

The Innovative Hospital Pharmacist- Imagination, Skills and Organisation

Innovation and hospital pharmacy: scientific and societal drivers

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Utrecht Institute of Pharmaceutical Sciences

Utrecht University

Disclosure of conflict of interest

- Advisor to Venture Capital companies, Thuja Pharmaceutical, Aglaia Biomedical ventures
- Scientific advice to major Pharma companies and Pharma SMEs. Merck, Amgen, Vifor, OctoPlus, J&J, Teva, HAL Allergy.
- Scientific advice to regulatory bodies
- Scientific advice to Public Private Partnerships, TI Pharma, IMI

Innovation..... Many definitions

The process of making *improvements* by introducing something new

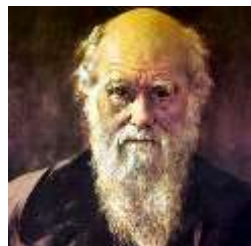
wikipedia

Science is turning money into ideas and innovation is turning ideas into money

Bayer Executive

Darwin

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.”



Menu

- Innovation in Europe
- New drugs, pharma industry, global picture
- Industry – Academia relationships
- Scenario analysis
- Concluding remarks

Internet pharmacy



DNA profiling

Robots



Advanced therapies



Automated dispensing machines



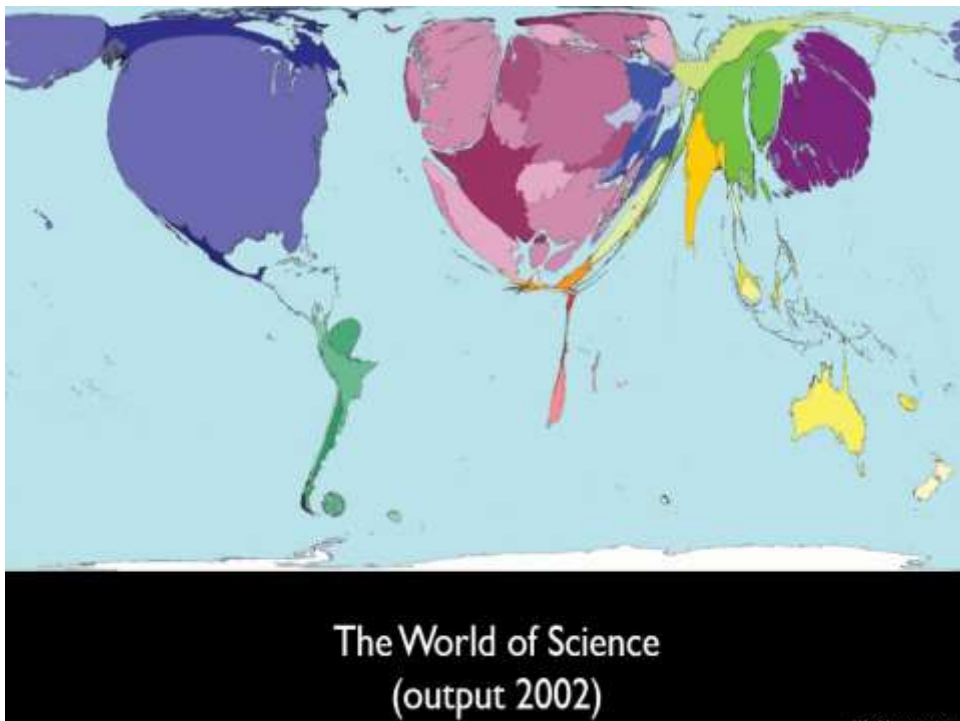
Lisbon Strategy

In March 2000, the European Council in Lisbon set out a ten-year strategy to make the Union **‘the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion’**. During the Swedish Presidency, in

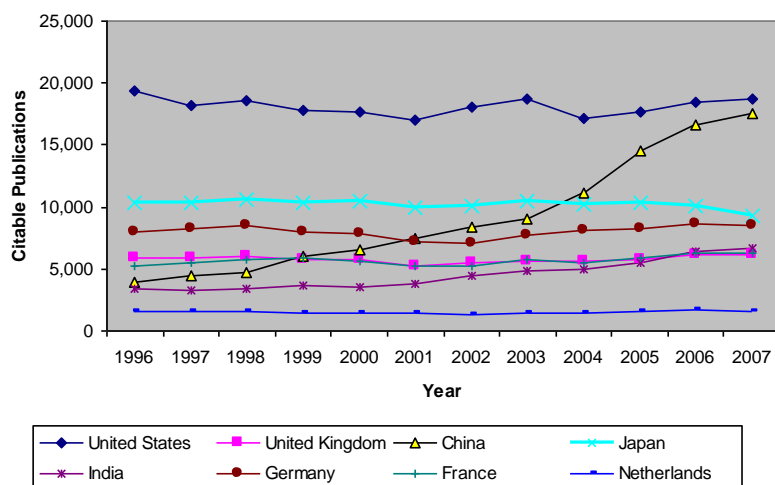


European Research & Development investment to 3% of the European Union's Gross Domestic Product in 2010.....

