



DSTI

*Technology development and implementation
platform for the process industry*

key slides

Dutch Separation Technology Institute (v Jan 10)



Building a partnership = building trust

Intimacy needed



*“Together we can take bigger steps,
have more impact, and share the risks”.*

What is DSTI?

DSTI is a **technology development and implementation platform** for the **process industry**.

It aims at ***speeding up innovation processes*** and make them more efficient than they are at present.

Industry, universities and contract research organisations work closely together under the motto:

“Together we can take bigger steps, have more impact, and share the risks”

Breakthrough results are valued on their impact on the **integral process technology chain** - *from raw materials to end product* - .

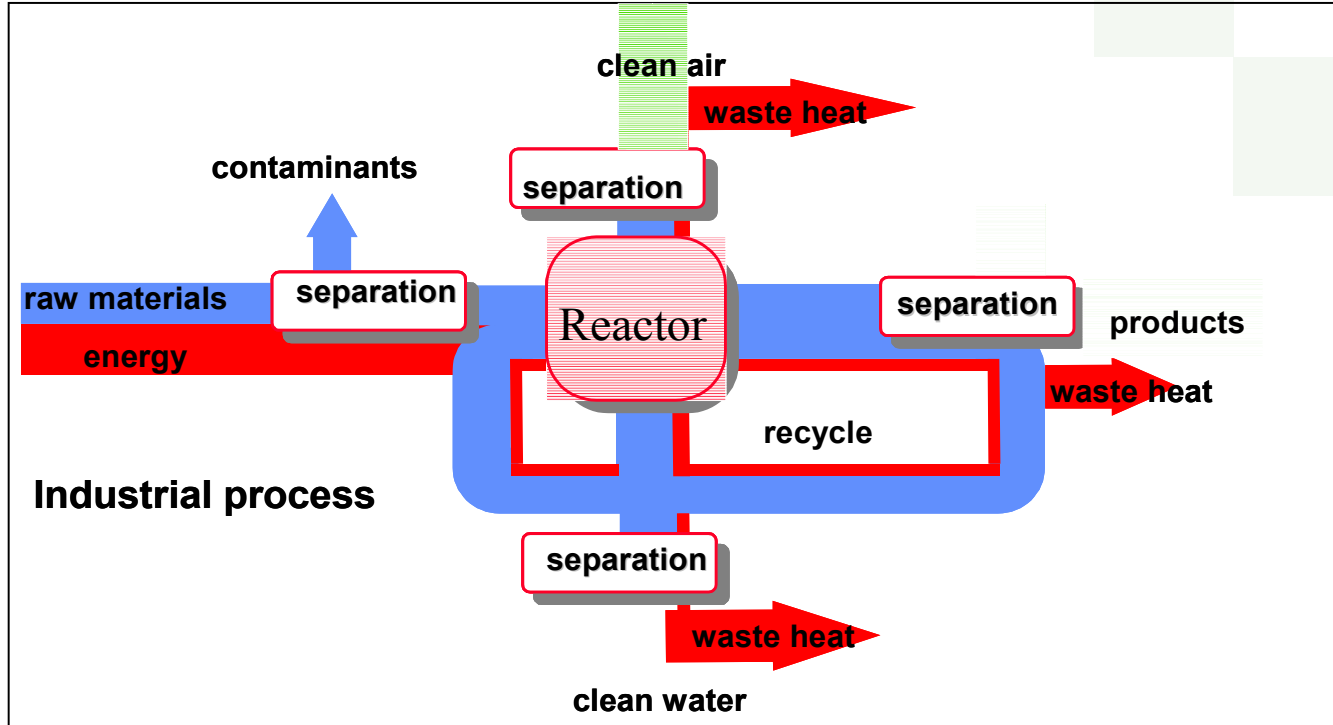
The final result should be a considerable improvement of the **sustainability and competitive position** of the (Dutch) Process Industry.

A solid partner base is key to success (status 1/01/10)



