

A researcher's perspective – IMEC as a RI for training and knowledge production

Barry P. Rand

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Motivation

2. Increasing costs, complexity & multi-disciplinarity of R&D calls for new approaches of Open Innovation
 - Use of a leveraging strategy of Research Infrastructures in a public private partnership
 - The IMEC case as an illustration, then my group as a microcosm
 - International dimension as a prerequisite for regional impact in a small country due to critical mass requirements.

What attracted me to IMEC for my first real job?

I was looking for...

- a job at the intersection between academia and corporate R&D
- a new experience
- a place where I could make a difference
- an international environment
- state-of-the-art laboratories
- a place where I could develop professionally

imec



But I also found...

- a dynamic work environment where people work together really well
- a place where *the people are the real RI*



My steps for a successful RI roadmap

0) Establish RI

← Initial RI

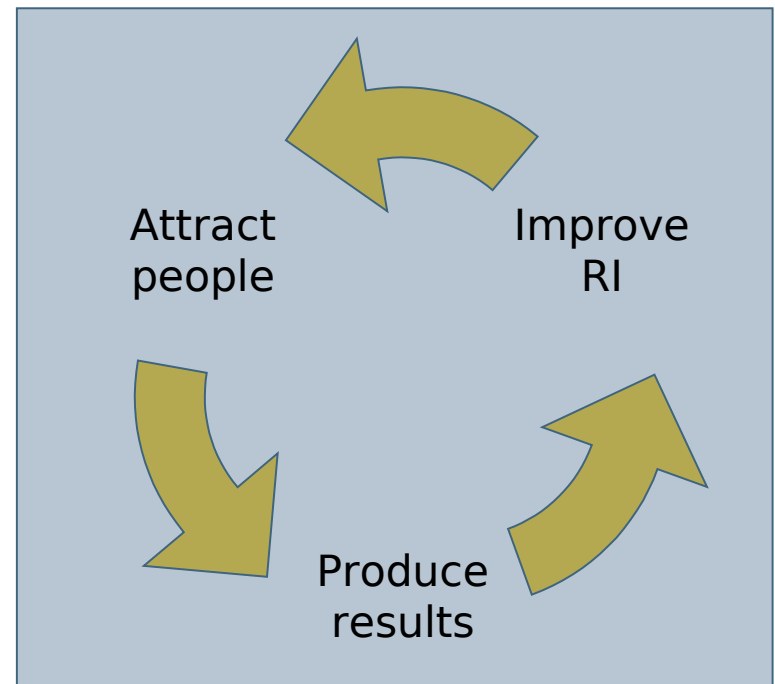
1) Attract talent

2) Generate results/IP/revenue

3) Re-invest in new, improved infrastructure

4) Attract more talent!

Eventual,
steady-state RI



IMEC 1984 – 2008 - 2009...a bit of history

1984

Established by state government of Flanders in Belgium
Nonprofit organization
Initial investment: 62M€
Initial staff: ~70



2008

One of the largest independent R&D organizations in its field, worldwide
Revenue (P&L) : about 260M€ (includes 42 M€ grant from Flanders government)
17% government/state funding
Staff: over 1650
Worldwide collaboration with many partners

2009

We will celebrate 25 years IMEC with a number of events



Mission statement

To perform research and development, ahead of industrial needs by 3 to 10 years, in microelectronics, nanotechnology, design methods and technologies for ICT systems

Performance criteria

- **being a worldwide center of excellence**
(total contract revenue, publications, invited papers)
- **being excellent in exploratory work**
(number of Ph.D.s, projects and publications with universities)
- **with impact on local industry**
(new spin offs, collaborations, training, interaction with local SME's)



IMECAMPUS

Clean room 2

3200 m² clean room
2200 m² vibration controlled
300 mm pilot line
Ball room, clean sub-FAB
FOUP wafer transport

IMEC 4 Office building

Clean room 1

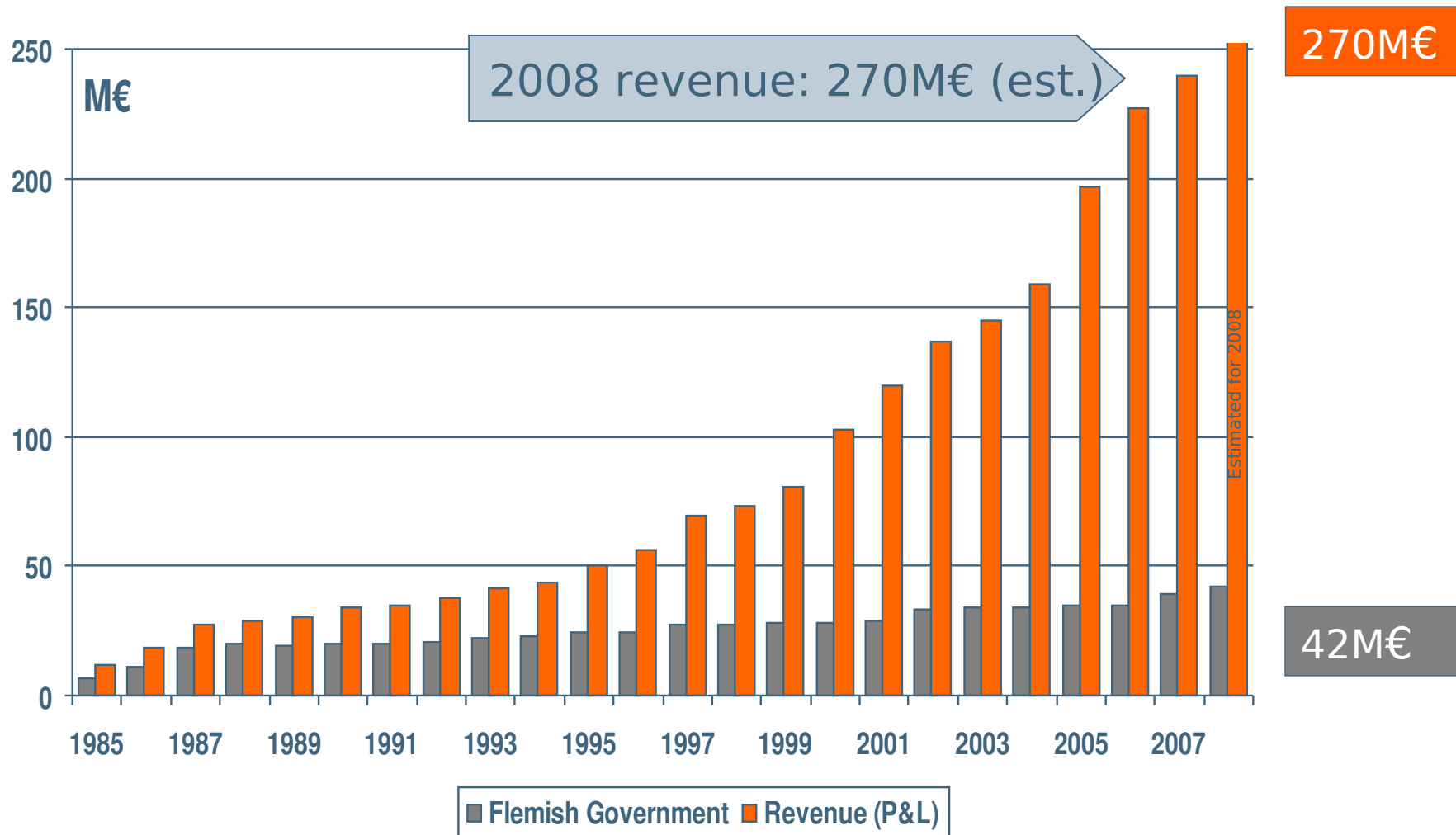
5200 m² clean room
1750 m² class 1
200 mm pilot line
Continuous operation:
24hrs / 7 days