Conquistadores-monument; the explorers....



Citable Publications Chemistry (476 journals)



SCImago. (2007). SJR — SCImago Journal & Country Rank.

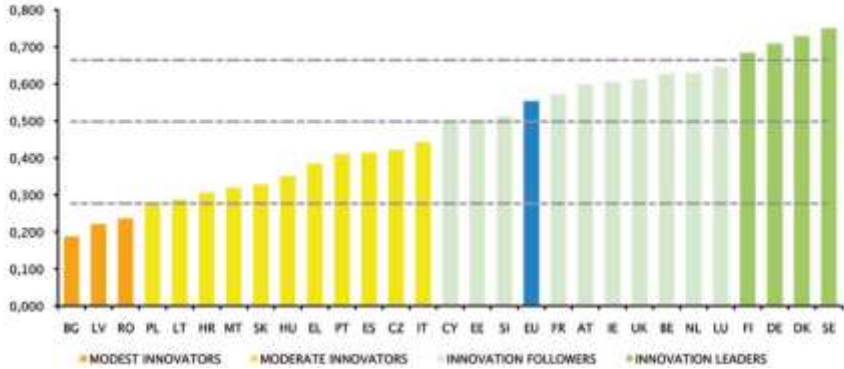
FIP/PharmSci 2020

Rank	Country/Region	Expenditures on R&D (billions of US\$, PPP)	% of GDP PPP	Year	Source
1	United States	405.3	2.7%	2011	[1]
2	China	296.8	1.97%	2012	[1]
3	Japan	160.3	3.67%	2011	[1]
4	Germany	69.5	2.3%	2011	[1]
5	South Korea	55.8	3.74%	2011	[1]
6	France	42.2	1.9%	2011	[1]
7	United Kingdom	38.4	1.7%	2011	[1]
8	India	36.1	0.9%	2011	[1]
9	Canada	24.3	1.8%	2011	[1]
10	Russia	23.8 ^{nt}	1.0%	2011	[1]
11	Brazil	19.4	0.9%	2011	[1]
12	Italy	19.0	1.1%	2011	[1]
13	Taiwan	19.0	2.3%	2011	[1]
14	Spain	17.2	1.3%	2011	[1]
15	Australia	15.9	1.7%	2011	[1]
16	Sweden	11.9	3.3%	2011	[1]
17	Netherlands	10.8	1.6%	2011	[1]
18	Israel	9.4	4.2%	2011	[1]
19	Austria	8.3	2.5%	2011	[1]
20	Switzerland	7.5	2.3%	2011	[1]
21	Belgium	6.9	1.7%	2011	[1]

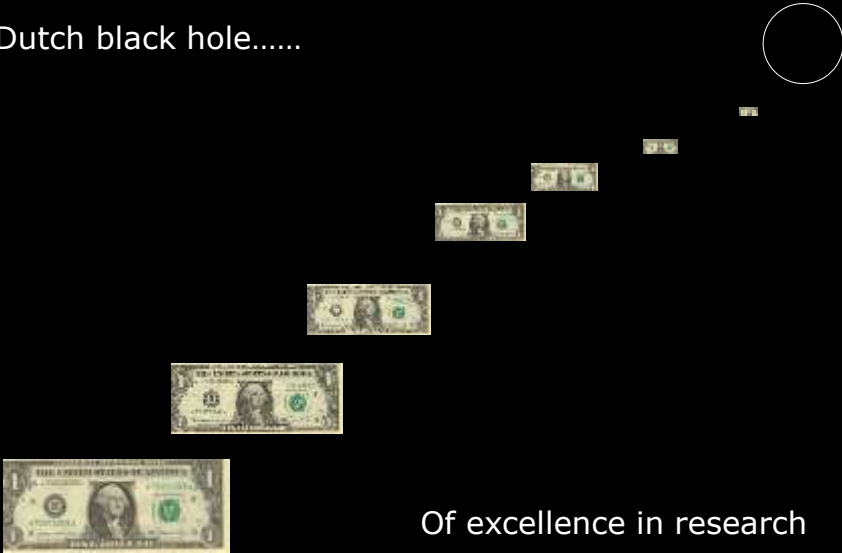
Total amount spent on R&D and as fraction of the GDP (2010)



Figure 1: EU Member States' innovation performance



The Dutch black hole.....