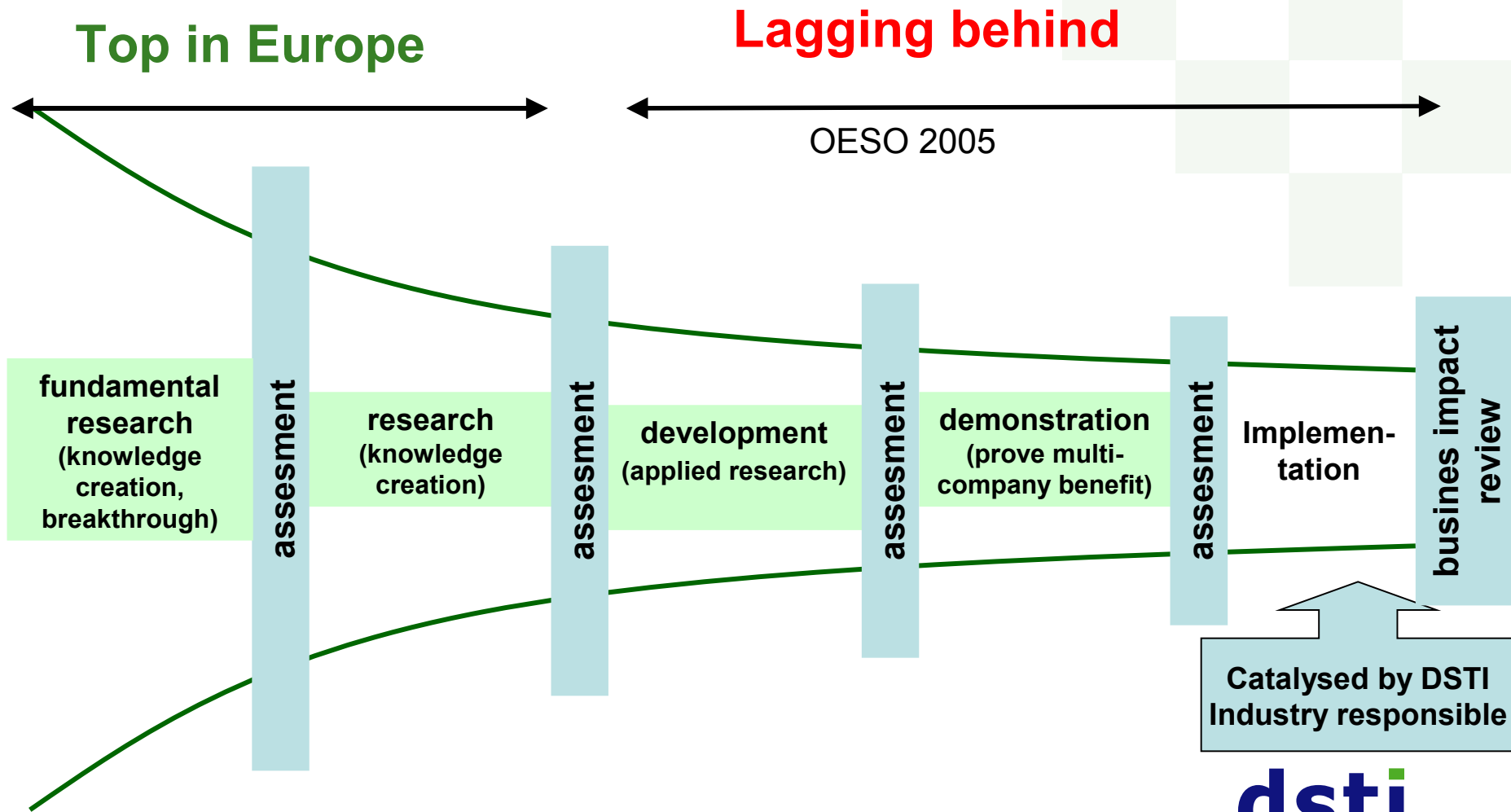
*Together we can take bigger steps,
have more impact, and share the risks*

Separation Technology a key technology for the Process Industries.



Why DSTI?

Knowledge Paradox in the Netherlands illustrated



DSTI: parallel approach and learning cycles in stead of serial

Why DSTI ?

