The Balancing Act between *Radical* and *Incremental* Innovation

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Unleashing Innovation

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IT’S IN OUR HANDS
Innovation is a way of life
Overview

- Introduction to Royal DSM
- Innovation
  - Open (Chesbrough) Model
  - Venturing
  - Radical vs. Incremental
- Breakthrough Examples
  - Bio Medical Materials
  - Bio-based Products & Services
  - Advanced (Solar PV) Surfaces
- Learnings
Royal DSM in 2013

- Net Sales (x billion) ~€ 9
- Employees (worldwide) 23,500
- Headquarter The Netherlands Heerlen
- Stocks Euronext Amsterdam

- Global science-based company active in health, nutrition and materials.
- Develops solutions that nourish, protect and improve performance.
- Leading position in Dow Jones Sustainability World Index
- Credit rating Single A
 DSM - understands change

Coal Mining
Commodity Chemicals
Specialty Chemicals
Life Sciences & Materials Sciences
Mission

Our purpose is to create brighter lives for people today and generations to come.

We connect our unique competences in Life Sciences and Materials Sciences to create solutions that nourish, protect and improve performance.
DSM in motion: *driving focused growth*

Global Shifts

Climate and Energy

Health and Wellness

High Growth Economies

Innovation

Sustainability

Acquisitions & Partnerships

Life Sciences

Materials Sciences

People - Planet - Profit: creating value along three dimensions
Building an intrinsically innovative company

20% Innovation Sales 2015

@ ~5% higher Gross Margins

Top Quartile McKinsey Innovation Benchmark 2012

€1B Disruptive Platforms, 2020
Accelerating and supporting innovation

DSM Innovation Center

New Business Development

- EBA Biomedical
- EBA Bio-based Products & Services
- EBA Advanced Surfaces
- Business Incubator

Enablers / Accelerators

- Excellence in Innovation
- CTO Office
- Licensing
- Venturing
Bright Science @work

R & D

Technology Platforms

Competences

Inventions

Knowledge

IP

Ideas

Know-how

Market Solutions

Innovation

Business Models
Why do we need Open Innovation?

99.996% of world population outside DSM!

Networks needed!
Value Creation by Open Innovation

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

Market Scouting / Business Intelligence

Fuzzy Front End

Interaction / Synthesis

Joint Business Developments

Licensing In

Venturing

Spin in

Acquisitions

R&D services (Chemelot)

Licensing Out

Spin out/off

Divestments

Well defined Rear End

Competence Development, Technology Intelligence

Intellectual Asset Management
Venturing: How to mitigate risks?
Venturing: an integral part of innovation

Since 2001

-> Scouted and screened more than 5,000 companies, which provided useful insights and complementary windows on-the-world for our businesses

Resulting in:

~40 direct investments; >20 active in current portfolio

Partnerships and collaborations realized with >50 companies in various forms and to varying degrees
Portfolio of Direct Investments

Life Sciences

- Provexis
- Sol-Gel
- upfront
- HARLAND Medical Systems
- Ganeden
- Regentis
- CellMade
- IntegraGen
- VIOCARE
- agennix

Material Sciences

- Van Technologies, Inc.
- SupraPolix
- Verdezyne
- DMat
- Segetis
- nanoholdings
- Cambrios
- Xolve
- Green UIO
- bioprocess control
- Skysails
- NOVOMER

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.
Manage the portfolio of innovations

- **Renew & Grow existing position**
- **Red Box**
  - Explore & Build
- **Maintain & Strengthen existing position**
- **Expand to adjacent markets**

- **Emerging**
- **Decline**

- **Existing**
- **New**

**Disruptiveness**
Breakthrough versus Incremental Innovation

**a balancing act**

Innovation Center

**Long term** Vision
Entrepreneurship
Agility

Breakthrough
Innovation

Pilot plants
Scaling-up

**Medium term** Vision
Operational Excellence
Lower risk

Sustainable, Profitable Innovations

Business Groups

Corporate Research Programs
The first natural, scientifically substantiated solution for healthy blood flow

EFSA (proprietary) health claim:

“Fruitflow® helps maintain normal platelet aggregation, which contributes to healthy blood flow”

People+

FiSA 2012: Fruitflow® one of the most innovative products of the year
Maxilact®
The freedom to enjoy dairy
People+

Lactose free is one of the fastest growing segments in dairy, driven by increasing awareness of lactose intolerance and health & wellness trend.

