Green Chemistry Innovation in the Chemical Industry: Venturing and Start-Ups

Cora Leibig, VP of R&D, Segetis

Erik Rutten, Senior Investment Manager, DSM Venturing
Webinar Discussion Instructions

• Due to the number of participants on the Webinar, all lines will be muted.

• If you wish to ask a question, please type your question in the Q&A box located in the drop down control panel at the top of the screen.

• All questions will be answered at the end of the presentation.
Venturing as Open Innovation Tool

Erik Rutten
Sr Investment Manager USA
DSM Venturing
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Safe harbor statement

This presentation may contain forward-looking statements with respect to DSM’s future (financial) performance and position. Such statements are based on current expectations, estimates and projections of DSM and information currently available to the company. DSM cautions readers that such statements involve certain risks and uncertainties that are difficult to predict and therefore it should be understood that many factors can cause actual performance and position to differ materially from these statements. DSM has no obligation to update the statements contained in this presentation, unless required by law.

The English language version of this document is leading.

A more comprehensive discussion of the risk factors affecting DSM’s business can be found in the company’s latest Annual Report, which can be found on the company’s corporate website, www.dsm.com
DSM: Ability to change
100 years of successful transformations

Evolution
- Coal
- Fertilizers
- Petrochemicals
- Performance Materials
- Life Science Products
- Bioterials / Biologics

Technological competences
- Mechanical engineering
- Chemical engineering
- Polymer technology
- Material science
- Fine chemicals
- Biotechnology

Unique business positions of DSM

- Global leader in nutritional ingredients for feed, food and personal care
- Market leader in anti-infectives and key custom manufacturing player
- Market leader in sustainable high performance materials
- Merchant market leader in nylon precursor caprolactam
- Innovator active in advanced biofuels, biochemicals and biomedical materials
DSMs global presence

World total: 200+ locations, 22,000 employees

North America:
33 locations
4,000 employees

Latin America:
15 locations
1,000 employees

Europe:
64 locations
13,000 employees

China:
31 locations
3,000 employees

India:
8 locations
700 employees

2011 Sales by Region

North America: 19%
Western Europe: 36%
High Growth Economies: 39%
Other: 6%

DSM at a glance 2011, continuing operations

- Net sales € 9,048m
- EBITDA € 1,296m
- Net Profit € 594m
- ROCE 14.0%

- Capital Employed € 6,581m
- Capex incl acquisitions € 1,508m
- R&D € 476m

- Workforce 22,224

- Amongst leaders in sustainability
  No 1 in 6 out of 8 years DJSI

* Innovation Center and Corporate Activities related Sales & EBITDA weighted distributed over clusters
Global societal trends drive DSM’s markets

Health & Wellness

Global shifts

Climate & Energy

Ageing population

Population growth

Resources constraints

Healthcare costs

Urbanization

Energy security

Food security

Wealth

Sustainability

Health

Nutrition

Materials
Growth through four growth drivers

**High Growth Economies**
From ‘reaching out’
to becoming truly global

**Innovation**
From ‘building the machine’
to doubling the output

**Sustainability**
From responsibility
to business driver

**Acquisitions & Partnerships**
From portfolio transformation
to growth
Why do we need Open Innovation?

99.9996% of world population outside DSM! Networks needed!
Value Creation by Open Innovation

- Literature Search / Business (market and competitor) Intelligence
- Joint Business Developments
- Venturing
- Licensing-In
- Spinning-In
- Acquisitions
- Divestments
- Licensing-Out
- Spinning-Out
- R&D for non-DSM companies
- Technical Competence Development; Literature Search / Technology Intelligence
- Intellectual Asset Management
Choose the right hunting areas!
Accelerating and supporting innovation

DSM Innovation Center

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

Enablers
- Excellence in Innovation
- CTO Office
- Licensing
- Venturing
Accelerating and supporting innovation

DSM Innovation Center

New Business Development
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Enablers
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- CTO Office
- Licensing
- Venturing
DSM Venturing supports DSM’s innovation and growth ambitions by providing venture capital to “start-up”-companies and partnering with them.

