The Art Of Innovation; How to bypass countless hurdles?

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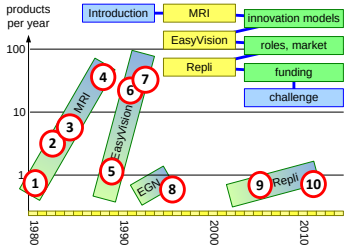
Abstract

Mature companies grow often via consolidation and incremental innovation. They have so much focus on their running business that there is little room for significant innovations. However, for long-term business, companies need solutions beyond the ordinary. In this presentation we look at practical hurdles of significant innovations in several case studies. We analyze some aspects further, e.g. innovation models, roles in innovation, the market, and funding.



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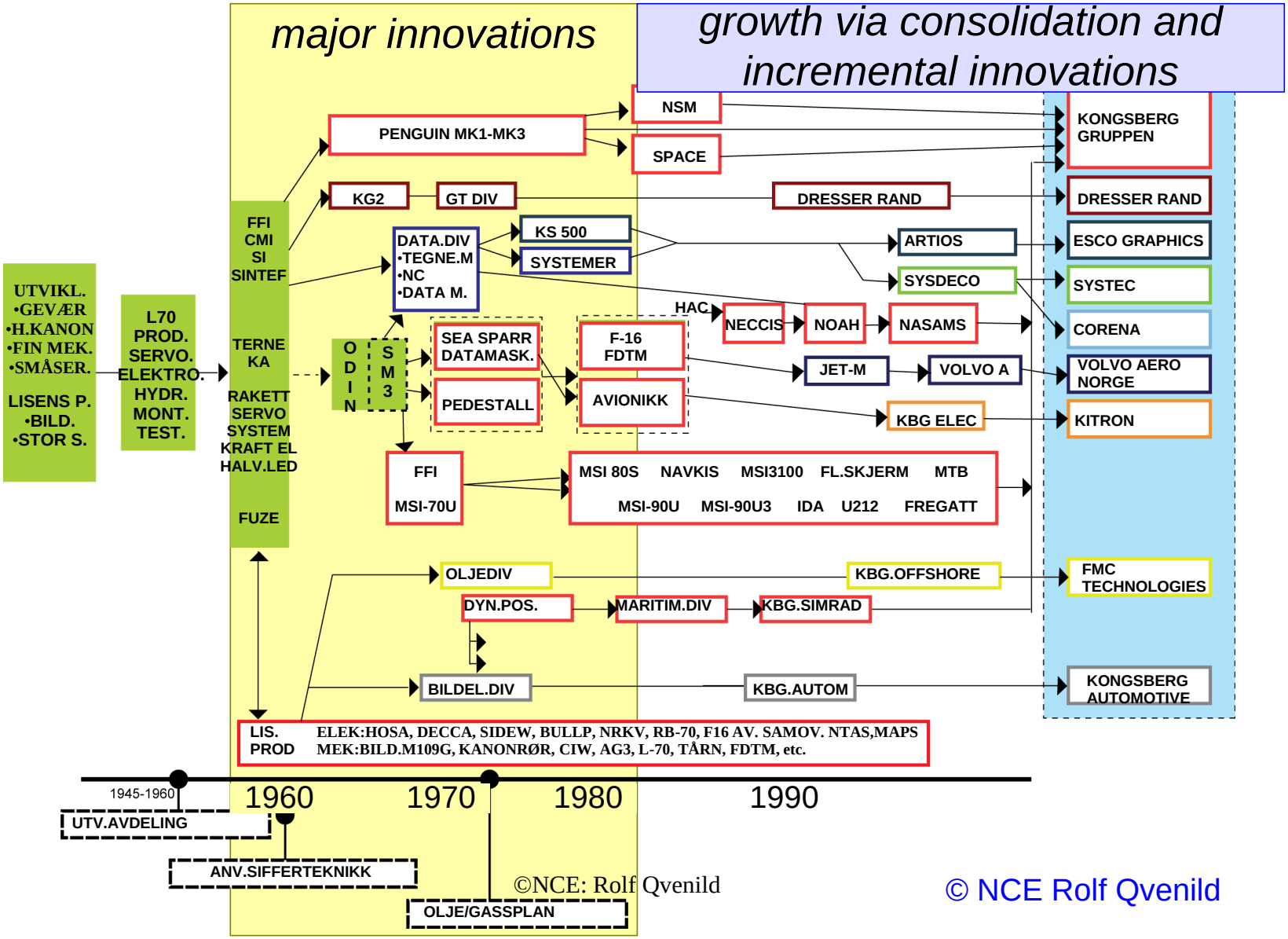
Genealogy of Kongsberg Industry



Why Innovation and Solutions beyond the Ordinary?

*Why is **Innovation** such popular **buzzword**?*

Sales **price erosion** -> **low margin**

Innovation maintains sales **price** and **margin**

*Why "**Solutions beyond the Ordinary**"?*

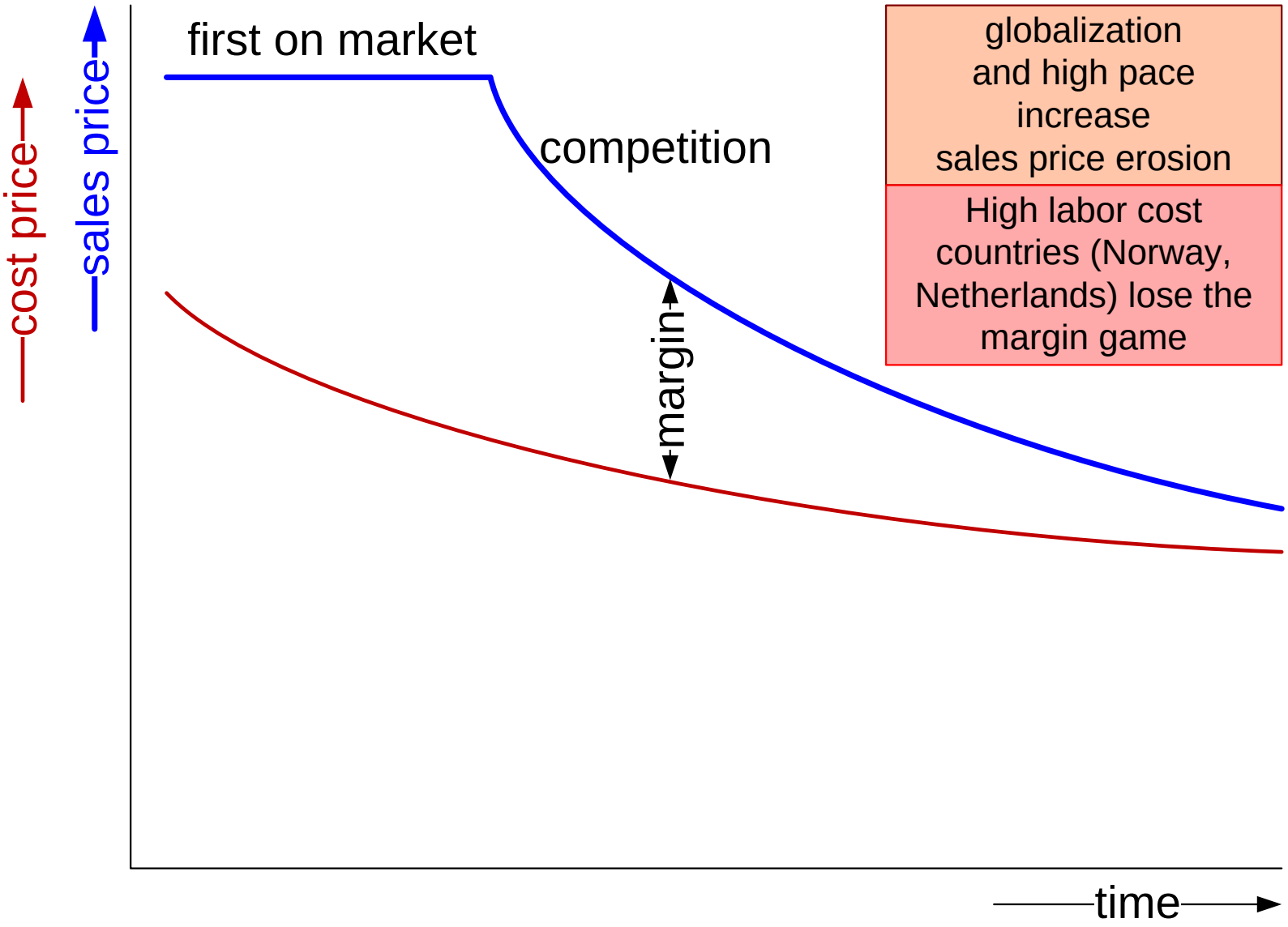
Mature companies grow via consolidation and **incremental innovation**

Mature companies struggle to **innovate significantly**; creating ***Solutions beyond the Ordinary*** is rather difficult for them

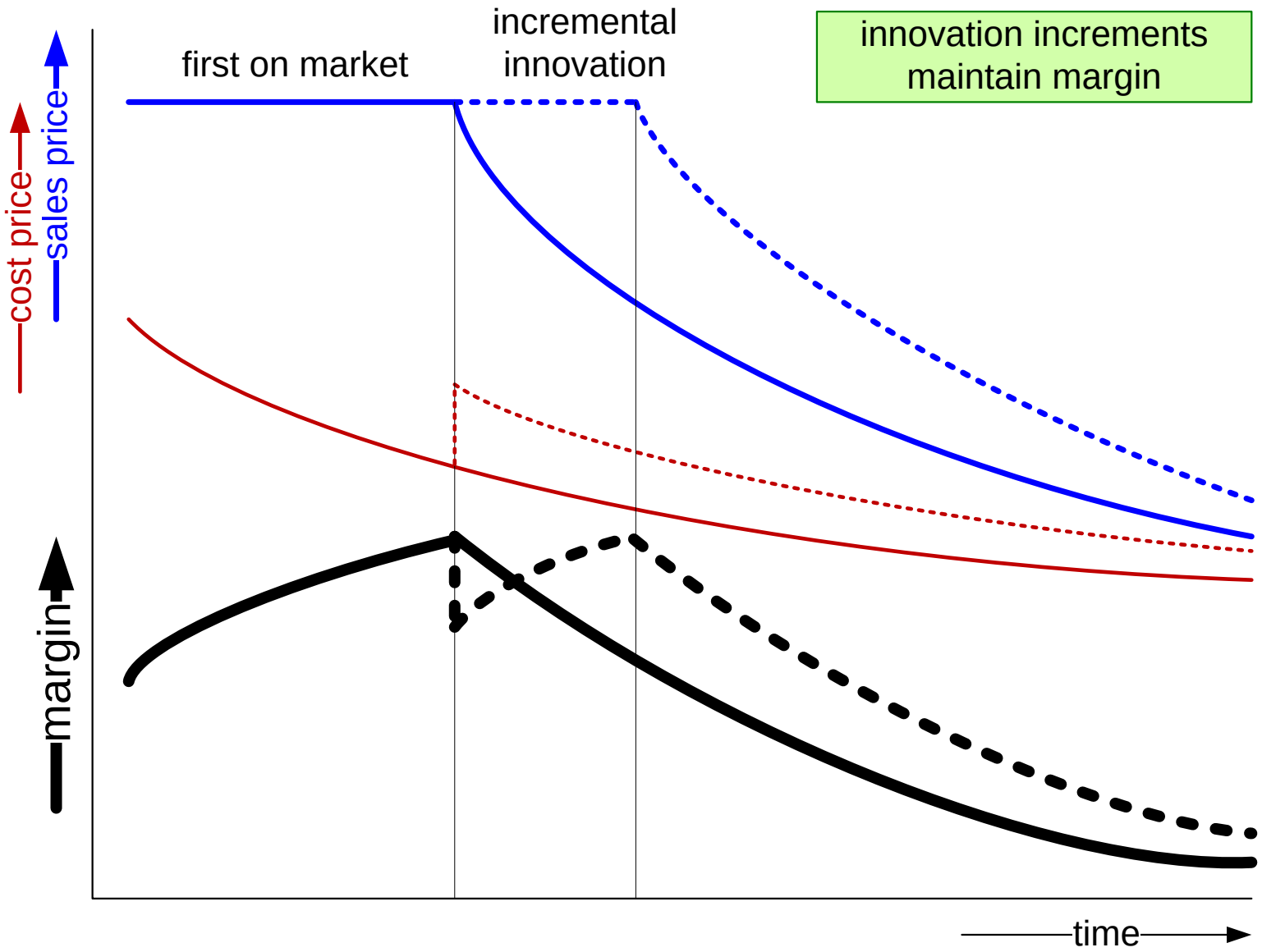
What happens when current markets get saturated and **current solutions** get **obsolete**?

