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Innovation-driven research in Europe; how to identify and translate opportunities into R&D projects ?

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« Innovation-driven research in Europe; how to identify and translate opportunities into R&D projects ? »

Hugo de Vries,
with a focus somewhat more on innovations in post-harvest



Introduction: a tendency to move towards innovation trajectories

- European Commission: Horizon2020: focus is on innovation, NOT research pure (rupture)
- France: INRA PTI traject, Cirad (Epic), ACTIA, ...
- The Netherlands: the ministry of agriculture and the ministry of economic affairs have been integrated > innovation programs priority!
- Invite researchers of companies to participate in research projects (kind of outsourcing R&D by companies) > public-private partnership platforms

Running innovation projects

10 key elements based on my experiences

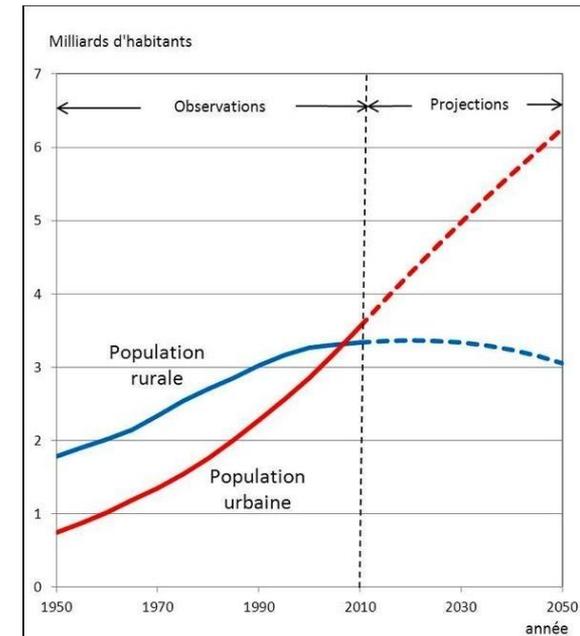
in The Netherlands & France, in EU projects



(1)

Preparing an innovation project
is

‘being capable of looking into
the future’



They really believed it ...

“Radio has no future.”

“Heavier-than-air flying machines are impossible.”

“X-rays will prove to be a hoax.”

Lord Kelvin, British mathematician, physicist, and president of the British Royal society, C. 1895

They really believed it ...

“A severe depression like that of 1920-1921 is outside the range of probability”.

The Harvard Economic Society, 16 November 1929

They really believed it ...

**“I think there is a world market for about
five computers”.**

Thomas J. Watson, chairman of IBM, 1943

They really believed it ...

**“There is no reason for any individual to have a
computer in their home”.**

*Ken Olson, president, Digital Equipment Corporation,
1977*

They really believed it ...

“We don’t like their sound.

Groups of guitars are on the way out”.

Decca Recording Co. executive, turning down The Beatles in 1962

They really believed it ...

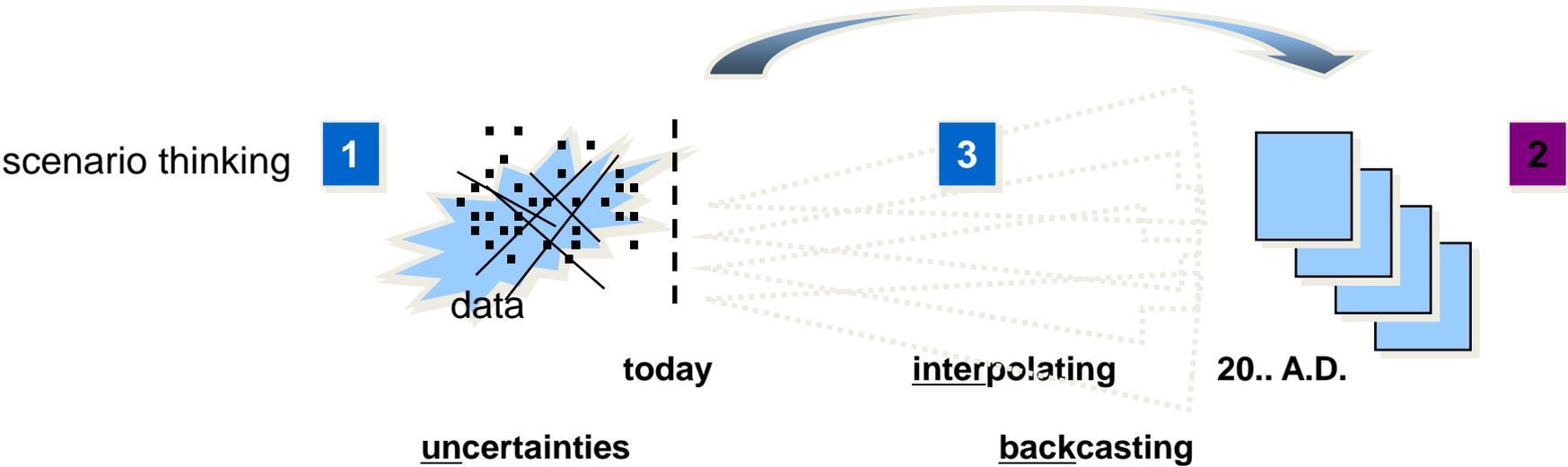
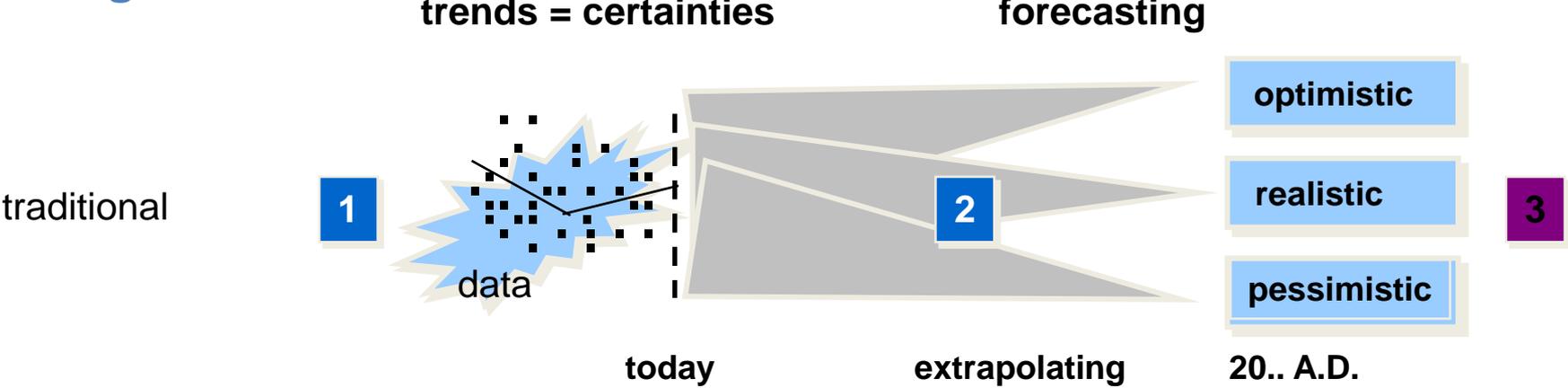
“There is not the slightest indication that nuclear energy will ever be obtainable. It would mean that the atom would have to be shattered at will”.