Founded in 2006

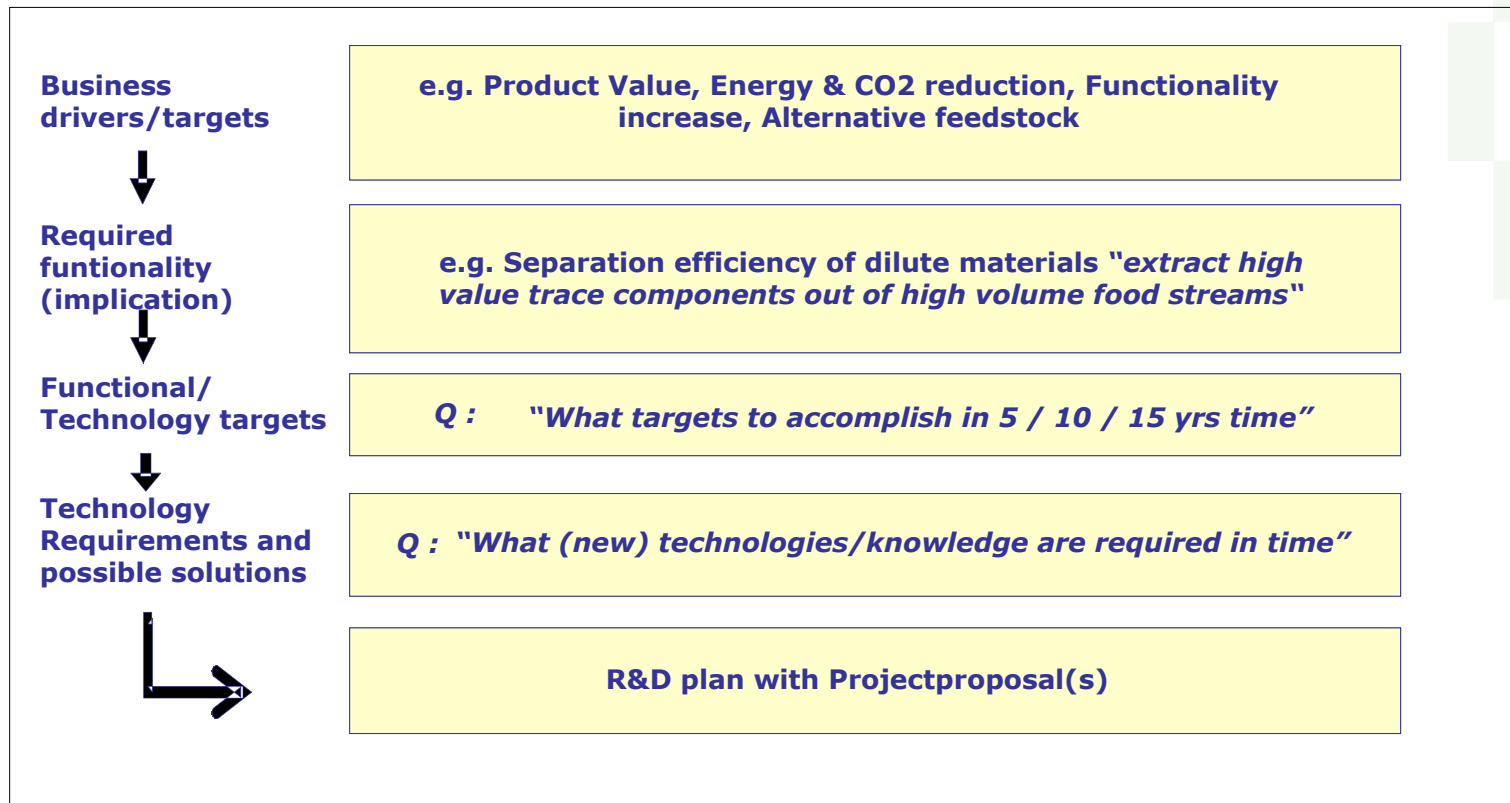
- Process industry is of great importance to Dutch Economy (7.5% Gross National Product). But competitive position is endangered!
- Laborious and slow transformation of knowledge into concrete applications. Too fragmented
- Insufficient attention for long-term innovation strategy within the industry
- Weak competitive position equipment suppliers in The Netherlands
- Shortage of well educated technologists

History: Technology Roadmap- Basic Question

- What technology (development) do we need to be able to fulfill our future (business) goals?
- If we have common needs can we cooperate and share risks and costs?

History: roadmap

From business drivers to project proposals



"Market pull followed by technology push"

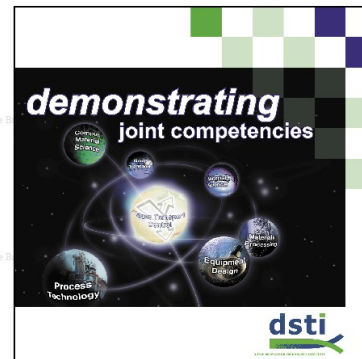
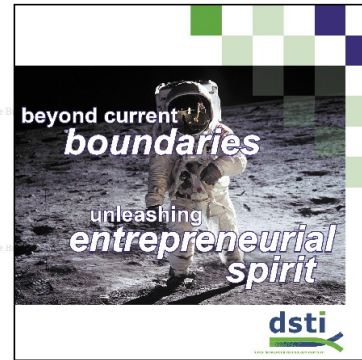
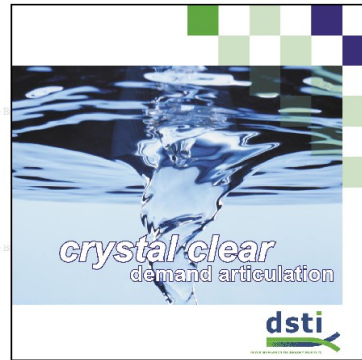
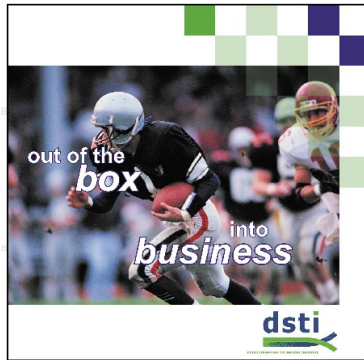
History: Outcome of roadmap (Examples)