Window to the world
Explore new emerging markets, technologies and products in order to enhance DSM’s product portfolio, technology toolbox and business model’s

Strategic value
Add value internally and externally through facilitating strategic co-operations with start-ups

Financial return
Create value by investing in and divesting start-up companies
Investment criteria

1st filter: Strategic relevance
- Fit with DSM’s competence base?
- Strategic benefits for the business (and collaboration potential)?

2nd filter: Venture capital criteria
- Viable business proposition?
- Attractive return potential?
- Exit opportunities other than spinning-in?
When does DSM Venturing invest?

- **Emerging Technology**: High investment amounts, high risk.
- **Commercialization**: Venture Capital, Public/PE, DSM Venturing.
- **Expansion**: Sales, High investment, high risk.

**Financing gap**

- **Time**
Summary Investment scope

- Companies in early stage to expansion stage, active in DSM strategic scope
- Typical initial investment: € 0.5 - 5 mln
- Minority participations typically a 10 - 25% stake
- Recognized potential for strategic cooperation with DSM Businesses
- Representation in board of start-up
- Global (focus on USA, EU, China and India)
Strategic Cooperation

- Our investments in start-ups are meant to create mutual benefits:
  - We help the start-ups navigate successfully through DSM’s global structures and will facilitate their linking in to our technology and business networks
  - We support start-ups with hands-on advise and share our experiences, e.g. in IP strategy; market intelligence; commercial contracting terms; technology assessments; second opinions; etc.
  - The start-ups ‘partner’ with one or more of our DSM businesses and thereby provide us with insights in and access to new technologies, new markets, new products, new business models, etc.

- DSM Venturing will be actively involved in the start-up’s activities but always at ‘arm’s length’ to make sure that they keep their identity, entrepreneurship, key people, agility, enthusiasm and business responsibility
Track Record

• 40 direct investments since 2001; 23 still active in our current portfolio
• 17 divested:
  - 2 acquired by DSM businesses (LTP and TCG)
  - 2 sold to third party acquirers (Morphotek and OPM)
  - 2 sold back to the founders (Creagri and Terreco)
  - 1 successful IPO (Speedel)
  - 10 failed and were dissolved, liquidated, wound down

• Net financial result is positive - i.e. ‘free’ option generation!
• Partnerships realized with 30 portfolio companies in various forms and degrees (feasibility studies, joint development, licensing, distribution/marketing relations, supply relations)
• In addition, DSM Venturing facilitated similar partnerships with > 50 other start-ups which it scouted but did not invest in
• We scouted and screened more than 3000 companies which provided useful insights and complementary window-on-the-world for our businesses
Renewables, enabling the bio-based economy

**LIFE SCIENCES & MATERIALS SCIENCES**

Energy and resources security requires renewable energy

Renewable energy from residues & waste (biofuel, biogas), sun and wind

Demand for ‘greener’ products

Bio-based alternatives to oil-based products

“Nature takes 10,000 years to turn plant material into fuels. DSM can do that in a week.”

“It can be calculated that by 2022 ~ 150-200 plants to produce cellulosic bio-ethanol from corn crop residue could be required in the US.”
The challenge

Bio-Based Products & Services

- Biogas
- Yeasts
- Algae
- Enzymes
- Bio-based polymers
- Bio-refinery/process technology

Biofuel;
- Cellulosic ethanol
- Advanced biofuels

Bio-based chemicals
- Drop in
- New chemicals

Biotechnology

Biodiesel
In the value chain of bioethanol back- and forward integration is ongoing
Open Innovation in action

Bio-Based Products & Services

- Own developments
- Licensing
- Acquisitions. f.i. Nedalco
- Joint Ventures. Poet, Roquette
- Venturing; minority participations
  - Technology collaboration
  - Business collaboration
  - Window on the world
- R&D collaborations
  - Companies
  - Universities
- Public-private partnerships
Venturing Portfolio Direct Investments