Albert Einstein, 1932

THUS: step 1:
try to get insight in the future >
develop scenarios

Scenario's are developed
to better understand
current options for choices
in the context of potential 'futures'

The difference between scenario thinking and 'traditional' strategic planning



(2)

Preparing an innovation project
is

‘understanding challenges and
trends’

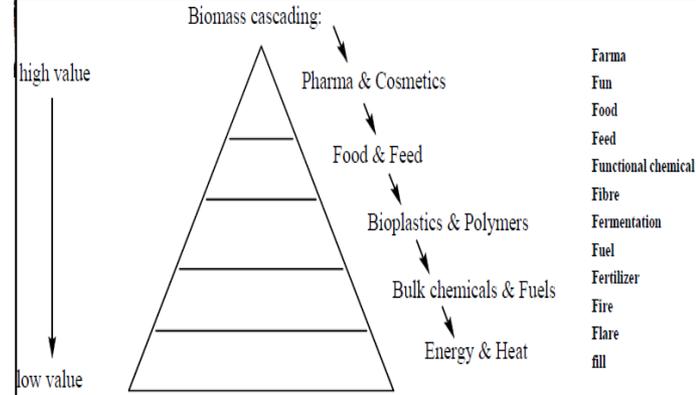
Challenges and trends:

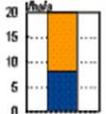
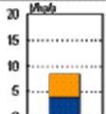
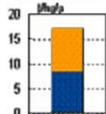
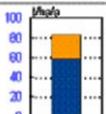
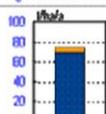
(i) Reducing waste streams

(ii) Valorizing new co-products and waste streams:

Sources: Poyry and Sanders

(i) Trends like convenience, pleasure, ...



Feedstock	Crop yield kg/ha/a (fresh)	Residues kg/ha/a	Fractions
 Wheat	8000	11800	
 Rye	3800	4400	
 Corn	8180	8700	
 Sugar cane	58000-88000	24000-37000	
 Sugar beet	69300	4700	

(3)

Preparing an innovation project

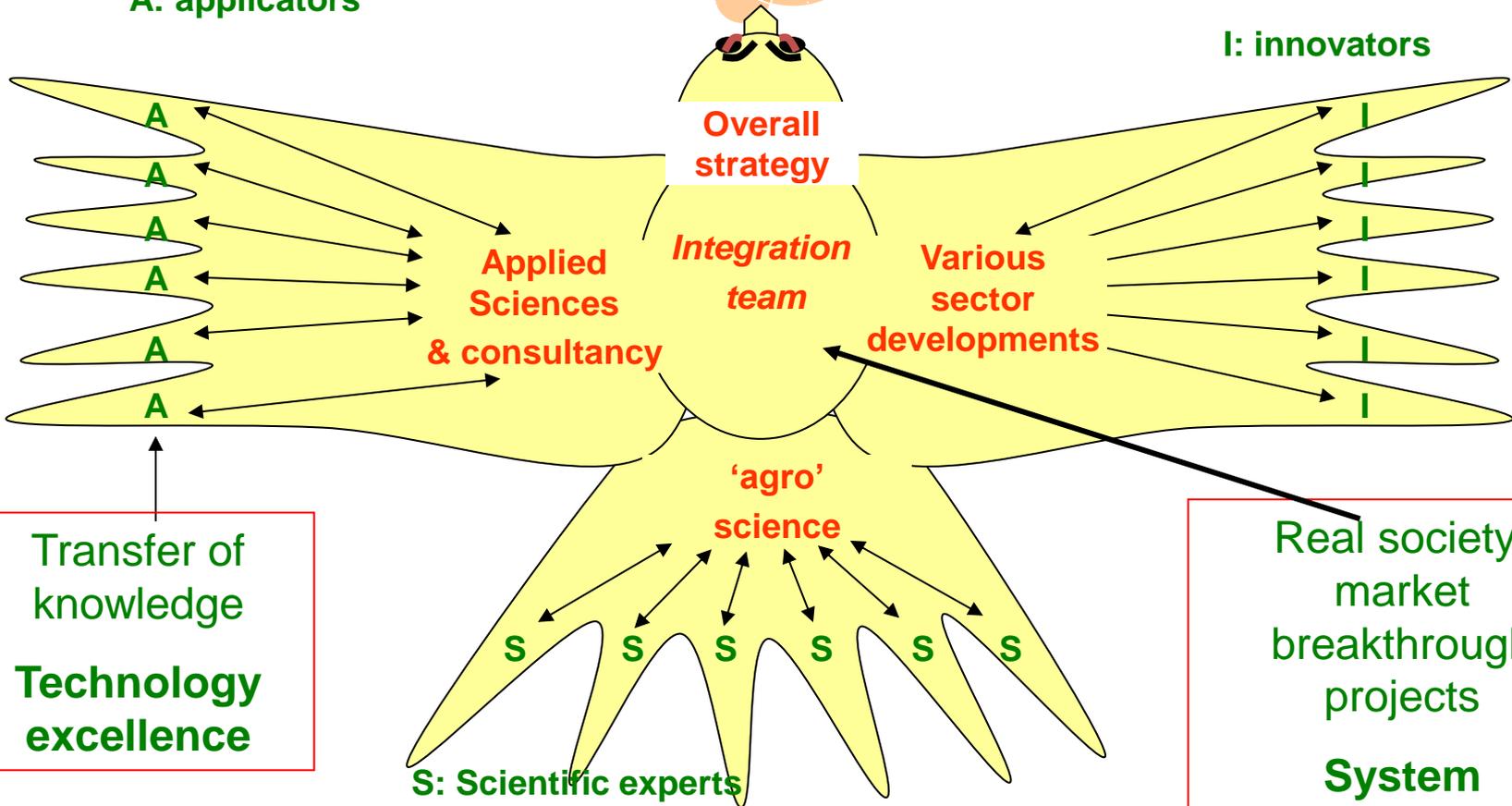
‘requires a strategic approach’