IMEC 2 & 3 offices and labs

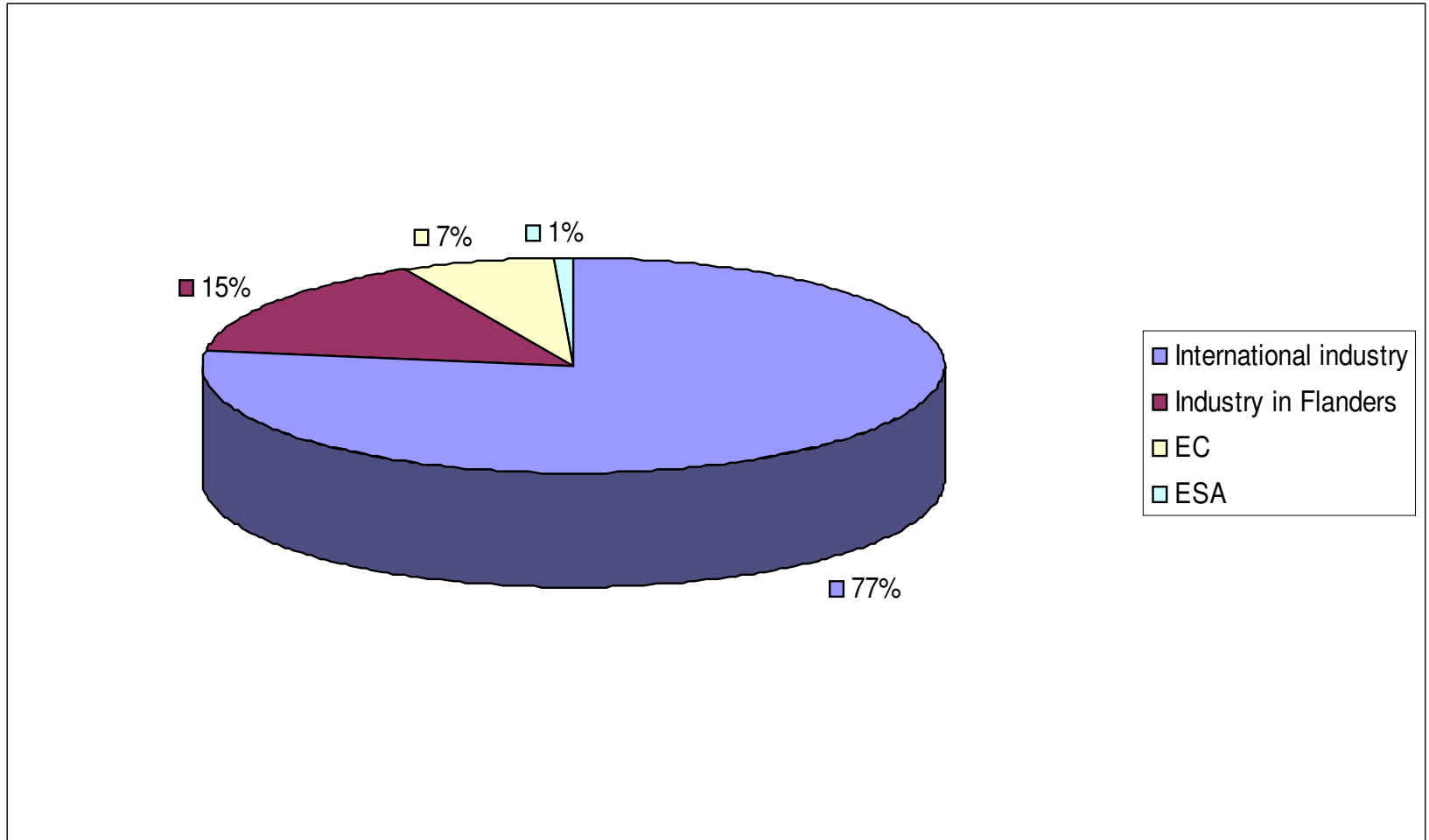
Cafeteria Training infrastructure

IMEC 1 Main entrance IMECEXPO visitor center Offices and labs

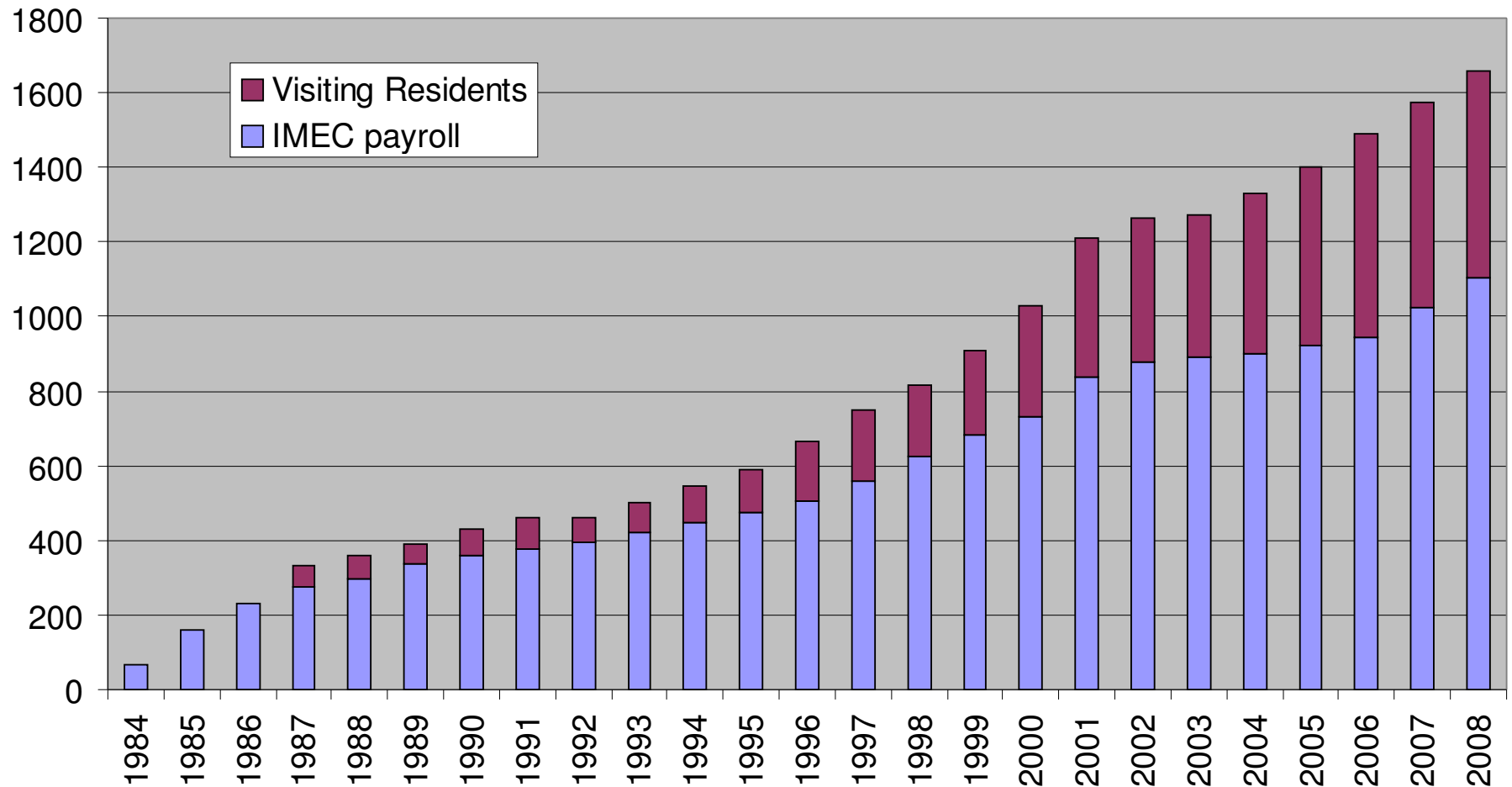
IMEC's total revenue (P&L) versus research grant



Distribution of revenues (2007)