Of excellence in research

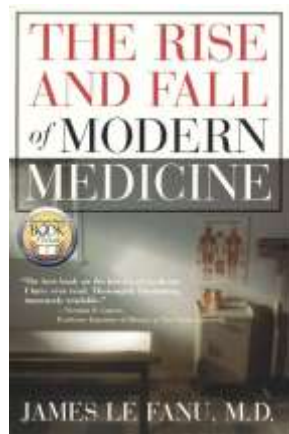
**Science is strong but ...
Innovation should be promoted**

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- *New drugs, pharma industry, global picture*
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- Concluding remarks

Did we lose something?

Where is the momentum?



**Insulin and the dog
and how to move fast!**



Banting and Best

Those were the days.....
Publication early 1922
Nobel prize Banting 1923

Did we lose something?

- The **precautionary** principle or precautionary approach states if an action or policy has a suspected risk of causing harm to the [public](#) or to the [environment](#), in the absence of [scientific consensus](#) that the action or policy is harmful, the [burden of proof](#) that it is *not* harmful falls on those taking an action.

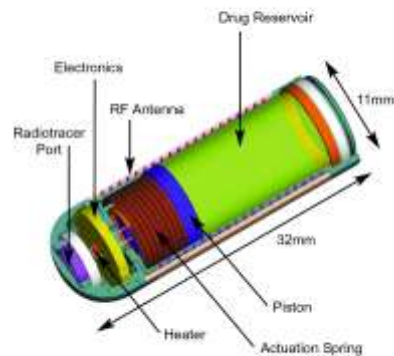


Google announces 'smart' contact lenses that monitor glucose levels

Published January 05, 2014 | 1 | Facebook.com

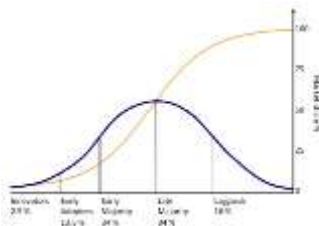


The Enterion™ Capsule



Is this innovation?

The Enterion oral drug delivery capsule. (image courtesy of Pharmaceutical Profiles)

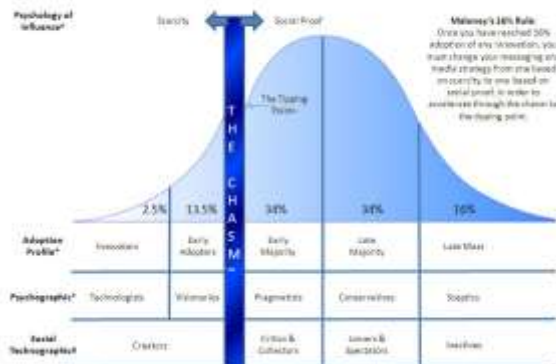


EU:
Invest in development
Launching customers?
Leadership awareness of the
importance of innovation



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Accelerating Diffusion of Innovation: Maloney's 16% Rule

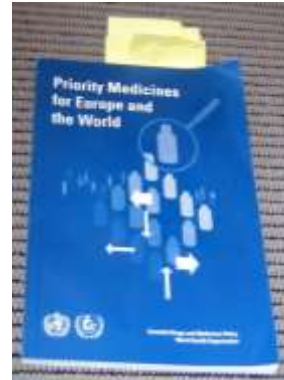
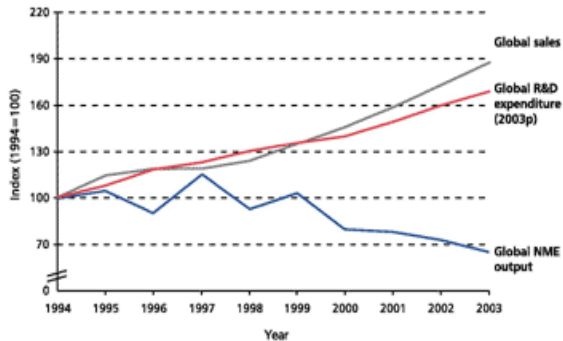


Menu

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While R&D expenditure is increasing, the output in New Molecular Entities (NME) is decreasing

Global sales, R&D expenditure and NME output from 1994 to 2003 [indexed, 1994=100]