- Drives and trends e.g.
 - Energy/CO₂/ emission reduction
 - Functionality increase products
 - Increased competitiveness
 - Alternative (bio-based) feedstock
- Implications/required functionalities e.g.
 - Integration and densification of process steps
 - Cost effective methods needed to remove and concentrate specific components
- Targets in time (5, 10, 15 yr) e.g. for 15 year target e.g.
 - 10, 30, 70 % energy reduction
 - 10, 25, 50% from profit comes from (patented) high added value products
 - 25, 50, 80% reduction of investment costs
 - 10, 50 , Zero waste production
- Technology roadmap e.g.
 - Innovative heat pumps / separation of liquids without heat phase transition
 - Selectors for enantiomer separations/valuable components from diluted streams

Long term objectives DSTI partnership

- **Key element in a global top position of the Dutch Process Industry**
- **5, 10, 15 year targets realized.** Examples 15 year targets:
 - Up to 75% energy saving (138-225 PJ/Y in NL)
 - 60-100% emission reduction and transformation to non-fossil feed stocks
 - Food production without losing taste
 - Reduction side effects medicines
 - 50-80% reduction costs and footprint production processes
 - Advanced process water treatment systems
- **A lasting cooperation platform for process technology with a special focus on separation technology**, multi-disciplinary with active participation all stakeholders from process industry; with good representation of SME and equipment manufacturers
- characterized by **focused knowledge generation** and **fast transformation in business applications**
- Creation of a “**talent pool**” for the **partners**: sufficient and well educated **technologists with R&D and business skills**