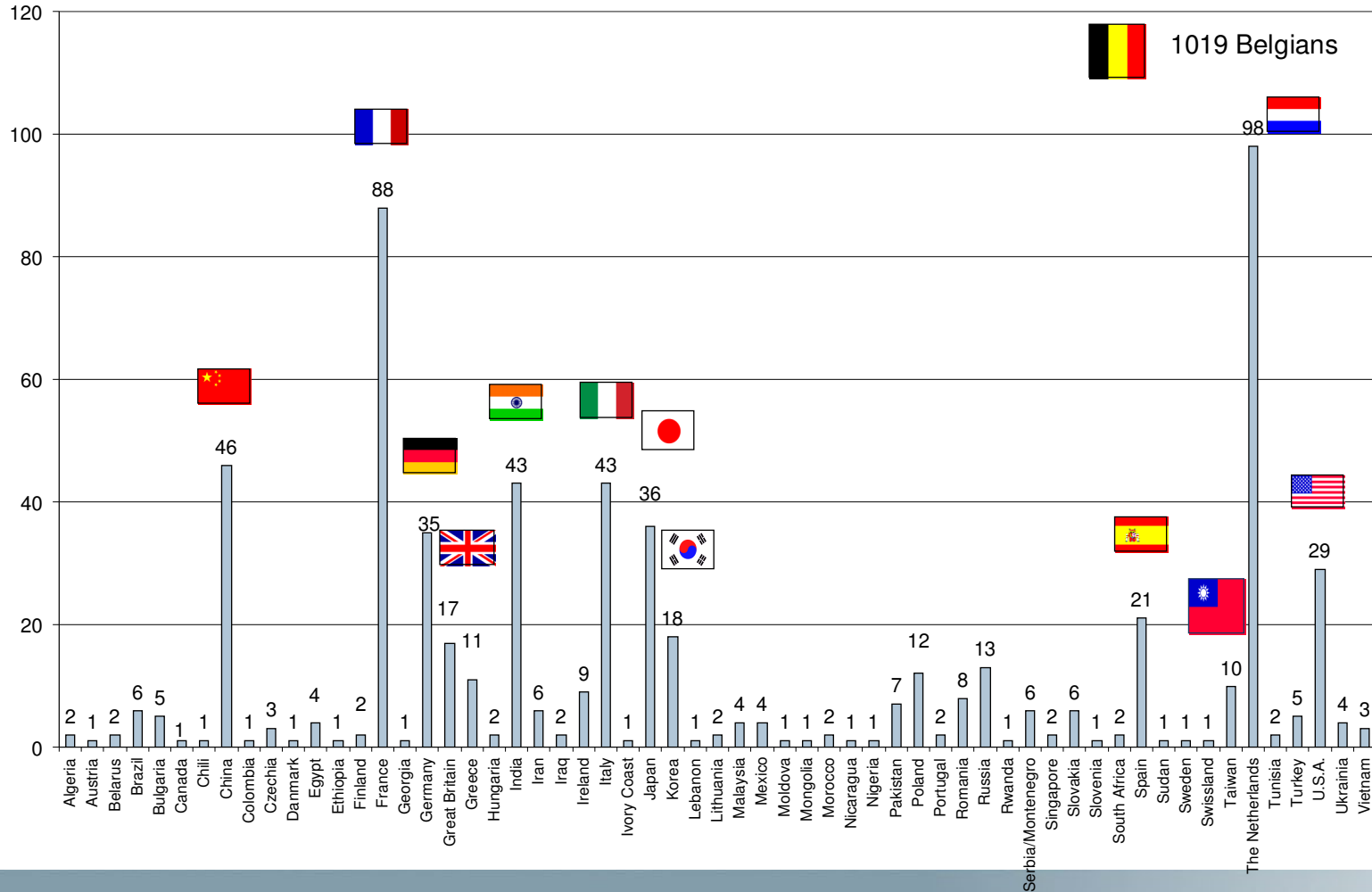


Staff evolution

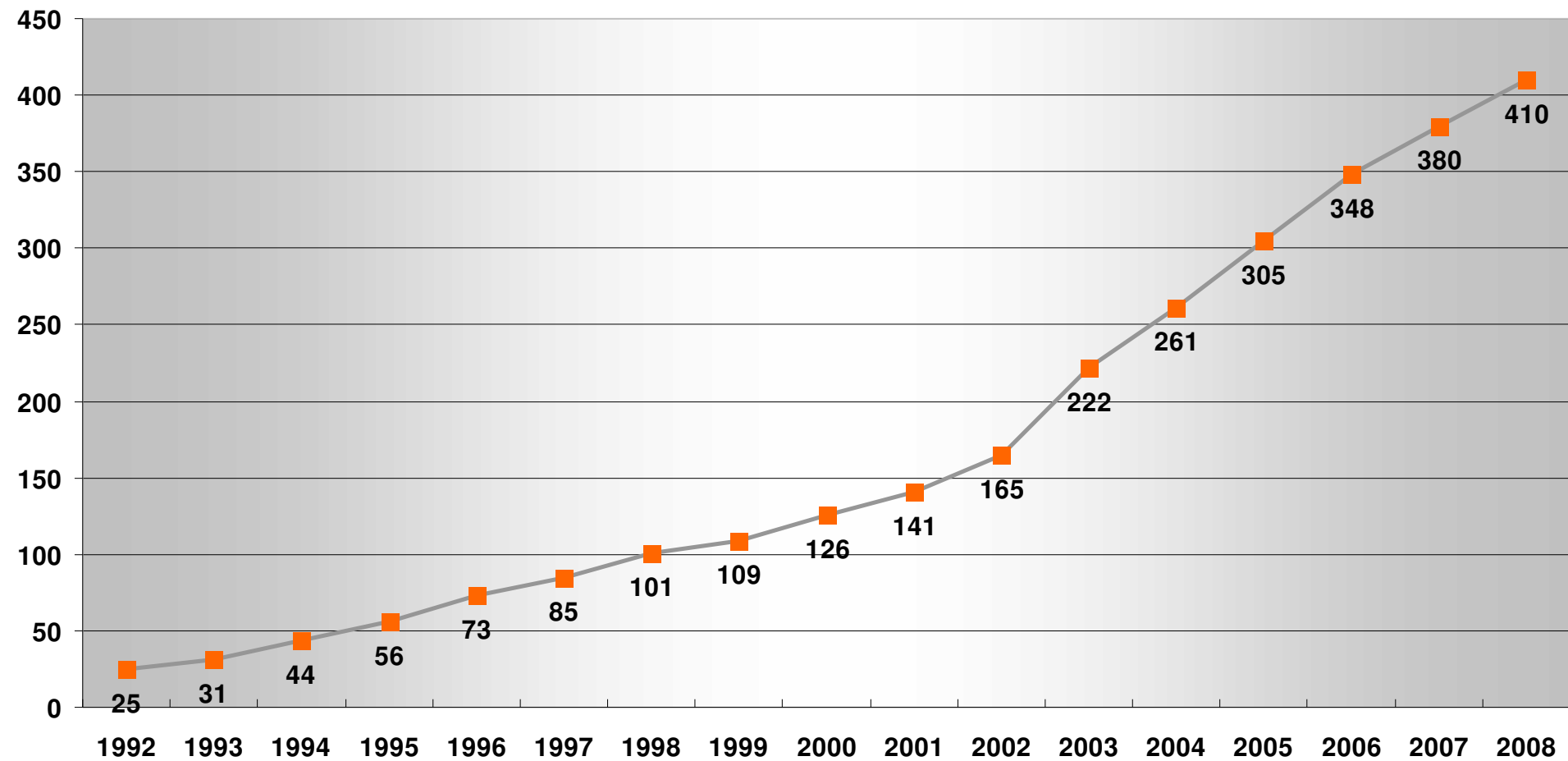


IMEC as a brain magnet