Source: Centre for Medicines Research

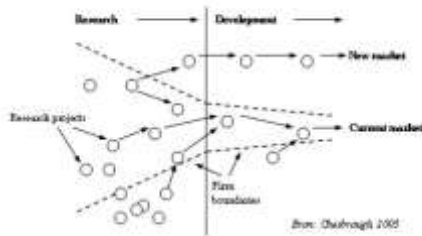
Reducing costs and filling pipelines are two main drivers for consolidation in big Pharma

Examples of mergers and acquisitions in big Pharma

   <p>November 2007: Schering-Plough buys Organon for USD 14.4 bn</p>	  <p>March 2009: Roche buys remaining 44% of shares in Genentech for USD 46.8 bn</p>
  <p>January 2009: Wyeth merges with Pfizer, Pfizer pays USD 68 bn</p>	  <p>September 2009: Abbott buys Solvay Pharmaceuticals from Solvay paying USD 6.6 bn</p>

From LSH

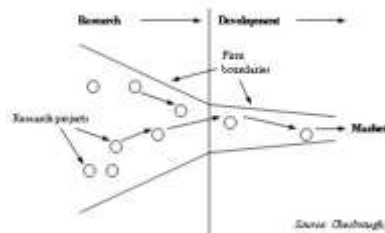
Open innovation can thus be described as combining internal and external ideas as well as internal and external paths to market to advance the development of new technologies.



Open innovation model

Figure 2 Open innovation

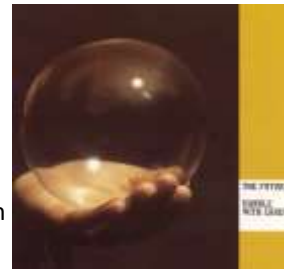
Traditionally, new business development processes and the marketing of new products took place within the firm boundaries (Figure 3).



Closed innovation model

Challenges and actions of pharma industry for the years to come

- 'Open innovation model' instead of 'in house development'
- Globalization: go for quality and speed
- Personalized medicines/Theranostics
- Options: Consolidation by Concentration or Diversification



WORLD PHARMA NEWS

Breaking News: Pfizer Completes Acquisition of Jazz | Pfizer Inc. (NYSE: PFE) has completed its

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You are here: Home » Abbott » Abbott to Separate into Two Leading Companies in Diversified Medical Products and Research-Based Pharmaceuticals

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Pharma Pricing Strategies
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Triecta Multimedical
Online Investigator Training - Sponsor, CRA, & Site Collaboration

Abbott to Separate into Two Leading Companies in Diversified Medical Products and Research-Based Pharmaceuticals

WEDNESDAY, 19 OCTOBER 2011

Today Abbott (NYSE: ABB) announced that it plans to separate into two publicly traded companies, one in diversified medical products and the other in research-based pharmaceuticals. The diversified medical products company will consist of Abbott's existing diversified medical products portfolio, including its branded generic pharmaceutical, devices, diagnostic and nutritional businesses, and will retain the Abbott name. The research-based pharmaceutical company will include Abbott's current portfolio of proprietary pharmaceuticals and biologics and will be named later. Both companies will be global leaders in their respective industries.


"Today's news is a significant event for Abbott, and reflects another dynamic change in our company's 123-year history, strengthening our outlook for strong and sustainable growth and shareholder returns," said Miles D. White, chairman and chief executive officer, Abbott.

Abbott's proprietary pharmaceutical business has delivered market-leading performance with a sustainable mix of products and built a strong pipeline of proprietary medicines through internal discovery, in-licensing and collaboration efforts. Abbott also has leadership positions in its



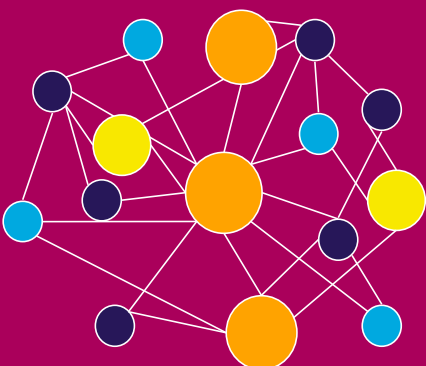
<http://www.worldpharmanews.com/factory/8>





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Open innovation is about networks

Drug discovery and development: a networked model



-  Academia
-  SME's
-  (Specialty) Pharma
-  CRO's

Gown and Pharma Friends or Foes?



Telegraph.co.uk

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Pharmaceuticals and Medicine
The latest news, analysis and share prices on Britain's biggest pharmaceutical companies, including GlaxoSmithKline and AstraZeneca.