- Societal context:
- Climate change
 - Food security
 - Transition bio-based
 - ...
 - Market opportunities

Don't loose time with issues that are out of your control

A: applicators

I: innovators



Transfer of knowledge

Technology excellence

Real society-market breakthrough projects

System innovation

Knowledge generation as basis

Scientific excellence

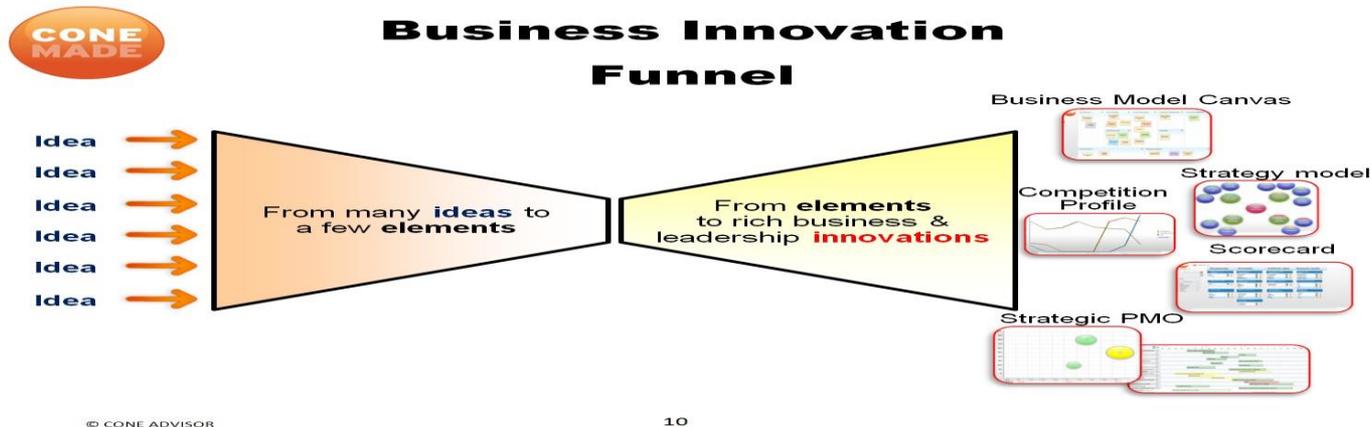
(4)

Preparing an innovation project

‘understanding the innovation
funnel and the important factor
TIME or TIMING’

Understanding the innovation funnel and time / timing: *from potential end-product back to scientific principles and vice versa:*

- Research – development – marketing – sales trajectory (with feedback loops)



- Recognizing time scales, market size and investments needed



- Being first or follower, alone or cluster, join an incubator, ...

(5)

Executing an innovation project

‘knowing your (complementary)
role and contribution’

Innovation cases: know your position and communicate

- What is your real contribution (don't act in the core of your partner's main activities?)
- Examples from others: what can we learn from cases (not only in content but also in the positioning of players)
- Innovation that have been leading to other innovations (the snowball effect)
- Do we recognize missed opportunities and why
- Failures in innovation: no shame but an excellent lesson to do it better next time (the real entrepreneurial spirit)
- Communicate your best practices!
- Even better: let your partner communicate those!

(6)

Executing an innovation project
requires

‘a change in mind-set’

A change in mind-set: from external opportunities towards an 'internal' research project:

ask questions in a logic manner & realize that much is unknown to you:

- What is the market and Who is the customer?
- Which trends are relevant for the customer?
- Which technological development proposes the customer today?
- Which added value do I have as research expert/center?
- How can I provide this added value?
- Can we test/benchmark this added value (attractivity, % achievable, ..)?
- Can we transform this into a proposition with at least a 75% success rate? ²

Accept that you have to learn and ask questions

What you do not know is more important than what you know

These question are translated into Research-Business Propositions:

an example for chilled (convenience) food products

- **Market:** marketing figures, growth potential of area, profit, quality improvement possible, innovation-grade, new product concepts
- **Customers of chilled meals:** manufacturers of chilled meals, packaging firms, ...
- **Trends:** convenience, fresh-healthy, on the go lifestyle, trendy, cultural diversity, ageing society & convenience
- **R&D short description:**
 - new product concepts (meal salads, cold soups in a bag, smoothies, multi-compartment meals, regional brands for fresh, ..)
 - Optimal balance in fibers, salt , fat, taste,
 - Keep ability: logical flexibility, new markets, out-of-home sector.
- **Added value of research centers:** packaging, food science, agro logistics, information technology, valorization of waste knowledge, sensory science
- **Already built up experience:** 1 European project, 5 industry projects, 10 thesis
- **Working approach:** Multidisciplinary R&D-team.
- **Criteria for cooperation with client:** IPR, re-selling, new projects after this one, more elevated revenues, ...
- **First evaluation:** Success rate of first new product concept above 70%

(7)