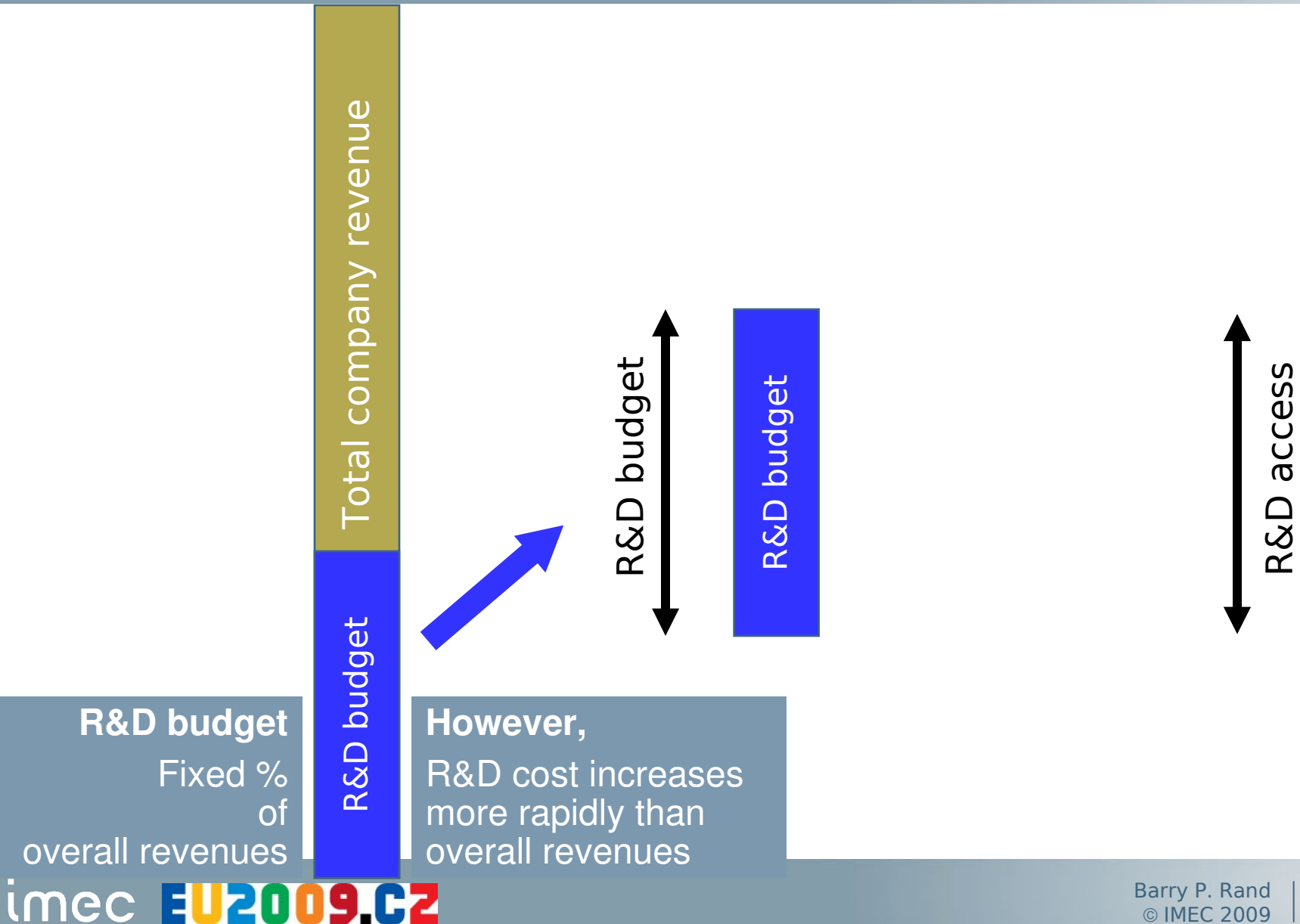
Foreign coworkers (PR + NPR): number per nationality
59 foreign nationalities, 1019 Belgians
(information dd. 31/12/2008)