LATEST PHARMACEUTICALS AND MEDICINE

Pharmaceutical companies "delaying cheaper drugs"
European Commission accuses pharmaceutical companies of delaying and impeding the entry of generic drugs to the market.
28 Nov 2008

Drugs deal will save the NHS £350m
The Government has agreed a deal with drugs companies that will save the NHS hundreds of millions of pounds a year.
28 Nov 2008

Evolutionary entrepreneur drug proposed
Entrepreneurs' ability to take risky decisions could be bottled and used as a performance enhancer.
13 Nov 2008

Top lung cancer drug to be available on the NHS
Lung cancer sufferers are to be given an expensive life-prolonging drug on the NHS under a deal with manufacturers to cut the medication's price.
26 Nov 2008

GlaxoSmithKline to cut a further 620 British jobs
GlaxoSmithKline has announced

Government moves to halt exodus
Government plans to forgo £175m of tax revenues in an attempt to

Around November 28, 2008

Who develops medicines?

Medical Progress Report 6 | The Truth About Drug Innovation: Thirty-Five Case Histories on Private Sector Contributions to Pharma



Medical Progress Report

No. 6 June 2008

The Truth About Drug Innovation: Thirty-Five Summary Case Histories on Private Sector Contributions to Pharmaceutical Science

Benjamin Zycher, Senior Fellow, Manhattan Institute for Policy Research

Joseph A. DiMasi, Director of Economic Analysis, Tufts Center for the Study of Drug Development

Christopher-Paul Milne, Associate Director, Tufts Center for the Study of Drug Development

Executive Summary

TI Pharma: a Public Private Partnership

Between ivory tower and smokestack..... The open innovation model at work

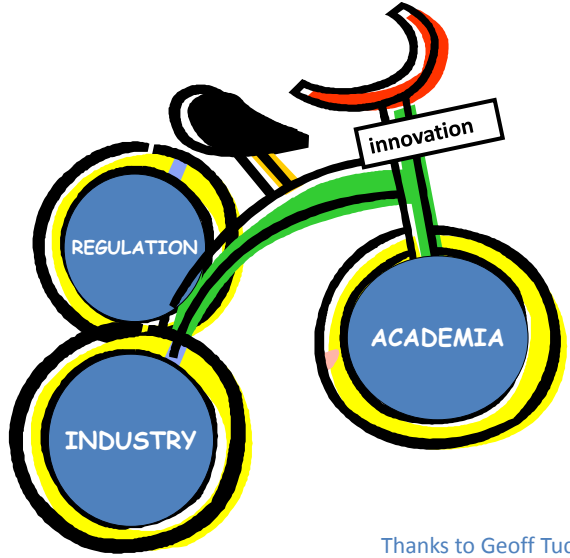


TI Pharma





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Thanks to Geoff Tucker.....

Key Concepts

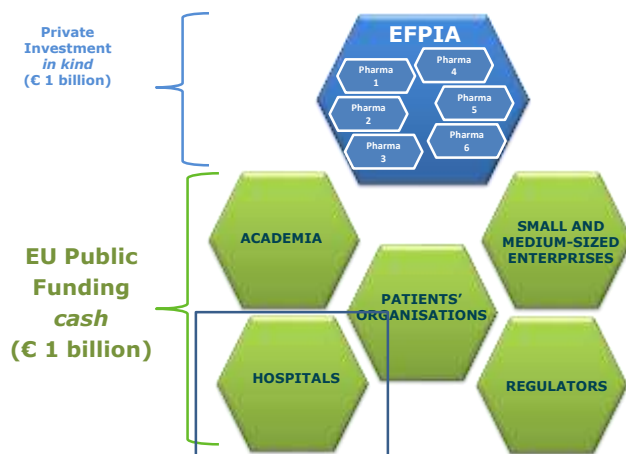


- “Non-competitive” collaborative research for EFPIA pharma companies
- Competitive calls to select (academic/SME) partners of EFPIA companies (IMI beneficiaries)
- Open collaboration in public-private consortia (data sharing, dissemination of results)



