Towards Excellence in Innovation at DSM

The Life Sciences and Materials Sciences Company contributing to Quality of Life

Rob van Leen, Chief Innovation Officer

DPI, Maastricht, 22 November 2007
> 105 Years of successful transformation

**Evolution**

Technological Competencies

- Mechanical technology
- Chemical technology
- Polymer technology
- Material sciences
- Fine chemistry
- Biotechnology


- Bio-materials
- Life Science Products
- Performance Materials
- Petro-chemicals
- Fertilizer
- Petro-chemicals
- Life Science Products
- Performance Materials
- Petro-chemicals
- Fertilizer
- Coal

**The DSM Business Card**

- Global top of chemical industry
- Shift to life sciences
- Net sales 2006: € 8.4 bn
- EBIT 2006: € 835 mln
- 75% of businesses among the global leaders
- 22,000 employees
- 250 locations on 5 continents
DSM Activities - Clusters

Managing Board

Innovation Center

Corporate Staff

Shared Competence & Services

Nutrition
- Animal Nutrition & Health
- Human Nutrition & Health
- New Business Development
- Food Specialties

Pharma
- Fine Chemicals
- Pharmaceutical Products
- Anticancer

Performance Materials
- Engineering Plastics (incl. Dyneema)
- Resins
- Coatings

Industrial Chemicals
- Fiber Intermediates
- Melamine
- Agri
- Energy

Vision 2010: Building on Strengths

Building on Strengths

- Market-driven Growth and Innovation
- Increased Presence Emerging Economies
- Operational Excellence

Value Creation
Accelerating Vision 2010

Climate and Energy
Health and Wellness
Functionality and Performance
Emerging Economies

Life Sciences
Materials Sciences

Nutrition
Pharma
EBAs
Performance Materials

Shared competencies
- Markets
- Technologies
- Functional Excellence

Exploiting strong market positions and technology platforms

DSM Nutrition

DNP Animal Nutrition and Health
DNP Human Nutrition and Health incl. Personal Care
DSM Food Specialties
Citric acid
DSM Special Products

Drivers
- Better nutrition to stay healthy
- Increased convenience foods
- Innovation to protect brands
- Food chain productivity and safety

2006 sales ~ € 2.4 bn
DSM Pharma

- Aging demographics
- Emergence of generics
- Growth of biopharma

2006 sales ~ € 0.9 bn

DSM Pharma Products

- Clavulanic acid
- Maleic anhydride

DSM Performance Materials

- Electrics & Electronics
- Transportation
- Building & Construction
- Paint & Coatings
- Packaging
- Safety & Protection

2006 sales ~ € 2.8 bn
Vision 2010: Building on Strengths

Building on Strengths
- Market-driven Growth and Innovation
- Increased Presence Emerging Economies
- Operational Excellence

Value Creation

Vision 2010: Innovation Boost

Innovation Boost
- Stronger business-driven innovation (incl. mindset)
- Up to €1 billion additional sales by 2010
- Building mid- to long-term new business via EBAs
- Improved Innovation practices

Input
- Building on excellent R&D & innovation capabilities
- €30 → €70 mln additional annual budget for selected innovation programs
- 15% of Capex → NBD
- ~250 FTE extra
- 11 Accelerated Growth Areas
- 4 Emerging Business Areas

Leading to an Intrinsically Innovative Company
Global Trends as Basis for Innovation

**Societal trends**
- Individualization
- Global networking
- Age and population growth
- Health, environmental and safety awareness

**Technology trends**
- Biotechnology
- Nanotechnology
- Information technology
- Process technology

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**Intensify Existing Innovation Programs**

**Nutrition/Health**
- Food
  - Fitness & Wellness
  - Metabolic syndrome
  - Cognitive function
- Feed
  - Eubiotics
  - Improved feed conversion
  - End product quality
- Health
  - PER.C6 human cell line
  - Generic APIs

**Performance Materials**
- Resins
  - Eco-friendly coatings
- Engineering materials
  - High Performance Materials e.g., Stanyl Excel

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Intensify ‘open innovation’ via partnering, venturing, & NBD
### Start up Emerging Business Areas

<table>
<thead>
<tr>
<th></th>
<th>Biomedical Materials</th>
<th>Specialty Packaging</th>
<th>Personalized Nutrition</th>
<th>White Biotech (incl. Enzymes)</th>
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#### Characteristics of Emerging Business Areas:
- Field driven by global mega and technology trends
- Within the Corporate portfolio priorities
- Building upon DSM capabilities (business, markets, technical)
- Potential to generate multiple business opportunities
- Potential for real impact on DSM profile

### Emerging Business Areas beyond 2010

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<td>Focus on:</td>
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<td>- Coatings &amp; Implants</td>
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<td>- Drug device combinations</td>
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<td>- Regenerative medicine</td>
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<td></td>
<td>- Food packaging (freshness)</td>
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<td>- Pharma (compliance)</td>
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<td>- Smart packaging</td>
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<td>Focus on:</td>
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<td>- Assessment/advice/feedback</td>
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<td>- Weight management</td>
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<td>- Hypertension</td>
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<td></td>
<td>- BioFuels</td>
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<td>- Bio-based chemicals</td>
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<td>- Enzymes &amp; yeasts</td>
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The DSM Innovation Center