How can we fill the **market-product-technology pipeline** for the **next 30 years**?

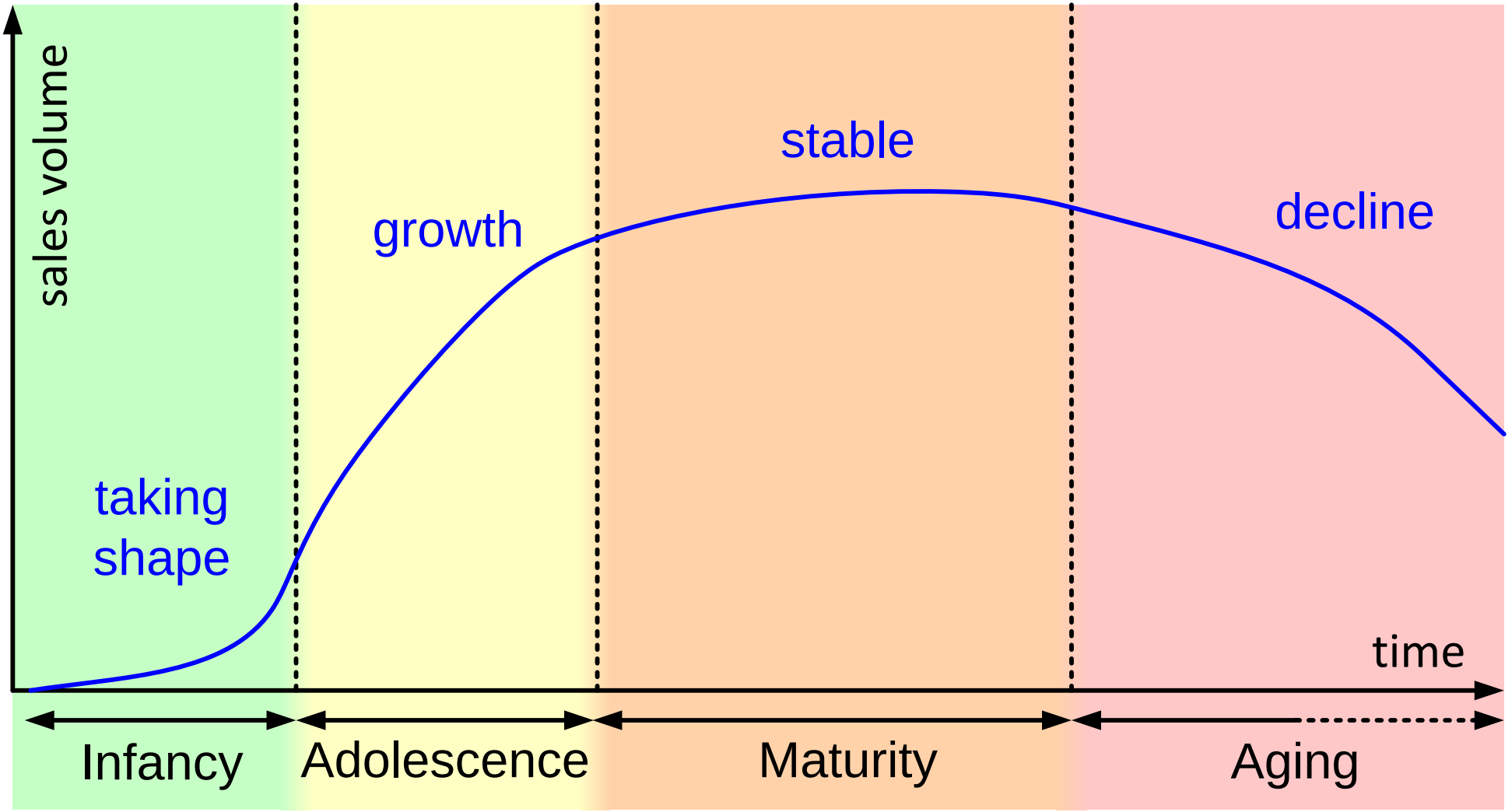
Margin Problem Due to Price Erosion



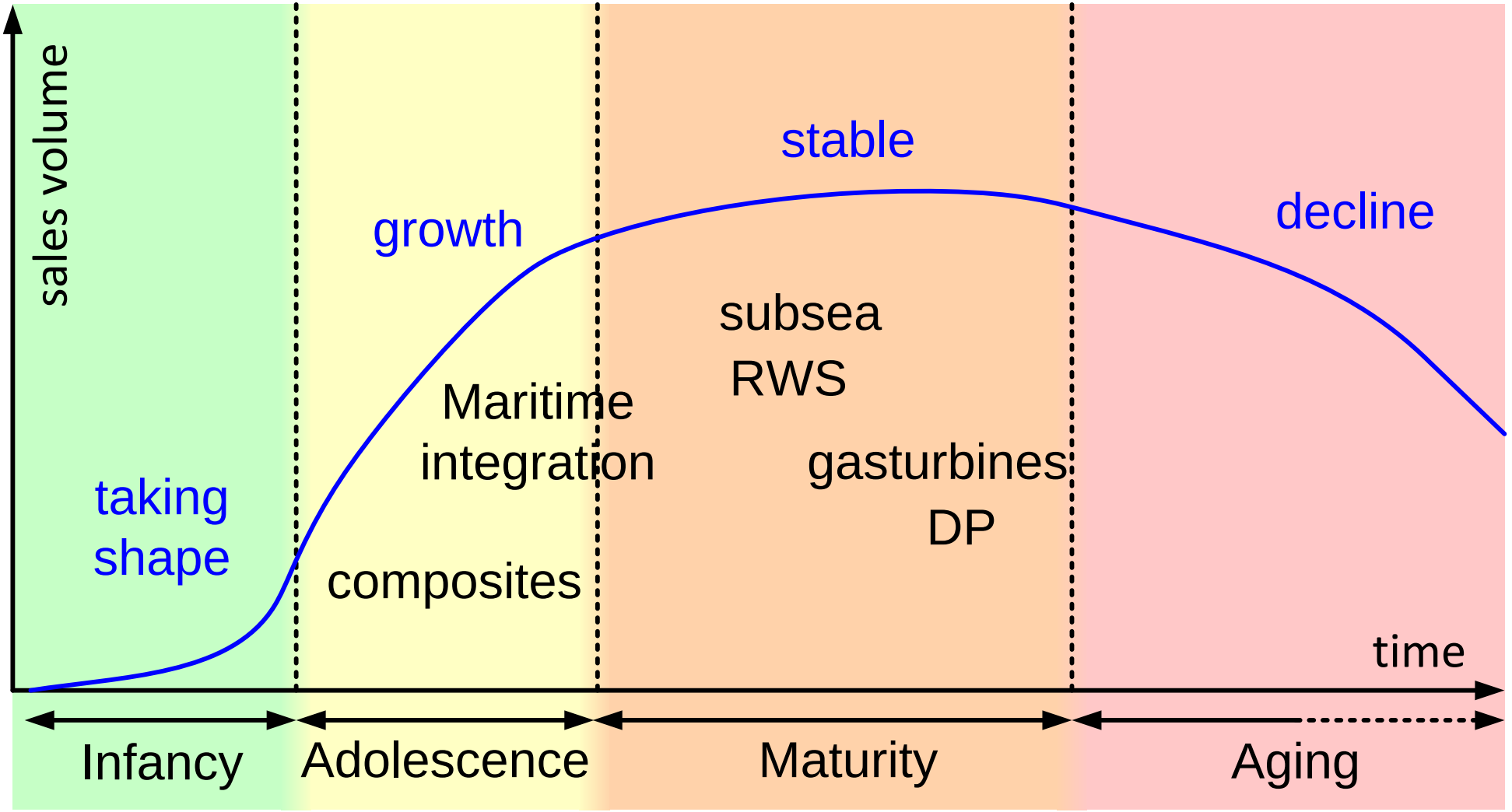
Innovation is the Escape



Market Product Life Cycle

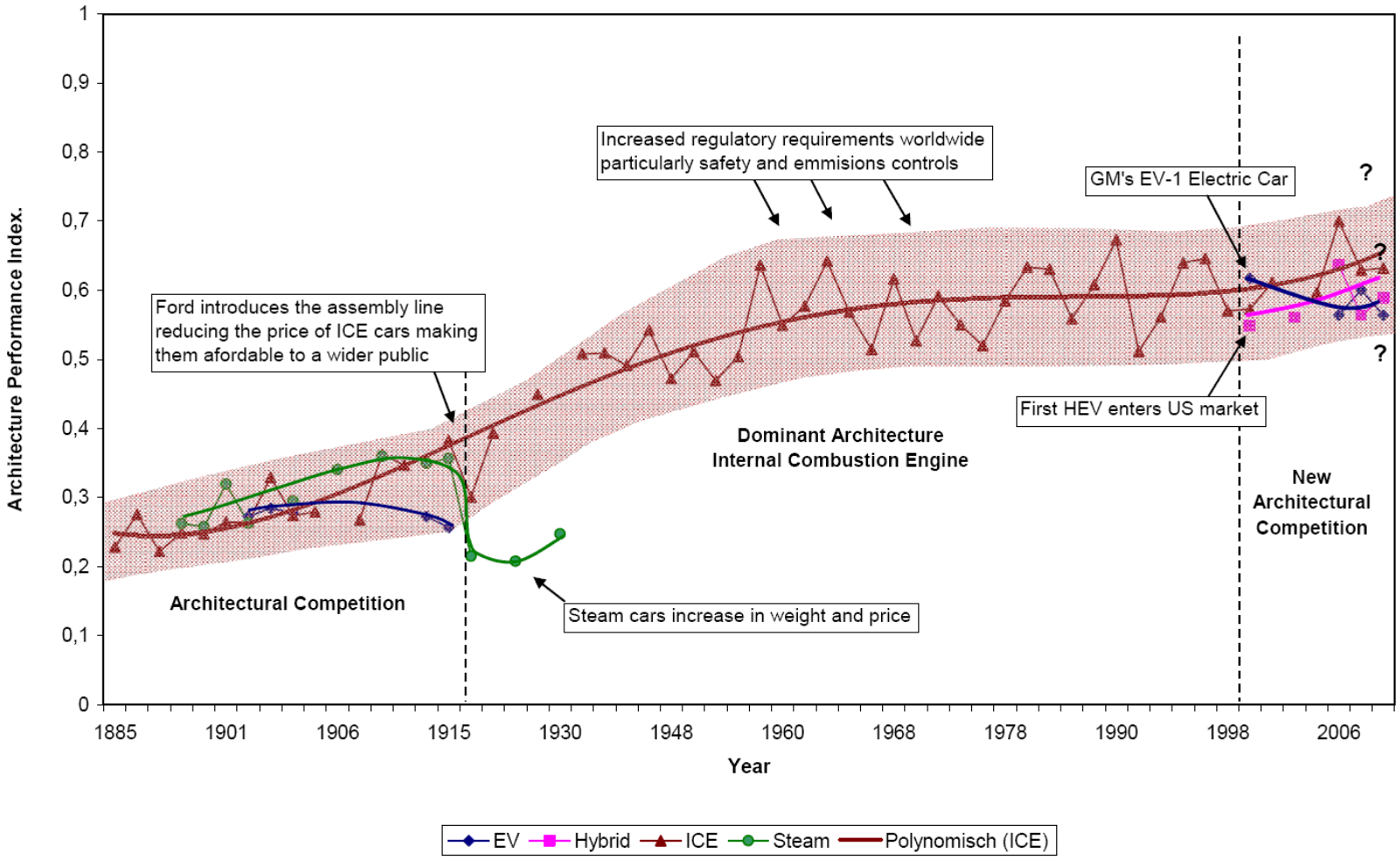


Where is Kongsberg Industry?