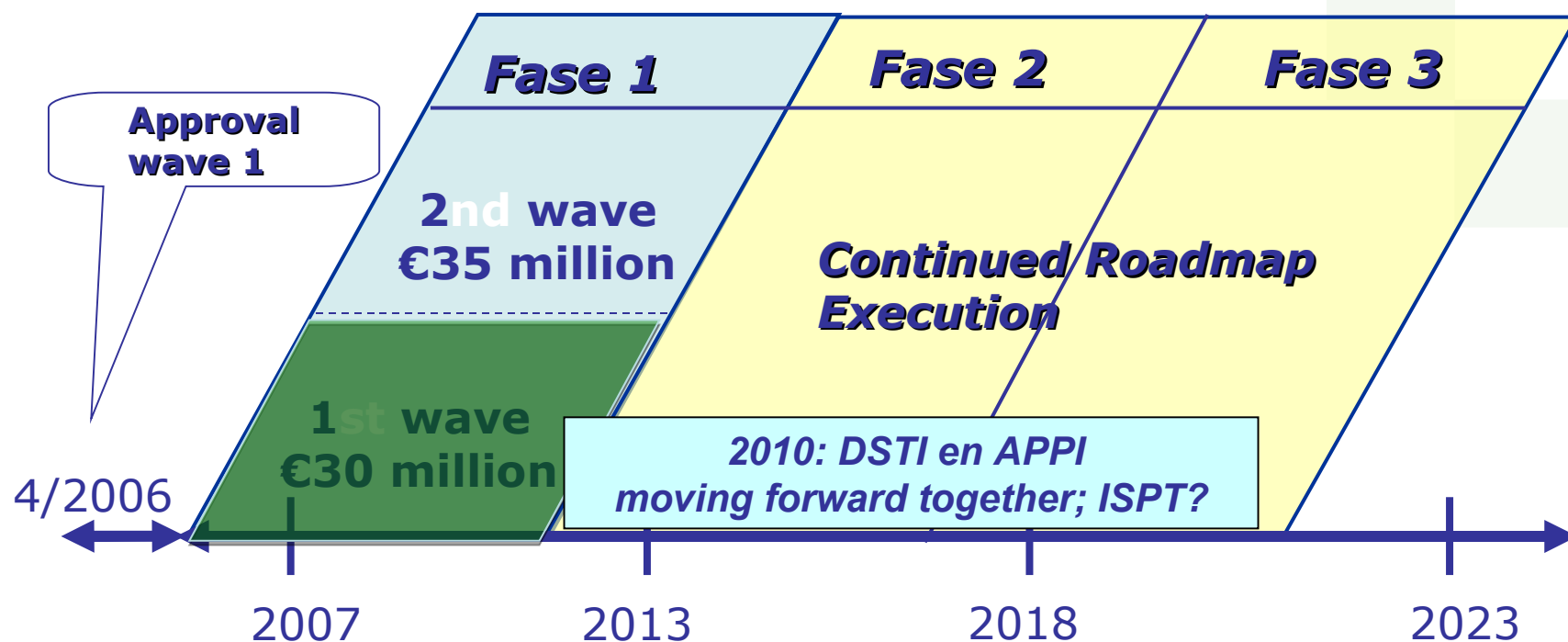
Mission and vision visualized



Phasing of the Process Technology Innovation

Program budget towards 100 million Euro

Prepare for Phase 2



Process Intensification (APPI) around 30 million Euro

What makes DSTI effective

- DSTI is an **active technology community**, linking all key stakeholders in process industry including SME; industry has a leading role
- R&D programme is defined on basis of **future technology needs companies have defined** as key to their business development (roadmap)
- The programme integrates the whole scope from **advanced knowledge creation to technology implementation** via a **parallel approach** and **learning cycles**
- **All partners** (industry, universities, contract research organisations) are **involved** with **own resources and facilities** in definition *and* execution of the programme
- **Program management method** that facilitate **multi-partner** cooperation and has a strong focus on **new technology implementation**
- The funding is based on **in-cash and in-kind** contribution of partners
- Project definition **managers** and project leaders come **from industry**

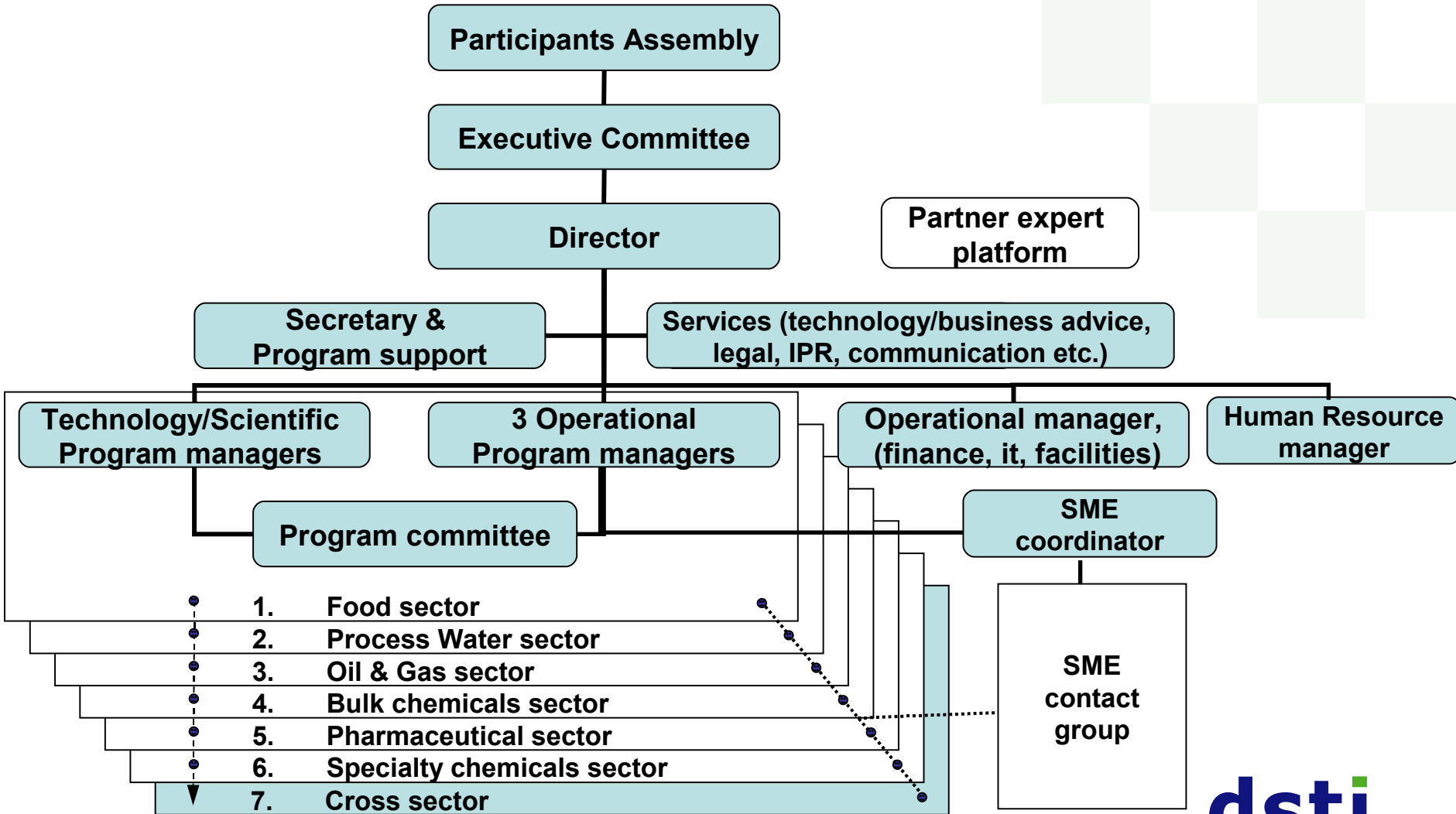
Some examples of DSTI projects (1/2)

