

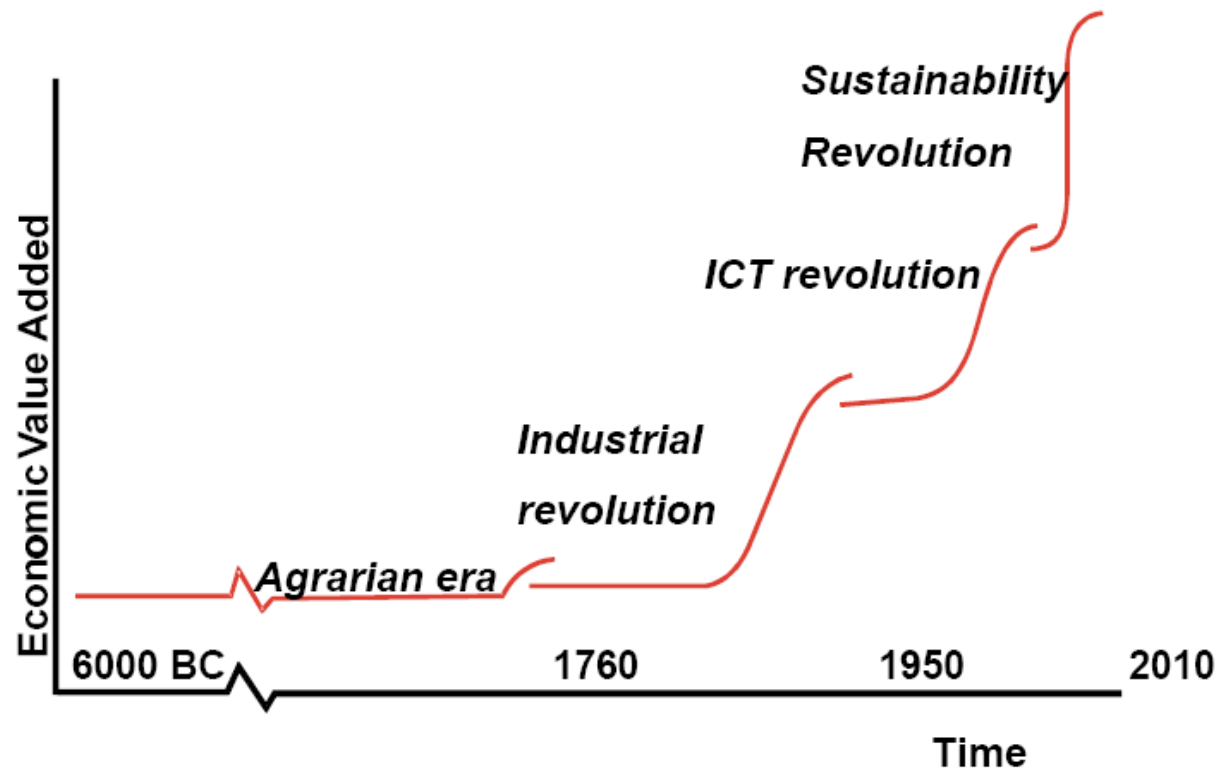


# Van Kennis naar Kassa

Ir. Drs. B.P.A. (Bart) Vander Velpen (Royal Haskoning)

# Waarom wordt Biobased Industry beschouwd als de 4<sup>de</sup> industriële revolutie

Towards increasing sophistication and refinement



Adapted from Oliver, R.W., *The coming biotech Age: The business of biomaterials*, McGraw-Hill (1999)

# Biobased, terugdringen van fossiele grondstoffen!





# Biobased, antwoord op duurzaamheidsaspecten

## EU's Restrictive & Promoting Legislation to tackle Climate Change & Energy



20% Less CO<sub>2</sub> emission

20% More Energy-efficiency

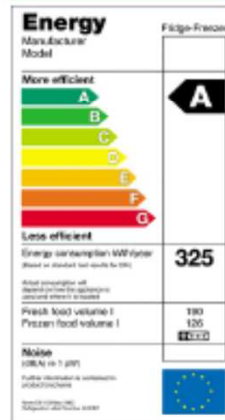
20% From Renewable energy

Eco-label



José Emmanuel Barroso

Energy-label



Chemicals




Waste & Hazardous materials



## Carbon footprint is entering the mainstream as a competitive differentiator

### CO<sub>2</sub>-emissions as a business driver

working with the Carbon Trust



per 250ml serving

The carbon footprint of this juice is 360g per 250ml serving and we have committed to reduce this

By comparison the typical footprint for Tesco Ambient Pure Orange Juice is 240g per 250ml serving

The footprint of this product is higher than average because of the energy needed to chill and transport 100% pure juice