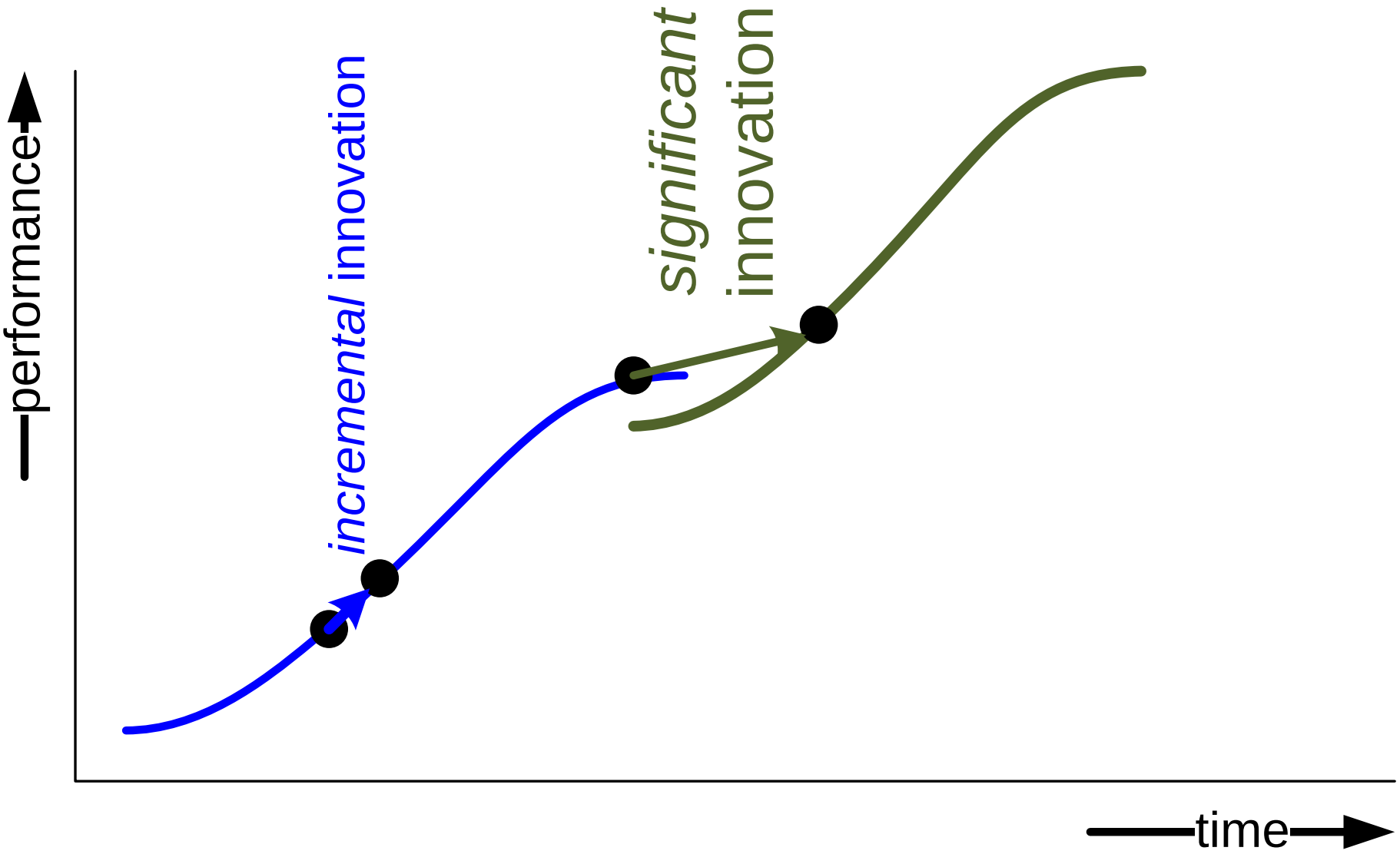
S-curve, Automotive Example

Performance = f(power, weight, v_{max}, fuel consumption, price)

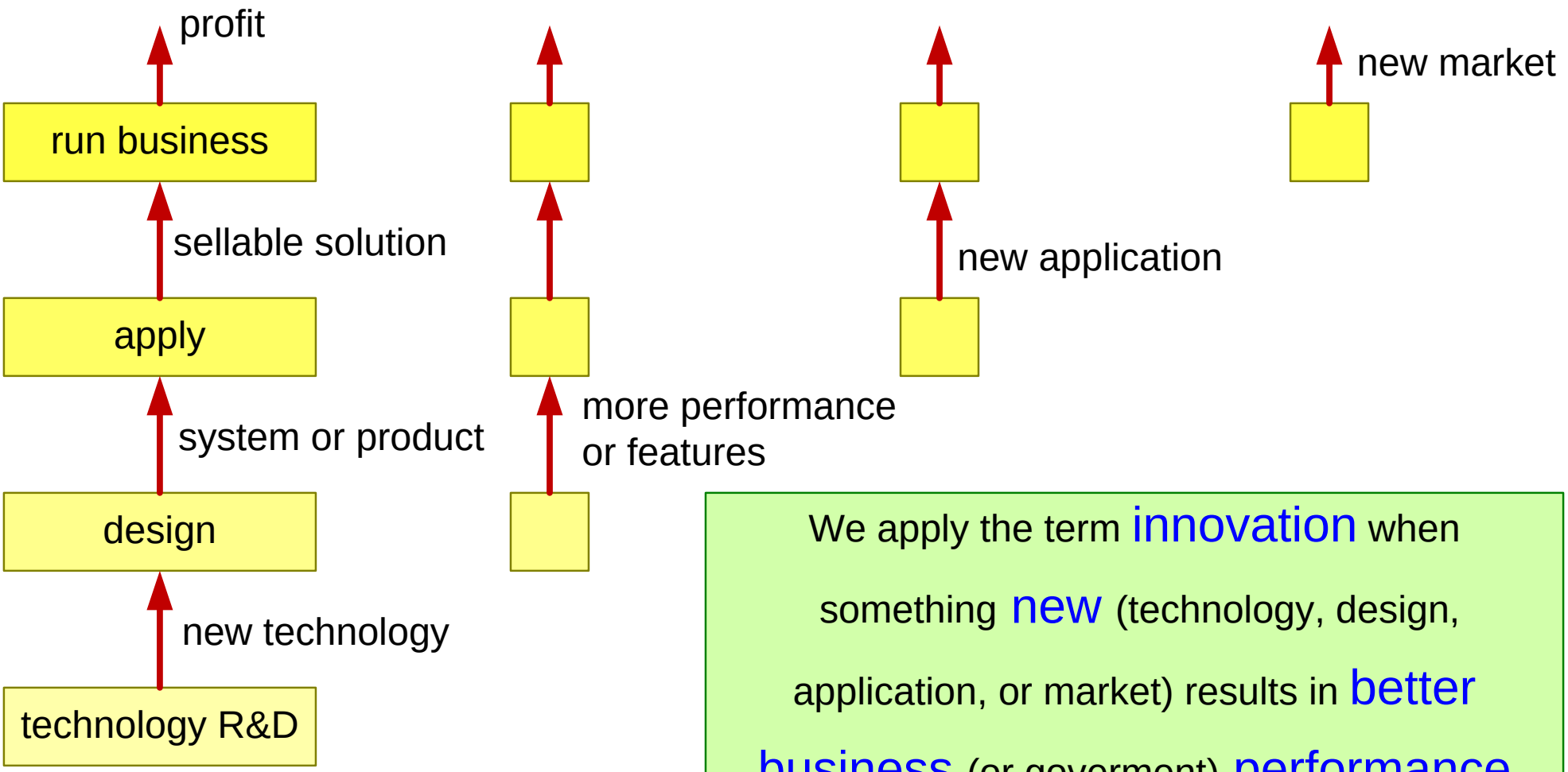


[Gorbea 2008] Carlos Gorbea, Ernst Fricke, and Udo Lindemann,
The Design of Future Cars in a New Age of Architectural Competition,

Significant Innovation

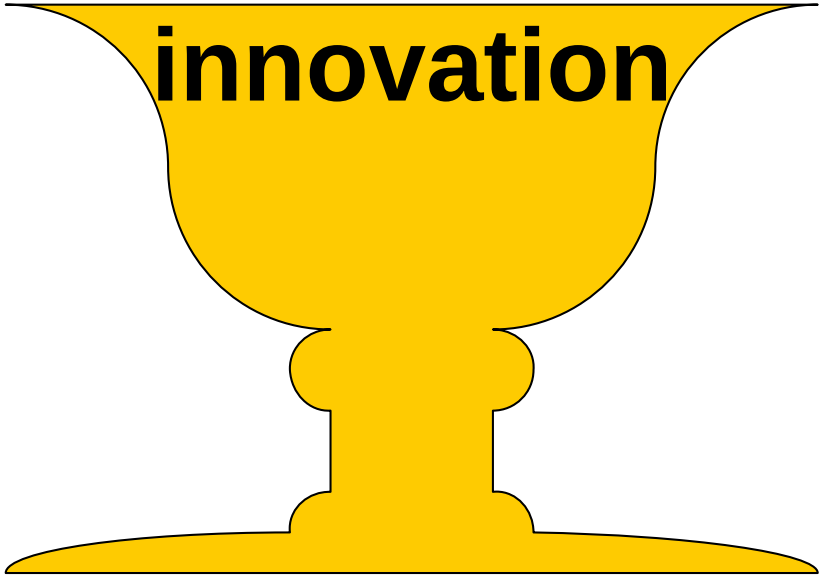


What is Innovation?