Cumulative number of Flemish partners: In other words, impact on local industry



How can companies keep R&D budget under control?



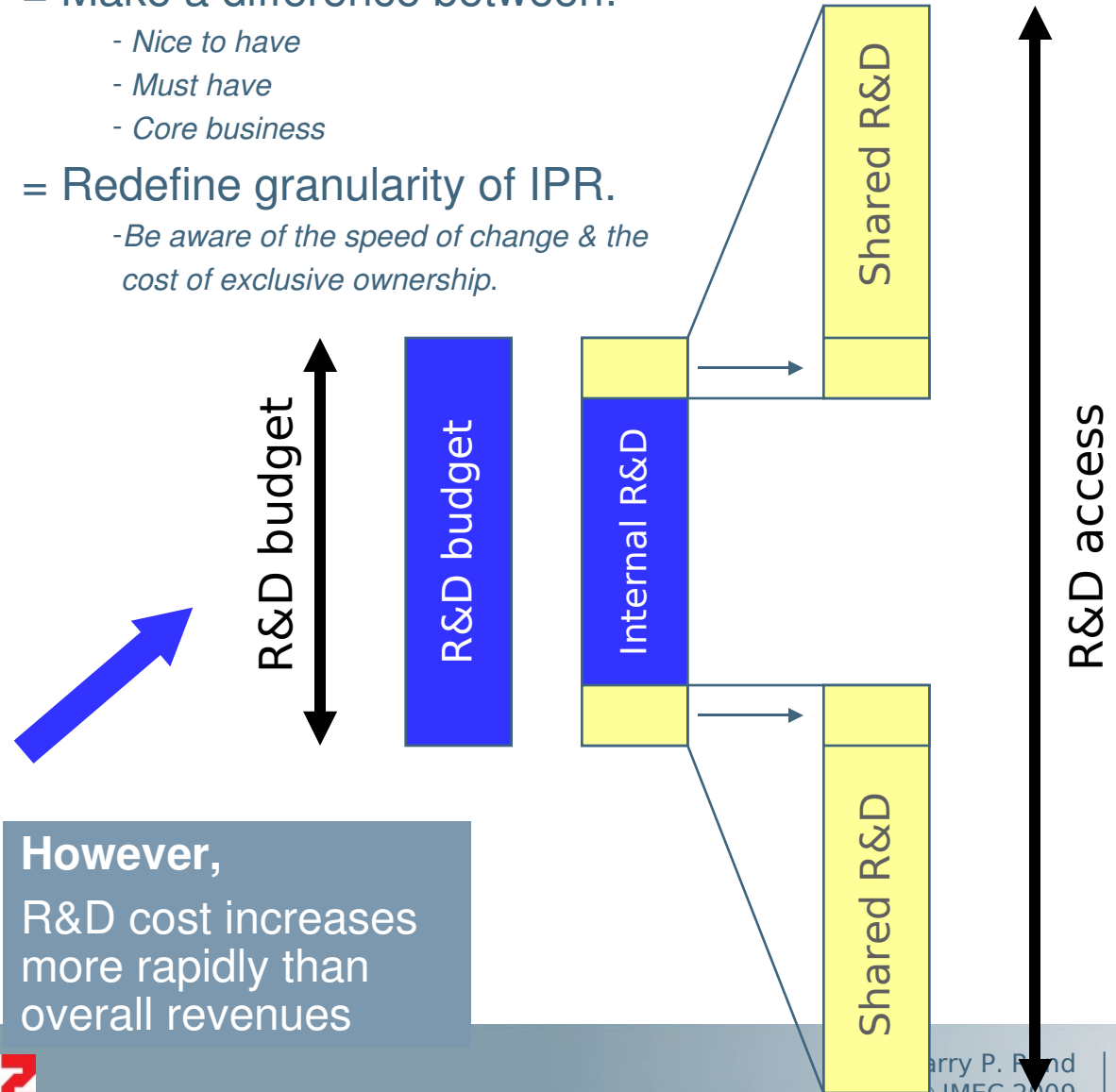
How can companies keep R&D budget under control?