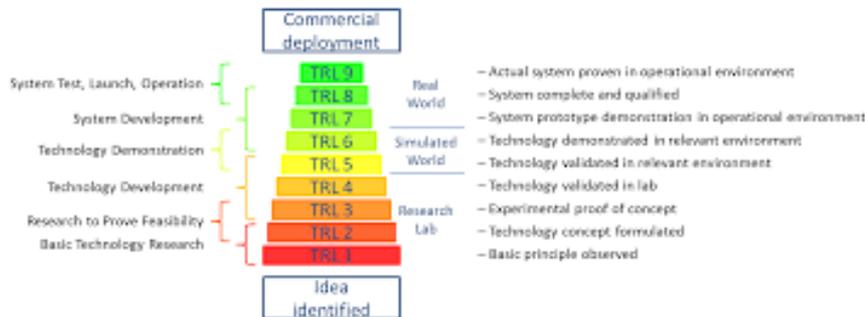
Executing an innovation project
could also be

‘a traditional science-impact
driven approach’

The science project as source for innovation:

from internal scientific excellence to external impact

- Creativity as driver for science
- Recognizing potential valuable deliverables in your research project
- Protection of results: why, when and where
- Patenting of insights and applications (the mother patent, specific application-oriented patents, software tools, licensing ..), evaluating patents and added value, support of patent offices, cost & revenues (start thinking about revenues as early as possible) ..
- From patent to business: finding the right partner, spin-out/spin-off, ...
- Entrepreneurial skills
- Writing a business plan
- Attracting seed money, capital funds, .. (taking care of who leads what)

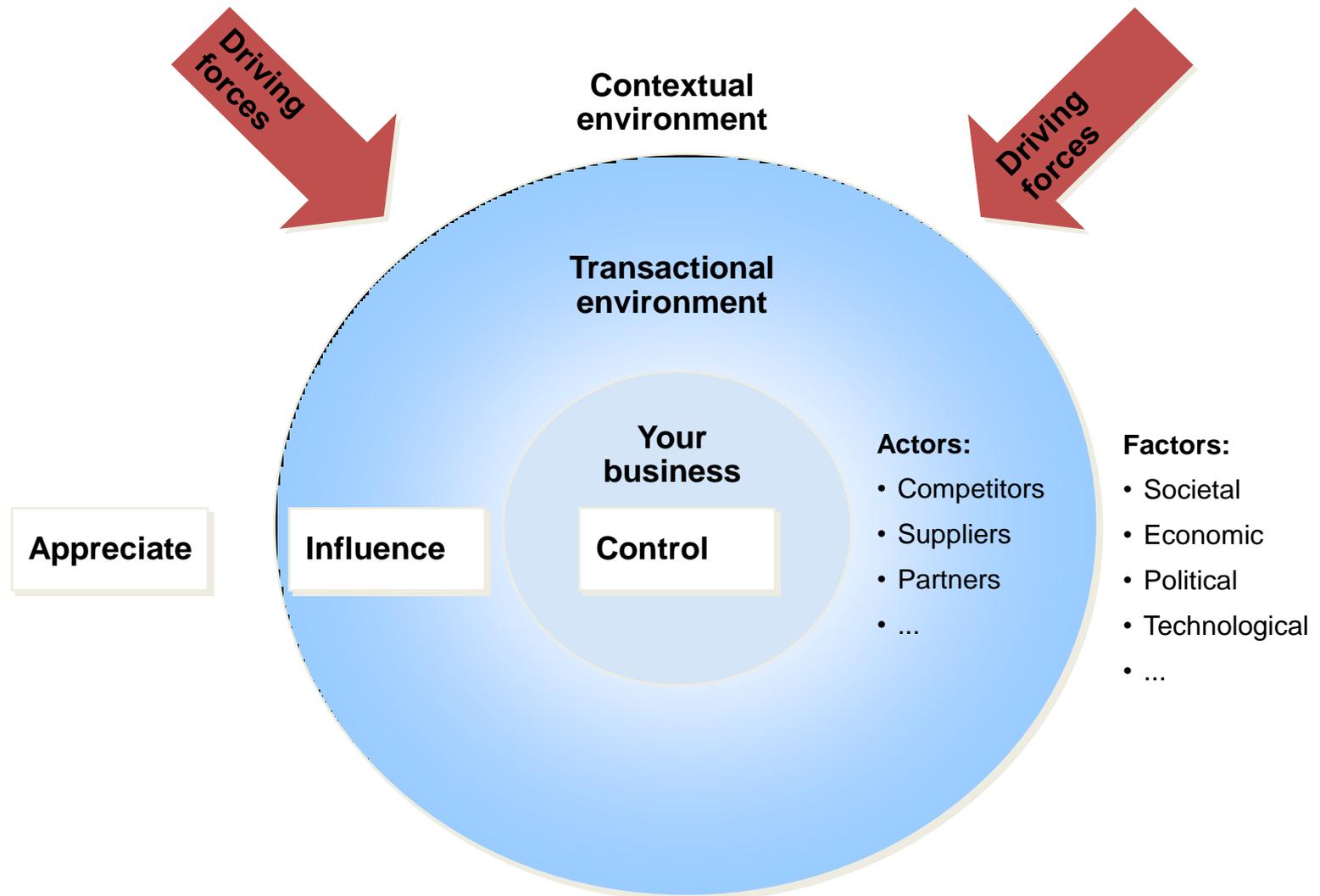


Current generic approach in science

Climbing the TRL staircase

BUT realize where are key factors

*They are outside your direct environment and **out of your control!***



(7)

Executing an innovation project
requires

‘targeted kind of projects’

7. The kind of 'innovation' project:

the description of a project plan can become challenging

- The different kind of project offers from research institute(s):

- *'Contrat de recherche' (partly own investment and/or subvention)*
- *'Prestation de service' (standardized payment; full cost = 100%)*
- *Applied research project multi-disciplinary team (100% +)*
- *Real innovation project (100%++: full cost & high margin OR fixed price),*
- *Strategic consultancy project (very high value; elevated tariffs), ...)*

But all more or less standardized as action plan:

- Project definition (working plan, milestones, deliverables, Gantt charts, RH input, ...)
- Project management (key skills, management team, advisory teams (industry, science, NGO, ...), & **responsibilities**, tasks descriptions)
- From Project plan to Description of Work (action plan: specified tasks, sub-tasks, project phases, reporting, evaluation moments, go-nogo decisions, ...)
- *From DoW/Action plan to business plan (mission, vision, summary of potential outcomes, context and trends description, R&D case, technology case, partnership, timing, costs (including de-commissioning in case of failure), SWOT analysis, **SWOT as basis for precise actions**, ...)*
- ***Key performance indicators** (KPI; registration of the full process)*
- ***The post-project phase:** get feedback from partners to improve & it facilitates new projects (**snow-ball effect**)*

