data from camera images, LiDAR and millimetre radar
- Identify objects even in harsh conditions

Initiatives for the future
Sensor fusion

Automotive Initiatives: Sensor Fusion

Current Technology

Sony’s Sensor Fusion

- Identify car ahead despite fog making it difficult to see
- Identify car ahead despite glare making it difficult to see
- Identify car ahead despite headlights and rain making it difficult to see

Scene 1: Fog  Scene 2: Backlight  Scene 3: Night & Rain
Image Sensor Revenue Share Target

Sony
51%*

FY25 Target

Sony
60%

Source: Sony

Revenue Portfolio Target

Sensing
Several%

FY25 Target

Sensing
30%

Source: Sony
**Image Sensor CAPEX**

- **FY12-14**: Small investment
- **FY15-17**: Moderate increase
- **FY18-20E**: Approx. 700 billion yen
- **FY21E-23E**: Significant increase

**ROIC Target / Roadmap to Improvement**

- **FY18**: Actual 15%
- **FY21**: Increase to Target 20%-25%
- **FY25**: Further improvement

- **ROIC**
  - Higher functionality, higher value added products
  - Operational improvement

- **Margin**
  - Decrease in depreciation and R&D

- **Invested Capital Turnover Rate**
  - CAPEX increase due to higher demand
  - Improvement in turnover rate due to decrease in CAPEX investment

*Sony Corporation*
2. Long-Term Business Strategy

### Long-Term Business Strategy

<table>
<thead>
<tr>
<th>FY19-21</th>
<th>Beyond FY21</th>
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</thead>
<tbody>
<tr>
<td><strong>Market Environment</strong></td>
<td><strong>Market for mobile-use image sensors grows</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Mobile 3D sensing penetration expands</strong></td>
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<td></td>
<td><strong>Sensor market growth stabilizes</strong></td>
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<td></td>
<td><strong>Use case diversifies</strong></td>
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<tr>
<td><strong>HW Strategy</strong></td>
<td><strong>Aggressively invest to maintain No.1 position</strong></td>
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<tr>
<td></td>
<td><strong>in imaging and take No.1 position in sensing</strong></td>
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<td></td>
<td><strong>Generate cash flow</strong></td>
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<td></td>
<td><strong>Expand the business through new use cases in sensing</strong></td>
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<tr>
<td><strong>SW Strategy</strong></td>
<td><strong>Pursue partner strategy in the software space</strong></td>
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<tr>
<td></td>
<td><strong>Combine edge AI processing with sensor hardware</strong></td>
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<tr>
<td></td>
<td><strong>Pursue a recurring revenue business model</strong></td>
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*HW: hardware, SW: software*
Sony Sensors Used in Various Applications Around the World

Cloud and Edge AI Processing

Cloud AI Processing

- Processing
- Benefit:
  - Big data processing is possible
  - Less influence from edge device performance

Edge AI Processing

- Processing
- Benefit:
  - Ensure privacy
  - Reduces data transfer time
  - Reduces cloud usage costs
  - Reduces bandwidth
Image Sensors × AI Possibilities

**Imaging** × **AI**

**Sensing** × **AI**

**Better Picture Quality**
Possibilities limited to the number of human eyes

- Utilizes complementary colors
- High sensitivity and color reproduction

- Moire

**Recognition and Machine Vision**
Unlimited Possibilities

- Eliminates moire
- Correction beyond physical limitations

Role of Image Sensors in the AI Era

**What Image Sensors Aimed To Do Up Until Today**
Create clean images based on how human eyes see the world

**What Image Sensors Aim To Do Going Forward**
Create clean image data based on how AI sees the world
Integration of Edge AI Processing and Sensor Hardware

Sony Image Sensors

AI

Applications

Integrate edge AI processing and sensor hardware
Pursue a recurring revenue business model

Revenue basis, Source: Sony

Increase Image Sensor Possibilities with Stacked Structure

AI

Embed

Recognition

Pixels

Logic

Sony Corporation
Growth in Image Sensor Business
Sensing
Edge AI

FY2018 Review

<table>
<thead>
<tr>
<th>Operating Income Analysis (bn yen)</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales</strong> 850.0 Image Sensors 649.3</td>
<td>Increase in sales and OI in image sensors for mobile-use due to the shift to multiple lenses and larger sized sensors</td>
</tr>
<tr>
<td><strong>Operating Income</strong> 164.0</td>
<td>Adoption of Sony’s ToF sensors for mobile applications</td>
</tr>
<tr>
<td><strong>Sales</strong> 879.3 Image Sensors 711.4</td>
<td>Increased presence in the automotive market</td>
</tr>
<tr>
<td><strong>Operating Income</strong> 143.9</td>
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</table>

**Issues**

- Adaptability to market volatility for factory automation and security cameras

* Please refer to slide 24 of Presentation Material for FY2018 Earnings.
**FY2019 Forecast**

**Operating Income Analysis (bn yen)**

- **Sales**: 879.3
  - Image sensors: 711.4
  - Exchange rate
  - Inventory change
  - Depreciation
  - Unit increase /
    Product Mix
  - Cost reduction
- **Operating Income**: 143.9

**Environment**

- Acceleration in multiple lens and larger sized sensor adoption
- Sensor market for factory automation and security are expected to recover from the second half of FY19, after a slowdown in the second half of FY18

**Basic Strategy**

- Invest to meet the growing demand for sensors
- Accelerate initiatives to generate monetization opportunities that go beyond selling sensor hardware

**Sony Corporation**