No.	Industry Sector (**) Cross Sector Uitvoering	Industry / University / GTI's Partners	Project Title	Impact on Energy/CO2 reduction	Impact on Emission reduction	Impact on Foot print reduction	Impact on Increase product value
1	Bulk Chemicals	Akerkvaerner, Huntsman, Lyondell, DSM, Akzo, Shell, TUD, ECN	Heat pumps in bulk separation processes	H	M	M	L
2	Bulk Chemicals	GE, Huntsman, Pervatech, TNO, ECN	Azeotropic separation prevention	H	H	M	M
3	Bulk Chemicals **	Shell, Akzo, TU/e, TUD	Immobilized designer solvent for water removal	H	L	M	H
4	Bulk Chemicals	Akzo, Akerkvaerner, Lyondell, Shell, UT	Nanofiltration at extreme conditions	H	M	H	H
5	Bulk Chemicals **	Lyondell, Shell, Akzo, GE, TNO, TU/e, TUD, UT	Trace removal (organic streams)	M	M	H	H
6	Bulk Chemicals	DSM, Lyondell, WUR, TU/e, TUD	Intensified extraction for bulk processes	H	M	H	L
7	Technology Validation **	MACT, Purac, Cosun, WUR	Prevent membrane fouling. Practical implications and validation of recent developments.	M	H	M	M
8	Technology Validation **	Solsep, Organon, DSM	Evaluation of the use of SolSep membranes in process industries	H	H	M	M
9	Technology Validation **	DSM, Friesland Foods, Organon, ResQLab, Mosaic	Hypercatch: new high performance separation platform	L	M	H	H
10	Food	Norit, Friesland Foods, Cosun, WUR, A&F, NIZO	Mild fractionation of suspensions and emulsions	M	M	H	H
11	Food	DSM, Friesland Foods, Cosun, Norit, BAC, Aquamarijn, Proxcys, Feyecon	Mild isolation and fractionation of bio-macromolecules from agro- and bio-feedstock	M	M	H	H
12	Food **	DSM, Friesland Foods, Cosun, Norit, BAC, Proxcys, ResQLab, Mosaic, TNO	New separation principles for functional peptides and oligosaccharides based on molecular affinity	M	M	H	H
13	Food	Cosun, Friesland Foods, ECN	Mild dewatering systems	H	L	H	M

Some examples of DSTI projects (2/2)