= Make a difference between:

- Nice to have
- Must have
- Core business

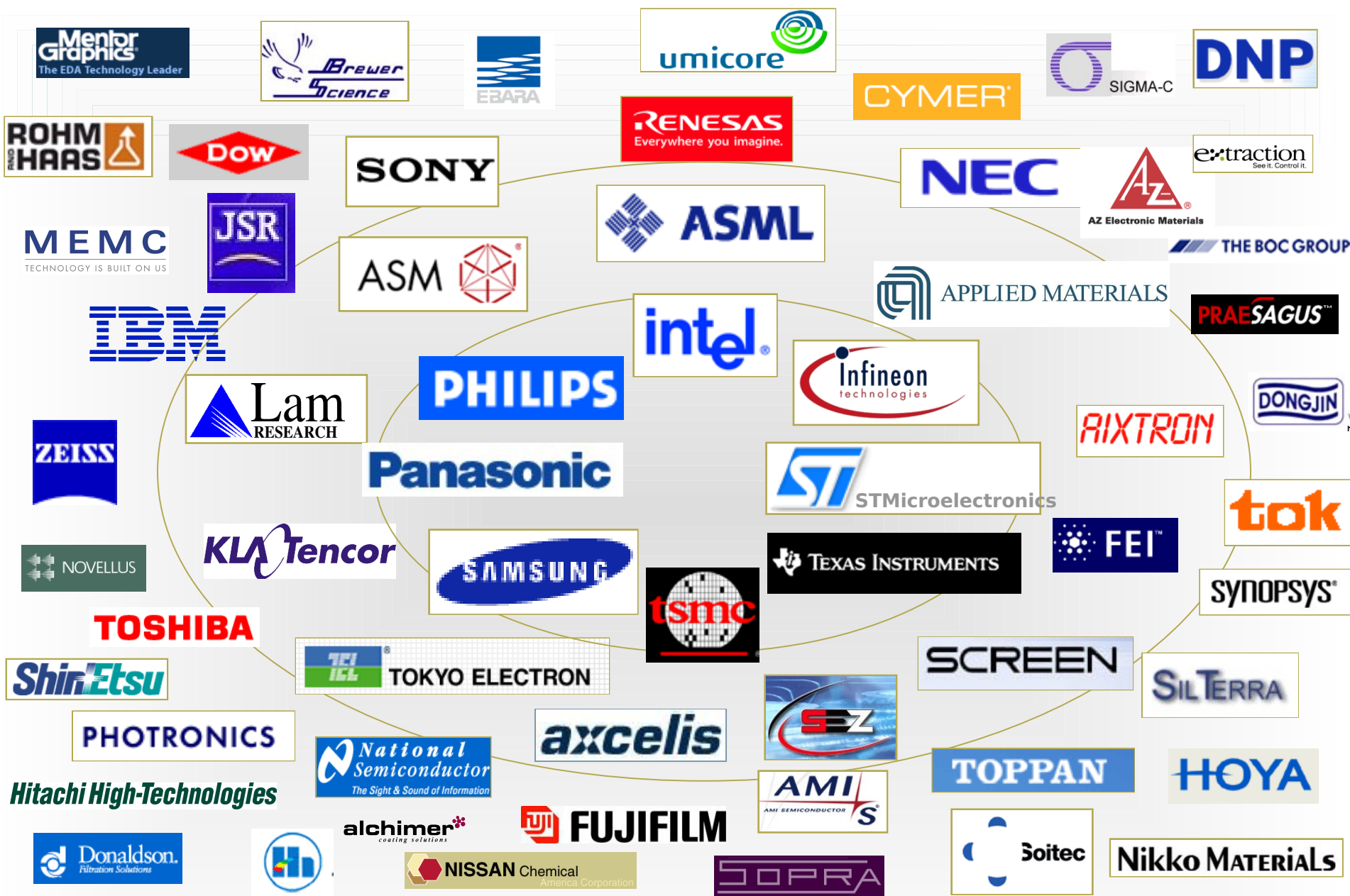
= Redefine granularity of IPR.

- Be aware of the speed of change & the cost of exclusive ownership.



R&D budget
Fixed %
of
overall revenues

However,
R&D cost increases
more rapidly than
overall revenues



The world's largest industry commitment to semiconductor research

IMEC spin-offs

INCUBATION

Trinean

ACTIVE SPIN-OFFS

SOLTECH
SUNNY WAY TO ENERGY

PhotoVoltech

XENICS
Partnering Your Infrared Solution

Septentrio
satellite navigation

3E
ENGINEERING A SUSTAINABLE ENERGY FUTURE

Q-STAR
TEST
The Current Test Company

easics

AnSem

TARGET
COMPILER TECHNOLOGIES

CoWare

POWERESCAPE
Low Power by Design

VIVACTIS
screening and profiling

GEMIDIS
INNOVATING

MAGWEL

ESSENSIUM

EXITS

Sirius
communications

Matrix
Integrated Systems, Inc.

Fillfactory
image sensors

ACUNIA
DRIVES TELEMATICS

Frontier Design

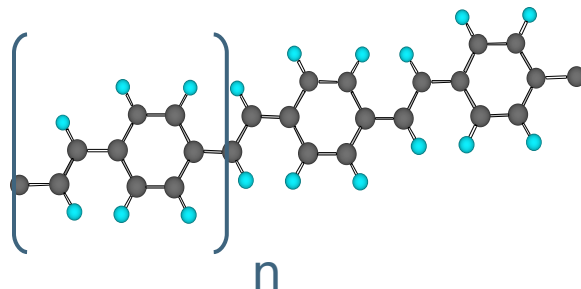
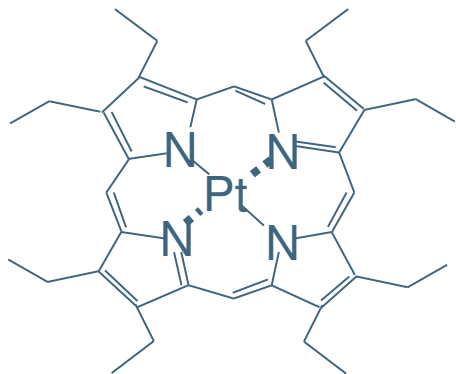
Alphabit