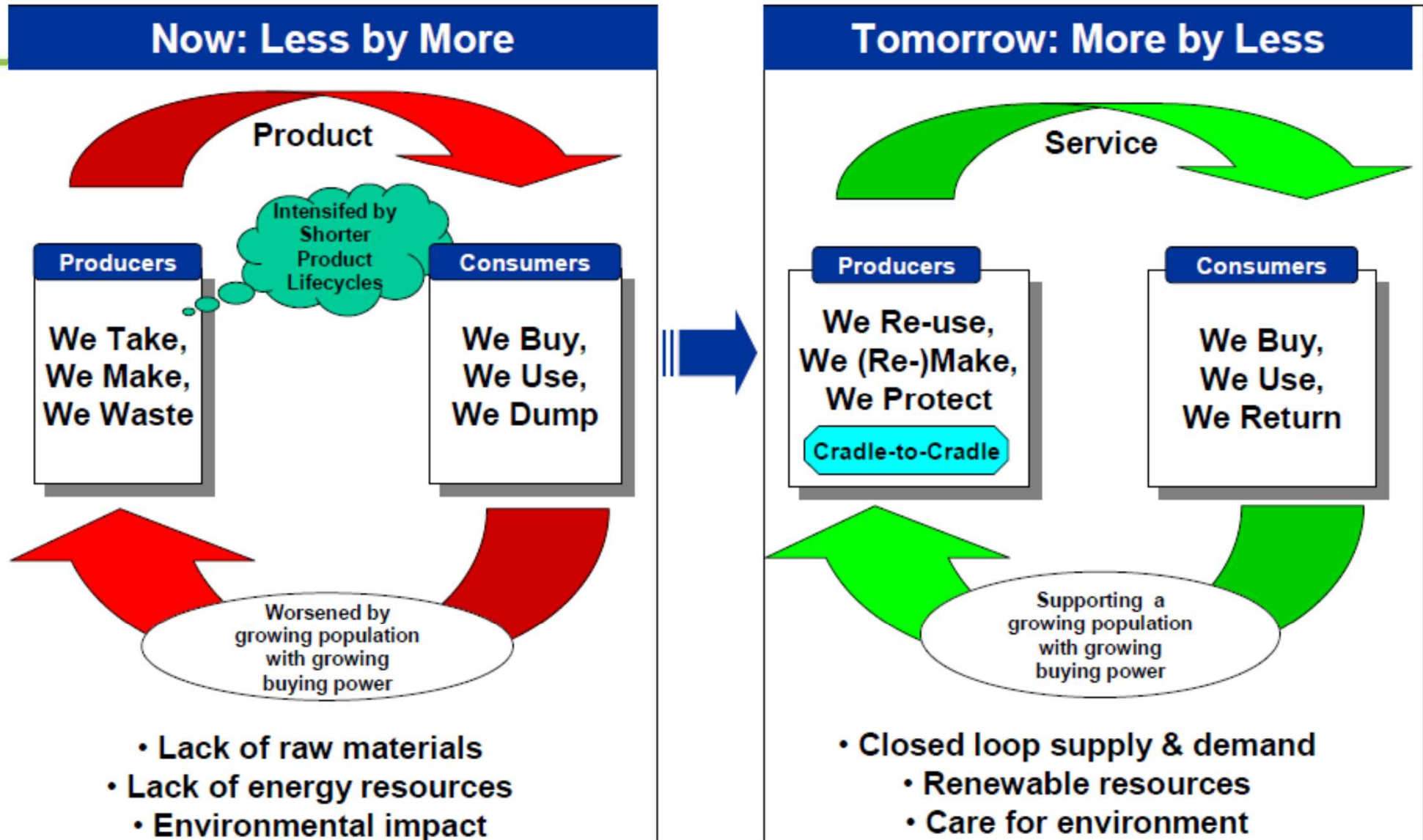
Disposal

CARTON	FOIL	PLASTIC
SLEEVE widely recycled	TRAY (check local recycling)	FILM not correctly recycled

