



Enabling Europe to Innovate

Andrew Dearing
Hamburg, June 2007

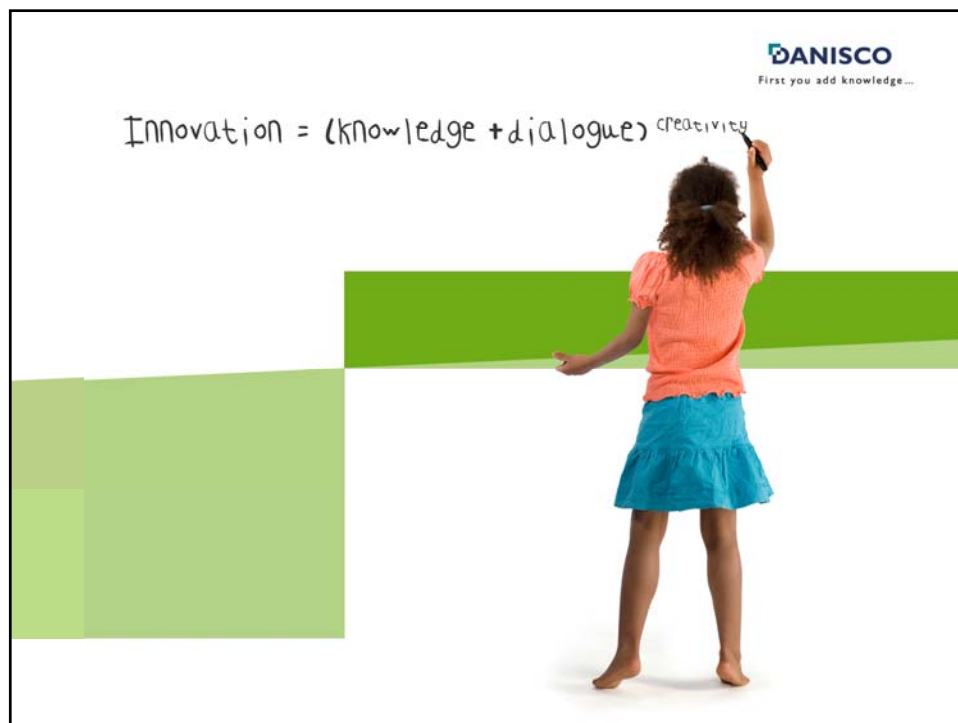
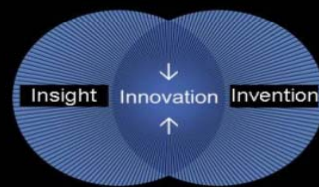
Road Map

- What's happening to business sector R&D
 - Managing internally, managing the network
- People, places, institutions, globalisation
 - Critical mass and company growth
 - Universities, industry and effective knowledge transfer
- Implications

What is Innovation?

Innovation occurs at the intersection of invention and insight.

*It's about the application of invention;
The fusion of new developments and new
approaches to solve problems.*



Company R&D - Then and Now

"Safeguard the corporation's future"

Basic -> applied research -> development

In-house corporate + BU

Physical products

Proprietary "stuff"

Protective IP management

Technology as driver

Western brains

Western standards

Start in the West

"Unambiguously business driven"