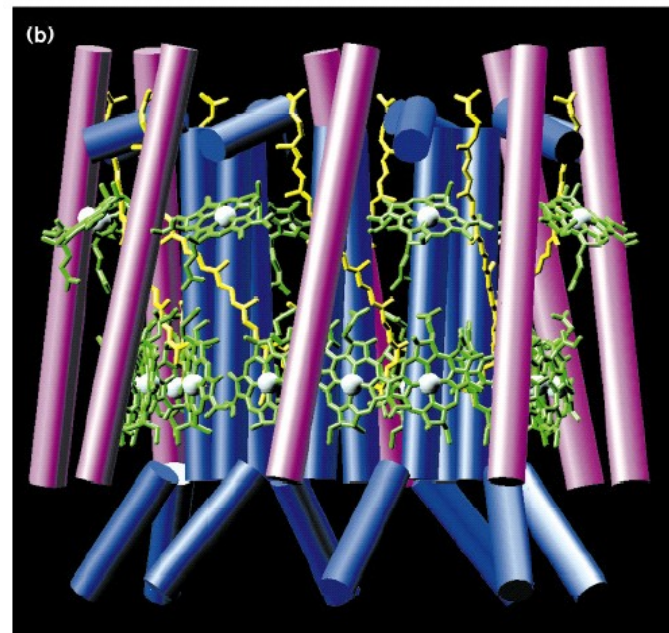
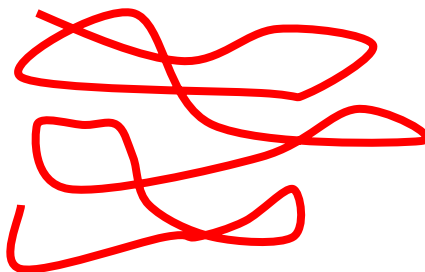
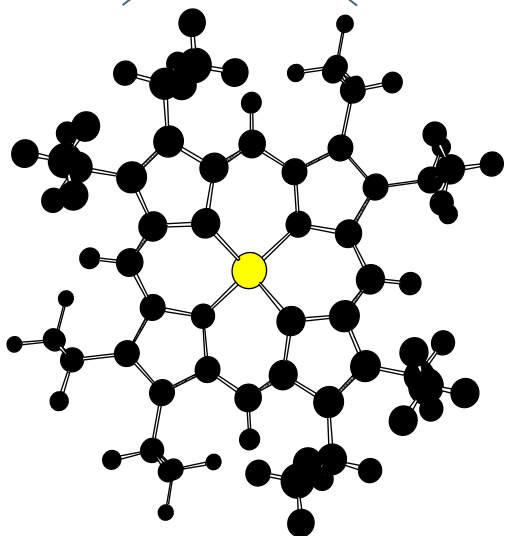
Organic Photovoltaics



Types of organic molecules



Efficiencies of Organic PV
up to 6.5%



Koepke *et al.* Structure 4, 581 (1996)

Monomers

Polymers

Biological Molecules

Structural Complexity

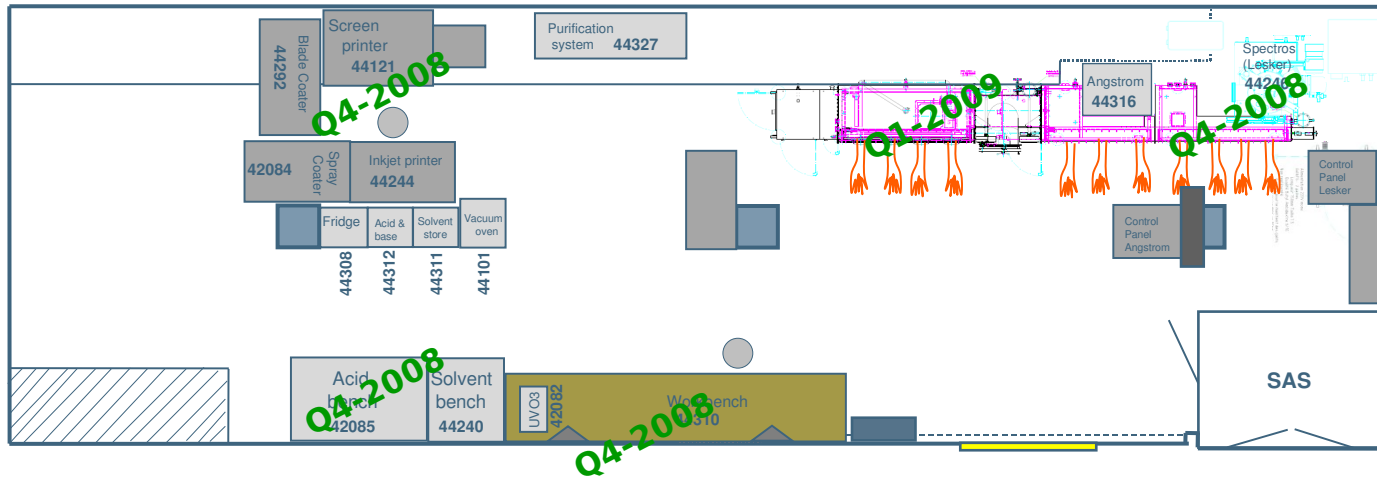
One young researchers' micro-example

- I joined Polymer & Molecular Electronics group in the beginning of 2007
- About 1 year later, we thought to create an “O-line”, a RI where we could demonstrate the true potential of organic photovoltaics
 - We would build up a new lab space with new equipment while continuing to work in our current lab space
 - The initial equipment investment would be by IMEC, but ultimately paid back by outside investments from industrial partners who want to be a part of the O-line for training and IP sharing
- Started working in the lab in Fall 2008
- Hired new people in 2008 – 2 Ph.D. and 2 masters level

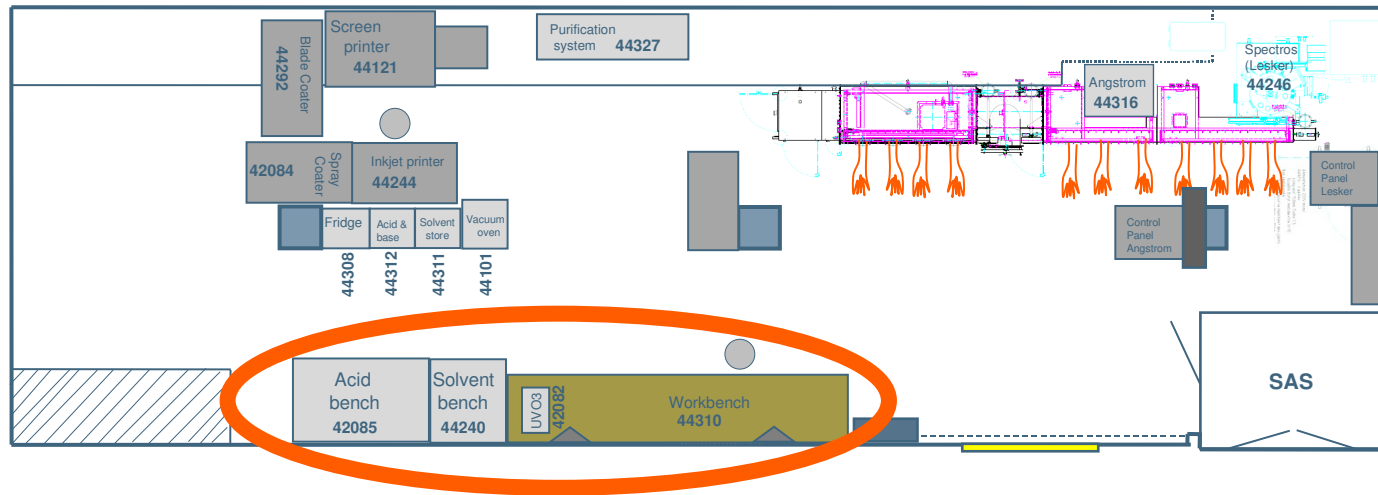
The current state of the O-Line (3 weeks ago)