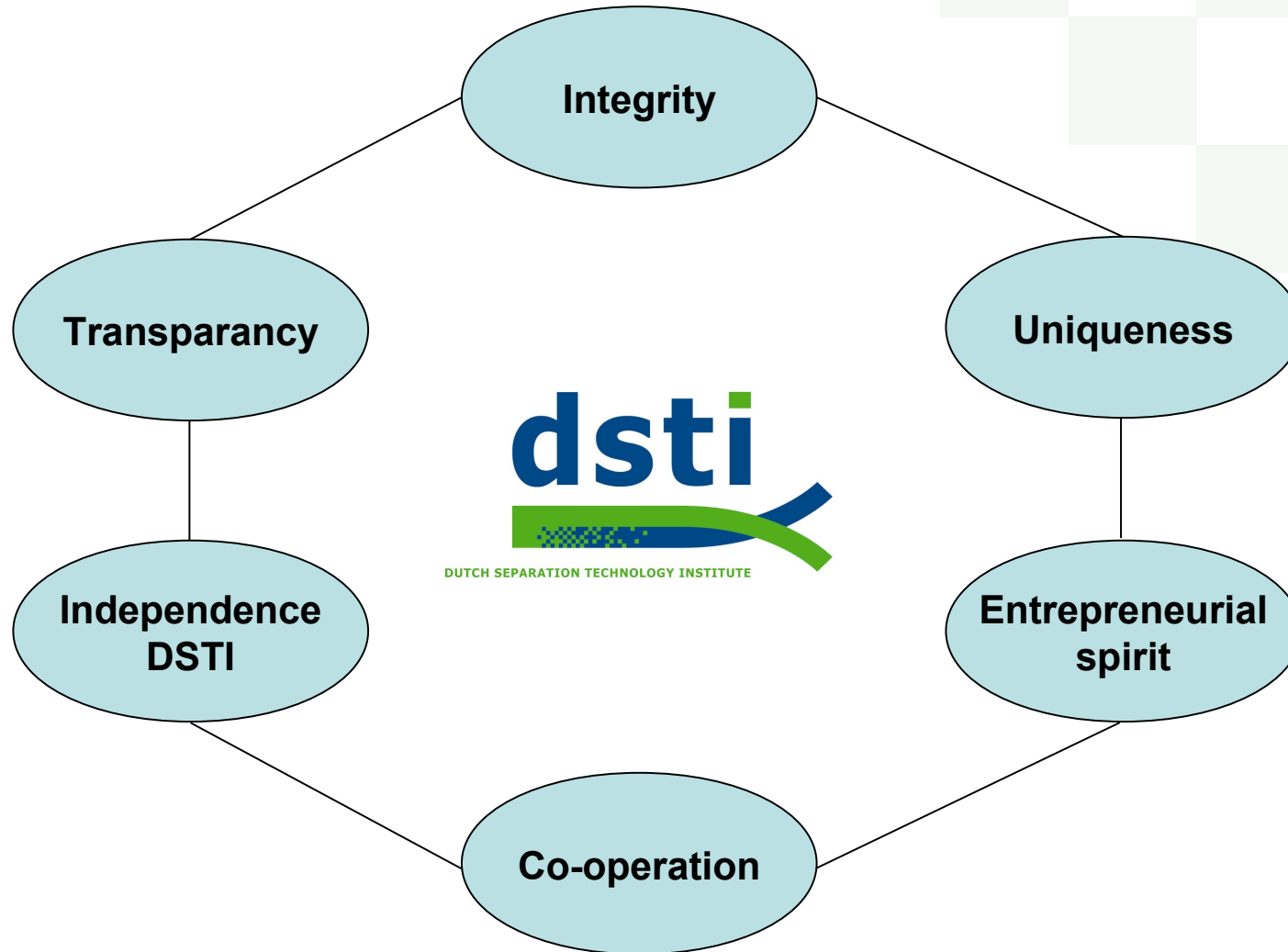
No.	Industry Sector (**) Cross Sector Uitvoering	Industry / University / GTI's Partners	Project Title	Impact on Energy/CO2 reduction	Impact on Emission reduction	Impact on Foot print reduction	Impact on Increase product value
14	Oil & Gas	Shell, Frames, UT, TUD, ECN	Methane separating membrane	H	H	H	M
15	Oil & Gas **	Shell, Frames, TUD, TNO	Designer Solvent for natural gas treatment	M	H	M	H
16	Oil & Gas	Shell, Frames, CDS, TUD, UT	Development of an Ω 2R separator focussing on oil/water separation	M	M	H	H
17	Pharma **	DSM, Organon, Albemarle, BAC, Proxcys, ResQlab, Mosaic, Syncom, WUR, TU/e	New affinity separations technology for pharma, food and specialties	M	M	H	H
18	Pharma **	DSM, Albemarle, Organon, Friesland Foods	Selection protocols and synthesis tools for advanced separation technologies and isolation processes in the Pharma and Food industries	M	M	H	M
19	Pharma	Albemarle, DSM, Friesland Foods, Organon, Ipcos, TU/e, TUD	Intelligent Observer and Control for Pharmaceutical Batch Crystallisation	M	M	H	H
20	Specialties	DSM, Purac	Intensified selective recovery of highly water soluble components from fermentation broths	H	H	H	M
21	Specialties	DSM, Purac, TNO, TU/e	Intensified selective recovery of highly water soluble components from fermentation broths. Follow up pre-project	H	H	H	M
22	Specialties **	DSM, Organon, Albemarle, ResQlab, Mosaic	Mosaic System Technology as tool for the separation of proteins / large peptide from biopharmaceutical process streams	M	M	H	H
23	Specialties **	Akzo, Purac, TU/e, UT, TUD	Removal of compounds present in ppm concentrations in aqueous streams	H	H	M	L
24	Specialties	Akzo, DSM, TU/e, TUD	Reactive distillation for multi-product continuous plants	H	L	H	M
25	Specialties	Akzo, DSM, Electrolyse project	Development of large scale processes to reduce salt formation/emmission	H	H	M	M

Organization chart facilitate execution objectives



●--▶ represented in
 ●..... liaison relationship

Values DSTI



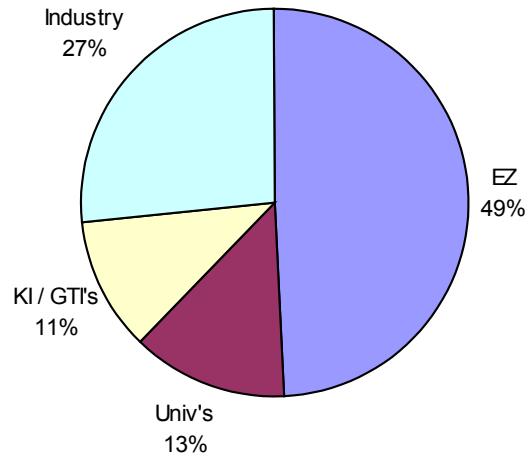
Program - DSTI aims for active participation of all partners in projects and project execution at all partners premises

	Temporary Staff	Permanent Staff
MSc (AIO)	30 %	Industry University, Knowledge Institutes,
MSc PhD level Other (HBO, TWAIO, Technician)	70 %	
% of total fte's	60 %	40 %