# Biobased, leid tot duurzaam materiaalmanagement!

We need to re-think the way we produce and consume

11

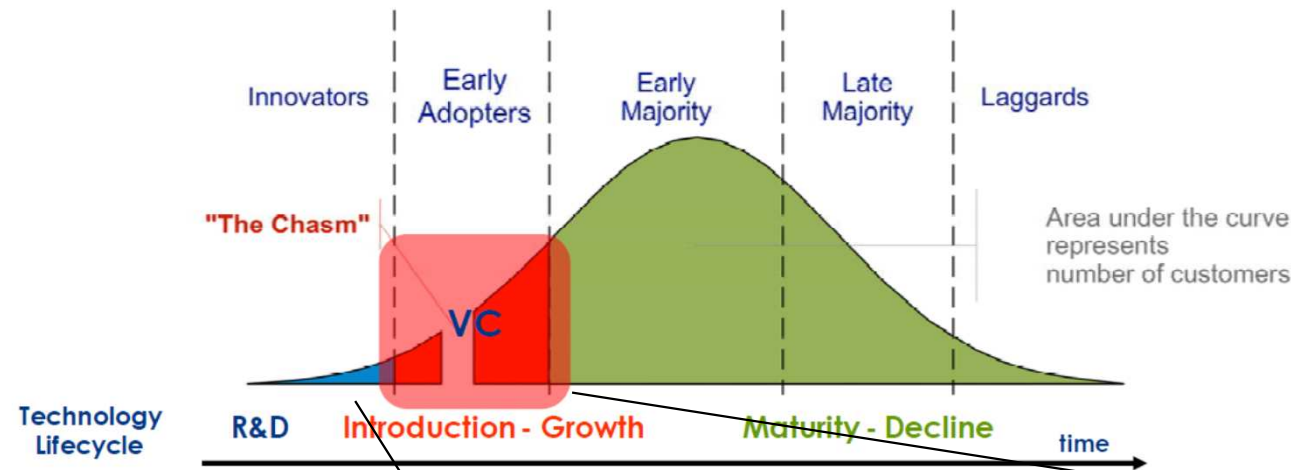


---

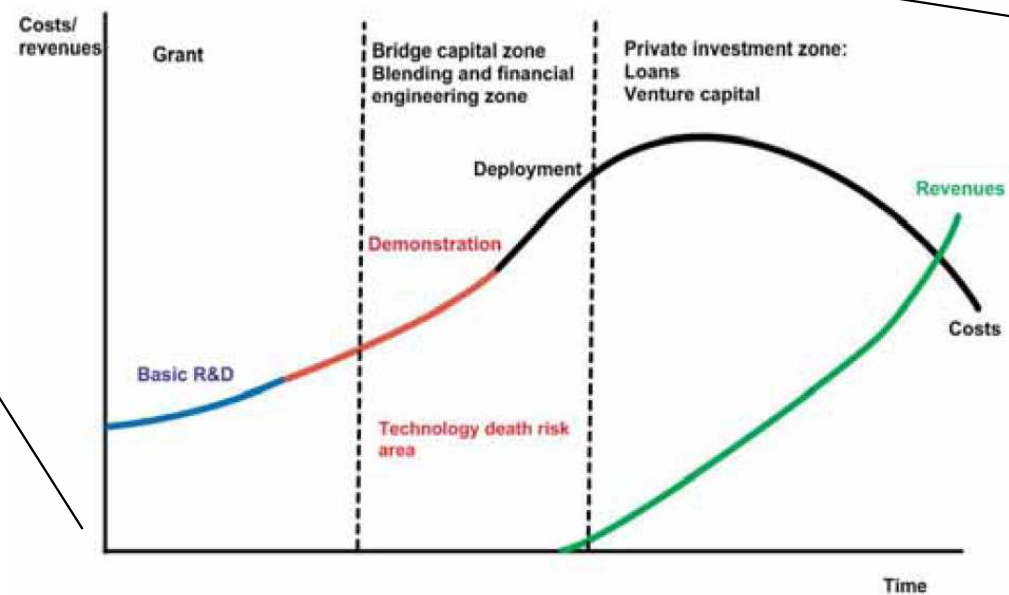
# Waarom kent de biogebaseerde industrie een trage doorstart ?

# Hoe identificeren van en bouwen aan kansrijke doorbraakprojecten ?

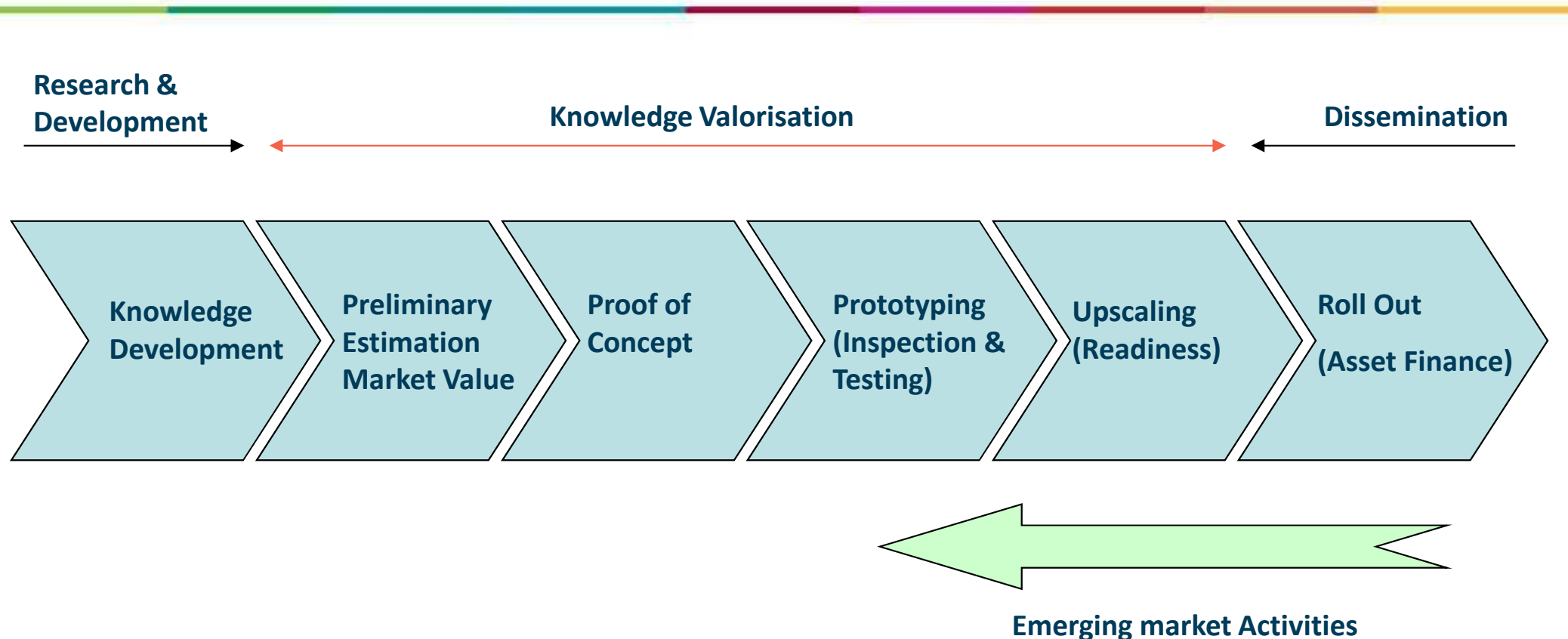
Figure 1: the Technology Lifecycle curve