Courtesy of Michel Goldman

A Typical IMI Consortium

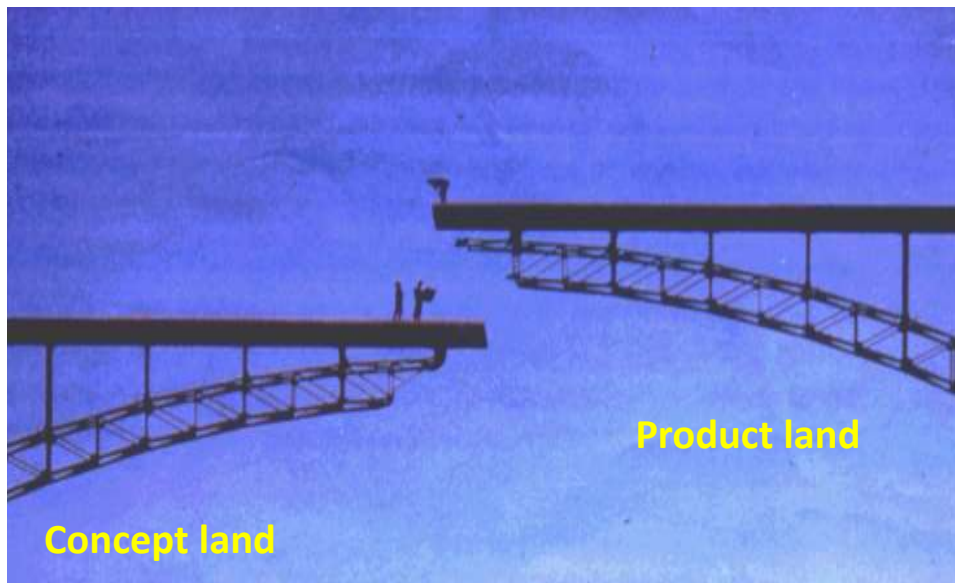


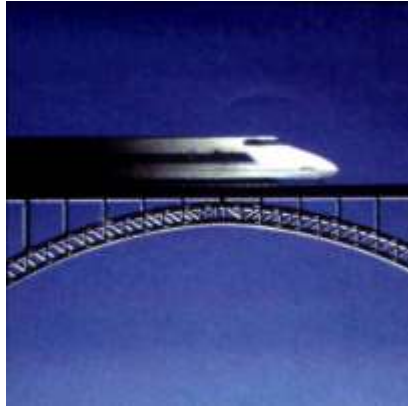
Courtesy of Michel Goldman



**IMI II in the framework of Horizon 2020
Budget 3.5 billion euros**

A move in the direction of Innovation!



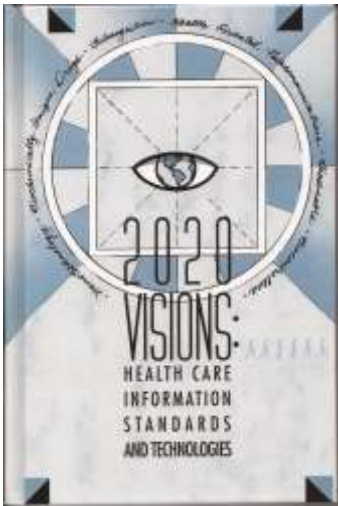


The TI Pharma/IMI bridge.....

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- Innovation in Europe
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The future?



**From 1992
An USP initiative**

**MABs: OK
Gene therapy?**

Internet? NO



Pharmaceutical Sciences in 2020:

A scenario analysis

**Daan Crommelin, Pieter Stolk,
Bert Leufkens**



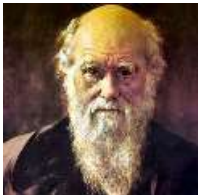
FROM THE ANALYST'S COUCH

Pharmaceutical sciences in 2020

*Daan Crommelin, Pieter Stolk, Luc Besançon, Vinod Shah,
Kamal Midha and Hubert Leufkens*

Scenario analysis

- Scenario planning is about changing minds, *not* making plans
- Scenarios are *not* forecasts
- Scenarios are learning devices to take a long view and to open mental maps
- Think the unthinkable



Charles Darwin
(1809 - 1882)

And keep in mind:

It is ***not*** the survival of the fittest.....

It is the survival of those who can ***adapt best.***

Or: le hasard ne favorise que les esprits préparés (Pasteur)

chance favors only the prepared mind (Pastor)

October 2008 – Meeting in Amsterdam
BPS – FIP as organizer/driver for a scenario analysis for 2020

About 30 experts, including: investors, industry professionals, academics, regulators, NGOs



Plenary presentations

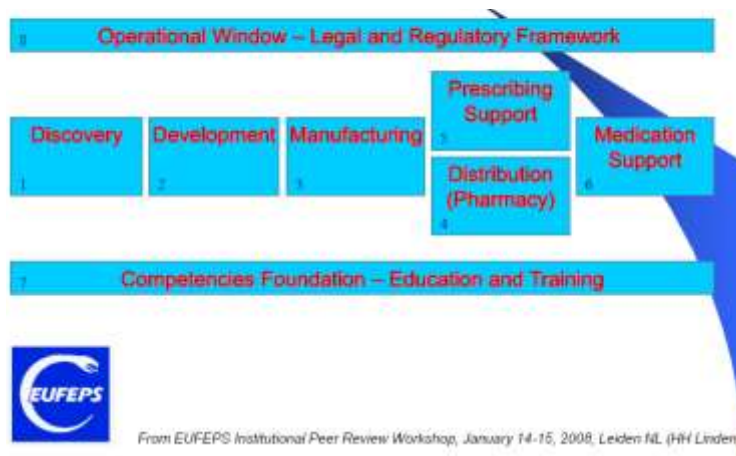


Small group discussions

Steps in scenario development.....