Maxilact® breaks down lactose in dairy products, making them suitable for lactose intolerant consumers.

DSM was the first company to commercialize lactase and has been innovating ever since to meet today’s and tomorrow’s lactase needs.
Brewers Clarex™
Natural beer stabilization system for extended shelf life

‘With DSMs Brewers Clarex™ CO2 emissions from brewing 1 hectoliter of beer are reduced between 5 and 8%’

‘Every December, in the UK a billion pints of beer are being sold’

Eco+ example
Reducing Methane Emission from Cattle

Identification and development of a feed additive(s) solution to:

1. reduce methane by 25-30% in vivo
2. with the potential for better performance (increased milk yield, increased daily weight gain, etc.).
Red Box growth platforms established

**DSM Biomedical**
Innovative materials that enable more advanced clinical procedures and improved patient outcomes

**DSM Bio-based products & Services**
Advanced Enzymes and Yeast platforms: enabling Advanced Bio-Energy and Bio-based chemicals

**DSM Advanced Surfaces**
Smart coatings and surface technologies to boost performance in the solar industry
DSM Bio-based Products & Services
From the Fossil Age to the Bio Age

Living off the land

A brief moment in history, “the Fossil age”

Living off the land
DSM in public-private partnerships for Industrial Biotechnology

- **CANADA**
  - Concordia University fungal enzymes screening

- **USA**
  - Cellulases development

- **UNITED KINGDOM**
  - BBSRC Sustainable Bioenergy Centre

- **FRANCE**
  - BIOHUB Succinium

- **THE NETHERLANDS**
  - B-BASIC
  - EIT KIC Climate
  - BE-BASIC
  - KACELLE
  - BIOCORE
  - Catchbio

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Biomass as a source of fermentable sugars
Current major Biomass Ventures

- Cellulosic bio-ethanol
  ![POET-DSM](http://example.com/POET-DSM.png)

- Renewable diesel
  ![bp + DSM](http://example.com/bp+DSM.png)

- Advanced Biogas
  ![Partner + DSM](http://example.com/partner+DSM.png)

- Bio-Succinic
  ![reverdia](http://example.com/reverdia.png)
EcoPaXX®: Engine cover

- Trend: Reducing carbon footprint
- 70% bio-based engineering plastic
  - Superb surface appearance
  - High thermal resistance up to 250 °C

Reduction of 40% of the CO₂ emissions compared to conventional polyamides

Mercedes A class: reduced CO₂ footprint with 40%
Arnitel® Eco

A high performance thermoplastic elastomer

Partially made from renewable resources, using rapeseed oil.

Adding new performances, like UV and heat resistance

Eco+

Panliners of Arnitel Eco, lowering the carbon footprint enabling higher temperatures
Materials evolution

Treatment moves from repair to healing

**BIO-PASSIVE**
Medical coatings and polymers
- Material stays in the body
  - Highly durable
  - Maintaining mechanical properties over years

**BIO-ACTIVE**
Resorbable polymers and Drug Delivery
- Controlled drug release
- Disappears after use

**BIO-INTERACTIVE**
Therapeutic materials, Regenerative medicine
- Healing by stimulation and growth of patients’ own tissue
  - Disappears over time

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**Cardio**
- Pacemaker leads

**Orthopedic**
- Hip implants

**CMF**
- Bone cement

**Ophthalmology**
- Back-of-the-eye medication

**Orthopedic**
- Resorbable screws
- Tendon repair

**Orthopedic**
- Cartilage repair
- Stimulation of Bone growth

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Open Innovation in biomedical materials

Scientific Advisory Board & other Consultants

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DSM Advanced Surfaces
KhepriCoat® - anti-reflective coating

KhepriCoat® AR coating has best in class transmission gain and outstanding outdoor durability.

DSM is a committed partner, offering development support and a filled pipeline of future offerings.
Learnings....

- *Sustainability* and *Innovation* go hand-in hand
- *Venturing* creates options and mitigates risks
- Create enough *breakthrough options* in the pipeline
- Nominate and empower “*Intrapreneurs*”
- Blue Box activities *Reinforce* DSM’s Business
- Red Box Platforms *Rejuvenate* DSM’s portfolio
Invention is like a flower, but....

Innovation is the weeding process
BRIGHT SCIENCE. BRIGHTER LIVING