(8)

An innovation project
should

‘not be regarded as something
too costly

BUT

as a balanced
benefit – cost activity’

How to define cost/benefit ratios and how to finance innovation projects **(don't think you are too expensive!!!)**

- *Pricing strategies and negotiations (the potential market value, your value and the value for others), costs versus value & input, quick wins, it is not a single project but a series of activities .. > real challenge*
- When is financing needed in the innovation funnel, pay-back times, rules and strategies *(it is not only the budget of your project; but especially the follow-up actions)*
- What sources & what are their benefits: private, public, loans or subventions (regional, national, European (DG Research, DG Enterprise, DG Agri, DG Sanco), banks (OSEO, traditional banks, Hedge funds, ...) and why (accelerating, initiating, ...)

(9)

Exploiting an innovation project
is

‘taking into account the
boundary conditions (e.g. legal
issues)’

At least *some* notions of boundary conditions, legal and ethical issues (and asking experts in this area)

- The level playing field
- Regulation (e.g. trade regulations, food law, trademarks, territorial protection, PAC, European policy on competition, EFSA/FDA, ILSI, European Food Law Institute,..)
- Pre-competitive and competitive research
- Ethical issues in operations, subjects, resources, approaches, communication
- Conflicts and controversies: the public opinion!
- **The do's and don't > write them down and share them.**

(10)

Exploiting an innovation project
is

‘above all about the human
factor’

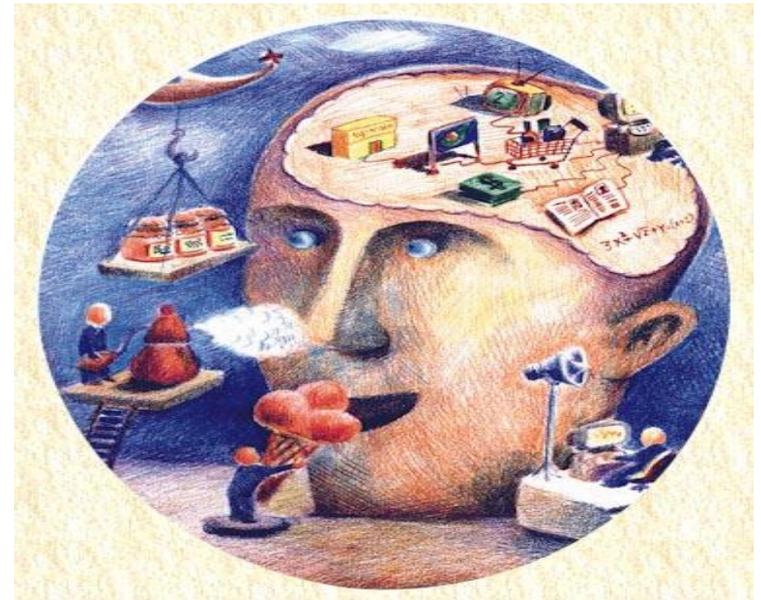
The human factor

- Competences and skills required for successful innovation
- **Team building and complementary skills**
- Dealing with your customer (customer relationship management and account management) **> not all are well in acquisition!**
- Training and case studies (specialized courses in innovation project management) **> science manager is a profession**

Competences

- Initiator
- Entrepreneur
- Organizer
- Strategic
- Commercial
- Social
- Economical
- Technical (various)
- Philosophical
- Pro-active – responsive
-

Being a team player to help and initiate and carry out a project and thus to recognize / respect others and their competences (strong and weak points)



- You often need all in a project team

Some examples

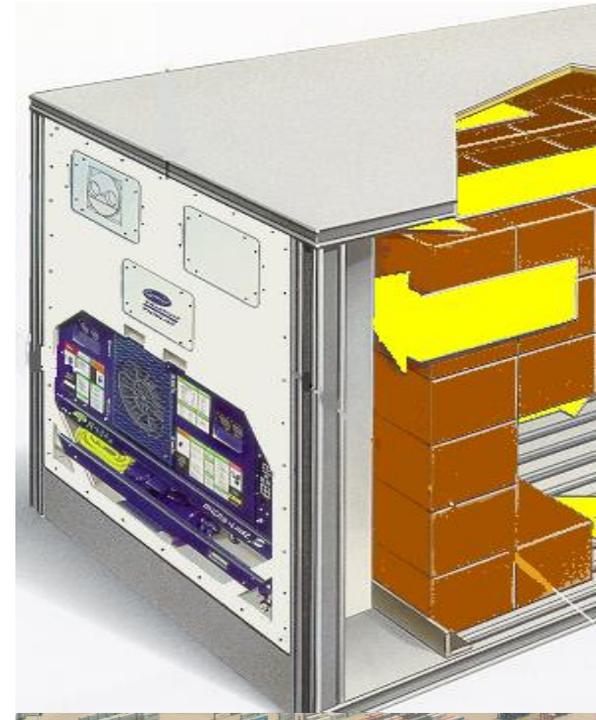
CEET 2005: agro-container concept for 21st century: stand alone transport to reduce product loss

