Welcome to the IFR CEO Round Table

20 June 2018 Munich
Schedule

Welcoming and presentation of the participants of the IFR CEO Round Table
Gudrun Litzenberger, IFR General Secretary

Preview on World Robotics Industrial Robots 2018
Junji J. Tsuda, IFR President

Discussion on Robots and AI: Vision and Reality

Get together and personal interviews with the participants
International Federation of Robotics
Representing the global robotics industry

- Robotics turnover 2017: about $50 billion
- More than 50 members:
  - National robot associations
  - R&D institutes
  - Robot suppliers
  - Integrators
- Sponsor of the annual International Symposium on Robotics (ISR)
- Co-sponsor of the IERA Award
- Primary resource for world-wide data on use of robotics – IFR Statistical Department
Speakers on the Panel – Robot Suppliers

Dr. Kiyonori Inaba  
Director Executive Managing Officer, General Manager  
ROBOT Business Division, FANUC CORPORATION Japan

Stefan Lampa  
CEO  
KUKA Industries Germany

Per Vegard Nerseh  
Group Senior Vice President  
ABB  
Switzerland
Speakers on the Panel:

**Expert**

**Professor Dr. Bruno Siciliano**
Director of ICAROS and Coordinator of the PRISMALab
University of Naples Federico II, Italy

**Robot user**

**Dr. Markus Kueckelhaus**
Vice President
Innovations & Trend Research
DHL
Germany
Presentation of WR Data

Junji J. Tsuda
IFR President
Representative Director Chairman of the Board
Yaskawa
Japan

Moderator

Ken Fouhy
Moderator, Editor in Chief, Innovations & Trend Research
VDI Nachrichten
Germany
Preview on World Robotics 2018

Industrial Robots 2017
- Global installations
- Regions
- Main Markets
- Main Customers
- Challenges of the Robotics Industry
2017: record growth of industrial robots

Estimated worldwide annual shipments of industrial robots 2006 – 2017*

*preliminary results of 2017

Source: IFR Statistical Department
2017: considerable increase in all regions

Estimated worldwide annual supply of industrial robots at year-end by regions 2015 – 2017*

<table>
<thead>
<tr>
<th>Region</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia/Australia</td>
<td>50</td>
<td>67</td>
<td>191</td>
</tr>
<tr>
<td>Europe</td>
<td>50</td>
<td>56</td>
<td>67</td>
</tr>
<tr>
<td>America</td>
<td>38</td>
<td>41</td>
<td>50</td>
</tr>
<tr>
<td>All others</td>
<td>5</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

+37% increase in 2017 compared to 2016

*preliminary results of 2017

Source: IFR Statistical Department
China: Main driver of growth in 2017

Annual shipments of industrial robots in China 2007 - 2017

Source: IFR Statistical Department
Top 5 countries represent 72% of total sales in 2017

Estimated worldwide annual supply of industrial robots at year-end main markets 2015 – 2017*

- China: 138,000 of units (+58%)
- Japan: 87,000 of units (+18%)
- Rep. of Korea: 41,000 of units (+6%)
- United States: 40,000 of units (+8%)
- Germany: 28,000 of units (+8%)

*preliminary results of 2017

Source: IFR Statistical Department
Vietnam now 7th largest destination

Estimated worldwide annual supply of industrial robots
at year-end main markets 2015 - 2017

<table>
<thead>
<tr>
<th>Country</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>+410%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>+410%</td>
</tr>
<tr>
<td>Italy</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>+19%</td>
</tr>
<tr>
<td>Mexico</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>+19%</td>
</tr>
<tr>
<td>France</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>+16%</td>
</tr>
</tbody>
</table>

Source: IFR Statistical Department
2017: electronics, automotive and metal industry are main drivers

<table>
<thead>
<tr>
<th>Industry</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive industry</td>
<td>103</td>
<td>98</td>
<td>77</td>
<td>+21%</td>
</tr>
<tr>
<td>Electrical/electronics</td>
<td>116</td>
<td>111</td>
<td>91</td>
<td>+27%</td>
</tr>
<tr>
<td>Metal</td>
<td>44</td>
<td>29</td>
<td>29</td>
<td>+54%</td>
</tr>
<tr>
<td>Chemical, rubber and plastics</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td>+9%</td>
</tr>
<tr>
<td>Food</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>+19%</td>
</tr>
<tr>
<td>Others</td>
<td>41</td>
<td>24</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Unspecified</td>
<td>125</td>
<td>116</td>
<td>98</td>
<td></td>
</tr>
</tbody>
</table>

Estimated annual supply of industrial robots at year-end by industries worldwide 2015-2017

Source: IFR Statistical Department
Challenges of the robotics industry

Simplification – critical to SMEs, but also important for large Global Manufacturers

• Easier to use robots with more intuitive programming
• Standardisation and consistency across global brands

Digitalisation - Big Data allowing people to make better decisions about factory operations

• Industry 4.0, linking the real-life factory with a virtual one
• Vision and sensing devices, coupled with analytics platforms
• Machine Learning/AI
Challenges of the robotics industry

Collaboration - humans and robots in shared workplaces without fences opens up new possibilities and concepts in production and in non-industrial areas

• Robots assist humans in the workplace
• More flexibility in the production process – Increase of productivity
  – Shop floor flexibility – not defined by cages
  – New processes to manage low-volume high-mix production
• Cobots in warehouses to manage increasing order volume
Robots and AI – Vision and Reality
Thank you!

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