Lab layout and tools



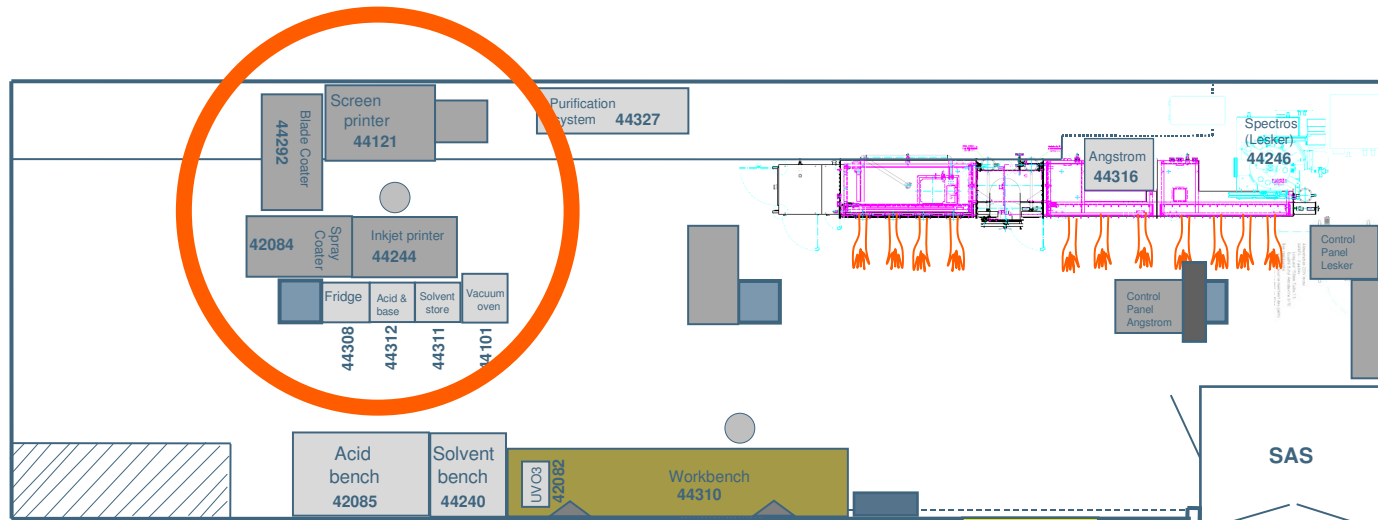
Lab layout and tools



Wetbenches + tables

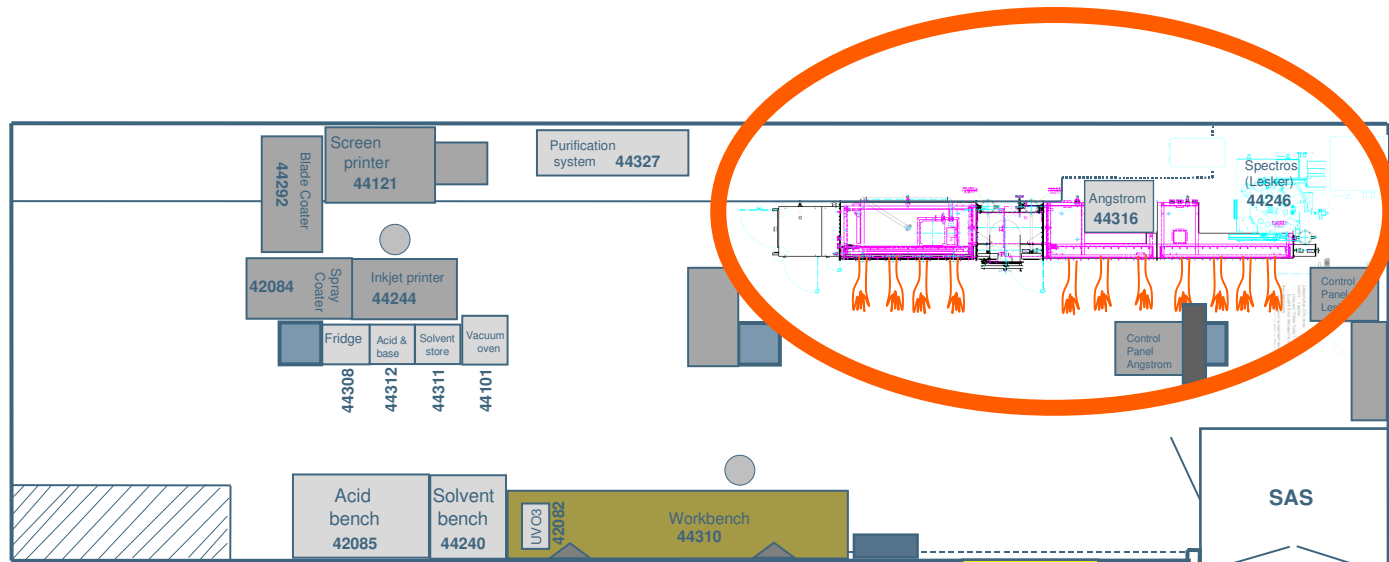
Lab layout and tools

Solution processing corner



Lab layout and tools

N₂ glovebox chain



My (*naïve*) recipe for a successful RI

- **Independence**

i.e. IMEC defines its research programs and invites industry, institutes and universities to participate

- **Share costs, risks and ultimately IP**

- Build up an advanced **infrastructure** over time

- **Infrastructure** = yes equipment, but perhaps more importantly, **talented people!**

- Strong network of **partners**

i.e. for IMEC, industry accounts for >80% of budget

- Strong **regional support**

- **A good track record will naturally result**

- i.e. for IMEC, over **25 years**:

- 1600 publications per year and > 100 invited/key note per year

- 100 patents per year