We apply the term innovation when something new (technology, design, application, or market) results in better business (or goverment) performance

How, that is the Question



The vision and harsh reality

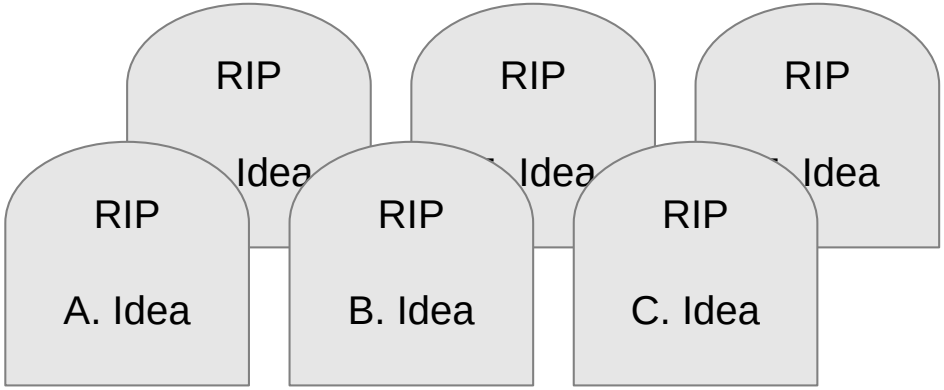
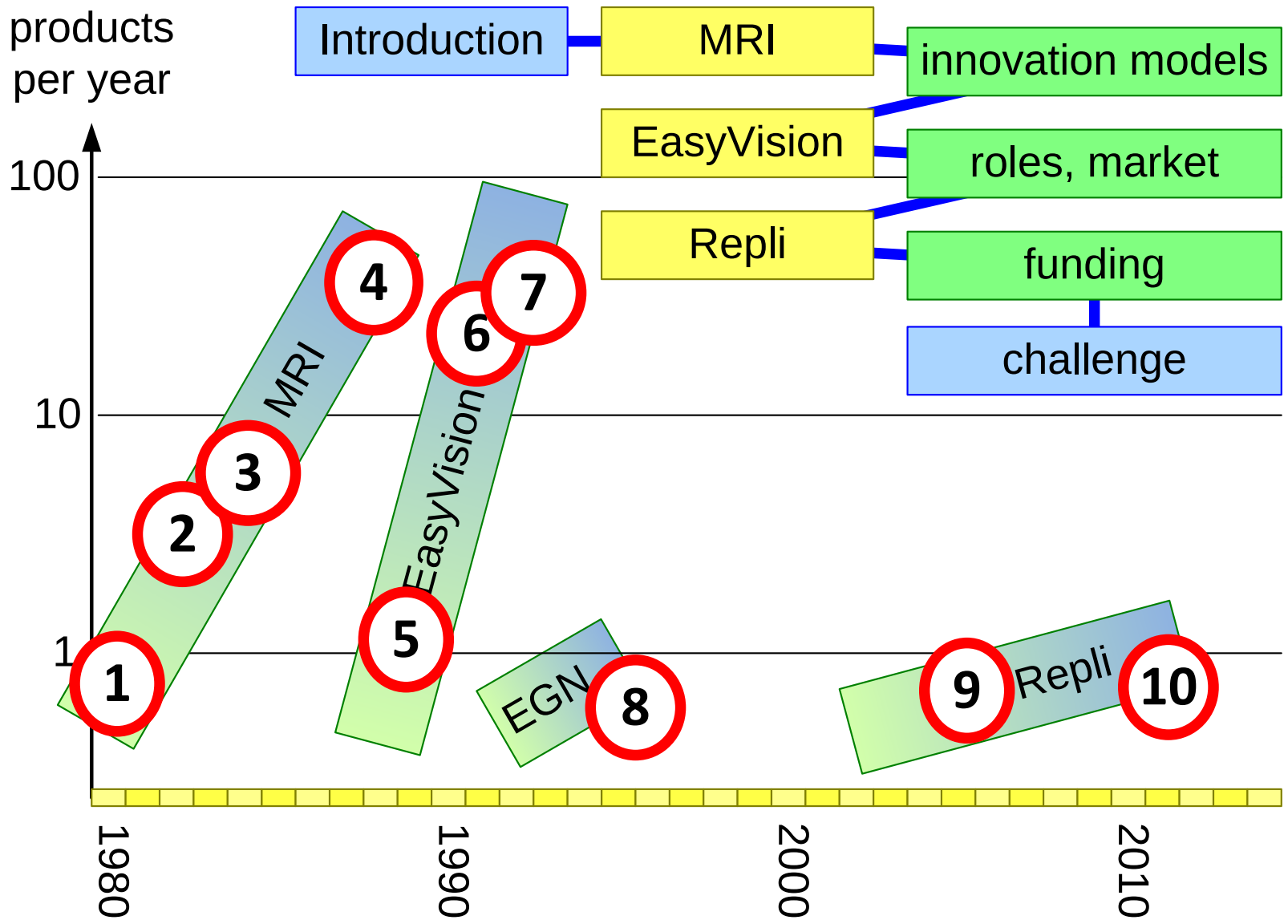
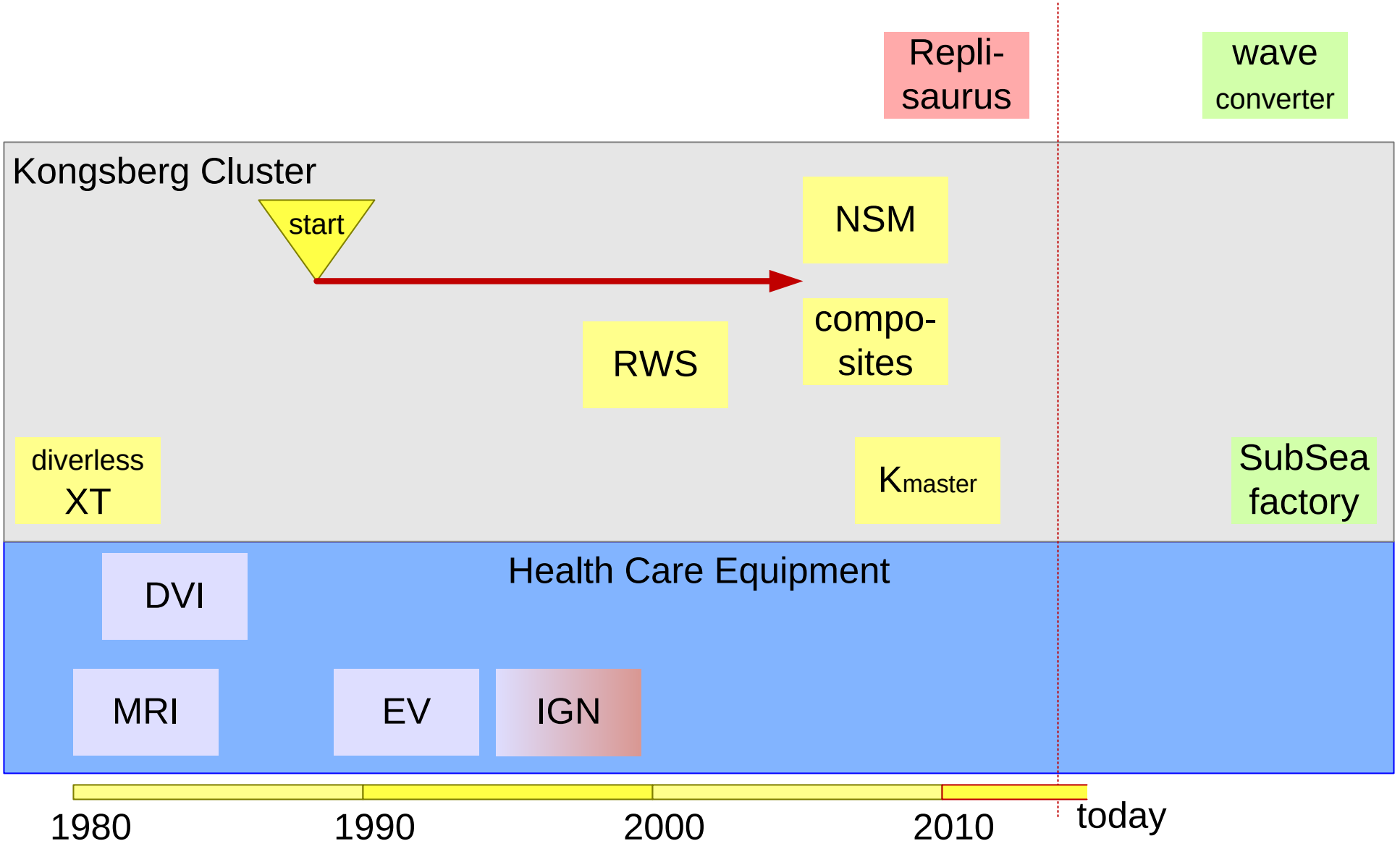


