

Broadening the scope of Open Innovation

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Agenda

- What is open innovation (OI)?
- OI and SMEs
- Open commercialization
- How to manage OI? Start-up connection!
- Strategic use of IP in OI
- Technology markets and the role of innomediaries
- Silent drivers of OI
- OI and corporate growth strategies
- Practical info: Get connected to the European OI-community!

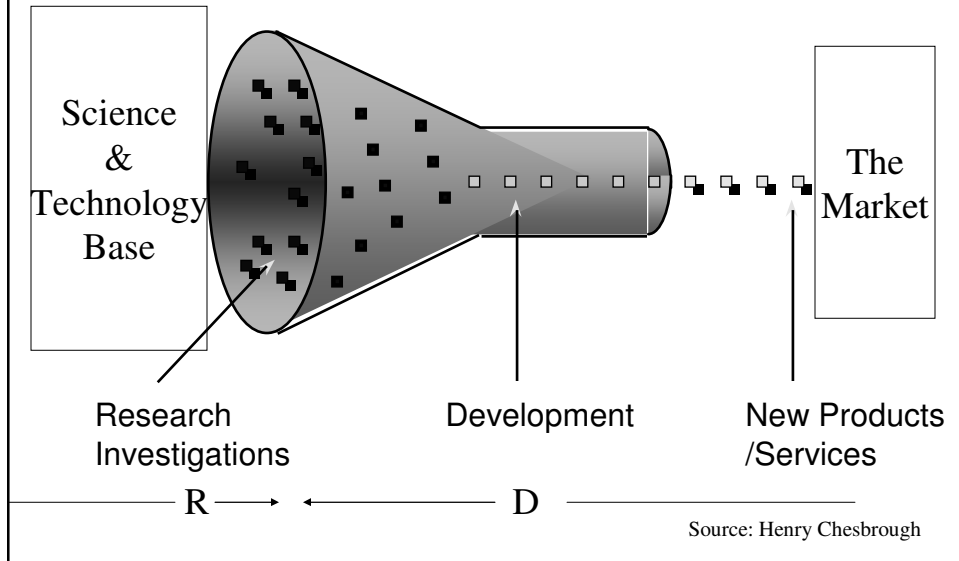
What is open innovation (OI)?

What is Open Innovation?

“Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.”

Chesbrough, Vanhaverbeke, West
Open Innovation: Researching a New Paradigm
(Oxford, 2006)

A Closed Innovation System



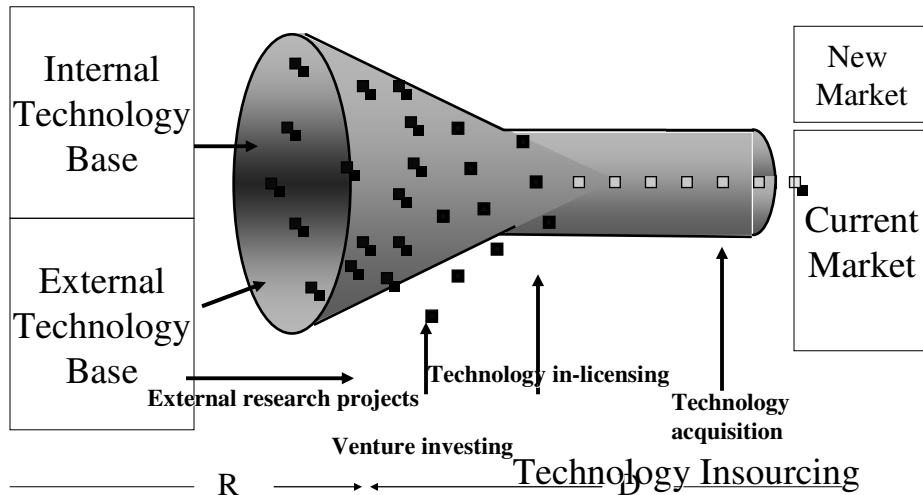
What changed?

New Division of Innovation Labor

- Increasingly mobile trained workers
- More capable universities
- Knowledge distributed more widely throughout the world
- Diminished US hegemony in many leading technology fields
- Erosion of oligopoly market positions
- Deregulation (EU-liberalization)
- Enormous increase in Venture Capital

Source: Henry Chesbrough

Inbound OI: Filling the gaps with external technology



Source: H. Chesbrough, *Sloan Management Review*, Spring 2003

Corporate growth strategy

Philip's objectives

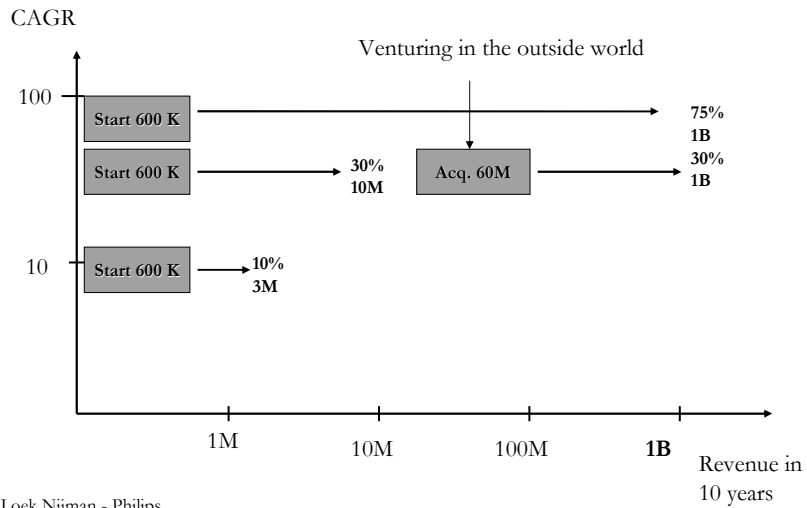
Sales in 2007 30 billion Euro

5-6% CAGR

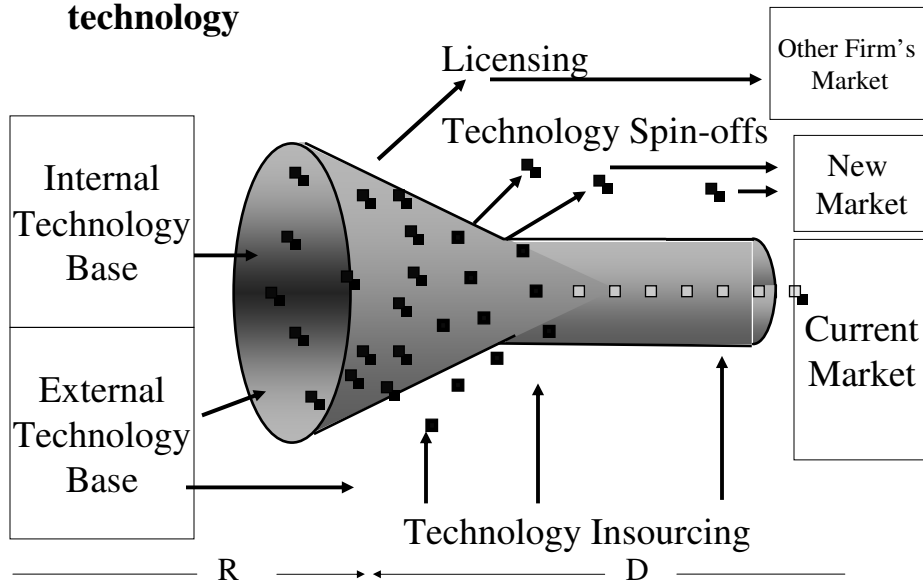
2-3% average organic growth in the next 5 years \approx 3.1 – 4.8 billion Euro