Innovation as much more than R&D

Partnerships essential

Growing service content

Business model

Active IP portfolio mgmt

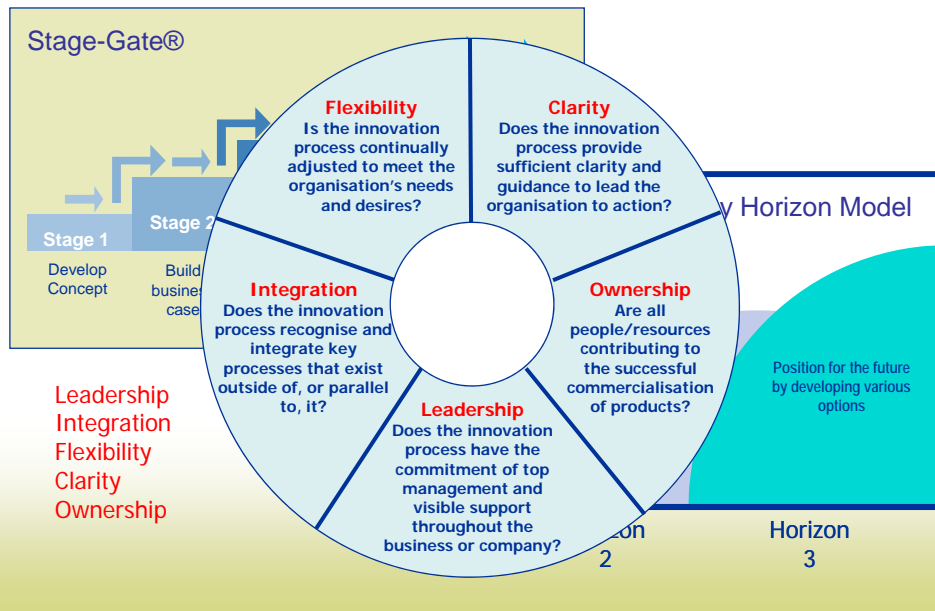
Customer as business driver

Brains are everywhere

Whose standards?

Which lead markets?

Established Internal Processes (2000)



Patent Policy

Old Definition of Competitive Advantage

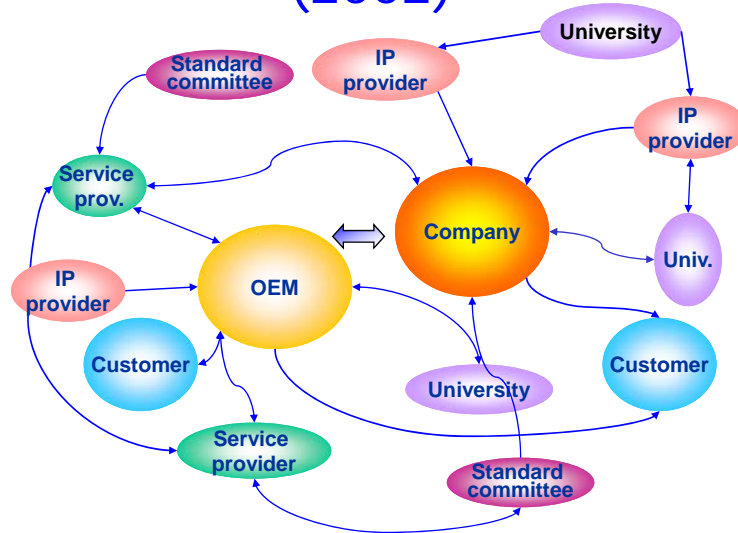
- I've got it!
- You don't!

Patent Policy

New Definition of Competitive Advantage

- I've got it, you've got it . . . but
 - *I've got it **cheaper**.*
 - *I've got it **with no less capital***
 - *I've got it **with 18 months lead time**.*
 - ***You follow my technology.***
 - ***I get to market two years faster than alone.***
- I've got it, you've got it . . . and I make money
*when I sell it, and I **make money when you sell it.***

A World of Opportunities (2002)



Rediscovery of the Science Base (2004)

Technology leads Change Not Customers

Sustained investment in long term scientific research delivers breakthroughs that change how the industry operates and the dynamics of the market

If you don't have in-house research teams, you won't sense the breakthroughs and won't know how to exploit them

Strong collaboration with leading academic researchers on "grand challenge" problems

Strong in-house teams turn academic research results into prototype technologies and applications ready for product unit exploitation, outbound licensing

2020 SCIENCE

A scientific revolution is just beginning. It has the potential to create an era of *science-based* innovation that could completely eclipse the last half century of *technology-based* innovation; and with it, a new wave of global social, technological and economic growth.