Life Sciences

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

Material Sciences

- Van Technologies, Inc.
- SupraPlex
- verdezyne
- Mat
- Segetis
- nanholdings
- CAMBRIOS
- Xolve
- GREENVU
- bioprocess
- SkySails
- NOVOMER

Red investments are related to BP&S

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.
Better Products…
Sustainably…From Renewable Feedstocks

Cora Leibig, PhD
VP R&D
Segetis Highlights

Renewable Source of Chemicals Addressing Large Market Opportunity

Platform of Tailored Products from Common Technology Base

Chemical-based Manufacturing Process Easily Scalable

First Validation Products In Market Today
Renewable Feedstock to Specialty Chemicals

Step 1: Convert Renewable Biomass Feedstock Into Levulinic Acid (LA)

- Cellulosic Biomass
- Sugar

Step 2: Convert LA to LA Ketals to Serve Various End Markets

- Levulinic Acid (LA)

Multiple Process Technologies

Segetis Patented Process / Products
Commercial Products in Stores Today...

**Segetis Specialty Solvents**

- Strong Solvency & Coupling Power
- Low to No Odor
- VOC Compliance in Cleaners, Coatings & Personal Care
- Non-Toxic
- Life-cycle advantages

In Target stores today:

- Method
  Launched Products in 2010

- Seventh Generation
  Launched Products in 2012
Commercial Products in Stores Today...

Segetis Plasticizers

In Inpro’s Wall and Door Protection Products

Global Adhesive Manufacturer - Trialing Segetis products for packaging applications
Building Production Experience & Capacity

**Segetis (Pilot Scale) - 2009**

- **0.25 Million lbs/yr**

  **Objectives:**
  1. Process development
  2. Support market validation

**Demonstration Plant - 2012**

- **3+ Million lbs/yr**

  **Objectives:**
  1. Demonstrate scale-up utilizing existing assets
  2. Supply Strategic Customers
Innovation for New Materials

Inside-out
New technology fuels market development

Challenge: select applications from a broad market space, then prove and develop product performance

Outside-in
Market need fuels technology development

Challenge: select technologies from a broad chemistry space, then prove and develop product performance

Iterations are always necessary!
Market demand is essential to justify capital and R&D investment
Segetis Development Path

• 2005-6
  Driven by world need for sustainable, safer chemistry, Sergey Selifonov invents broad platform of compounds based on Levulinic acid, a feedstock projected by DOE to be broad and plentiful in the bio-based economy

• 2006
  Segetis is founded with initial funds from Khosla Ventures, used to identify potential of the technology

• 2008
  Several proof-of-concept products are developed for a range of applications; market focus areas determined by technical feasibility, market need, and market attractiveness

• 2009 +
  Process development to scale production and lower costs

• 2009 +
  Customer trials and introductions to refine product composition and performance requirements

• 2011 +
  Development of toxicology dossiers on products with largest market potential

• 2011 +
  Development of supply chain
Motivating Safer Chemicals

Development of new materials is costly and multi-faceted. How GC3 members can help:

- Consolidate demand – where do your market needs overlap with others?
- Provide feedback on early-stage prototypes – may require confidentiality, poor quality, and incomplete cost and toxicology information
- Know your ingredients – what are the cost/performance trade-offs your formulation chemists make every day?
- Make sure your dreams really can come true – are you asking for a non-VOC that evaporates quickly at a low temperature?
- Motivate upstream – do your suppliers know you are looking for safer ingredients? Do you motivate them to look for alternatives?
The audio recording and slides shown during this presentation will be available to GC3 Members on the GC3 Website: http://www.greenchemistryandcommerce.org

Non-GC3 Member Attendees who would like to view these slides please contact Sarah Shields at sarah_shields@uml.edu

SAVE THE DATE!

GC3 Green Chemistry & Commerce Council 8th Annual Innovators Roundtable
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