10-15% operating profit

**Breakaway innovation takes a lot of time
for reaching large business sizes**
Immediate growth requires acquisition of early growth ventures



Outbound OI: Profiting from others' use of your technology



Source: H. Chesbrough, *Sloan Management Review*, Spring 2003

The advantages of Open Innovation in terms of real options

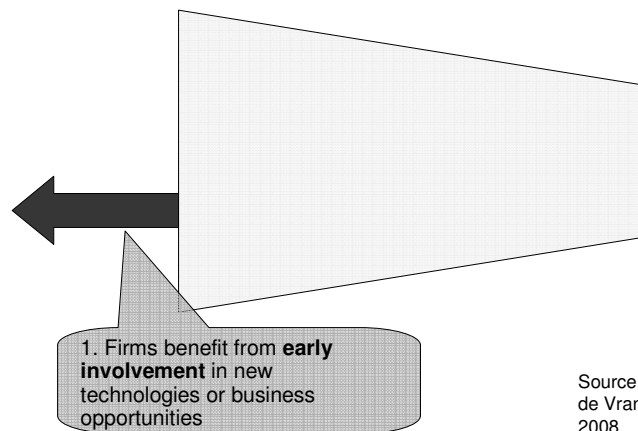
Understanding the advantages of OI in terms of Real Options

- RO = "the right, but not the obligation, to take an action in the future" (Amram and Kulatilaka, 1999, p.5)
- Two distant actions: option creation, option exercising
- Target = uncertainty reduction
- RO = an small, initial investment under high levels of uncertainty which creates an option for the future (OC), possibly followed by a larger follow-on investment (OE)

Understanding the advantages of OI in terms of Real Options

1. Firms benefit from **early involvement** in new technologies or business opportunities
2. Firms benefit from a **delayed internalisation** or financial commitment
-
3. OI offers firms the advantage of an **early exit**.
4. OI allows firms to benefit from **extended control** until full exit.

Understanding OI in terms of real options



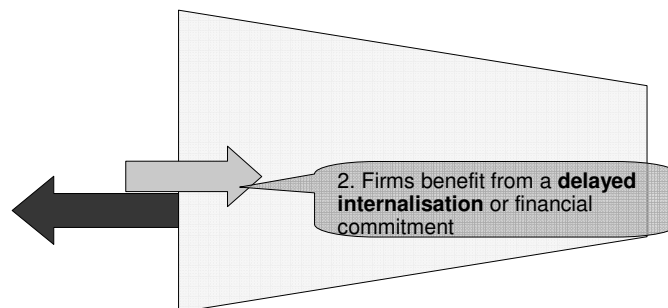
Source: Vanhaverbeke, Van de Vrande, Chesbrough, CIM, 2008

Understanding the advantages of OI in terms of Real Options

1. Firms benefit from **early involvement** in new technologies or business opportunities
 - Advantage:
 - ability to access a broader range of externally developed technologies and market opportunities
 - trace new technological or market developments earlier and more accurate (competence of partners)
 - How?:
 - buying minority stakes in (high-tech) startups
 - participating in VCFs
 - providing educational investments in promising projects at universities or research labs
 - Crowdsourcing, etc...

Source: Vanhaverbeke, Van de Vrande, Chesbrough, CIM, 2008

Understanding OI in terms of real options



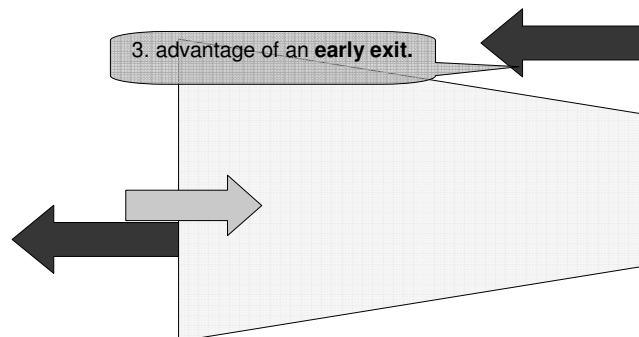
Source: Vanhaverbeke, Van de Vrande, Chesbrough, CIM, 2008

Understanding the advantages of OI in terms of Real Options

2. Firms benefit from a **delayed internalisation** or financial commitment
 - In CI: from idea to business
 - In OI: firms have more flexibility in deciding when when to start the internal portion of the innovation process
 - Start exploring the commercial possibilities of a technology outside initially, via relationships with universities, SMEs and other innovation sources.
 - Advantage: The ability to delay the investment in internal innovation activity enables the firm to consider a broader portfolio of entry options at the beginning, and take less risks internalizing the innovation

Source: Vanhaverbeke, Van de Vrande, Chesbrough, CIM, 2008

Understanding OI in terms of real options



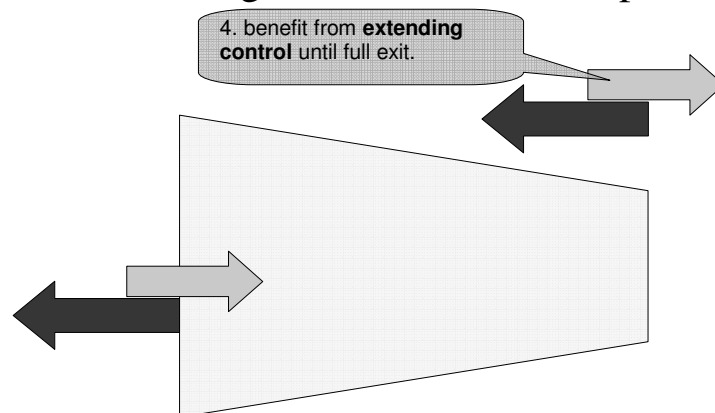
Source: Vanhaverbeke, Van de Vrande, Chesbrough, CIM, 2008

Understanding the advantages of OI in terms of Real Options

3. OI offers firms the advantage of an **early exit**.
 - Problem: Many venturing projects do not live up their expectations
 - OI advantage: possibility that innovating firms always can out *license or sell technologies or spin-off ventures* that are not promising enough or/and do not fit with their business model or core competencies.