Creative People

“Holst’s Rules” [Philips, 1914-1946]

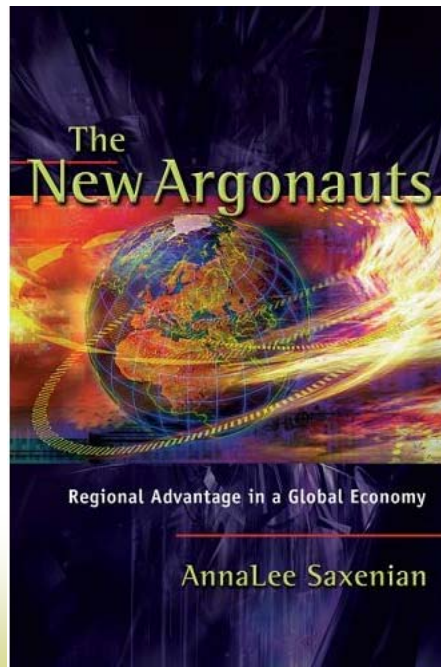
1. Engage competent scientists, if possible young, with academic experience.
2. Do not pay too much attention to the details of previous experience.
3. Give them a good deal of freedom and leeway to their idiosyncrasies.
4. Let them publish and take part in international scientific activities.
5. Steer a middle course between individualism and strict regimentation; base authority on real competence; in case of doubt prefer anarchy.
6. Do not divide according to disciplines: create multidisciplinary teams.
7. Give independence but ensure that leaders and staff are thoroughly aware of their responsibility for the future of the company.
8. Do not try to run research laboratories on a detailed budget system.
9. Encourage transfer of competent senior people from the research laboratories to the development laboratories of product divisions.
10. In choosing research projects, be guided not only by market possibilities, but also by the state of development of academic science.

Creative People [2007]

“7 Building Blocks of the Creative Climate”

1. Hire the best people - “the best of the best”
2. Maintain many direct contacts with customers
3. Ensure researchers feel that their initiatives and creative ideas are appreciated
4. Use contacts across the boundaries of discipline as a source of the most creative ideas
5. Ensure sound balance between structure and “anarchy”
6. Provide a good infrastructure
7. Cooperate with the best research players in the world

Philips



Labour market structure

Who moves around

Who rises up the ladder

“Brain circulation”

Linguistic/Cultural Skills

Market opportunities

Growth, Interests,

Specialised high wage
niches

Community support

For people

Returnee receptiveness

For prospective businesses

Win-Win or Win-Lose?

Invest in Education

Aggressively develop it!

PHILIPS

From “NatLab” to High Tech Campus (2005)



Q&A: Business education
Post a question for a panel of international experts about doing an MBA

Wednesday Jan 31 2007
All times are London time

SEARCH QUOTES

Home Europe

- UK | US | Asia
- World
- Companies
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- Managed funds
- Lex
- Alphaville
- Comment & analysis
- Technology
- Video & Audio
- Business Life
- Business education
- Wealth
- Arts & Weekend
- Most read
- In depth
- Davos 2007
- French Election
- Detroit Motor Show

Tata Steel wins Corus with £6.2bn offer
Tata Steel of India won the battle to control Anglo-Dutch steelmaker Corus with a £6.2bn (\$12.2bn) offer, after more than eight hours of head-to-head bidding against CSN of Brazil. - 08:58

- Tata and CSN square up for Corus
- Corus auction announcement
- CSN steels itself for the Corus finale