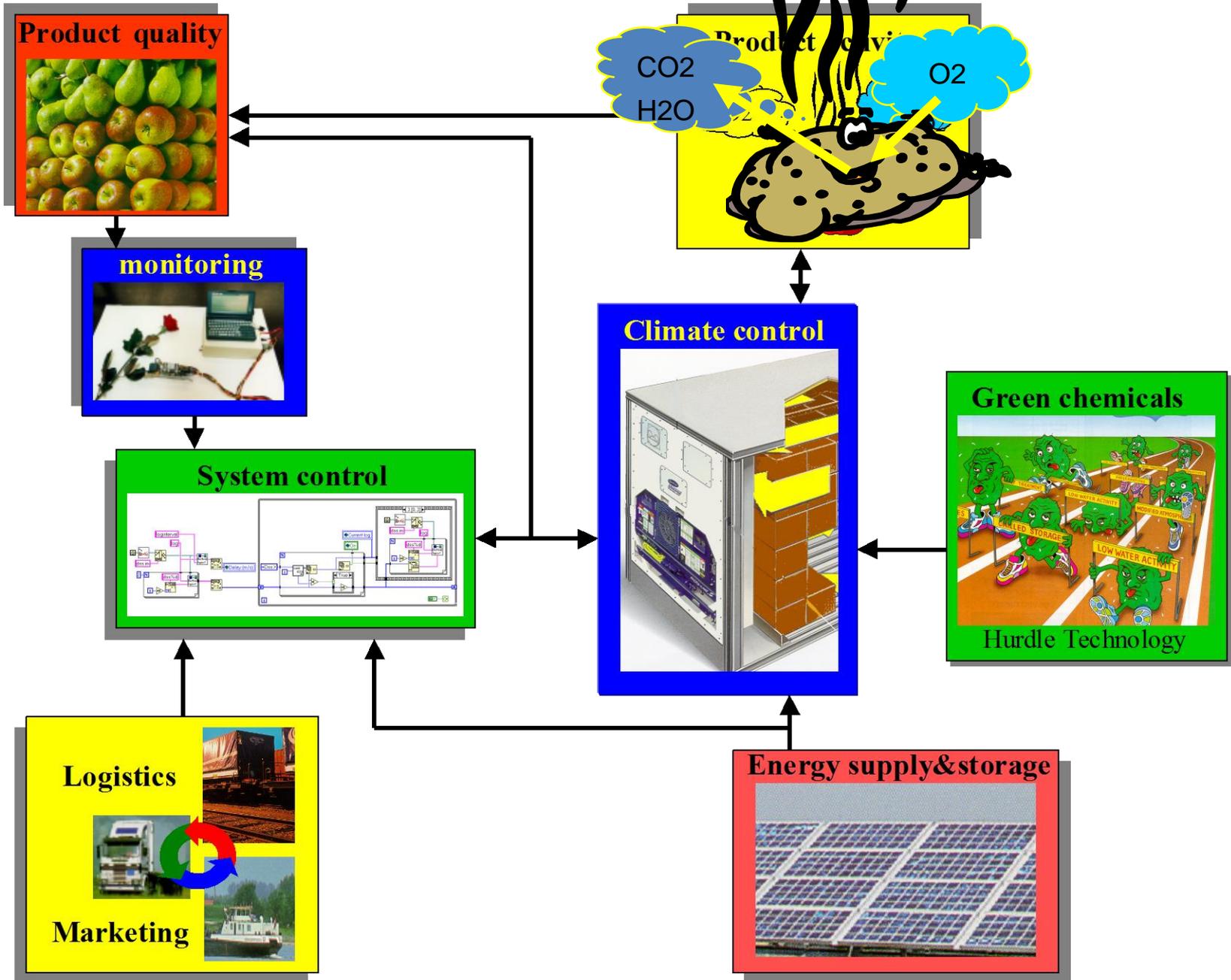
Goal: development of an agro-container for sea transport **using at least 80%** less energy consumption to include solar panels and still offering manageable product

Partners: EET, Carrier Transicold, Maersk, The Greenery, Shell Solar, Ecofys, ERBS, WUR

Why researchers involved: knowledge of quality–time relationships for fresh produce, dynamic models for climate control and monitoring/regulation systems

Real driving force: here legislation and assurance; who is responsible for losses!



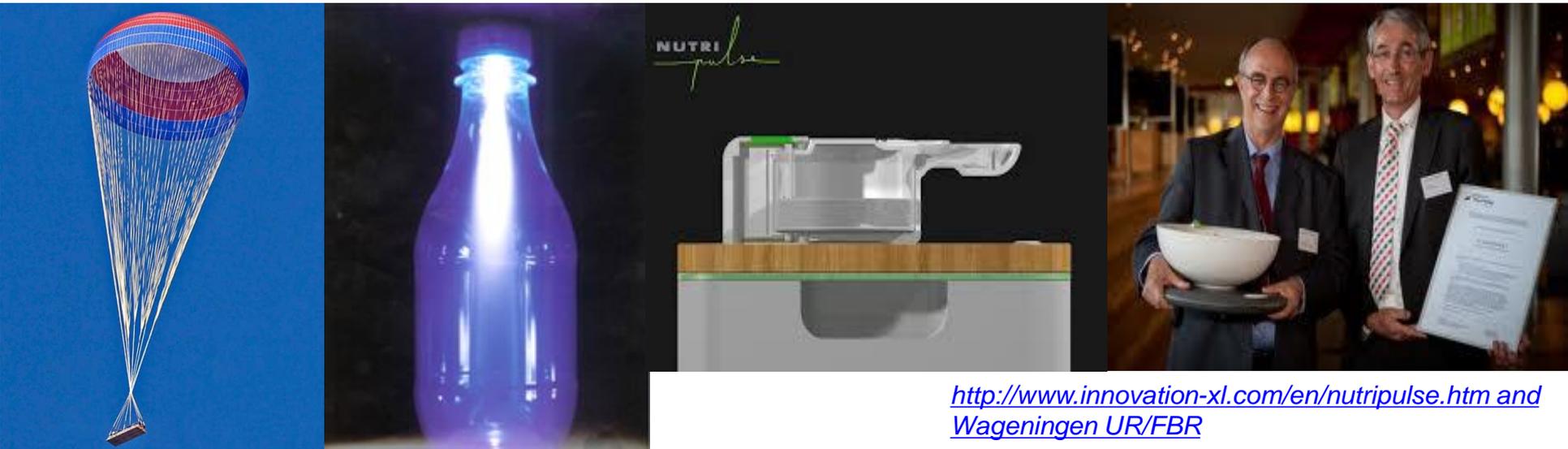


Goal: *To develop and successfully demonstrate - eco-friendly - novel processing technologies (HPP, PEF, Plasma, microwave, radio frequency, ohmic heating and new packaging materials) for improved quality food and new products (fresh-like character, extended shelf-life)*

Partners: 30 research centers and over 80 companies

Why research centers: basic food science and technology knowledge

Real driving force: transition towards reduction of energy, water and renewable resources