Source: Vanhaverbeke, Van de Vrande, Chesbrough, CIM, 2008

Understanding OI in terms of real options



Source: Vanhaverbeke, Van de Vrande, Chesbrough, CIM, 2008

Understanding the advantages of OI in terms of Real Options

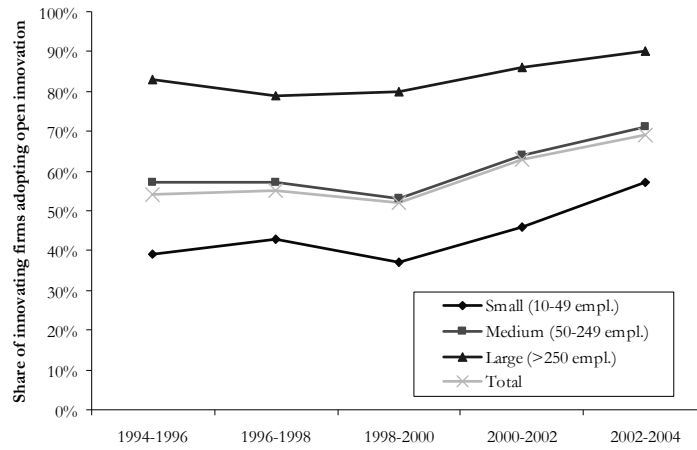
4. OI allows firms to benefit from **extended control** until a full exit.
- Exits are no black / white decisions!
 - Advantages:
 - Firm benefits from “other people’s money” supporting the development of the venture
 - Cheaper than supporting it internally
 - Strategic benefits may still play a role
 - Licensing and the creation spin-offs allow firms to monitor further developments while delaying a (full-)exit decision.
 - Delay in deciding whether to spin-in the venture or whether to sell it to external capital providers

Source: Vanhaverbeke,
Van de Vrande,
Chesbrough, CIM, 2008

OI and SMEs

OI: the Dutch situation

Share of innovating companies cooperating, licensing, or outsourcing R&D

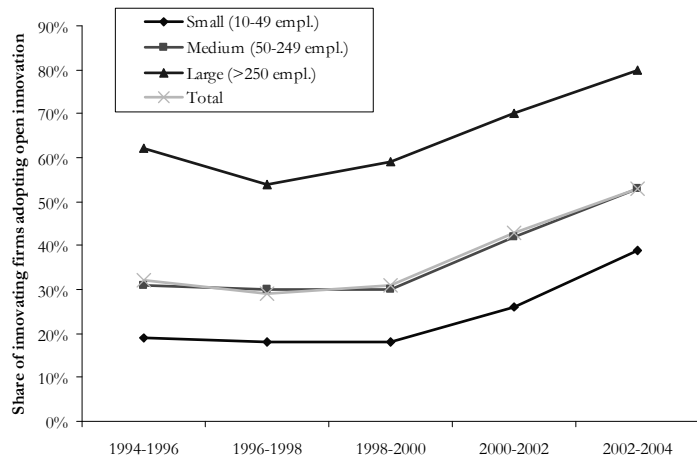


Based on quantitative analysis of Dutch CIS data

Source: Batterink, 2009

OI: the Dutch situation

Share of innovating companies cooperating for innovation



Based on quantitative analysis of Dutch CIS data

Source: Batterink, 2009

Broadening the scope of open innovation

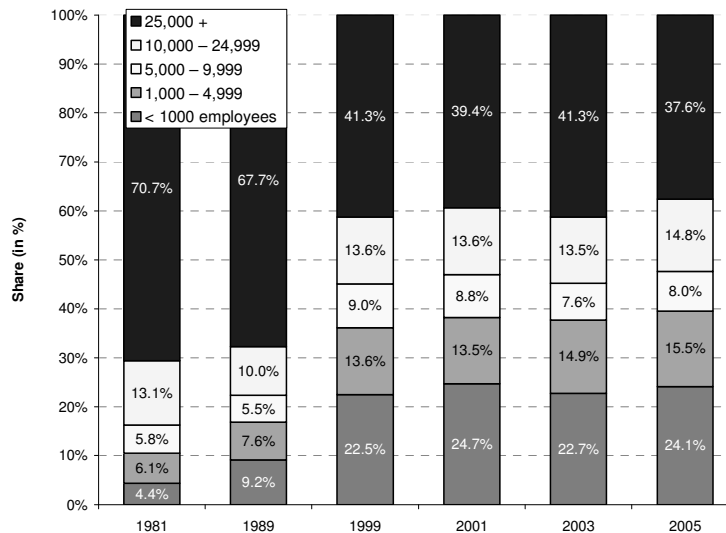
Open innovation for SMEs

Focus on large, technology user firms

- ◆ OI is about transactions
- ◆ Is Open innovation relevant for SMEs?
 - ◆ High-tech start-ups? Technology suppliers of large, technology user firms
 - ◆ Traditional SMEs in low and medium tech industries?

Source: Gassmann, Chesbrough & Vanhaverbeke

US Industrial R&D: by Size of Enterprise



Growing in
SMEs' inno

Sources: National Science Foundation, Science Resource Studies, Survey of Industrial Research Development 1999, 2001, 2003, 2006.

Challenges for SMEs

Challenges for SMEs

- lower sensing / detecting capability
- lack the ability to absorb external ideas and technologies into valuable products, even when they are initially identified and transferred
- often are unattractive as partners to inventors / innovators
- deficiencies in value capture (IP)

Source: Gassmann, Chesbrough & Vanhaverbeke

SMEs' structural advantages

- *Size*: their smaller size makes smaller markets attractive
- *Sharp focus*: SMEs execute very effectively against larger, diversified firms with more diffuse objectives
- *Business specialization*: SMEs can specialize their business more deeply in narrow fields
- *Entrepreneurial persons*: SMEs attract more entrepreneurial R&D employees
- *Speed*: SMEs take decisions faster and implement them more rapidly

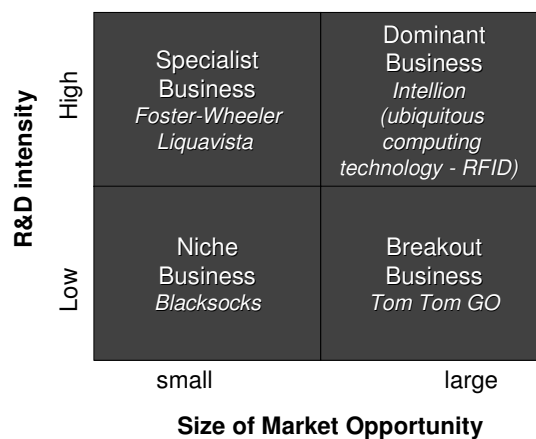
Source: Gassmann, Chesbrough & Vanhaverbeke

The Advantages of OI for SMEs

- SMEs with strong competences in focused specialties make attractive collaboration partners for larger firms
- Large firms creating technology platforms, actively recruit SMEs to develop products for these platforms
- SMEs as user of innovations by larger firms
- Open source development: benefits also for SMEs

Source: Gassmann, Chesbrough & Vanhaverbeke

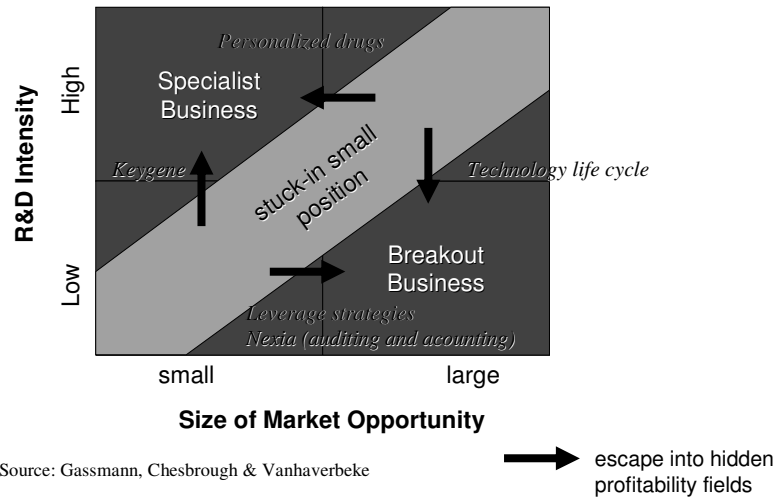
SMEs, where is your business?