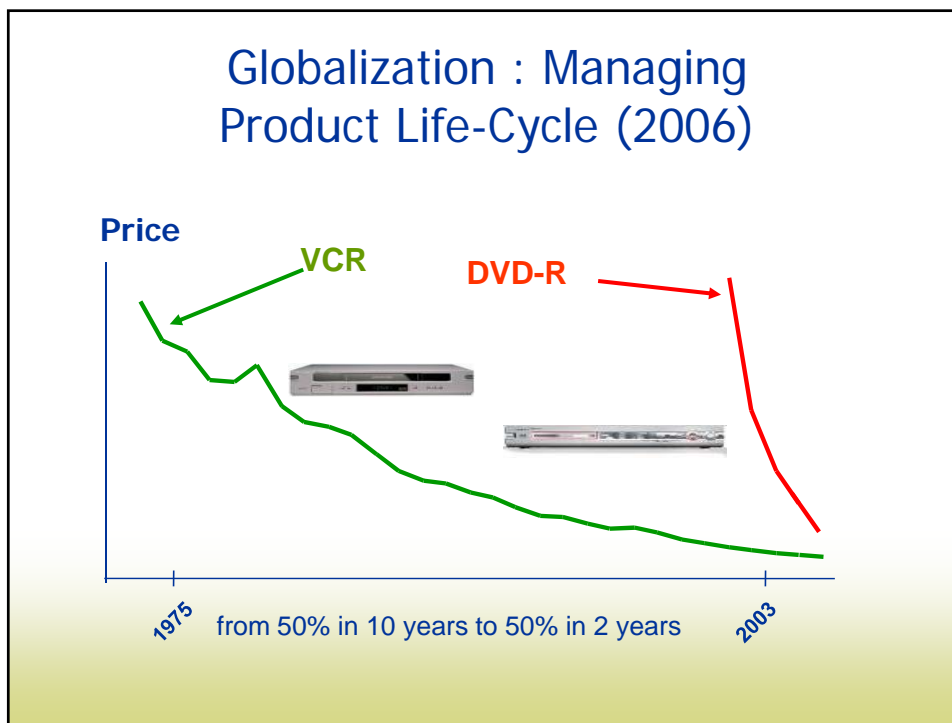
Merkel to fight vehicle emissions plan
Germany pits 'all its strength' against Brussels

- Analysts claim car emission plans are flawed
- Brussels split over new laws to cut vehicle emissions

Warning on China stock market 'bubble'
Top legislator predicts overheating

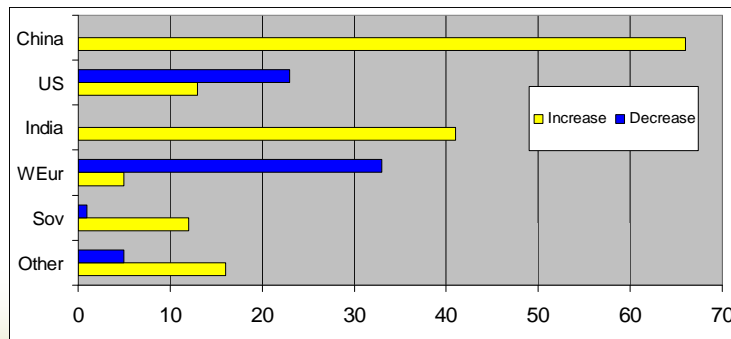
- China's feverish stock market too hot for comfort

French presidential candidate Nicolas Sarkozy leaves No. 10 Downing Street, London. He asked expats to return home and transform France



Globalisation Global Technology Management

When companies anticipate increase (decrease) in technical employment, what is/are the location(s)?



Thursby & Thursby (2005/06)

Globalisation: Increasing Inward R&D Investment

	UK	FR	DE	US
1997	32	16	17	11
2001	45	19	25	14

R&D expenditure by foreign affiliates as a % of
Business Expenditure on R&D (BERD)

Source: OECD/UK Government

Achieving Critical Mass Sector Concentrations

Company distribution (# firms in “global 700”):

	Europe	Americas	RoW	R&D/Sales
Global 700	192	334	174	4.3%
IT hardware	15	93	22	10.1%
Auto/parts	16	14	17	4.2%
Pharma/biotech	22	42	18	13.7%
Electro/electrical	10	14	28	6.0%
Software/services	9	57	2	9.0%
“High R&D”	72	220	87	
Other sectors	120	143	131	2.0%

UK DTI R&D Scoreboard

Achieving Critical Mass Networks of People and Money

Innovation Clusters

EU	Cambridge, UK
Researchers	9,200
Publications	15,000
Public companies	11
Biotech companies	110
University licence income	€3 mln

US	Cambridge, Mass
Researchers	23,500
Publications	38,000
Public companies	38
Biotech companies	200
University licence income (MIT)	€35 mln

Venture Capital Investment

EU	€3.1 bln / 4,354 companies
	€0.7 mln / per company
	2.3% / 5 year IRR
	7.2% / 20 year IRR