1. demarcating the domain for the analysis,
2. identifying critical driving forces of the pharmaceutical sciences, and
3. translating key scenario drivers into narratives

The Domain: pharmaceutical sciences



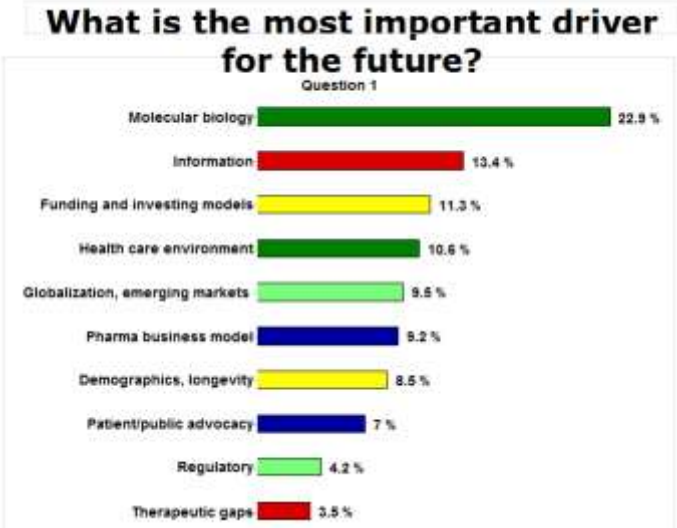
Steps in scenario development.....

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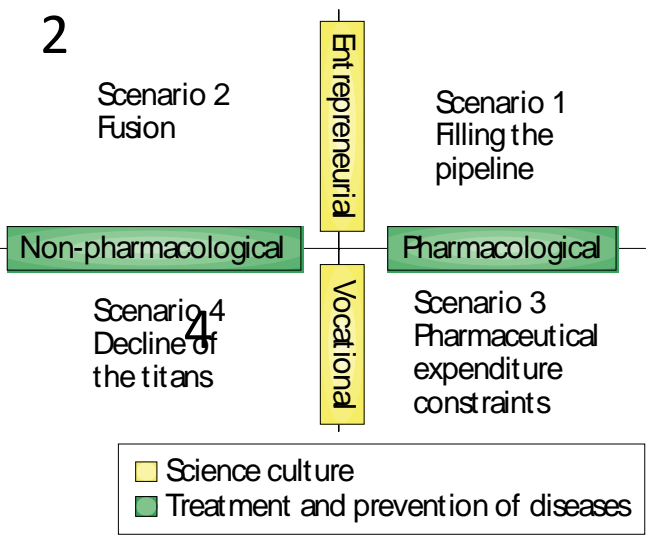
What are the most important drivers for the future? No priority in the list.

- | | |
|--|---|
| 1. Molecular biology, biomarkers, genomics | 6. Health care environment, payers in the hot seat |
| 2. Information and other new (material) technologies | 7. Therapeutic gaps, unequal access |
| 3. Rethinking pharma business model | 8. Patient/public advocacy, zero risk culture, ethics |
| 4. Funding and investing models, risk sharing | 9. Demographics, longevity, chronic diseases |
| 5. Regulatory constraints and opportunities | 10. Globalization, emerging markets (BRIC countries) |
| | 11. Financial system |

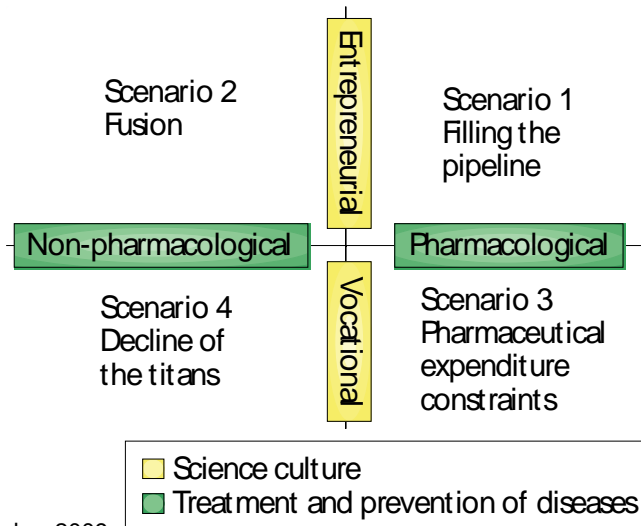
What is your number 1, 2 and 3?



