How we strengthen our innovative power

Ulrich Küsthardt,
October 5, 2017, Essen
Innovation in flux

**Incremental innovations**
- Maintaining sales and market position:
  - Updating/adapting products
  - Improving production efficiency
- Strength of established organizations

**Disruptive innovations**
- Displacing existing businesses
- Encroaching upon existing supply chain
- Strength of startups and open joint ventures
- Strength of Creavis
Over €4 billion planned for R&D from 2015 to 2025

Innovation KPIs:
What we invest

R&D expenditures and R&D rates

<table>
<thead>
<tr>
<th>Year</th>
<th>R&amp;D expenditures [€ million]</th>
<th>R&amp;D/sales [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>365</td>
<td>2.5</td>
</tr>
<tr>
<td>2012</td>
<td>393</td>
<td>2.9</td>
</tr>
<tr>
<td>2013</td>
<td>394</td>
<td>3.1</td>
</tr>
<tr>
<td>2014</td>
<td>413</td>
<td>3.2</td>
</tr>
<tr>
<td>2015</td>
<td>434</td>
<td>3.2</td>
</tr>
<tr>
<td>2016</td>
<td>438</td>
<td>3.4</td>
</tr>
<tr>
<td>2025</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ 3.6%
How we organize our innovation portfolio

€438 million

**Examples**
- **POLYVEST® ST**
  For tires with low rolling resistance
- **TEGO® Phobe**
  For high-quality building protection
- **VESTAMID® LX9115**
  For improving fire safety in railway vehicles
- **ORTEGOL® P1**
  For manufacturing synthetic PU leather with aqueous systems
- **Algae oil**
  For aquaculture
- **Digitalization in the chicken coop**
  For improving the health of chickens

**Incremental:**
- Securing market position ~70%

**Disruptive:**
- New business fields
- New business models
- New services ~30%

**Venture capital**
- (€100 million over the medium term)

**Direct investments**
- Vivasure Medical, Numaferm, Nanotech Industrial Solutions
Innovation Growth Fields: What we concentrate on

Growth Engines:
- Health & Care
- Smart Materials
- Animal Nutrition
- Specialty Additives

Innovation Growth Fields:
- Advanced Food Ingredients
- Additive Manufacturing
- Sustainable Nutrition
- Cosmetic Solutions
- Membranes
- Healthcare Solutions

More than €1 billion by 2025
Additional contribution to sales from all six Innovation Growth Fields
Example from the Sustainable Nutrition Innovation Growth Field

The Animal Nutrition Growth Engine

The challenge: Raising healthy chickens without antibiotic growth promoters

The solution: Develop chicken probiotics in house, complemented by technology acquisitions

- Leveraging our biotechnology competence in probiotics
- Acquisition of the probiotics business of Norel S. A. in 2016
  - Already approved and established brands
  - Access to the regulated and attractive European probiotics market
- In-house product development: GutCare®
  - In 2017 market launch in the US, China, India, and Bangladesh

Rollout of a global probiotics business within 12 months
Example from the Healthcare Solutions Innovation Growth Field

The Health & Care Growth Engine

The challenge: Selective release of modern active ingredients (biopharmaceuticals, etc.)
The solution: Expand portfolio by acquiring technologies

### Products

- **EUDRAGIT®**: Established Evonik product
- **RESOMER®**: Boehringer Ingelheim (2011)
- **LAKESHORE BIOMATERIALS™**: Surmodics Inc. (2012)
- **LIPEX®**: Transferra Nanosciences Inc. (2016)

+ Selected venture capital investments (e.g. Vivasure)

Evonik as an enabler and strategic partner for the pharmaceuticals industry

---

Illustration: C3 Visual Lab
Example from the Membranes Innovation Growth Field

The Smart Materials Growth Engine

The challenge: Gas extraction is energy intensive

The solution: A membrane system that uses resources efficiently; all key aspects adaptable

- **Superior gas separation**: biogas, helium, nitrogen, hydrogen, and natural gas
- **System solution**: complete system consisting of the polymer, membrane, module, and process; entire supply chain covered
- **Open innovation**: basic system developed in house and adapted to a given application in collaboration with the customer (example: Linde/helium extraction)
How we continue developing our culture of innovation

The challenge: Continue developing our technology portfolio and tapping into new business opportunities

The solution: Venture capital—learning from startups

- Early insights into technology trends, disruptive innovations, and new business models
- Review over 500 startups per year
- Acquire a direct share in 11 startup and technology companies as a strategic investor
- Radar for technologies of the future: investments in 7 funds
- Total volume: €100 million
- Examples: Vivasure, High-Tech Gründerfonds, Hosen Capital
How we foster staff development

The challenge: The market is becoming more dynamic

The solution: Encourage a startup mentality

- The Evonik Entrepreneurship competition
- Teach agile methods:
  - Reduce development cycles
  - Introduce products onto the market more quickly
  - Fail faster
  - Learn from mistakes
Innovation KPIs for 2016: Where we stand

56% patent-driven sales

33% increase in the value of innovation pipeline\(^1\)

3.4% R&D rate

€438 m R&D expenditure\(^2\)

10% sales from new products and applications\(^3\)

\(^1\) since 2012 \(^2\) since 2011: increase by 3.6% p.a. \(^3\) younger than 5 years
Innovation KPIs: What we want to achieve

R&D rate
Continue to exceed 3 percent mark in the medium term

R&D expenditure
€4 billion over the next ten years (from 2015)

Innovation pipeline
Continuous increase in value

Evonik Innovation Growth Fields
€1 billion additional turnover by 2025

Our goals

Products/applications younger than five years
16 percent share of overall sales (medium term)
## Key strategic objectives

### Focus on the innovation portfolio
- Innovation Growth Fields
- Collaborations along the value chain
- Technology acquisitions

### Strengthen the innovation culture
- Learn from startups
- Entrepreneurship competition
- Teach agile methods
- Open Innovation

### Grow through innovation
- Increase the value of the innovation pipeline
- Increase sales of products developed within the past 5 years
- Generate additional sales through Innovation Growth Fields