US	€13.7 bln / 2,208 companies
	€6.2 mln/ per company
	22.8% / 5 year IRR
	15.5% / 20 year IRR

European Innovation Scoreboard

DG ECFIN, 2005

Achieving Critical Mass Steady Investment and Purpose



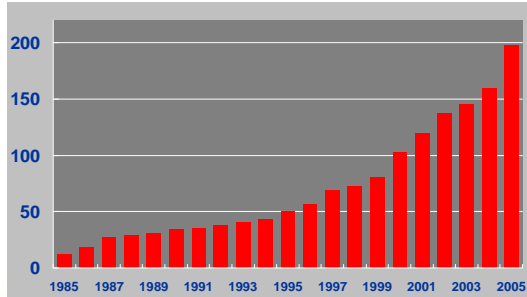
Established by state government
of Flanders in Belgium
Non-profit organization
Initial staff: ~70

1984

1984 Initial Investment: 62 M€

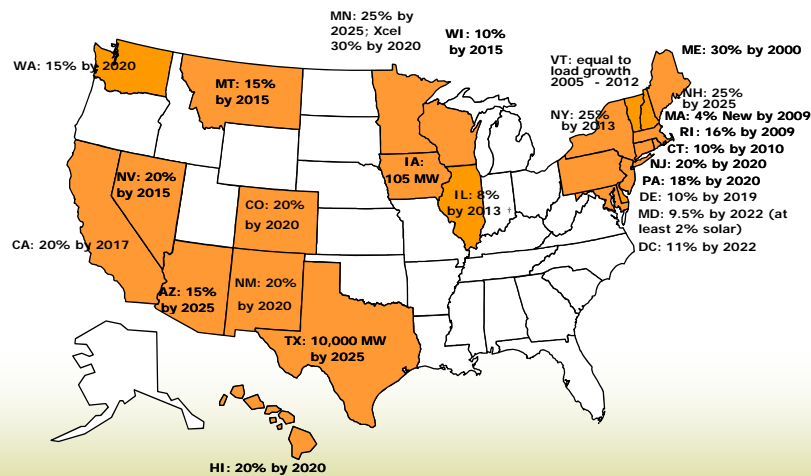
2006

One of the largest independent R&D
organizations in this field, worldwide
Annual budget : close to 200M€
(includes 35 M€ grant from government)
Staff: more than 1400
Collaboration with >500 partners
< 18% government/state funding



2005 Budget: close to 200 M€

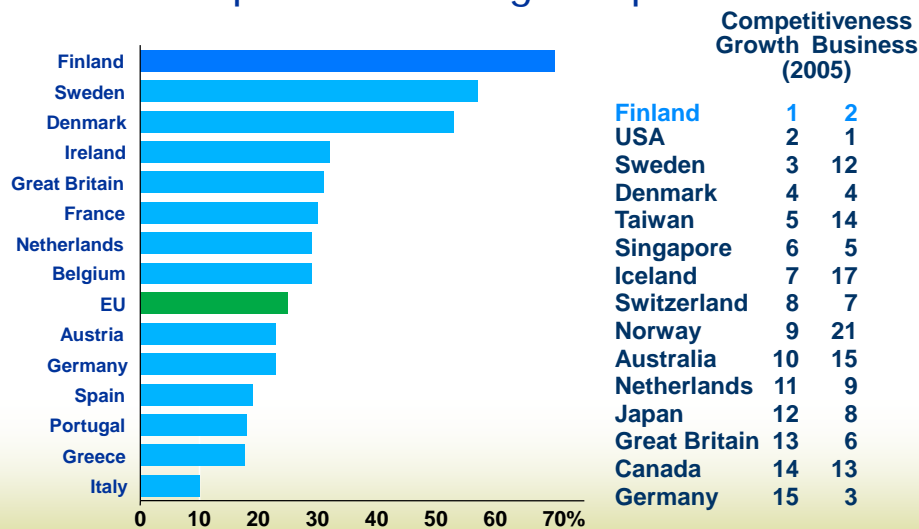
Achieving Critical Mass Ambition: Renewable Portfolio Standards