Source: Gassmann, Chesbrough & Vanhaverbeke

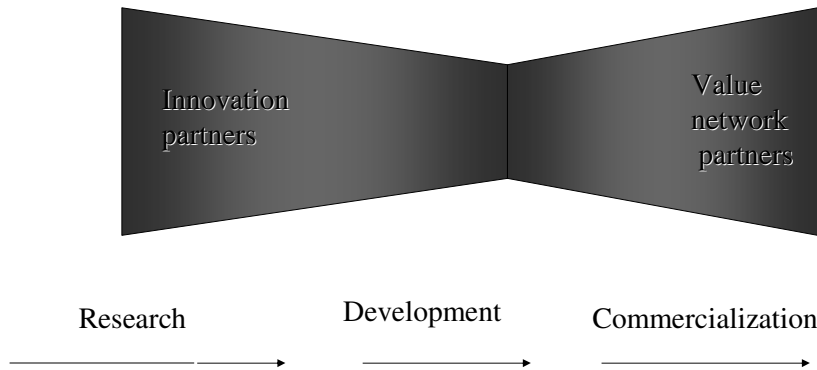
OI and SMEs

Gassmann, Chesbrough, Vanhaverbeke



Open commercialization

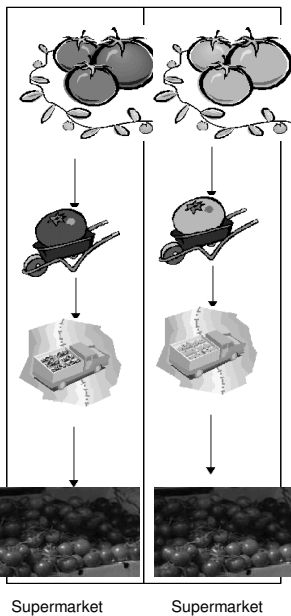
Open commercialization: From firm to network perspective



The Flavr Savr tomato Calgene 1994

The Flavr Savr tomato ripens on the vine – resulting in fuller flavor. It is modified so that it remains firm after harvesting.

Flavr Savr Traditional



The traditional tomato must be harvested while it is still green and firm so that it is not crushed on the way to the supermarket.

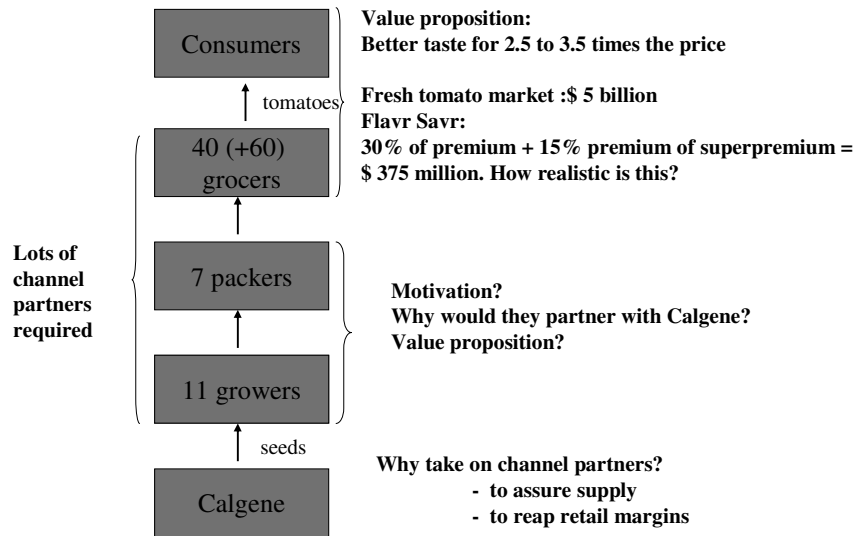
The traditional tomato is sprayed with ethylene after shipping to induce ripening



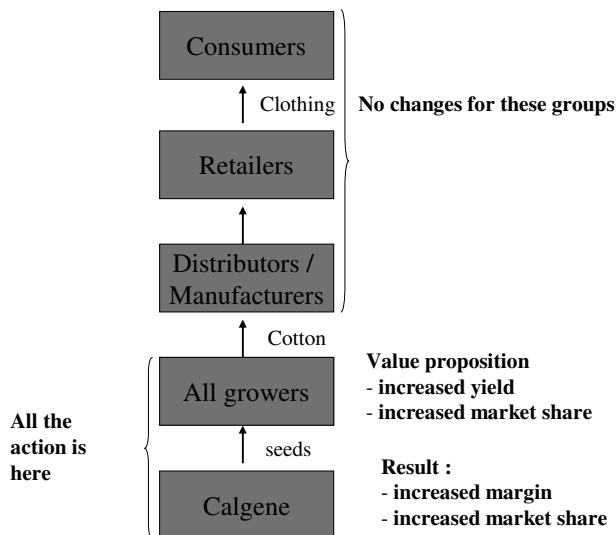
Ripe and Increased Flavour + Longer shelf live

Ripe but decreased Flavour.

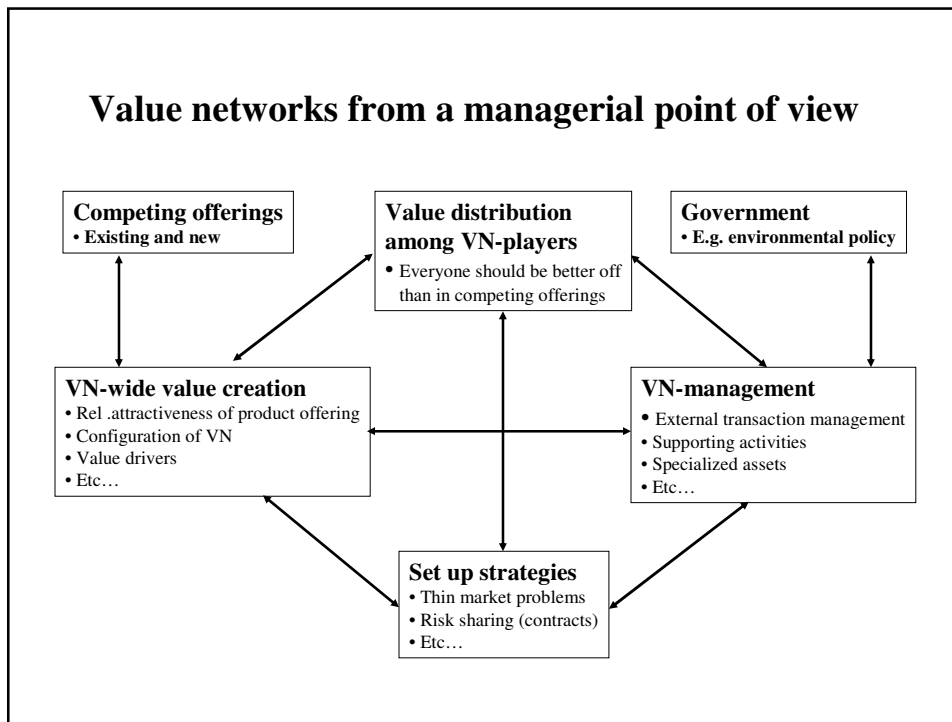
Two examples from Calgene: Flavr Savr tomato