Source: Roger, *Diffusion of innovation*, and Moore, *Crossing the Chasm*



# Welke stappen nodig ifv kennisvalorisatie & marktintroductie ?





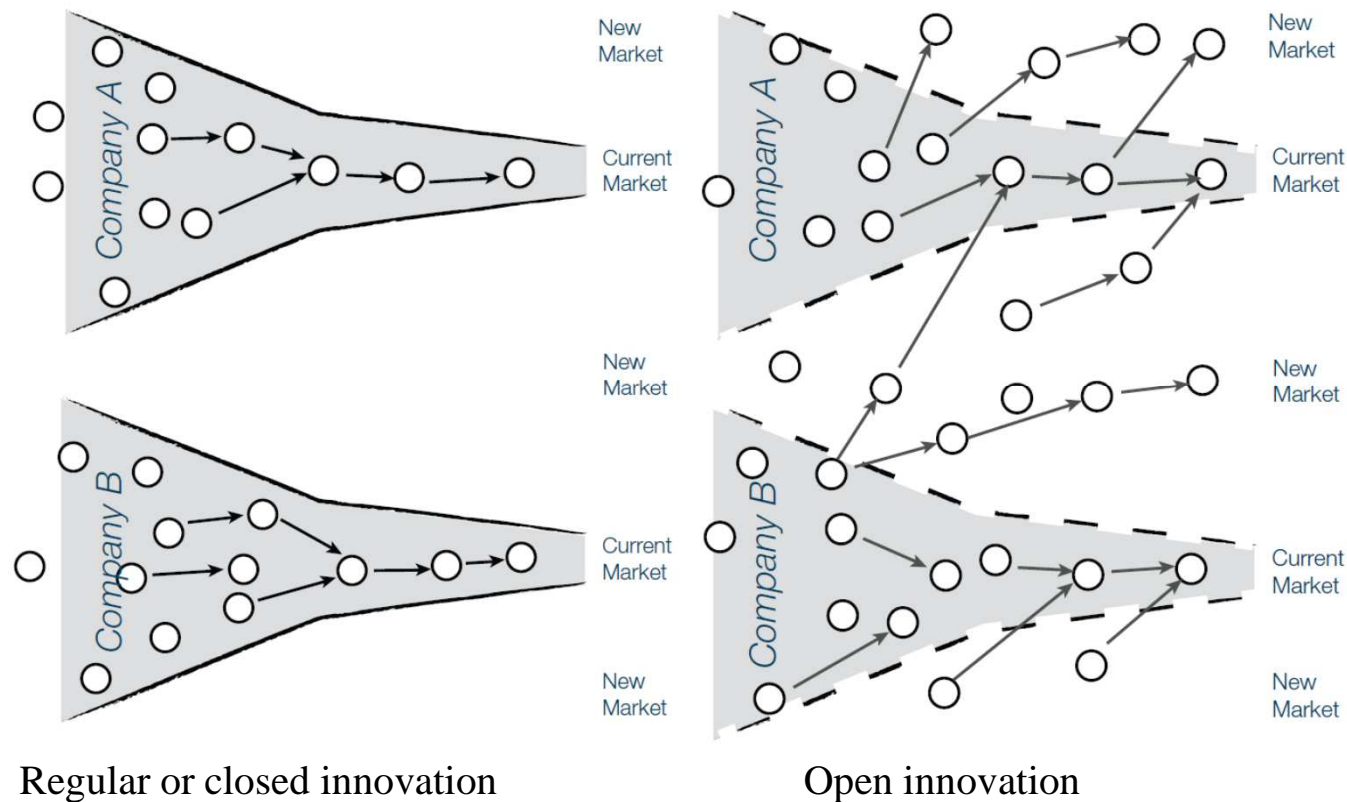
# Hindernissen wegnemen om rol-out van biotechnology te versnellen

- Duidelijke RD&I clustering : *Brug tussen R&D & prototyping*
- Combining (econo-social) science & engineering : *Brug tussen prototyping & Upscaling*
- Collaboration science, Engineering & Business : *Brug tussen Upscaling & Roll-out*

# Clustering RD&I via 'Open Innovation' (OI)

'Open innovation is the use of intentional inflows and outflows of knowledge to accelerate innovation, and expand the markets for external use of innovation respectively'

Chesbrough, Vanhaverbeke, West (2006)