Achieving Critical Mass Interdependencies – Health Care

Academic groups	Can't apply knowledge without the industry and thereby gain value from their intellectual property
Clinical groups	Do not have capability to develop the new biological tools
The SME's	Need academia for ideas, cannot maximise value from tool discovery unless applied by industry
The pharmaceutical industry	Cannot maximise use of new tools unless accepted by the regulators, which can only be done by sharing and pooling data
Government agencies	Face pressure to speed patient access to new medicines without increased risk, need better information for risk/benefit and cost/benefit analyses
The patients	Need to feel part of the process to ensure their willing co-operation

Achieving Critical Mass Cooperation Among Companies



Share of cooperating companies of all innovating companies

Global Location of R&D Key Decision Factors

1. Potential for market growth
2. Environments that foster development of a high-quality work force
3. Opportunities for productive collaboration between corporations and universities

Sources:

Thursby and Thursby (2006)
European Commission (2006)

Public Research Making More Use of Knowledge



University/Industry Collaboration Identified Problems

- Failure to recognise that it is more often knowledge that is transferred than specific technologies
- Too much focus on IP leading to drawn-out contract negotiations
- Technology transfer offices at universities staffed with people who often do not understand the technology and have no commercial experience
- Universities trying to act as businesses – without being in a business environment



Facts and Figures

- Between 1972 and 2001, industrial support to US universities and colleges grew more rapidly than any other source of support for academic research and development.
- Between 2002 and 2006, the absolute value of industrial R&D dollars to academic institutions declined and the percentage of industry funding in total academic R&D dipped from a high of 7.9% to 4.9%.

From NSF InfoBrief
Published September 2006



Why Is It So Hard to Reach Agreement?

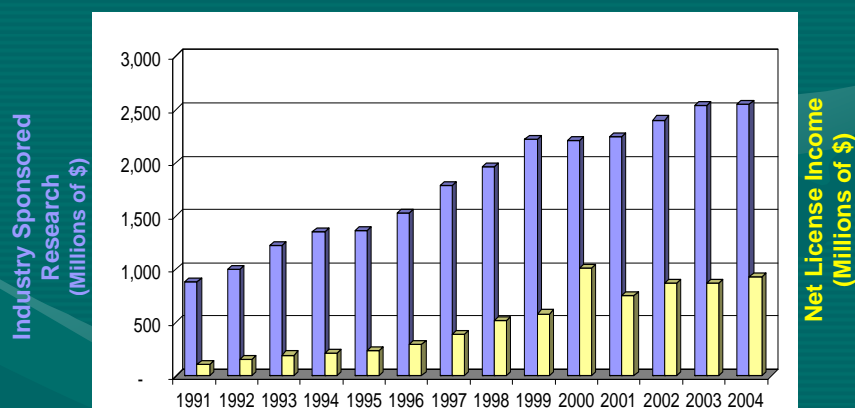
- Negotiation of intellectual property rights in sponsored research agreements has become a barrier to industry-university research collaboration in the United States.
 - more contentious
 - takes longer
 - increases transactional costs
 - little/no benefit results



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Sponsored Research Funding Exceeds Licensing Revenue



Source - AUTM Licensing Survey, Fiscal Year 2004

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Key messages for Universities

- Treat collaborative research as part of university excellence
- Recognise different partners' legitimate interests
- Invest in strategies that develop professionalism in collaborative research
- Young people are key to the change process