Two examples from Calgene: Bromotol Cottonseed (herbicide resistant)



Value networks from a managerial point of view



How to manage OI?

An example:
How to cooperate with high-tech start-ups?

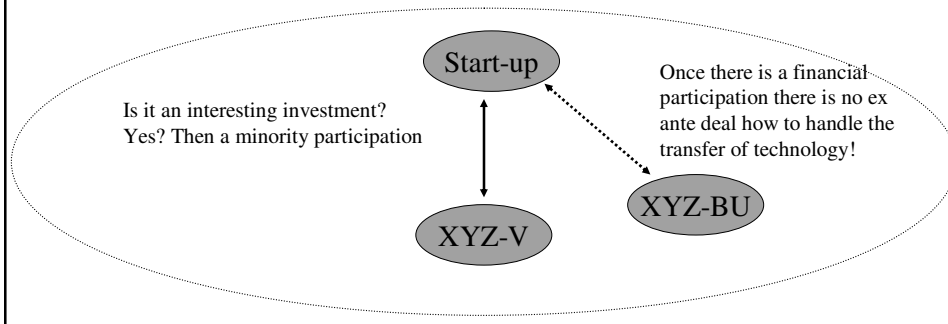
How to manage open innovation

How to source external technology? An example of corporate venturing

- ◆ BM / strategy but not organization structure, culture, dynamics of corporate strategy, routines, internal technology transfers
- ◆ *External Venturing @ DSM*

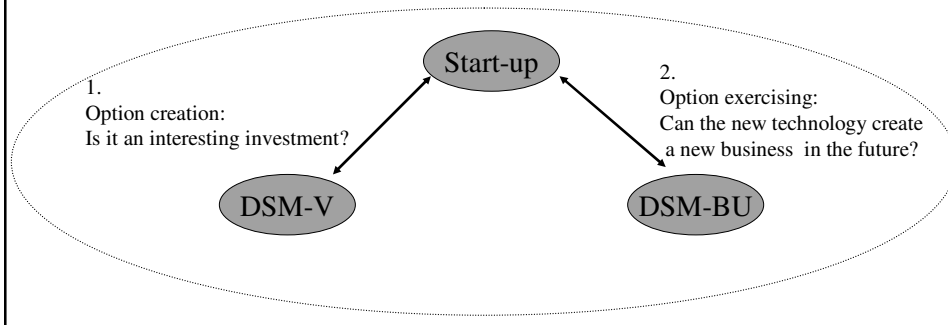
How to organize for OI? External Venturing at XYZ

- **Pitfall:** Large firm invests in a start-up and uses its financial participation as a power tool to enforce cooperation on terms of the investing company



How to organize for OI? External Venturing at DSM

- **Rationale:**
 - Strategic return, not a financial return
 - One of the BU should benefit from it
- Therefore: Negotiation is a *three way negotiation*
There are *two deals* packaged into *one overall deal*



How to organize for OI? External Venturing at DSM

- Result: negotiate to get a maximal win-win situation
 - Both firms can offer each other a lot
- The large firm:
 - business and market intelligence
 - application technology
 - marketing know-how
 - large scale manufacturing
 - credibility among large potential clients
 - patent writing skills
 - ...
- Start-up:
 - new technology, business model, etc..
 - entrepreneurial risk taking and decision making
 - ...

How to organize for OI? External Venturing at DSM

Six reasons not to start a power play with external ventures:

1. *Bad reputation:* when the large, investing firm is looking for interesting start-ups as a recurrent practice
2. *Pushing too hard for a particular application* (based on the business model and proposed application of the large, investing firm)
 - ◆ Market potential of start-up technologies is still very uncertain because of the early stage technology. *Keep options open* for unintended but interesting applications.
 - ◆ limits business potential of start-up (and thereby shareholders value)

....

How to organize for OI? External Venturing at DSM

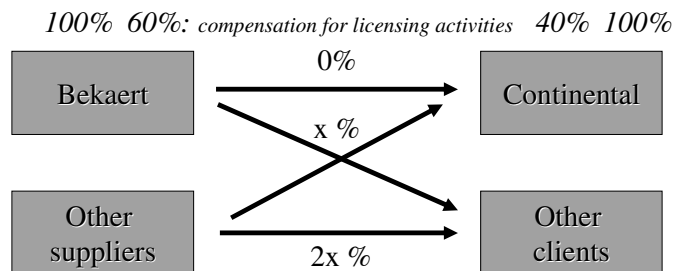
Six reasons not to start a power play with external ventures:

3. *Might kill the spirit of good cooperation.*
4. *Kill entrepreneurial spirit by creating another "corporate puppet on a string"*
5. *Could limit exit possibilities and exit value* for other shareholders (by lock-in to/dependency on corporate)
6. *Could result in litigation* if perceived as abuse of economic power

Strategic use of IP in open innovation

Some non ICT-examples

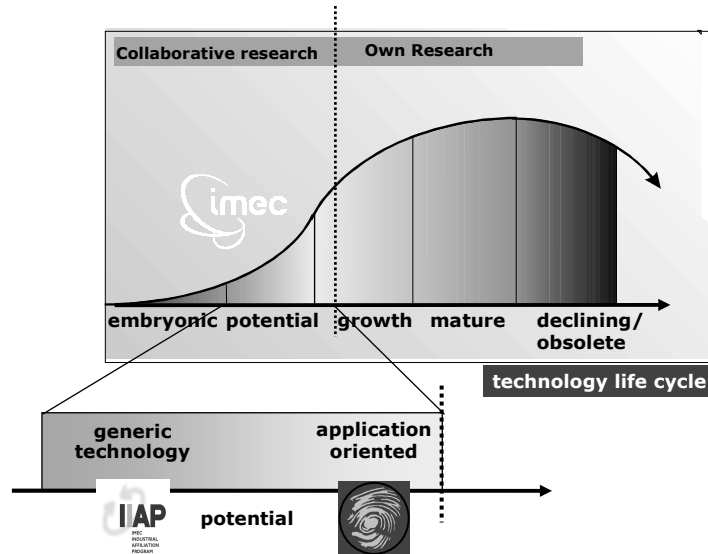
License scheme of Bekaert & Continental (technical standards)