Rob van Leen
Chief Innovation Officer

- Corporate Technology Management
- Intellectual Property
- Licensing
- Business Incubator
- Venturing
- EBA Biomedical Materials
- EBA Personalized Nutrition
- EBA Specialty Packaging
- EBA White Biotechnology

http://innovation-center.intranet.dsm-group.com

Strong innovation practices generate high return

Managing innovation with good practices makes a difference

Impact

R&D return*

High

Low

Weak

Strong

Innovation practices**

Innovation practices

1. Strategy/focus in line with headroom
2. Strong innovation engine from idea generation to launch
3. Breaking orthodoxies that limit innovation headroom

* Studies show innovation returns are highly correlated with strong innovation practices.
** Strong innovation practices are defined as a combination of high R&D return and strong innovation practices.

Source: Various studies and surveys.
Status Example Practices on Innovation

Aspiration and strategy:
- Business Innovation
- Analysis
- Process in development

Portfolio management:
- Installed and supported

Idea generation:
- Many options available

Project management:
- Project Plaza rolled out

Launch:
- CMO toolbox established

External networks:
- Open innovation model implementation

Culture, talent and organization:
- E.g. summits & communities established, building further

Value Creation by Open Innovation

Open innovation is no longer a competitive advantage!
It has become a competitive necessity!

1a Market Scouting / Business Intelligence

2 Joint Business Developments

3 R&D services

4a Licensing In

4b Licensing Out

5 Venturing

6a Spin in

6b Spin out

7a Acquisitions

7b Divestments

8 Intellectual Asset Management
Fabuless:  Venturing -> Licensing -> Acquisition

LTP
Lipid Technologies Provider AB

Current Active Portfolio DSM Venturing

CREAGRI, INC.  JURILAB  micromuscle  ORYXE
Harland Medical Systems  ProVita  Sol-Gel Technologies

Supreme Bio  FortePhaco  XYLOS  UnimelTec
Innovation Sales Growth until 2010

Innovation Sales Growth per Cluster

Target Vision 2010: innovation sales of € 1 billion

Output 2006: Building Blocks towards € 1bn

Astonishing Stanyl® for LED dies, connectors and joystick housings

ARNITEL® C for heat stable cables

Dyneema® for air cargo safety nets

NeoPac® E-160 for furniture wood coatings

NeoCryl® A-2090 family, food contact compliant resins

PER.C6®

Pharma, IC, EBAs target: € 200 m

Nutrition target: € 400 m

Performance Materials target: € 400 m
2007 Building Blocks towards € 1 bn

Performance Materials new target: € 400 m
Nutrition target: € 400 m
Pharma, IC, EBAs target: € 200 m

Daron® turane: an new DSM family of thermoset urethanes
- More strength at less weight
- Superior processing characteristics
- For body parts of cars, windmill blades, construction elements, etc.

Nuna4 solar powered vehicle
Winner World Solar Challenge
Australia, October 2007
Less & Better with Dyneema®

- **Less**
  - 7x lighter than steel for equal lifting capacity
  - Minimizes damage to load
  - Avoids transport by crane (12kg vs 100kg steel wire slings)

- **Better**
  - Easier and more precise lifting
  - Much safer for operators
  - More durable

Heavy duty lifting slings

DSM and the knowledge-based bio-economy

White Biotechnology delivers products and energy

Economy and Ecology go hand in hand
Agricultural (by)products

- Sugars
  - Chemo-physical treatment and/or enzymes
  - Cell factory: Biocatalysis or Micro-organisms

**DSM future**
- Biospecialties
  - Food ingredients
  - Pharmaceuticals
  - Fine chemicals
- Biomaterials
- Base Chemicals
- Biofuels

**Bulk chemicals**

**Fine chemicals**

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**Pharmaceutical ingredient: Bio-based Cephalexin intermediate**

**Fermentation**

Sugar

**Enzymatic**

**Recovery**

7-ADCA
2005: 50% capacity increase

Nutritional Ingredient: Bio-based Vitamin B2

Improvements w.r.t. chemical process
- 12 raw materials replaced by sugar
- 7 solvents replaced by water
- Waste reduction of over 75%
- Cost reduction of over 20%
New Processing Aid: Brewers Clarex

Brewers Clarex™
Novel enzyme for the cost-effective prevention of haze formation in beer

40% less haze compared to commonly used chemical clarifying agent (PVPP)
- No negative effect on foam and taste

Current lay-out of the Brewery

- Many batch operations
- Many powders used
- Risk of oxygen uptake
With Brewers Clarex

• New vision for brewing industry

Brew house
Ferm
Mat
Membrane Filtration
Beer

“particle-free concept”

Nutritional ingredient: Preventase

PreventASE™
The answer to Acrylamide
White biotech innovation in Nutrition

Preventing acrylamide formation by converting asparagine in aspartate

Leader in Sustainability, Now & in the Future

People, Planet, Profit

Climate & Environment

Nutrition Improvement

Internationalization & Diversity

DSM Values: “We can’t be successful in a world that fails”
We are on our way towards excellence in innovation

Unlimited DSM

The Life Sciences and Materials Sciences Company
contributing to Quality of Life