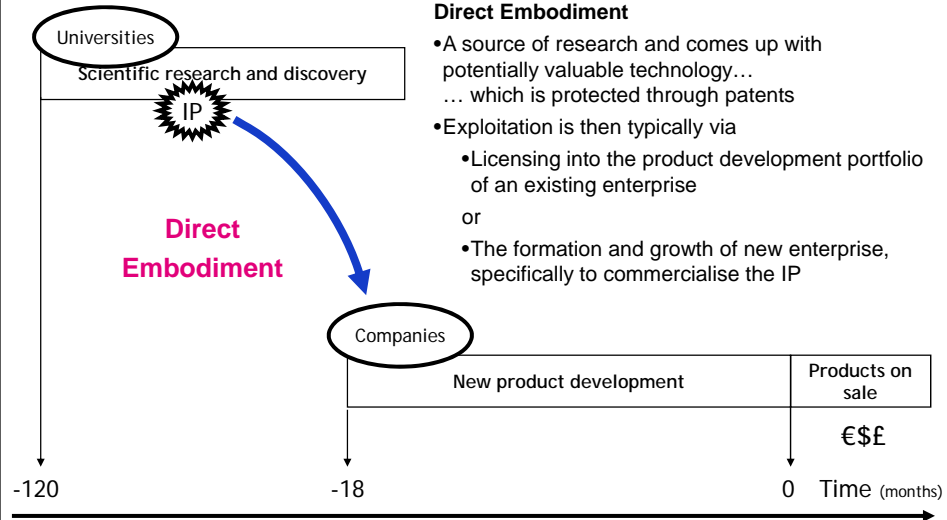
Georg Winckler
Rector University of Vienna, EUA President

Problem with models

“Direct Technology Embodiment” is highly ineffective

- Technology-driven innovations fit into a complex web of products, services, technologies, commercial relationships and markets. They cannot easily be pursued as discrete propositions.
- For typical “breakthrough technology” The Valley of Death is at least **10 years wide and €20m deep**
- Most research output is too ‘raw’ to be used directly:
 - Cannot be adequately captured as formal IP
 - Transformation into practical, advanced technologies takes time and expert resources
 - Results usually emerge in very different applications to those originally envisaged, with unexpected costs and timing
- Process of company formation and growth is fraught with many difficulties and risks not related to the potential of the IP

Why?



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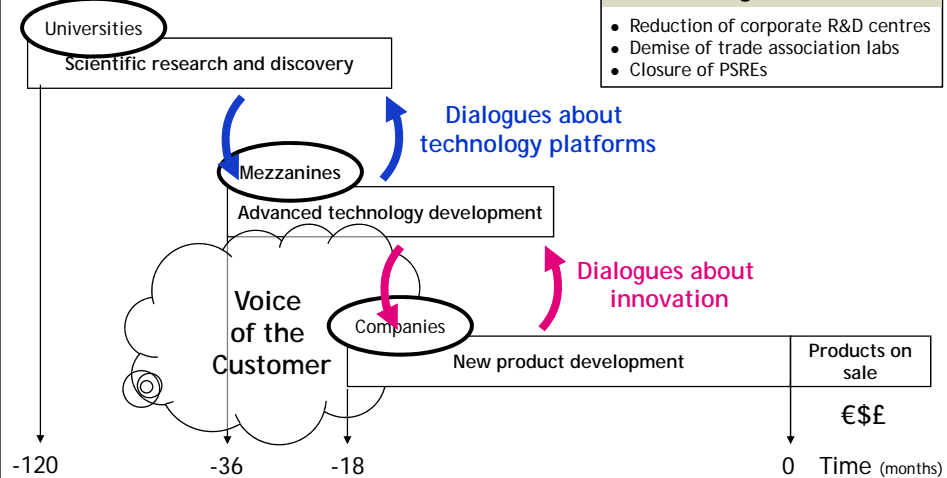
The Missing Mezzanine A key factor to bridge the gap

many missing links between research and development

Advanced Technology Development

Gone missing from the UK?

- Reduction of corporate R&D centres
- Demise of trade association labs
- Closure of PSREs



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Competitiveness

Corporate and European

"Unambiguously business driven"

Innovation as much more than R&D

Partnerships essential

Growing service content

Business model

Active IP portfolio mgmt

Customer as business driver

Brains are everywhere

Whose standards?

Which lead markets?

Identify where Europe needs innovation

- Focus on outcomes not inputs
- Link market pull with research push

Create effective ecosystems

- Locations, public procurement, lead markets, regulation, standards

More effective partnerships

- Role of Research and Technology Organisations
- University reform (but not at expense of primary mission)

Magnify efforts, achieve critical mass!

Attract talented people to work here