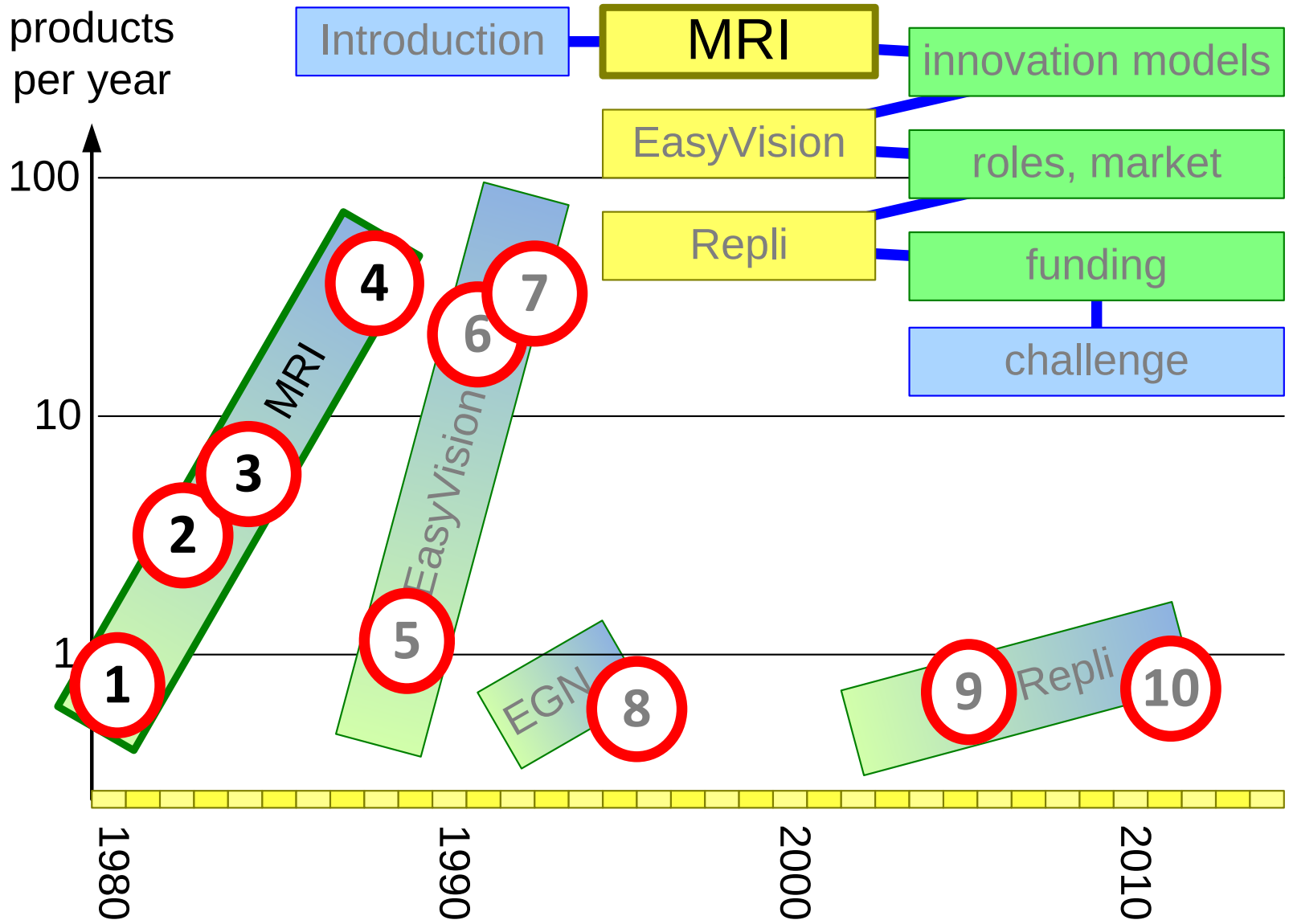
Figure of Contents™; 10 Hurdles



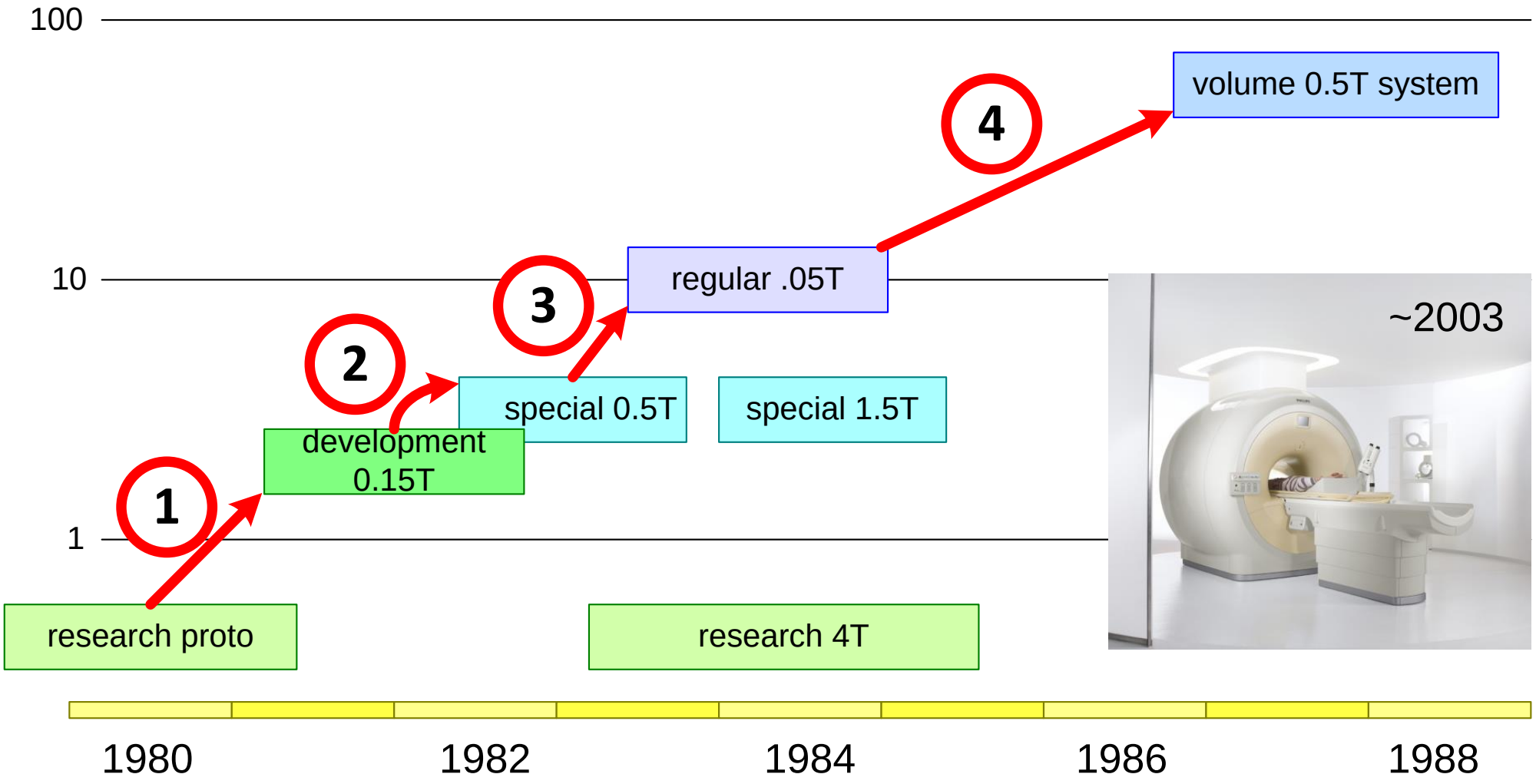
Examples of Significant Innovations



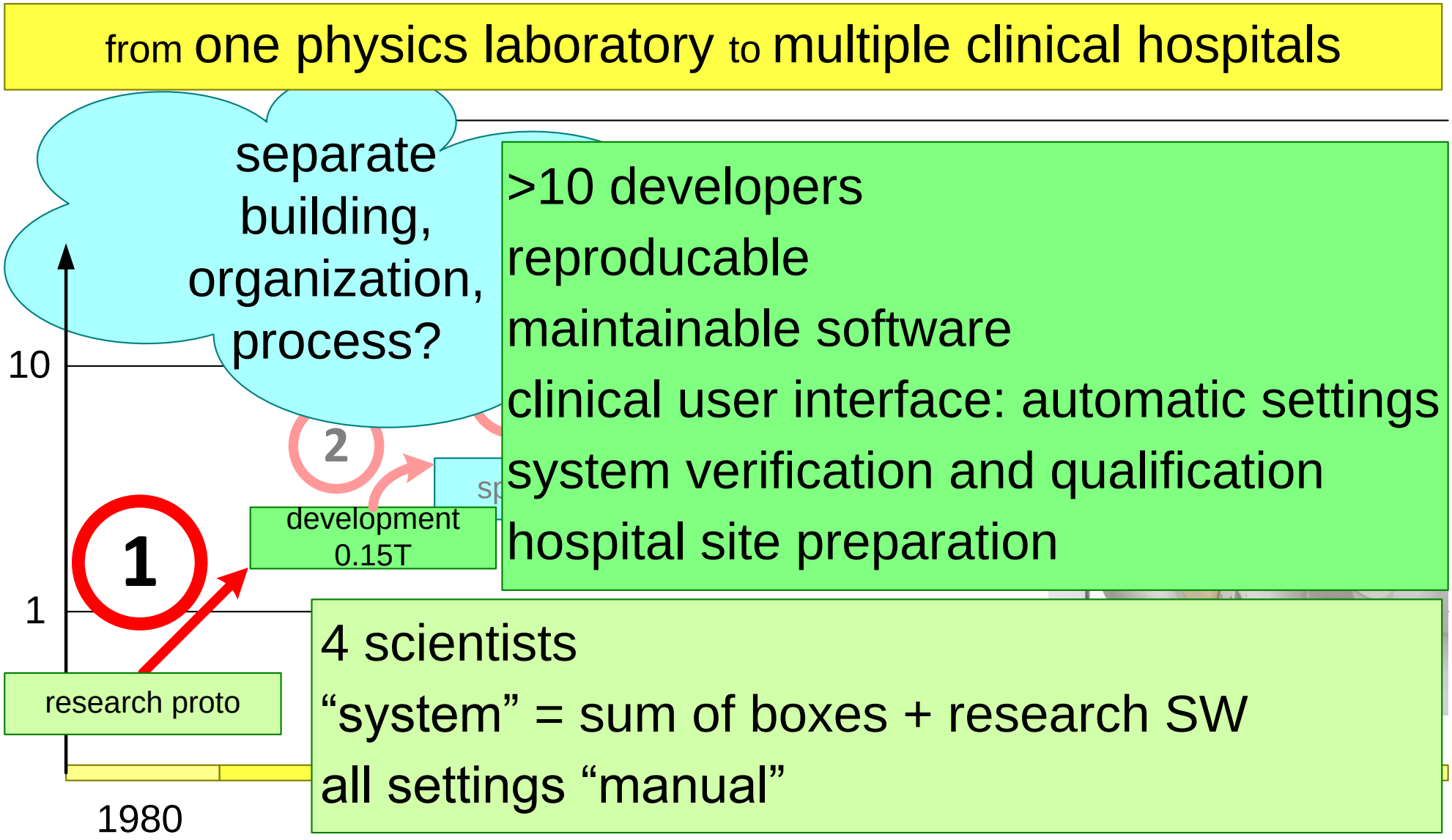
1980: MRI scanners



The Beginning of MRI scanners

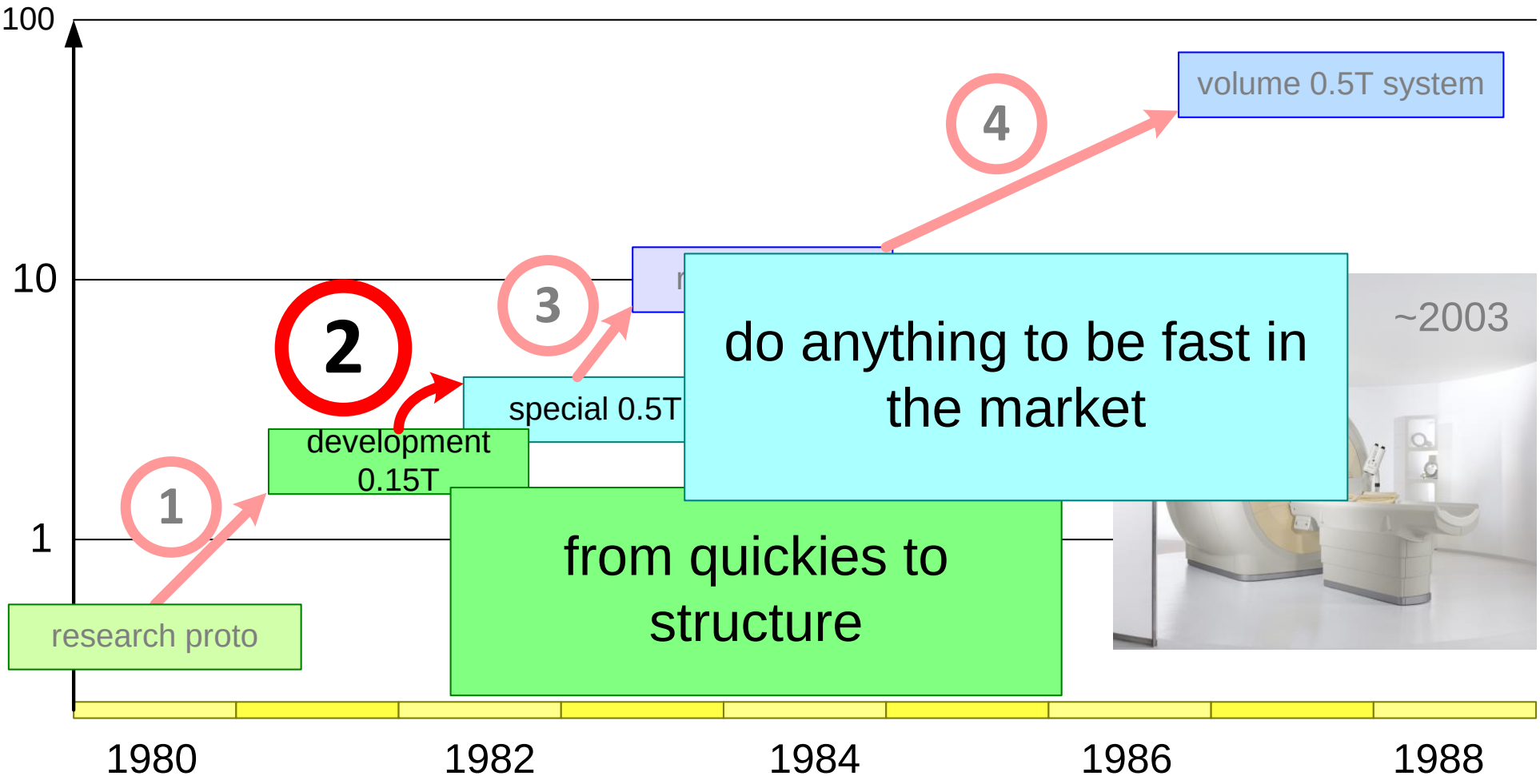


From Research to Development

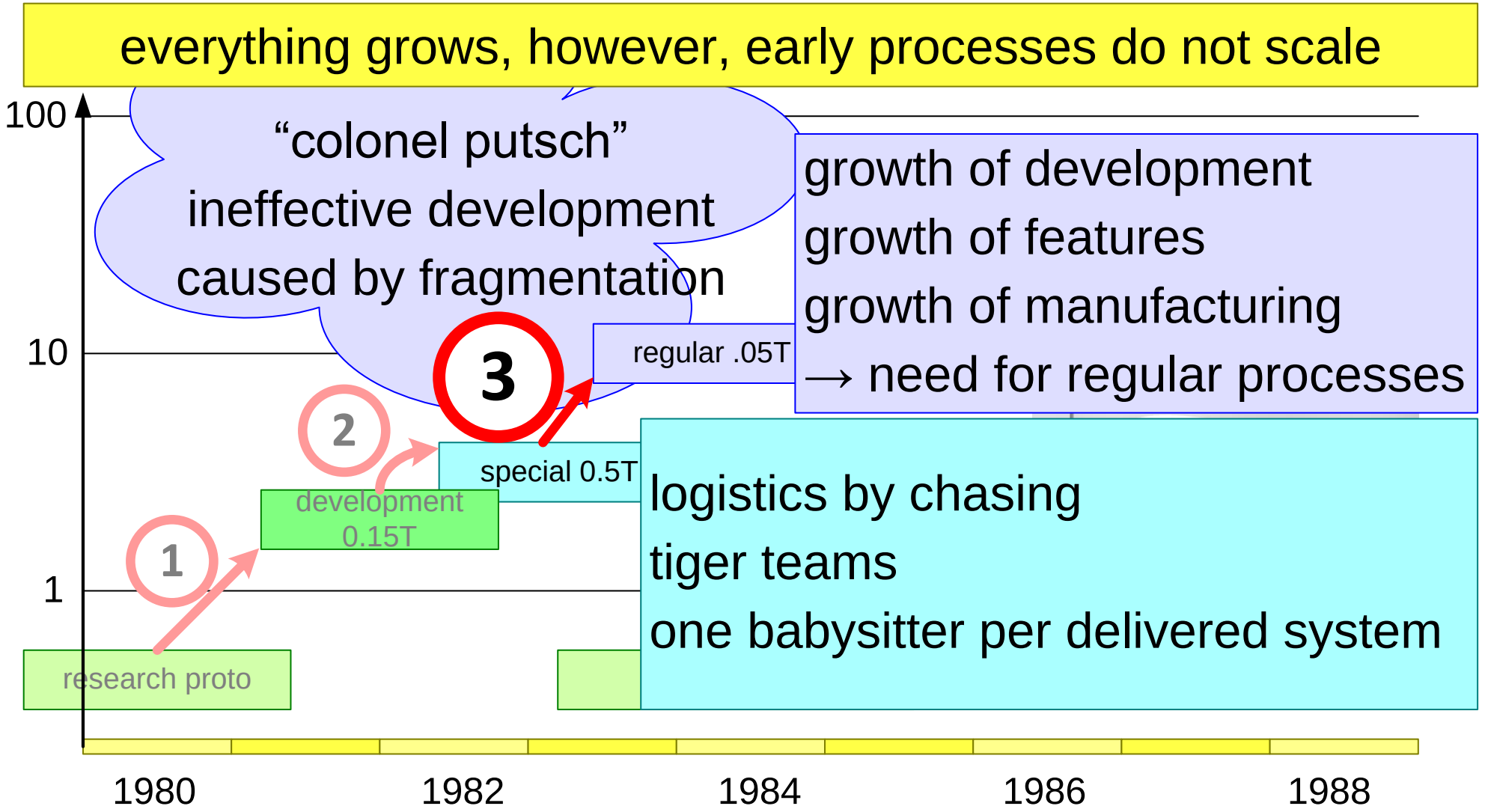


From Development to Specials

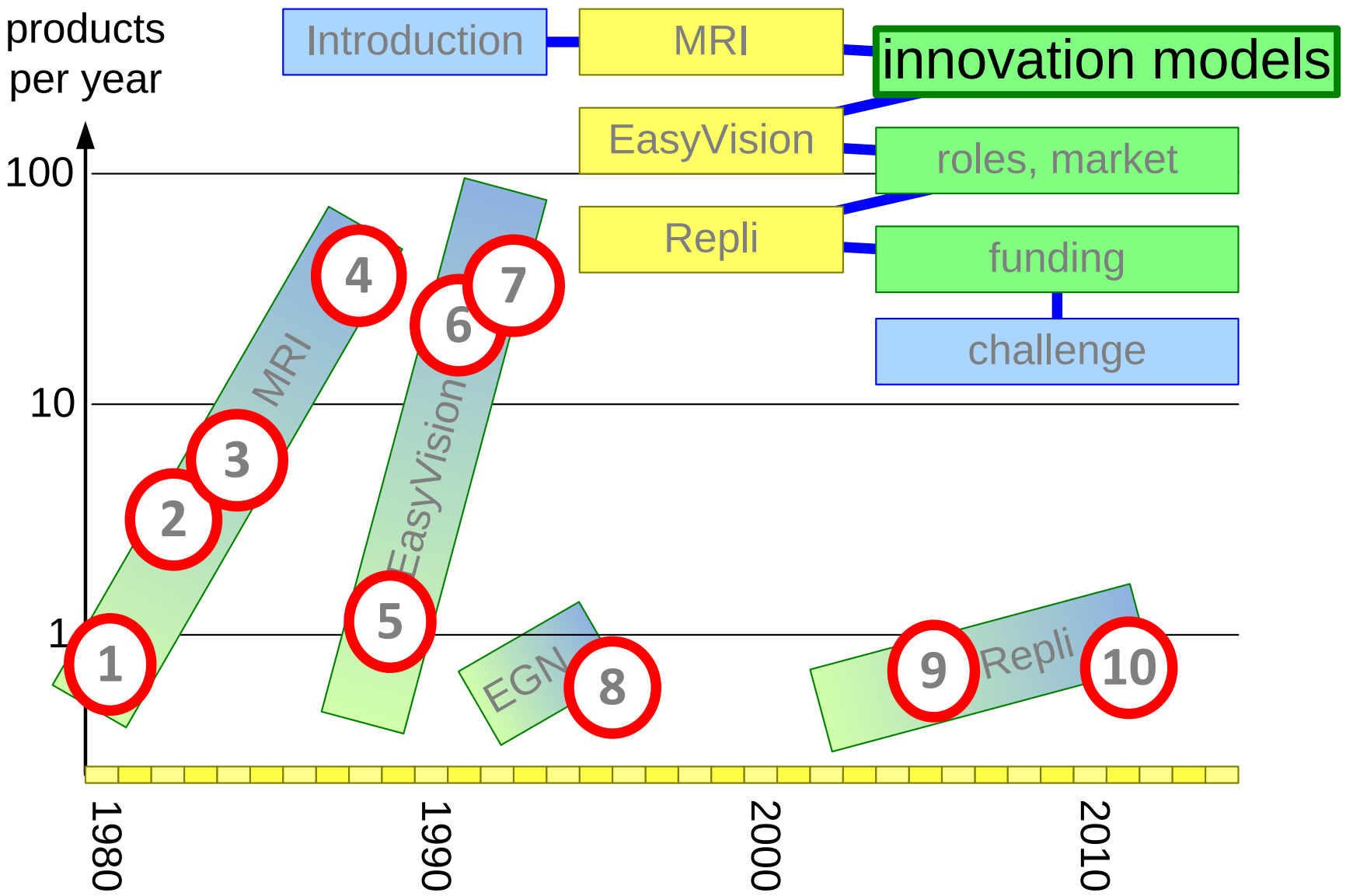
technology development proceeds rapidly;
serve luminary hospitals with specials



From Specials to Regular