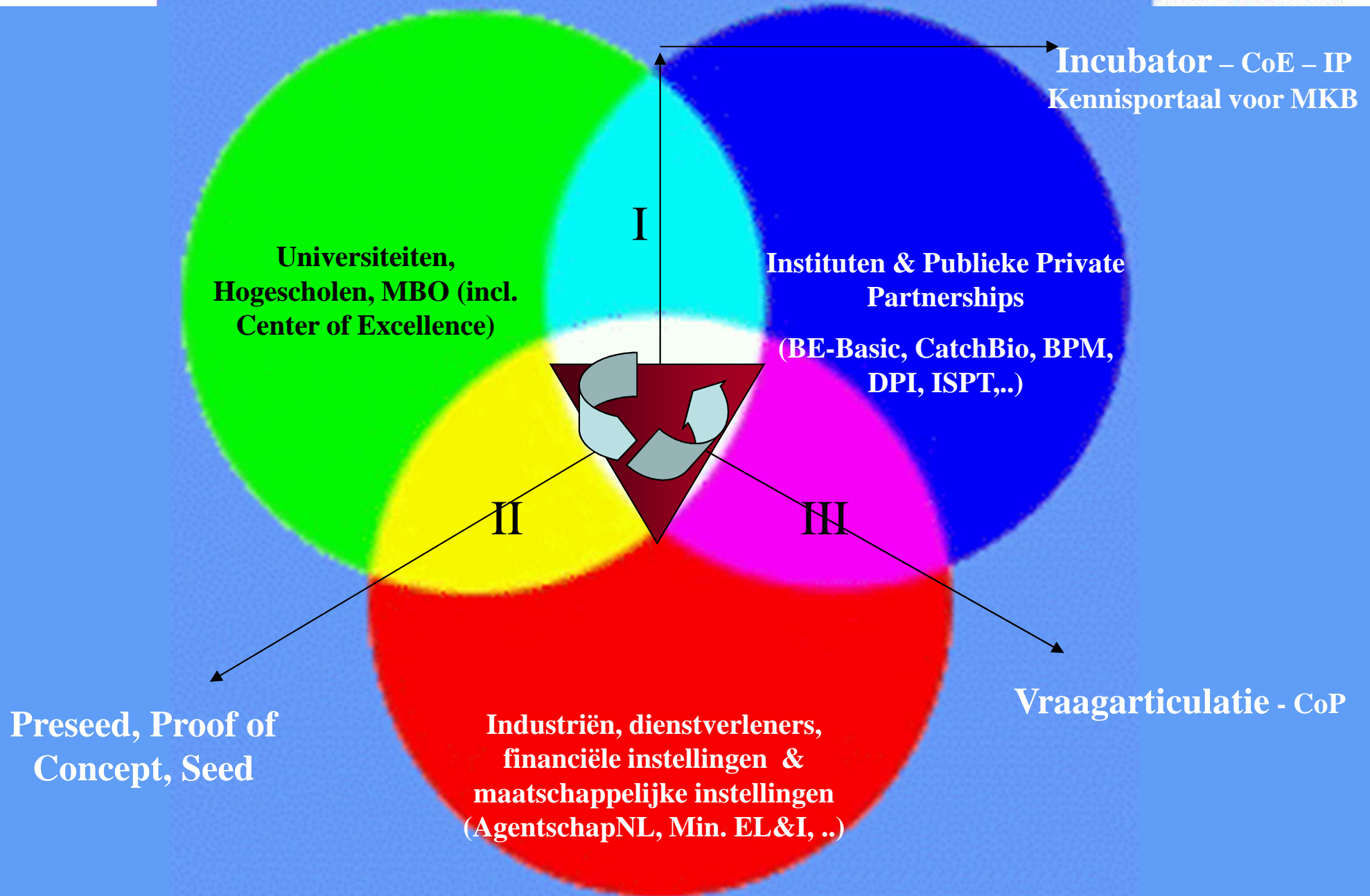


# R&D clustering & Spreiding van risico's:

## Open Innovatie (OI)

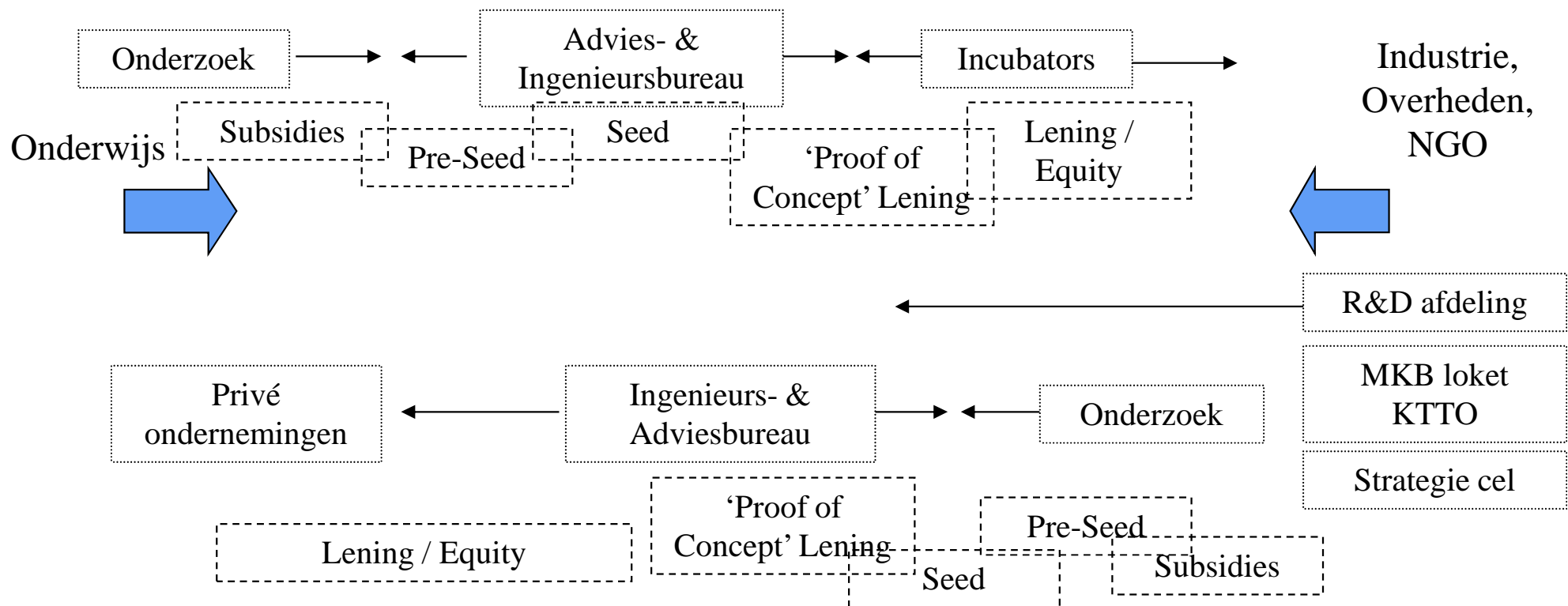


DIAL HASKONING



# R&D clustering & Spreiding van risico's: Open Innovatie (OI)

**PUSH**



**PULL**



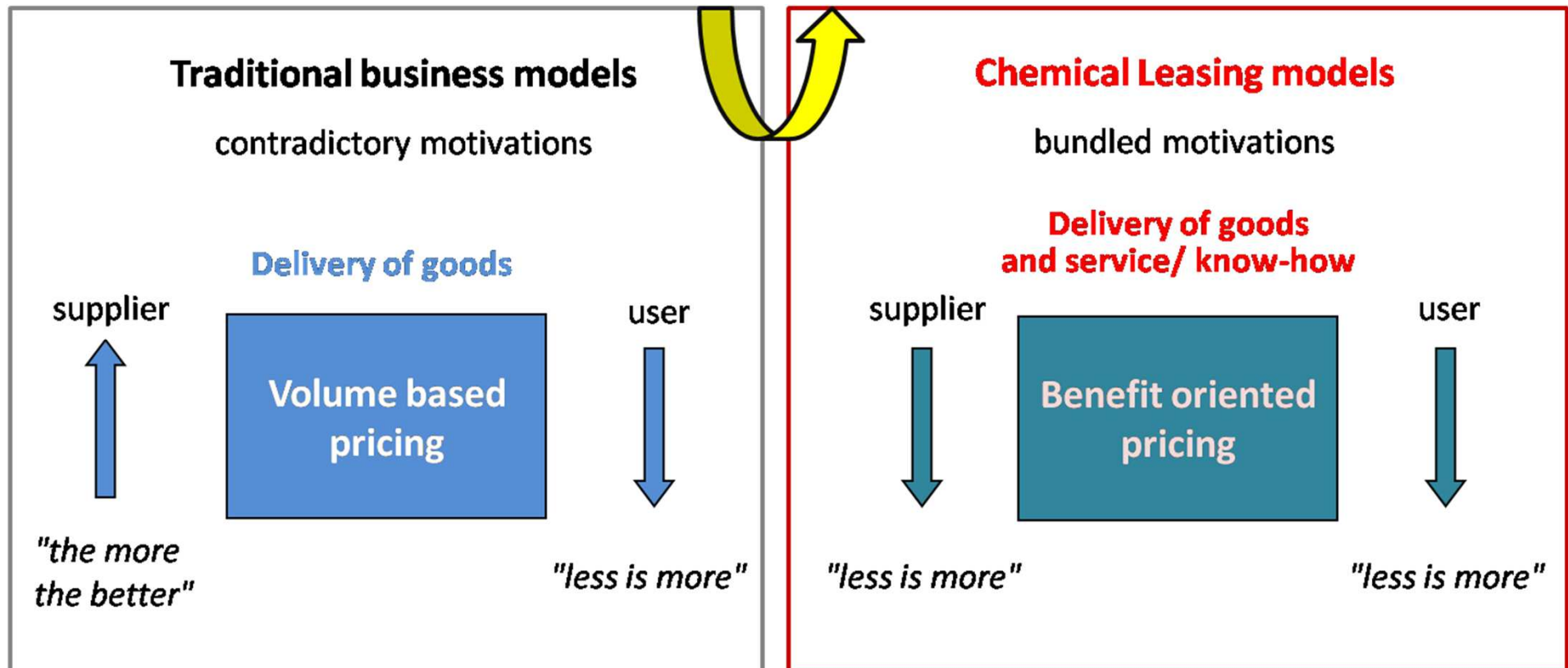
# Hindernissen wegnemen om rol-out van biotechnology te versnellen

- Duidelijke RD&I clustering : *Brug tussen Research & Development*
- Combining (econo-social) science & engineering : *Brug tussen Development & Manufacturing*
- Collaboration science, Engineering & Business : *Brug tussen Manufacturing & Roll-out*



# Case#1: Implementeren van nieuwe business concepten : Chemical Leasing

Sale-Lease modellen (o.a. ChL) is een op diensten gebaseerd business model dat de focus verschuift van een streven naar toenemende verkoop van chemicaliën naar een streven naar meerwaarde. De producent verkoopt voornamelijk de functies die chemicaliën kunnen vervullen; functionele eenheden zijn dan ook de basis van de betalingsovereenkomst.”