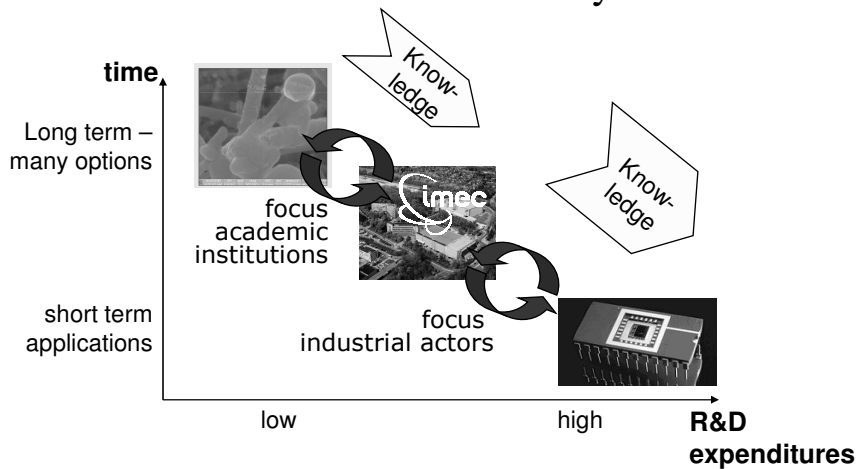
Proposal:

- $X = \dots\%$ of net sales value of supplied product
- Supplier collects royalties
- Cross-license agreement between client and supplier implying:
 - Bekaert to supply "other clients" at $X\%$
 - "Other suppliers" to supply the Continental at $X\%$
 - Bekaert grants sublicenses to "other suppliers". The latter can supply to "other clients" at $2X\%$

IP policy: IMEC's position in the technology life cycle



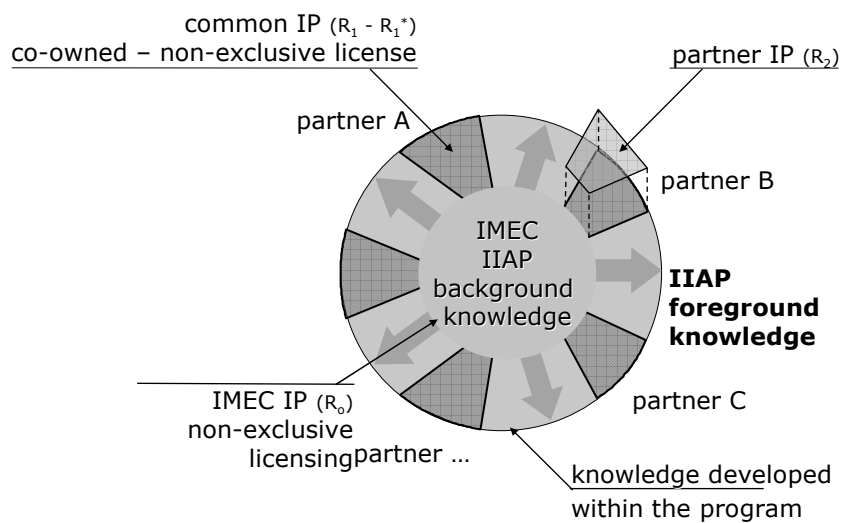
IP policy: Imec's bridge function between academic institutions and industry



IP policy: IMEC Industrial Affiliation Program

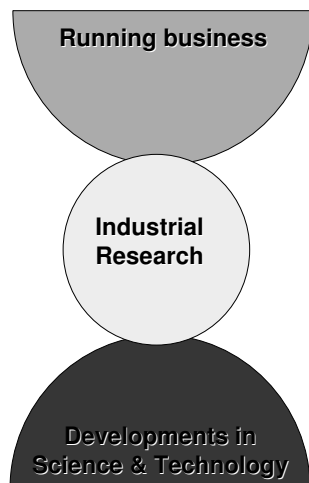
- What
 - ◆ R&D cooperation in generic technologies
 - ◆ Strategic program develop by IMEC and executed in IMEC
 - ◆ IIAP partners send guest researcher(s) to IMEC
- Advantages
 - ◆ Sharing costs, risks, research infrastructure, IP
 - ◆ IIAP partners get access to:
 - IMEC's background knowledge
 - selected results of other partners in IIAP
 - ◆ bilateral contract within the framework of IIAP
- Leverages
 - ◆ resources
 - ◆ knowledge
 - ◆ cross-fertilization of research of different partners
 - ◆ shortening time to market

IP policy: IIAP – Generic framework



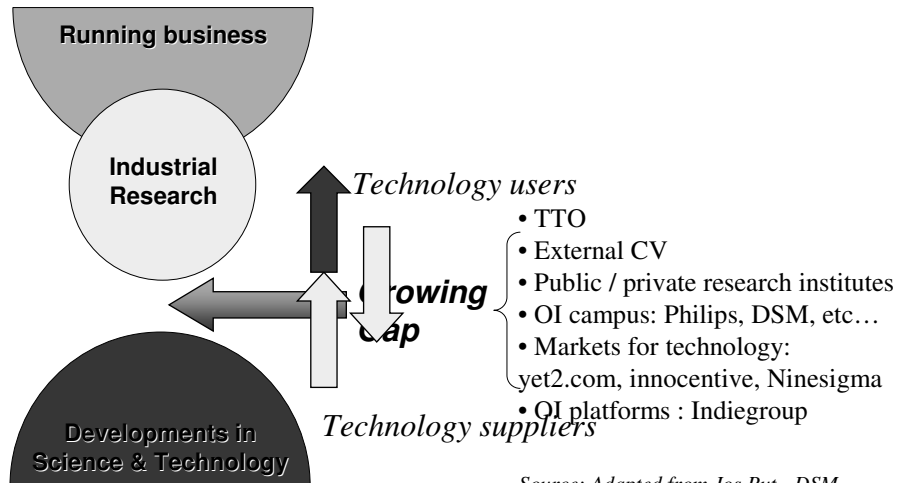
Technology markets and the role of innomediaries

Shifting roles and the emergence of (intermediate) technology markets



Source: Adapted from Jos Put - DSM

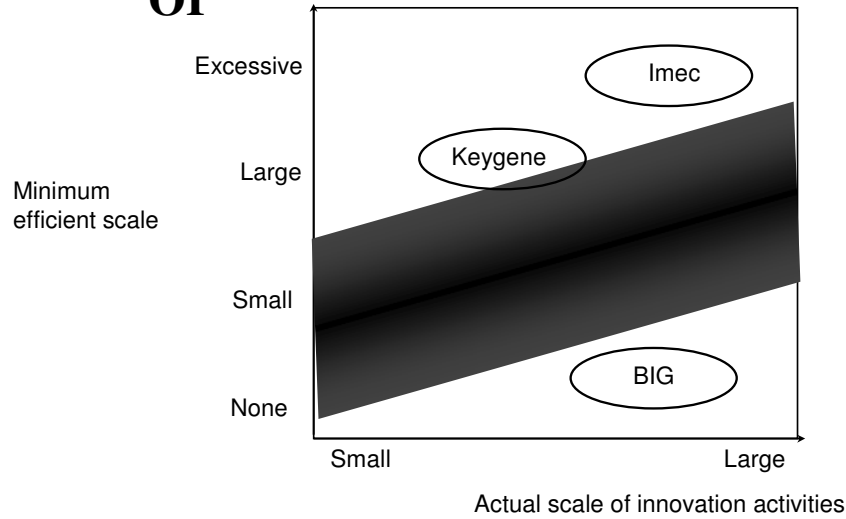
Shifting roles and the emergence of (intermediate) technology markets