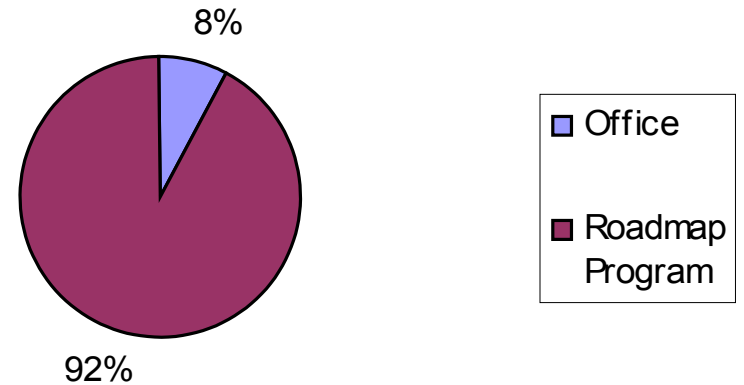
Balance in experience and affiliation

Projected DSTI Income & Expenditure

DSTI - Income



DSTI Expenditure

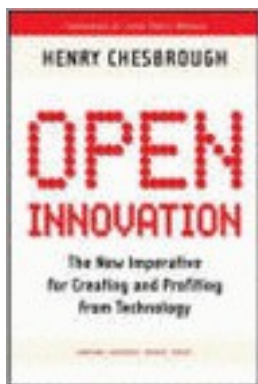


The DSTI Team:

Diversity United to Separate what really matters!



Open innovation = building trust



“While the key to successful innovation once lay in the controlled environment of the corporate laboratories, today the widespread distribution of use from knowledge makes such control unfeasible. Competitive advantage now often comes from leveraging the discoveries of others.

Rather than relying entirely on internal ideas to advance the business, an “open approach” to innovation leverages internal and external sources of ideas.”

Why and How join DSTI

Why join DSTI

Innovate and create (new) business faster, more efficient, and with less risk by:

- Being at the forefront of new developments and innovations in process technology
- Having the possibility to define and execute projects together with selected industrial partners and knowledge institutes
- Being co-owner of the IPR generated
- Enlarging your network into new and existing markets
- Sharing the costs of the developments with partners and The Dutch Ministry of Economic Affairs (multiplier 5 and higher on every euro you invest).

How to join DSTI

Which actions are needed to be become a DSTI Partner

- Start to actively participate in the program definition.
- Buy cash / 'in kind' tickets in sectors of interest; 50 kEur/y (MKB 25 kEur/y)
- Your ticket(s) can be used to support 2 projects and earmarks your financial participation in an Industry Sector.

Intellectual property regulations

Intellectual Property related to business opportunities

Patents are business tools and should therefore always be related to (potential) business opportunities

If business interest exists, DSTI files a patent on behalf of the partners

- **DSTI owner of IPR until the national phase**
- **Ownership rights: Industrial partners in sector* > industrial partners other sector > knowledge institutes**
- **“Voetballersregeling” for knowledge institutes**

*In cross sector project: sectors participating in a joint project both IPR rights unless agreed otherwise and approved by the Executive Committee

Your Next Career step?

We Seek

Junior and senior researchers with at least a Masters Degree in:

- (Bio)Chemical Engineering,
- (Bio)Chemistry,
- Applied Physics
- Food Technology
- Materials Science
- Mechanical Engineering
- Fluid Mechanics
- or a related fields

Occasionally, we also have positions for technicians and lab assistants

We Offer

- Work in a **multi-disciplinary project team** with experienced R&D colleagues from *industry, universities, and contract research organisations*; This gives you a prime opportunity to gain experience and to build a **strong network**.
- Work **on site** at **various DSTI partners**;
- Ample opportunities to **follow courses** and attend conferences to improve your technical competences;
- **Personal and business skills development support through:**
 - A **mentor** from industry;
 - Participation in **business simulations**;
 - Training in **project management and communication**.
- **Active support** toward your **next career step** with one of the DSTI partners.
- **Good salaries**

Role DSTI in project management

Typical DSTIand Risks....

- Innovation two times faster
- Sharing costs and knowledge

but

→ Cooperation takes time and money

and

If no special measures are taken the project “success rate” drops from **70%** (intra partner project) to **30%** (inter partner project).

Role DSTI: facilitate “30 to 70” and “factor 7”

Project success factors

- Methodology to increase project “success rate” from 30 to 70%
- Knowledge in “industry heads” acts as support for implementation
- Active participation. To acquire knowledge and support active participation is 7 times more effective compared to just listening

Other Proven Key Elements for project success

- Sense of urgency and priority at industry users and technology suppliers
- Professional project management support; e.g. facilitated project Kick-off
- Moscow (priority setting and time boxing during project execution)
- “Unreasonable and unconventional approach at times leads to major steps forward”