Approaches to Innovation



Exisiting Process Framework May not Fit

processes

and

procedures

facilitate

sales

supply chain, purchasing, logistics

manufacturing

installation, configuration, commissioning

maintenance

after sales

however, may constrain need and solution exploration

Various Innovation Approaches

DARPA, grand challenge

SFI, EU funding (precompetitive)

Skunkworks — Lockheed Martin -> KM

start-up

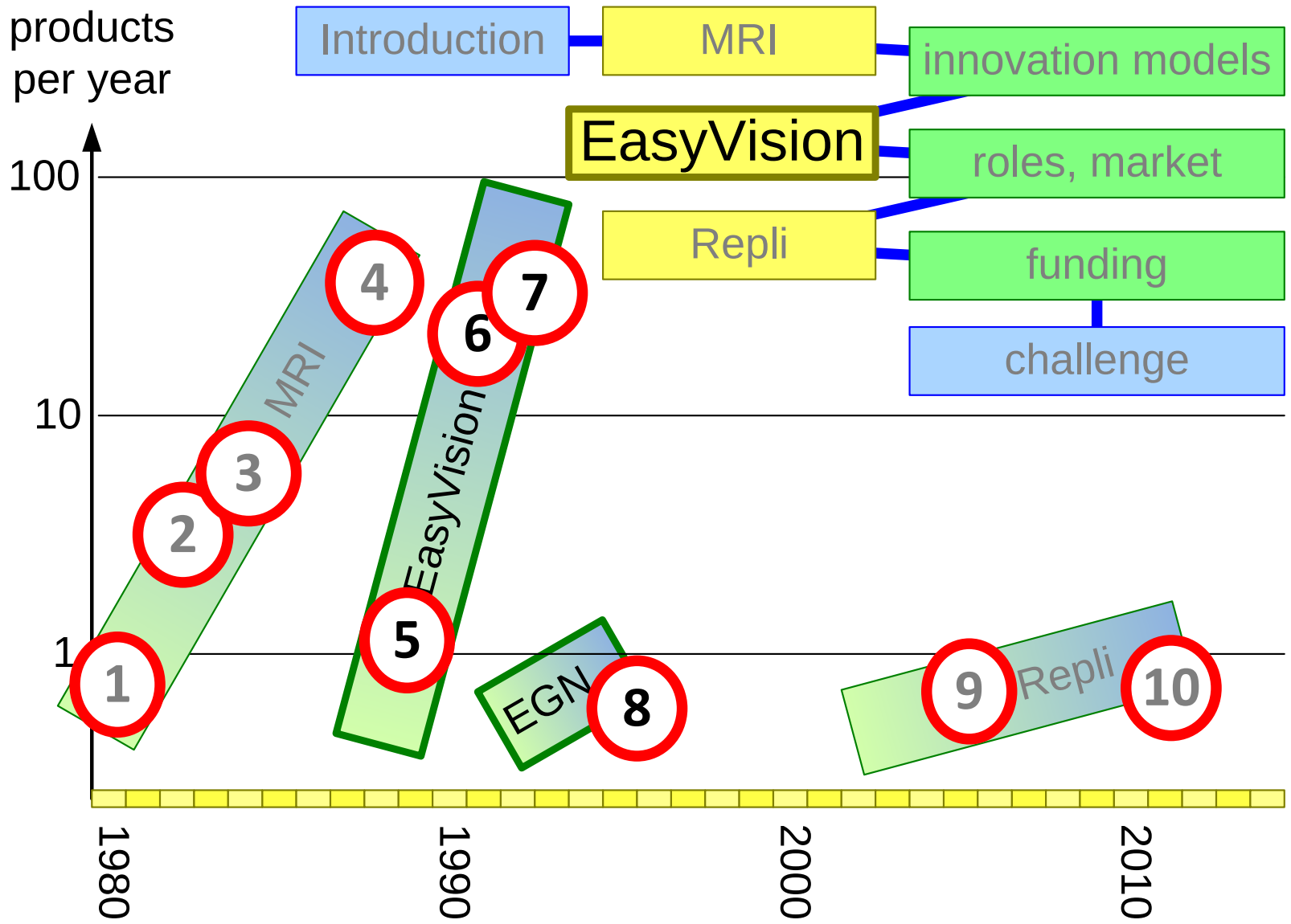
campus (parken) — Teknologiparken Kongberg; Oslo Cancer Cluster; High Tech Campus Eindhoven