Silent drivers of open innovation

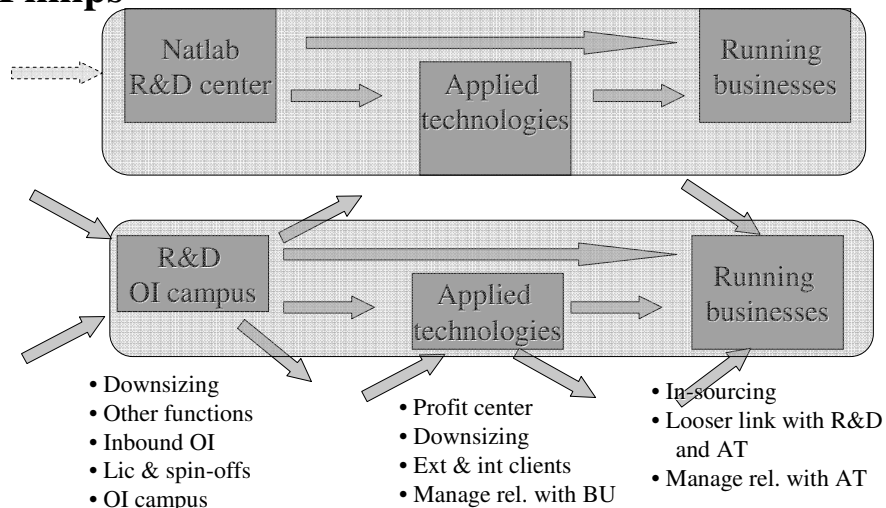
1. Changing MES of R&D activities
2. Restructuring
3. Globalization of R&D
4. **Technology life cycles – see Chesbrough, 2006**

1. MES in R&D as a silent driver of OI



2. Restructuring companies as a silent driver of OI

Philips



3. Open innovation and globalization of R&D

- **Open innovation literature:**
 - ◆ OI shows why and how to source outside knowledge
 - ◆ It does not tell us anything where outside partners are located
- **Internationalization of R&D literature:**
 - ◆ Considers a company as a MNE and international strategy plays a crucial role (global vs multi-local company, transnational company etc...
 - ◆ Shows why companies locate their R / D centers in particular places around the globe
 - ◆ Do not have advanced view how to tap into external sources of technology
- **How to marry OI and internationalization literature?**

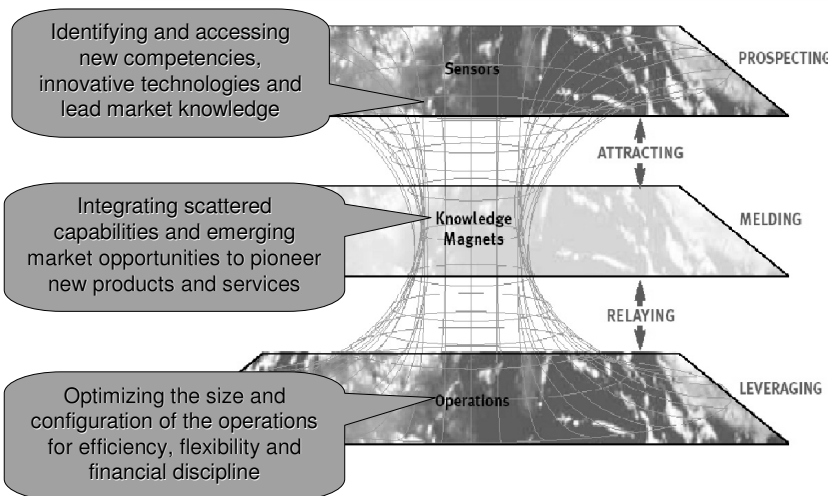
3. Open innovation and globalization of R&D

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- **How to marry OI and internationalization literature?**

The metanational company (Doz et a, 2001)

- Pockets of under-exploited technology and market knowledge scattered around the world that are locally imprisoned
 - Embedded in local context
 - Tacit, not codified
- If we could tap and connect these pockets of imprisoned knowledge this would fuel a powerful new source of innovation
- You have to be where the knowledge is!!!
- Conclusion: R&D globalization forces firms to start OI activities