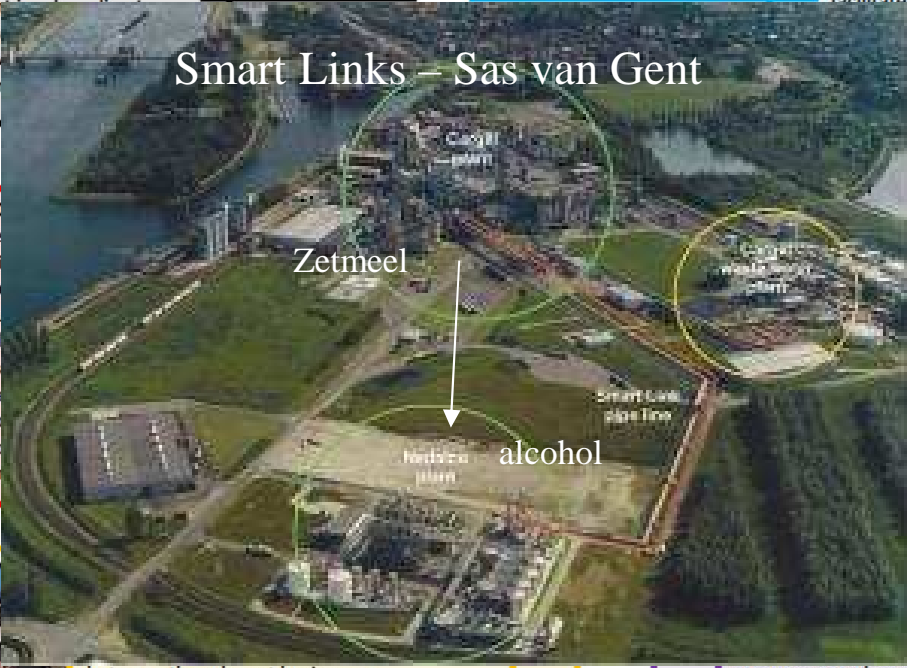
# Case#2: Faciliteren van nieuwe engineering mogelijkheden : Stimuleren co-siting via 'haves' & 'wants'

**1** **Building the IS Network:** Practitioners recruit new business members into the IS network to access a diverse range of resources, sectors, business sizes and locations. Recruitment includes direct engagement; participating in conferences; liaising with other organisations, and taking part in



**2** **Quick Wins Workshop:** Practitioners engage with businesses from all sectors and facilitate exchange of information between businesses regarding their 'HAVES' and 'WANTS'.

**6** **Implemented Synergy & Co-siting:** Practitioners complete the synergy process by preparing a final synergy 'Outputs Report' that summarises the outputs achieved by all parties and request formal sign off by all companies. Once completed, the outputs from the synergy process are recorded and contribute to the targets for the program.



**3** **Resource Mapping:** Practitioners record resource 'HAVES' and 'WANTS' from workshop delegates and facilitate potential matches between members.



**5** Practitioners provide **technical expertise** and experience where synergies involve businesses from different sectors. Practitioners provide all parties with a **Synergy Summary Report** detailing the expected commercial and environmental outputs from the synergy.



**4** **SYNERGie Management System:** The on-line tool captures information on the resource 'HAVES' and 'WANTS' of the network, along with the respective contact details. Practitioners utilise the on-line tool to facilitate suitable resource synergies using the new and stored data.

International Synergies  
industrial ecology solutions

# Case #3: 2<sup>de</sup> generatie bioethanol productie plant

## Delft pilot facility for innovations in sustainable bioprocesses

The Bioprocess Pilot Facility, planned to be built in Delft, The Netherlands, is a unique facility where companies and knowledge institutions can develop new sustainable production processes. These processes serve many purposes, such as converting biobased residues into useful materials or fuels. The facility has been specially designed to enable the transition from the laboratory to production on an industrial scale. It allows users to construct complex operations by linking separate process modules.

### Pre-processing and treatment

In this module, dry and wet residues are hydrolyzed and prepared for the fermentation phase.



### Training

The facility is also a centre of expertise where students, researchers and technologists can be trained.

### Permanent crew

The facility has a permanent and experienced crew whose services are available to every user.

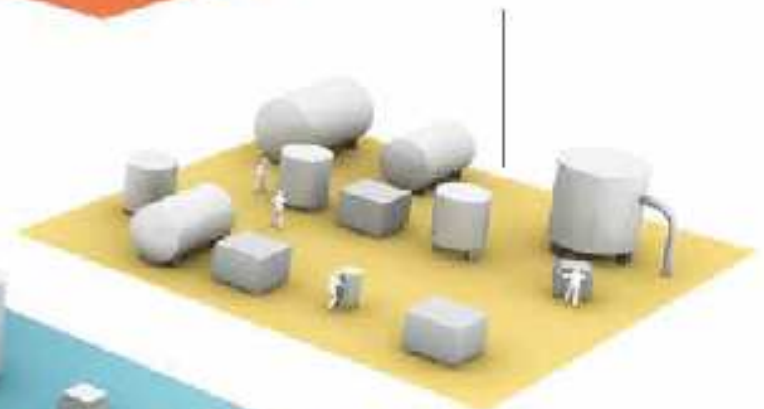


### Fermentation

In the fermentation module, enzymes and bacteria are added to the waste to convert it still further. This process takes place in bioreactors with a capacity of up to 8000 litres.