incubators — KTH Stockholm; Philips personal health

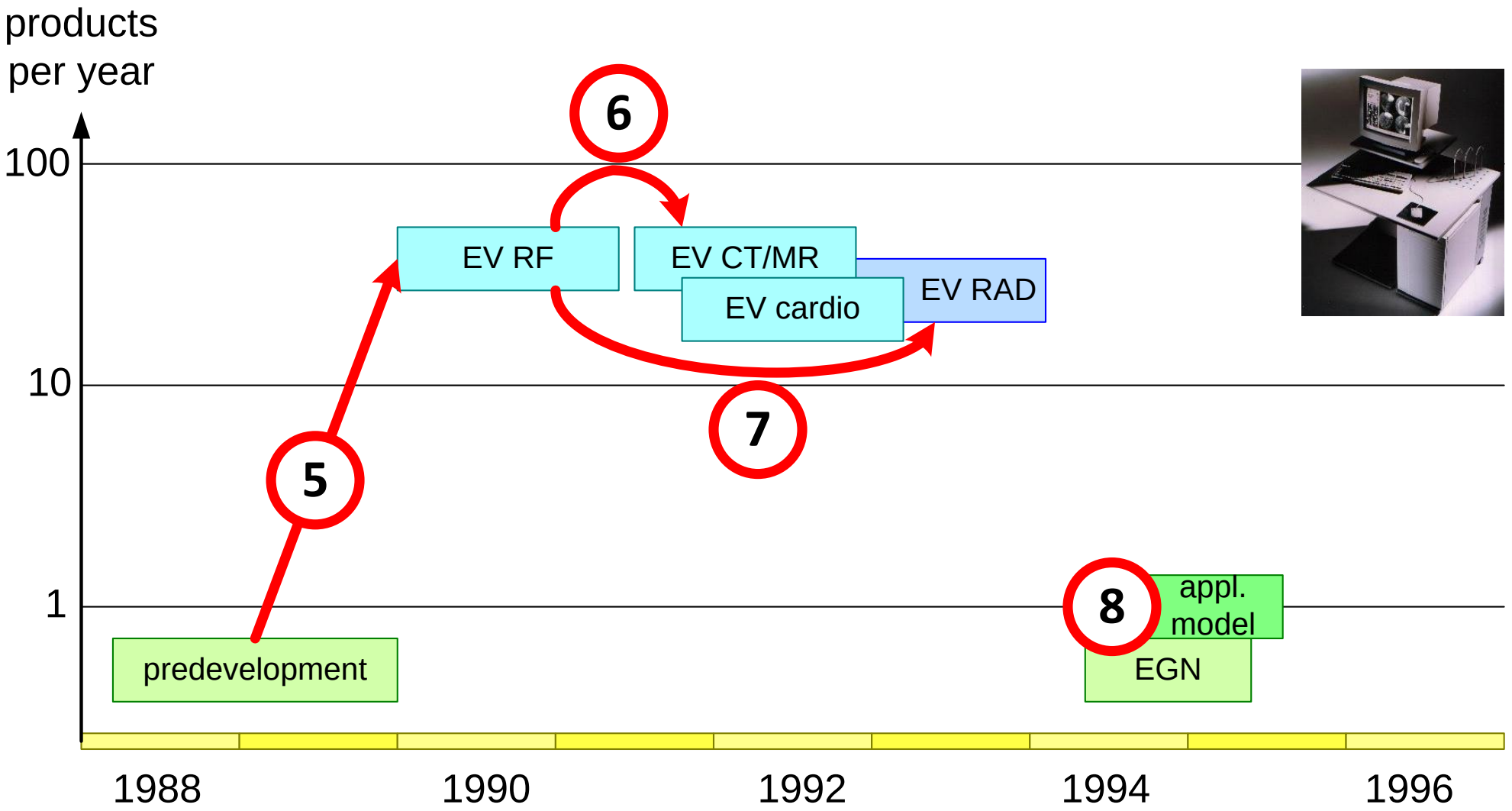
venture capitalists

open innovation

1990: Medical Workstation EasyVision

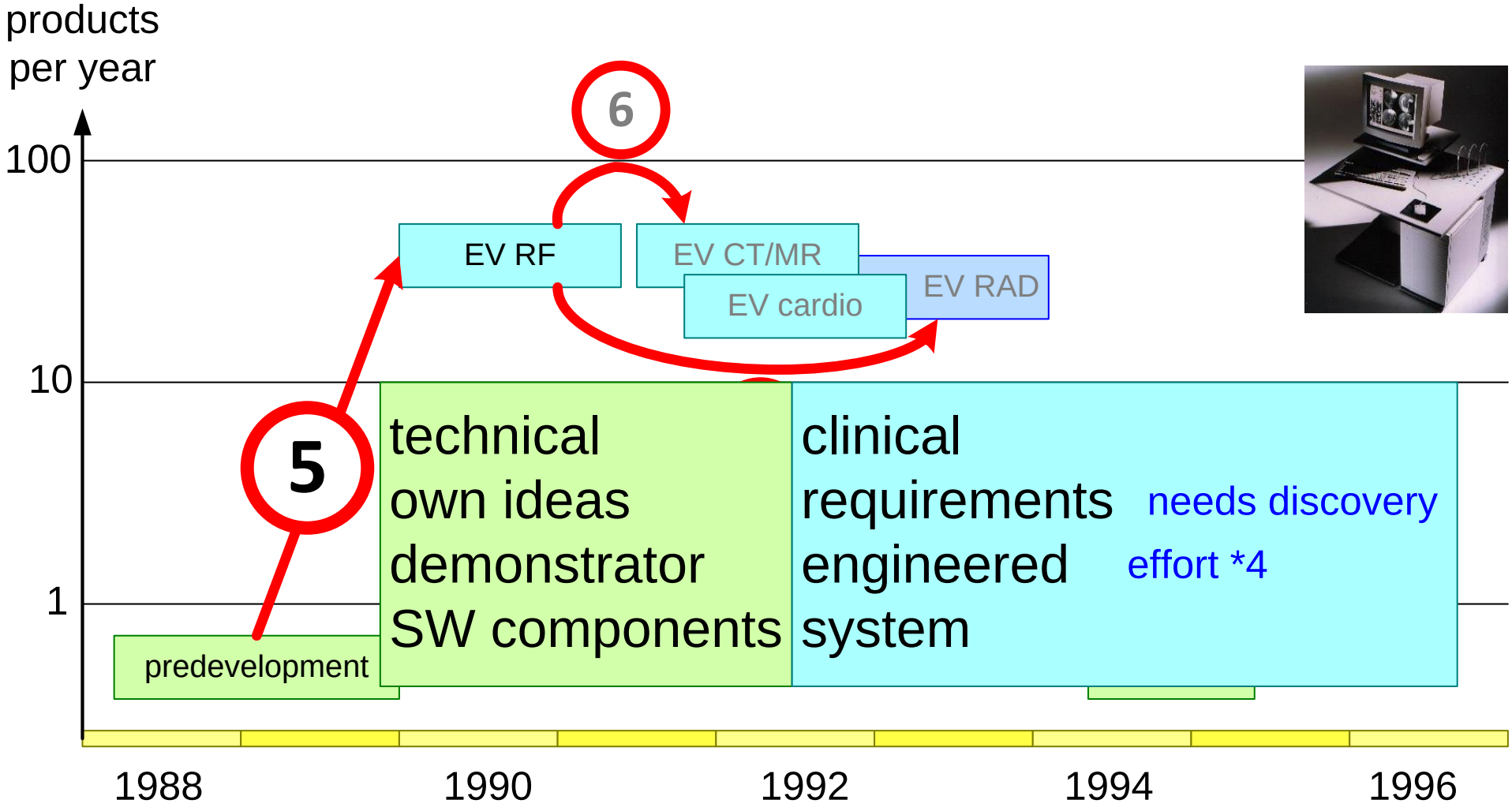


The beginning of EasyVision



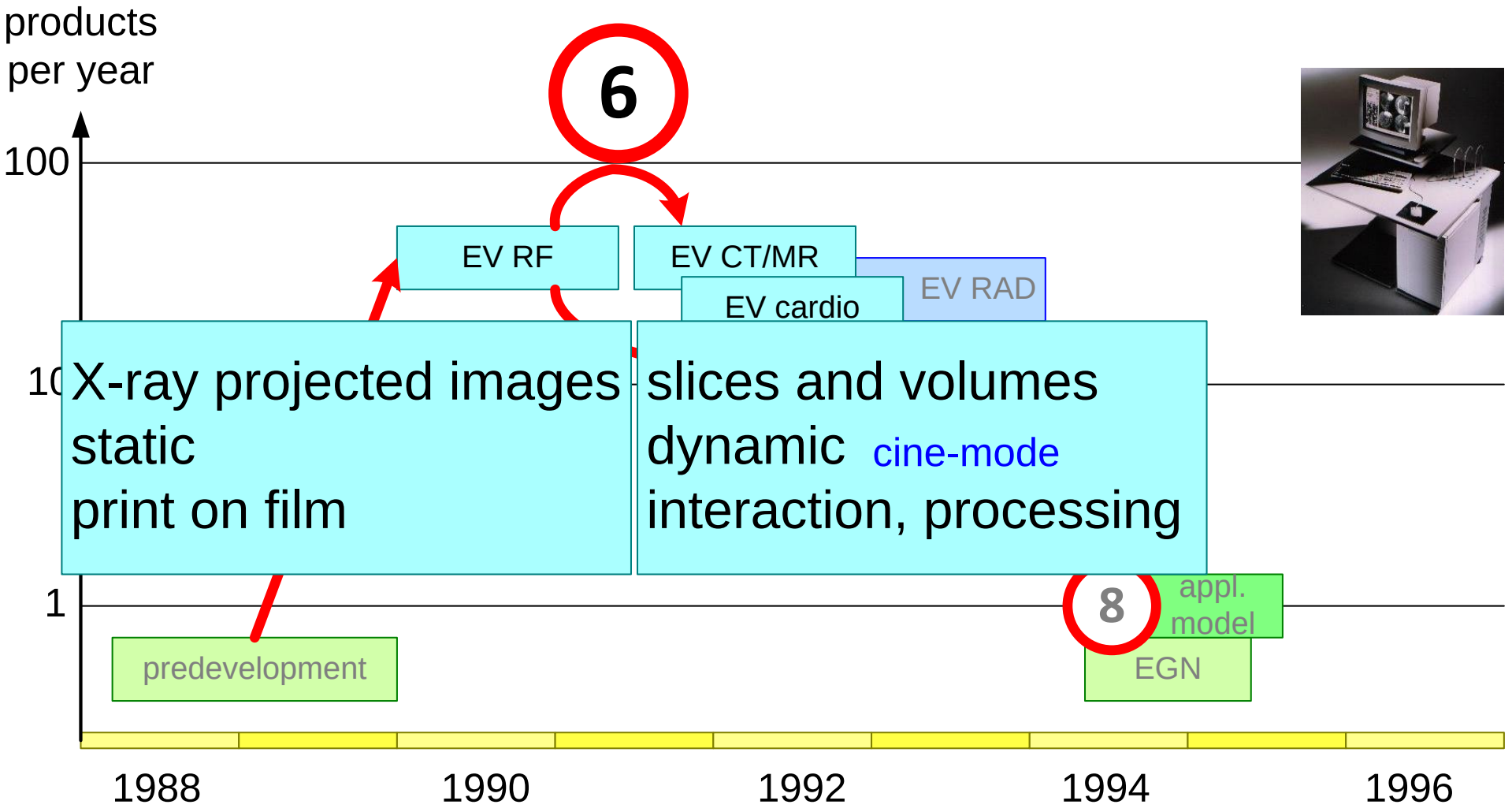
From Demonstrator to Product