The Metanational process Learning from the world

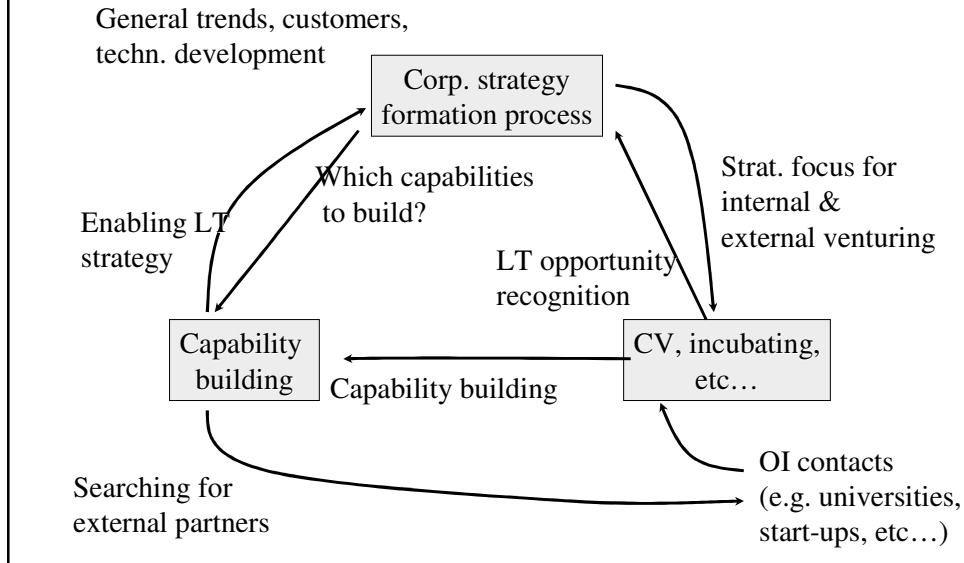


Integrating Globalization of R&D and OI

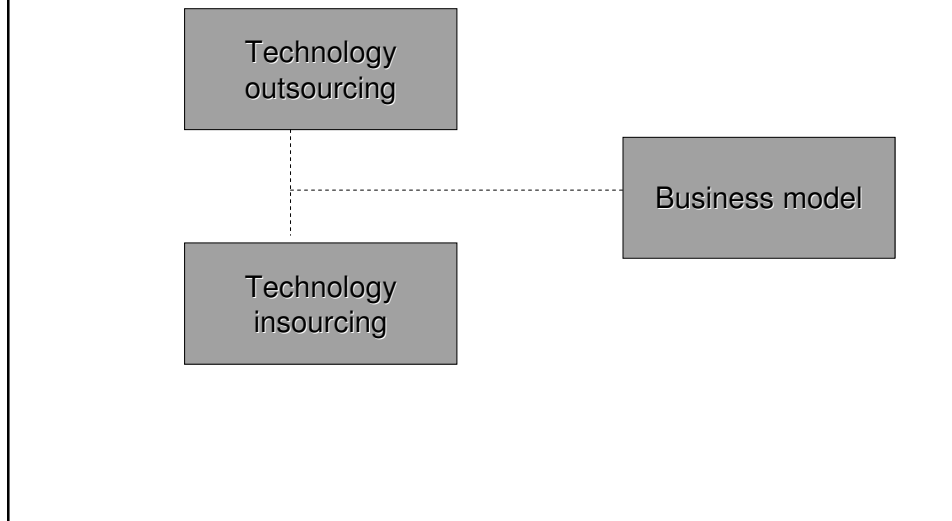
- Large firms are MNEs tapping into the globally distributed sources of knowledge (science, technology, design, fashion, market insight, etc..)
- What are interesting R&D locations for a firm?
- How to tap effectively into local R&D-communities around the globe?
- What is an effective number of R&D locations?
- How to integrate effectively knowledge from different parts of the world in a MNE?
- How to decide about task specialization in R&D among the different locations?
- How to link R&D with operational units (subsidiaries) in MNEs?
- How does this change OI-theory?
 - ◆ New questions: where? how many locations? how to manage cultural differences? how to manage knowledge integration between units?

Using OI in long term growth strategies

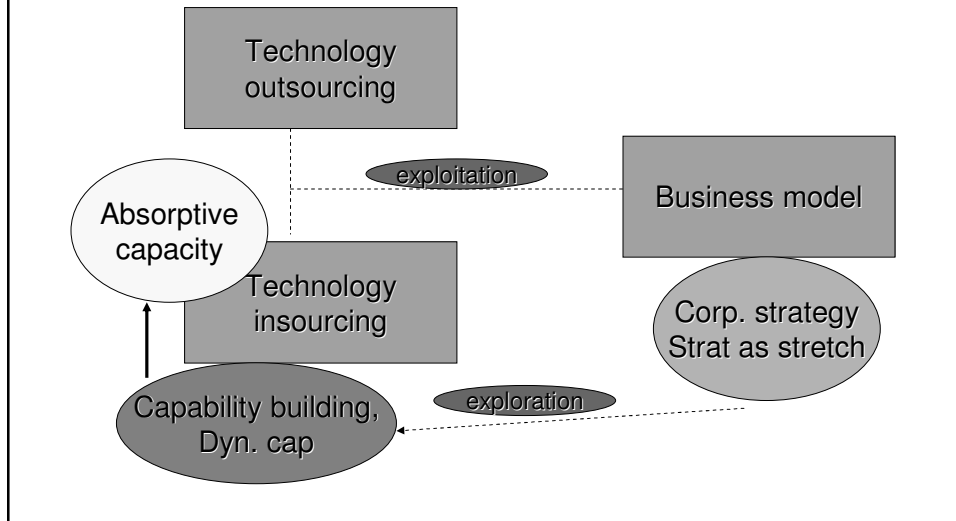
How to understand LT OI strategy?



OI: short term, static view



Long term, dynamic view on OI

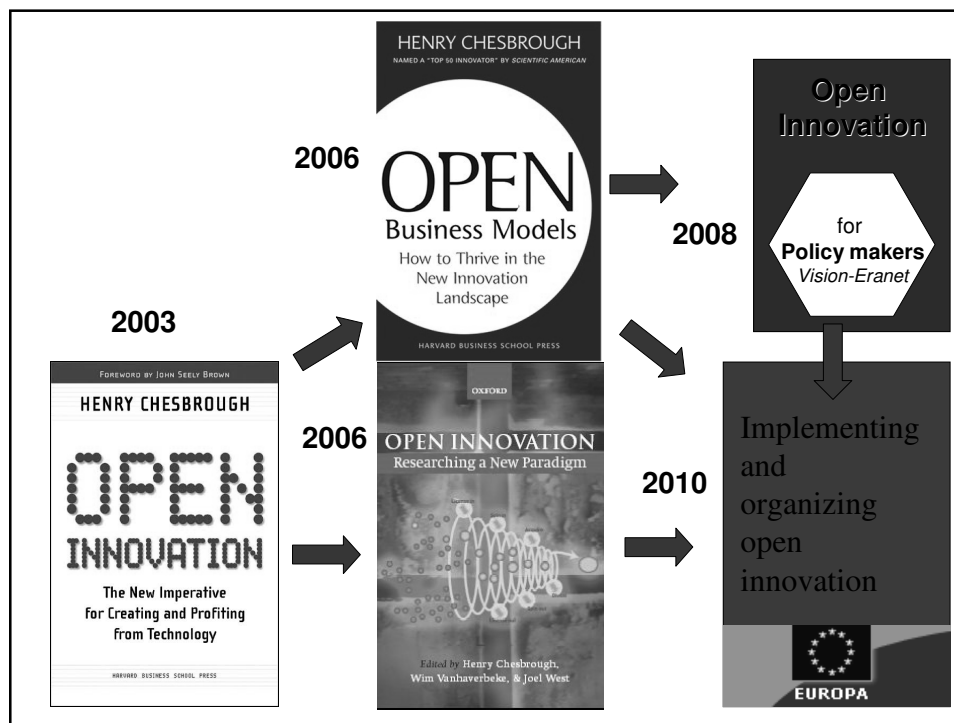


Databases

- Surveys
 - ◆ CIS
 - ◆ surveys; (Lichtenthaler - Germany; SMEs-Netherlands; China)
 - ◆ OI-scan
- Privately owned data:
 - ◆ Ninesigma; Innocentive; Yet2.com
- Publicly available data
 - ◆ licensing deals

From practice to theory

- Theory building (integrating existing theories to understand OI from a theoretical point of view):
 - ◆ RO; RVB. KBV; Rel. view; business and corporate strategy
- Focus on important management challenges that can be connected to OI
 - ◆ OI and corporate renewal
 - ◆ OI and restructuring
 - ◆ OI and internationalization of R&D
 - ◆ etc...



ECOCI as a network of excellence for OI-practitioners and scholars?

- www.openinnovation.eu
- **ECOCI:** European Center for Open and Collaborative Innovation
- Projects
 - ◆ CE and OI Masterclass (5 times already)
 - ◆ <http://www.hitech-projects.com/masterclass/fall2008/>
 - ◆ European Innovation Forum
 - ◆ OI For policy makers
 - ◆ Cases and syllabi about open innovation