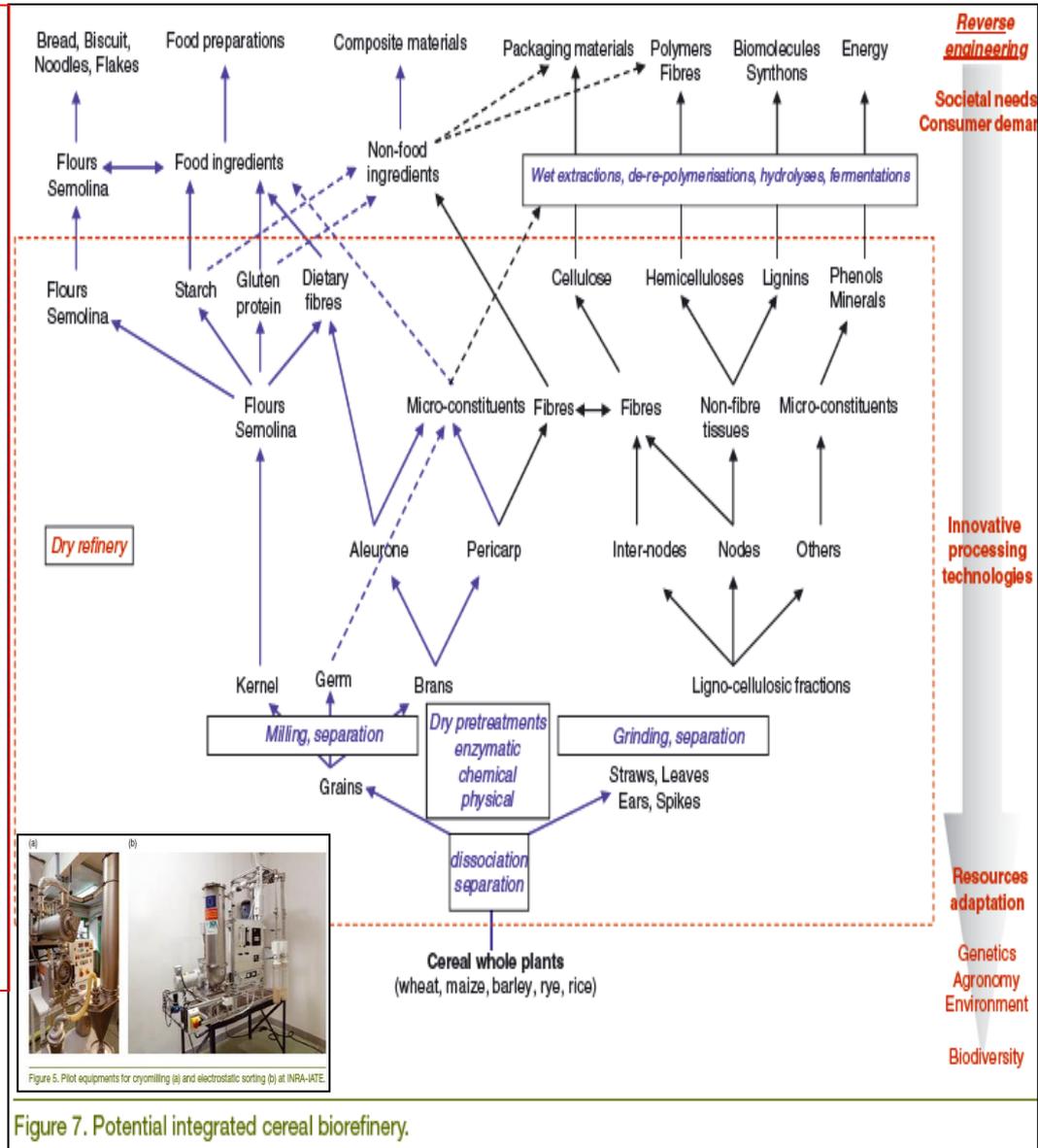


Goal: To develop a new approach for 100% valorization of cereal plants (durum wheat)

Partners: several research centers and about 8 companies

Why research centers: knowledge of cereals and processing in the widest sense

Real driving force: co-products are not valorized, and new economic activities, preferentially industrial ecology concepts



Abecassis, de Vries,
Rouau, 2013,..



EU project: EcoBioCAP 2010-2014

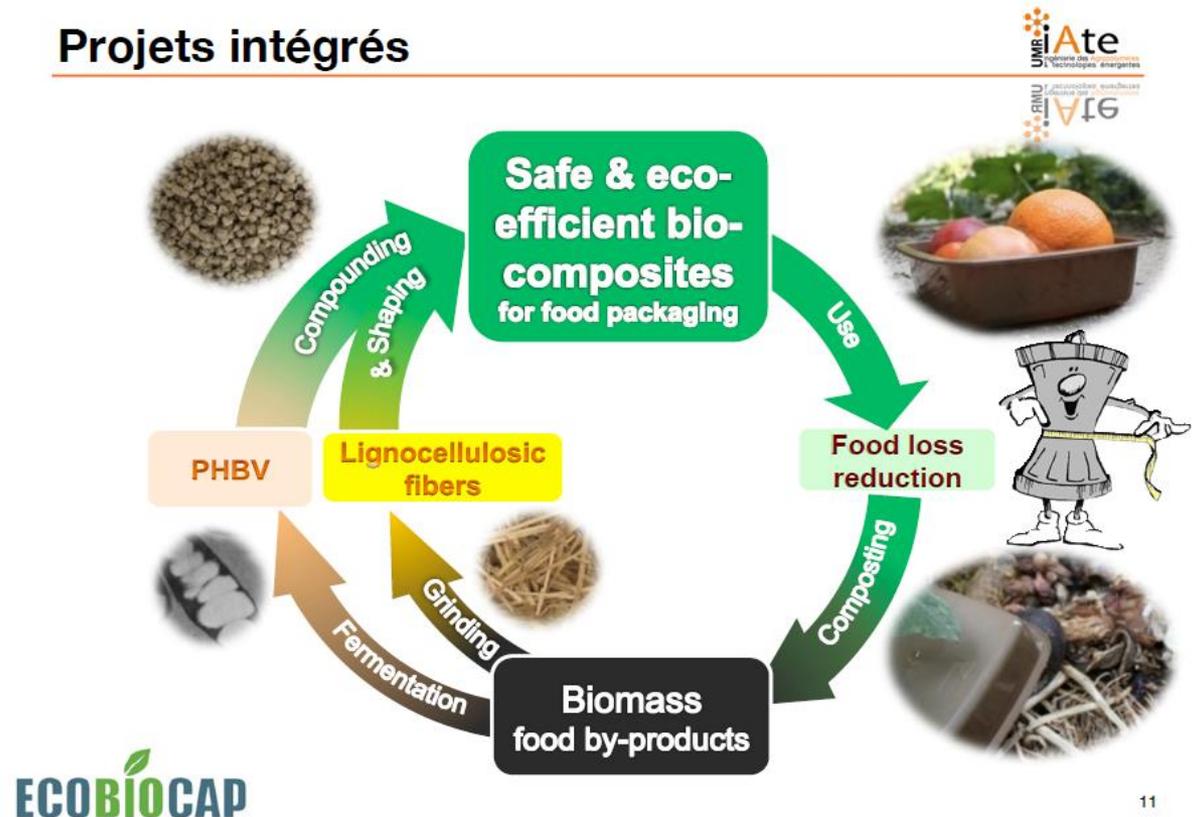
Goal: EcoBioCAP will provide the EU food industry with **customizable, ecoefficient, biodegradable packaging solutions** with direct benefits both for the environment and EU consumers in terms of food quality and safety.