### Third-generation bioprocesses

These modules are designed to increase efficiency and lower costs in the production of biofuels and biochemicals.



### Downstream processing

This is where products are extracted and refined. The modules can be combined at will to produce all kinds of products, such as raw materials for the construction sector, chemicals for biofuels or raw materials for the chemicals and pharmaceuticals industry.

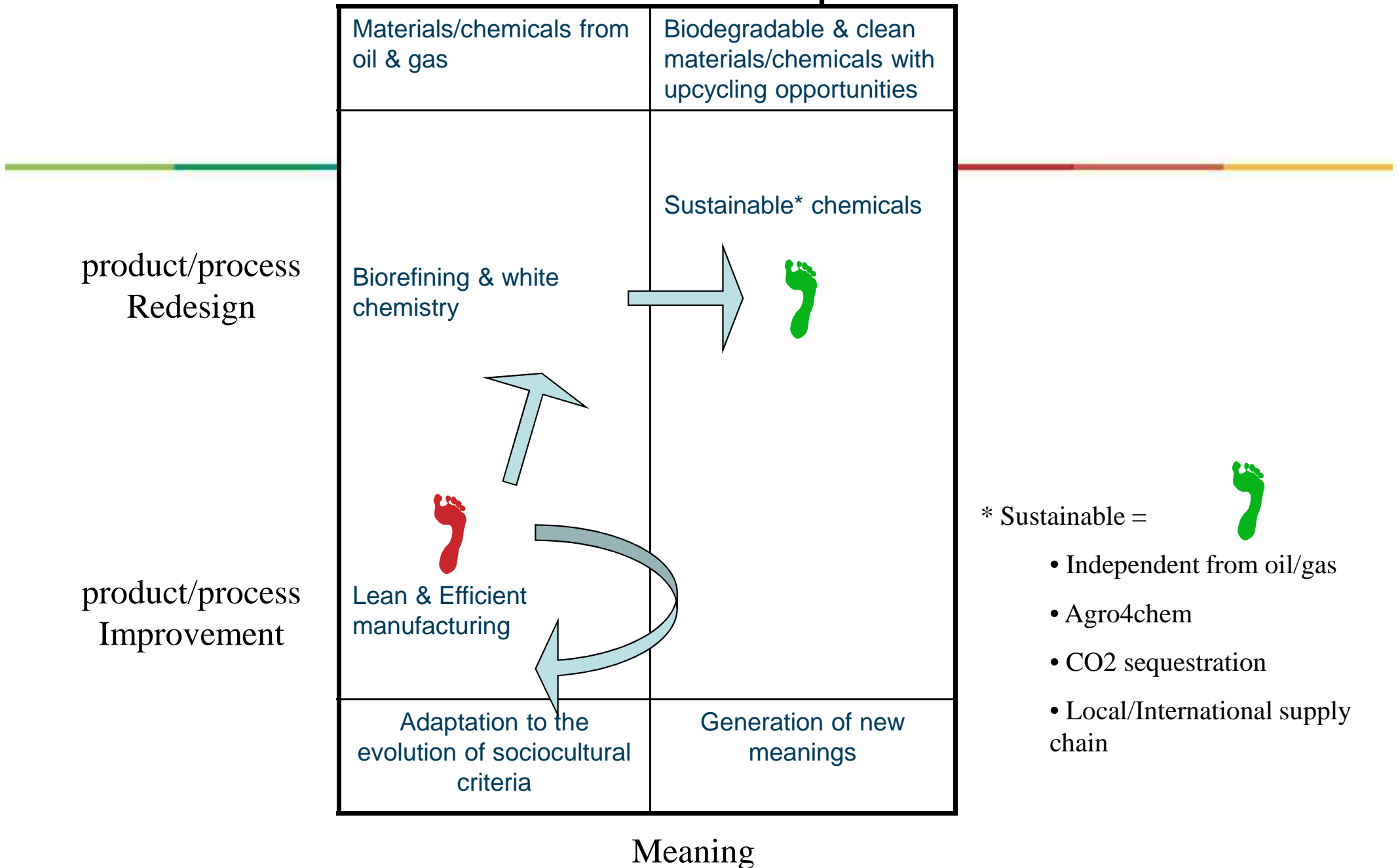


# Hindernissen wegnemen om rol-out van biotechnology te versnellen

- Duidelijke RD&I clustering : *Brug tussen Research & Development*
- Combining (econo-social) science & engineering : *Brug tussen Development & Manufacturing*
- Collaboration science, Engineering & Business : *Brug tussen Manufacturing & Roll-out*



# Uitwerken & communiceren van een nieuwe betekenis aan 'smart products'





**We can't solve problems by using the same kind of thinking we used when we created them.**

Albert Einstein

*Dank u wel*

*Bart Vander Velpen*

*Director Business Development & Innovation Manager*

*Mob. \*31 (0) 6 10 70 34 30*

*E-mail [B.Vandervelpen@royalhaskoning.com](mailto:B.Vandervelpen@royalhaskoning.com)*