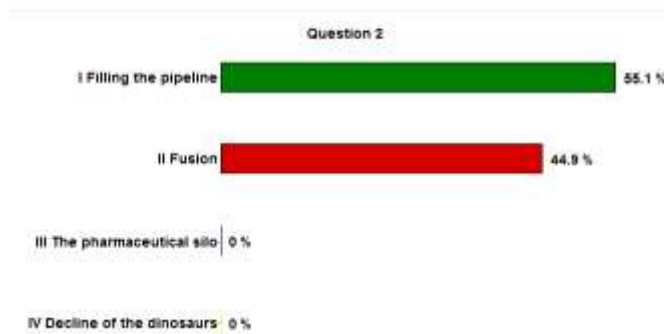
Which scenario do you prefer?



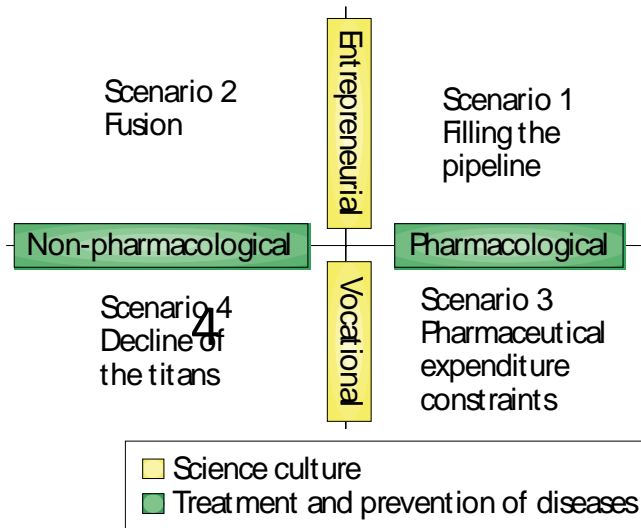
The 2 x 2 scenario matrix is the basis for the 4 scenario narratives



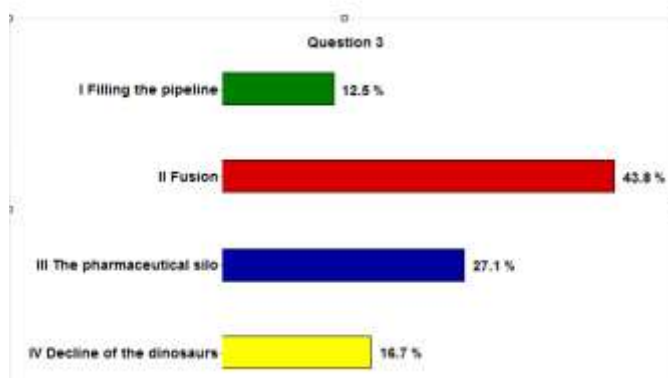
Which scenario do you prefer?



Which scenario do you think is most likely?



Which scenario do you think is most likely?





One of the fundamental tenets of scenario analysis is that it is probably better to **conduct** a scenario analysis than to **read/hear** about it!

FROM THE ANALYST'S COUCH

Pharmaceutical sciences in 2020

Doan Crattinelli, Peter Stoll, Luc Beuzorgot, Vinod Shah,
Kamal Mehta and Hubert Geislers

European Journal of Pharmaceutical Sciences
38 (2009) 419–425

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VOLUME 9 | FEBRUARY 2010 | 99

Alternative to Scenario Analysis



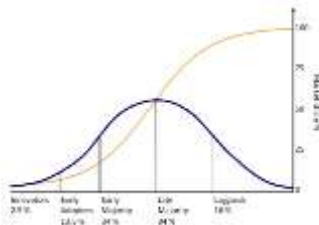
8-4-2014





Macchiavelli (1513)

‘One should keep in mind that nothing is harder in terms of preparation, nor more uncertain in terms of success, nor more dangerous in terms of realization than to present oneself as a man who intends to implement **innovations**.’



EU:
Invest in development
Launching customers?
Leadership awareness of the importance of innovation

Accelerating Diffusion of Innovation: Maloney's 16% Rule:



*Robert Glaser / Everett Rogers / W. W. Norton / Geoffrey Moore - Maloney (2004)



Quick, quick, I must hurry.
There go the people. I must
follow them as I am their leader

Alexandre Ledru-Rollin, France 1807- 1864
(thank to Mike Powell, Sofinnova)