Partners: EU consortium

Why research centers: integrated knowledge (circular economy)

Real driving forces: substantially reduce product and packaging losses

Projets intégrés



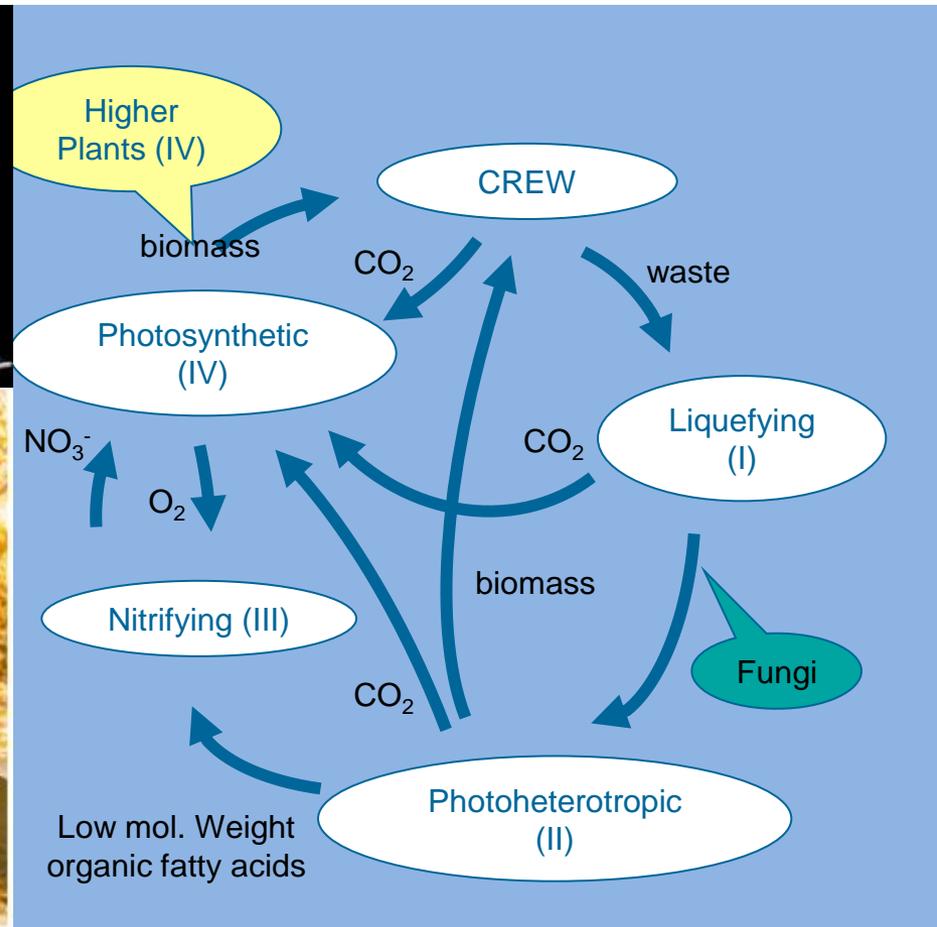
Melissa project: Micro-ecological life support alternative *in space*

Goal: closed cycle for renewable resources in a limited space

Partners: various public and private partners

Why research centers: highly complex systems

Real driving force: being self-sustainable & ENJOY & FUN



Some key lessons learned from setting up R&D project:

- Think before acting (scenarios /BP >> DoW)
- Accept that you have to learn and ask questions
- Be committed to activities of the other partner: don't wait for the results but try to understand how results are achieved
- Invite and become invited to occasionally work at each other site.
- Make all participants in the project responsible for the final result:
 - the entrepreneurial, multi-disciplinary scientists
 - the research-focused business development manager
- Include an out-of-the box thinker who is able to redirect

Lessons learned (II):

- Try not to arrange everything at the start, however also avoid a too simplified working scheme (for project content and contract matters);
- Include marketing of companies or governmental policy developers in the R&D proposal stage
- Focus on benefits vs costs instead of costs alone
- Define escape procedure and go/no go moments in the project running phase (and always add 20% extra budget and time)
- **Create a TEAM spirit!!!!!!!!!!!!!!!!!!!!!!**

Summary

Running innovation project is a science-innovation process in itself: should all researchers have a flavor of it?

- Thinking in scenarios and learning to know and define your horizon
- Market and marketing insights
- The people, planet, profit approach as basis for sustainable innovations (understanding socio-economic, environmental, ethical and esthetical drivers)
- Social and technical innovations
- In-house innovation and food chain innovations
- Innovation and human behavior
- The complexity of innovation strategies (multi-actors, interactions, changing contexts, emerging properties, game theory, ...)



We have all different perceptions!

*Good Luck, Enjoy your innovation trajectories and
thank you very much for attention*