from unconstrained coding to systems engineering



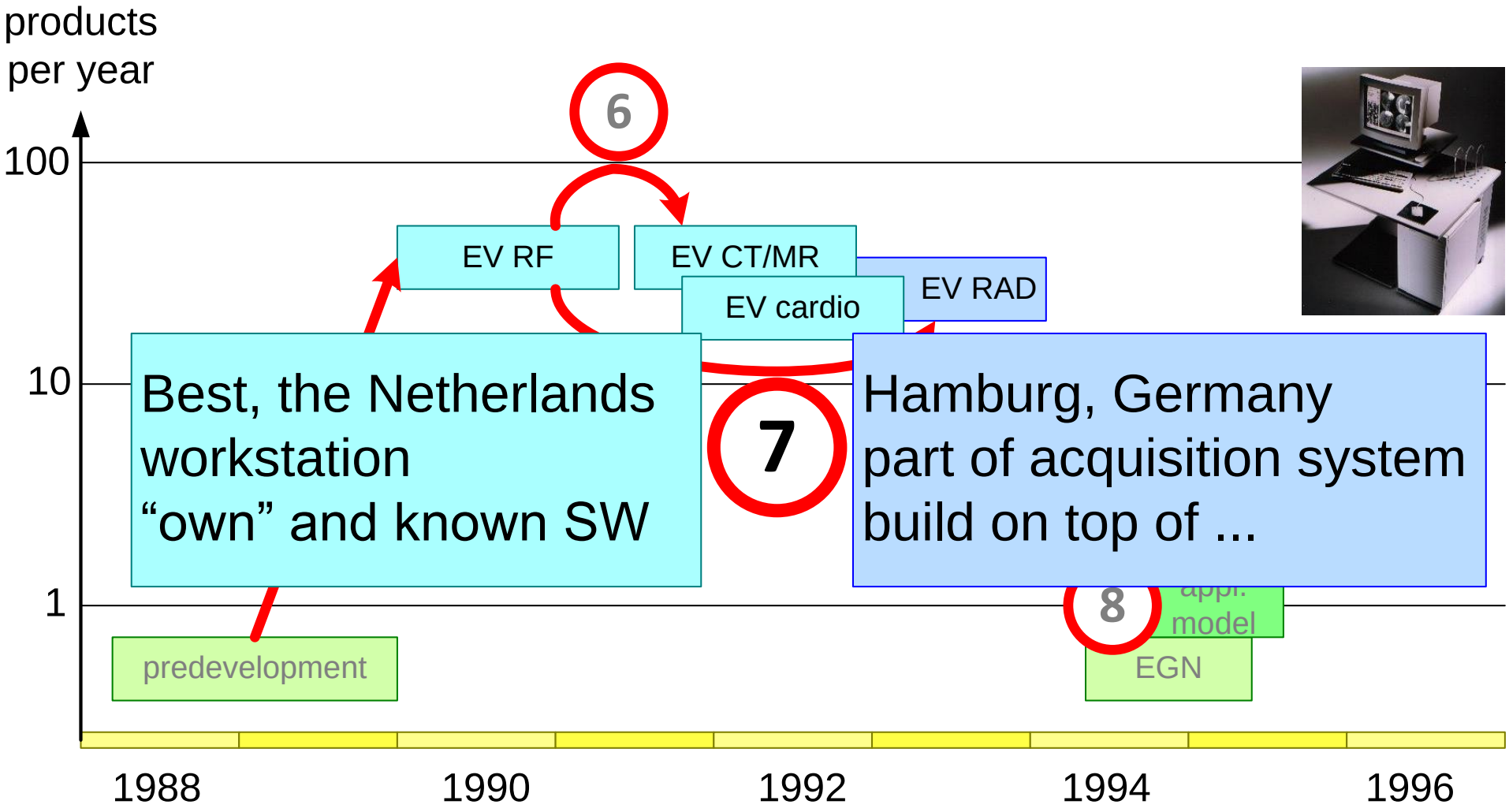
Adding other Applications

other clinical users, other images, new applications

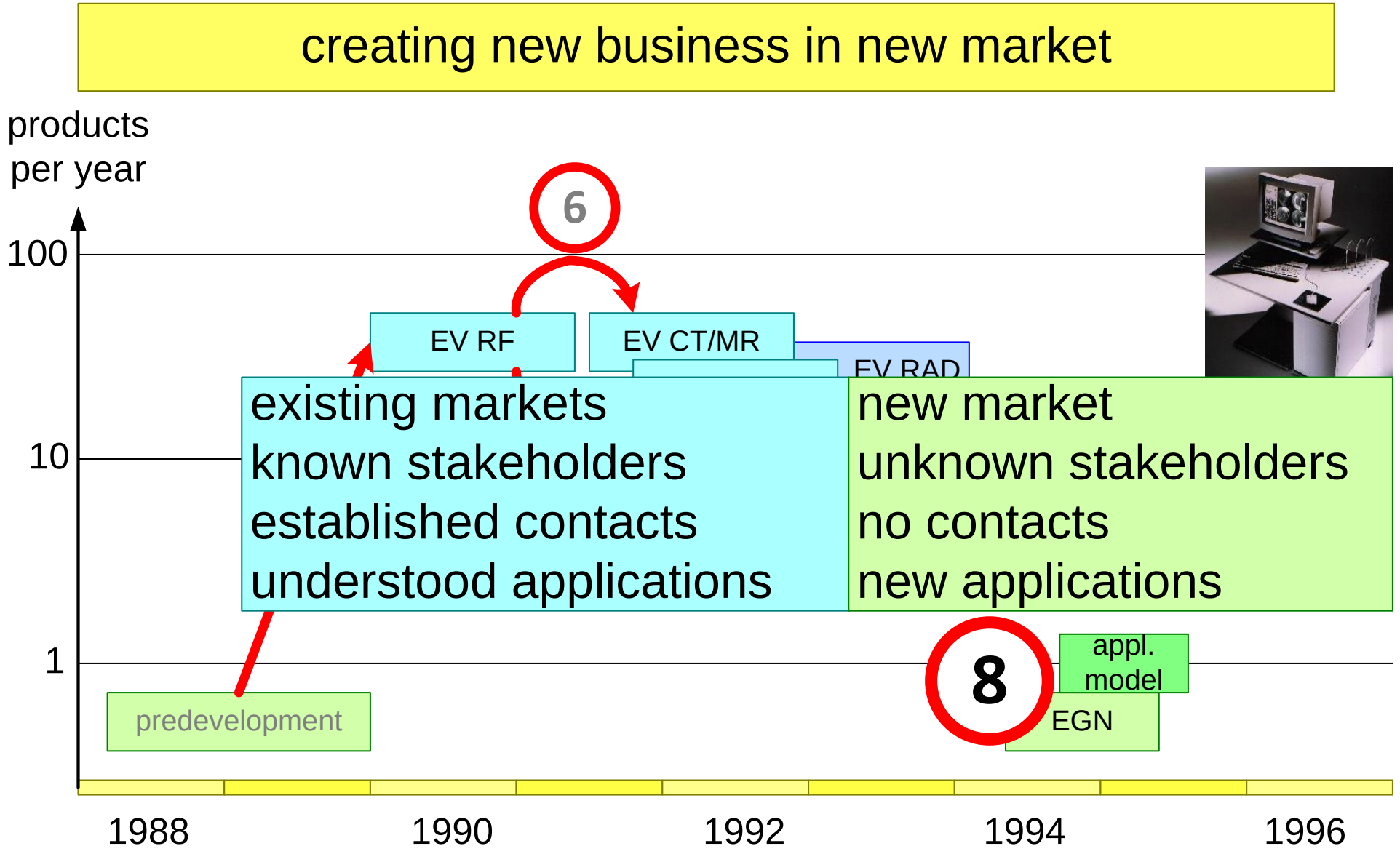


Re-use by Others

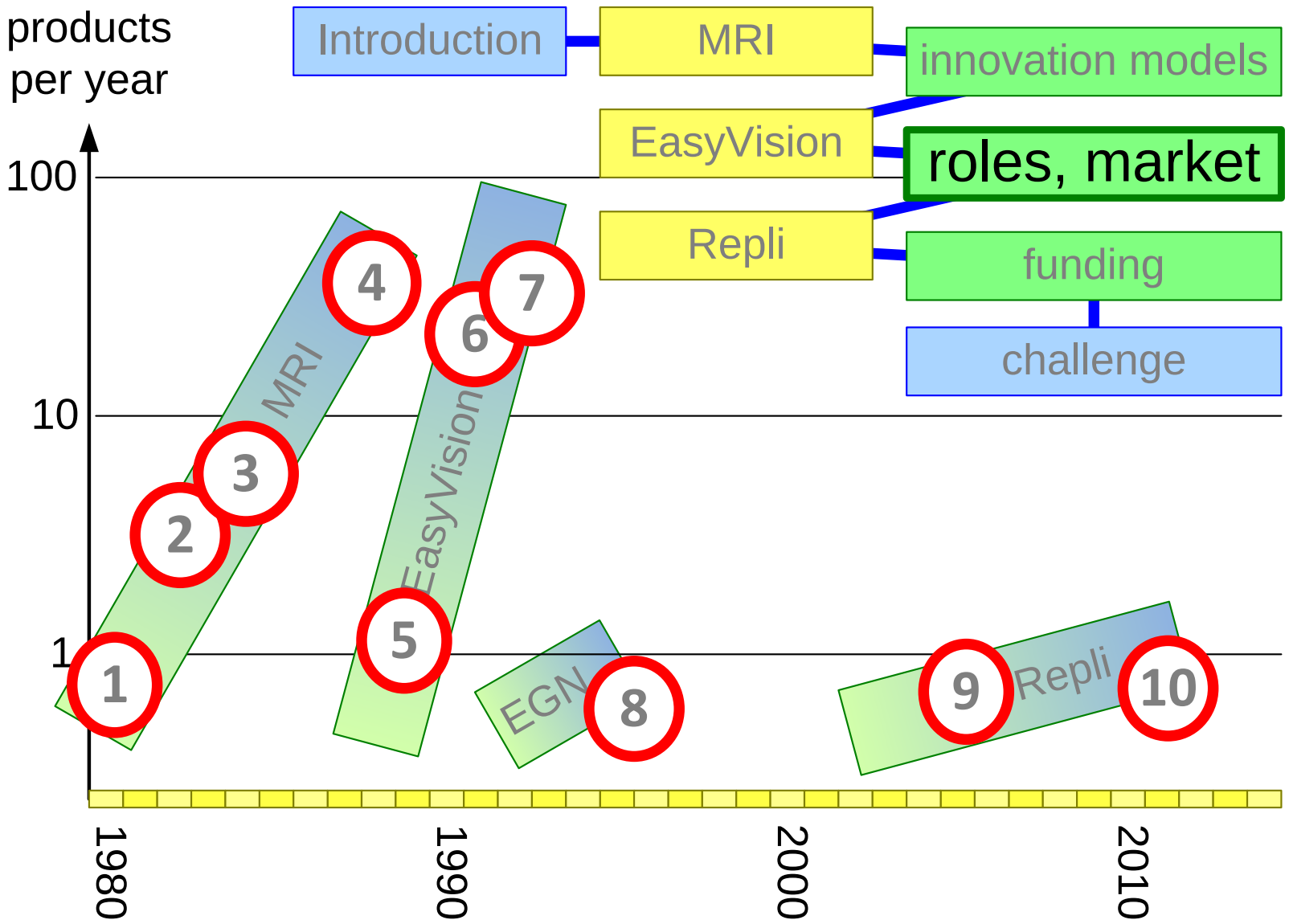
software re-used by other department in other location



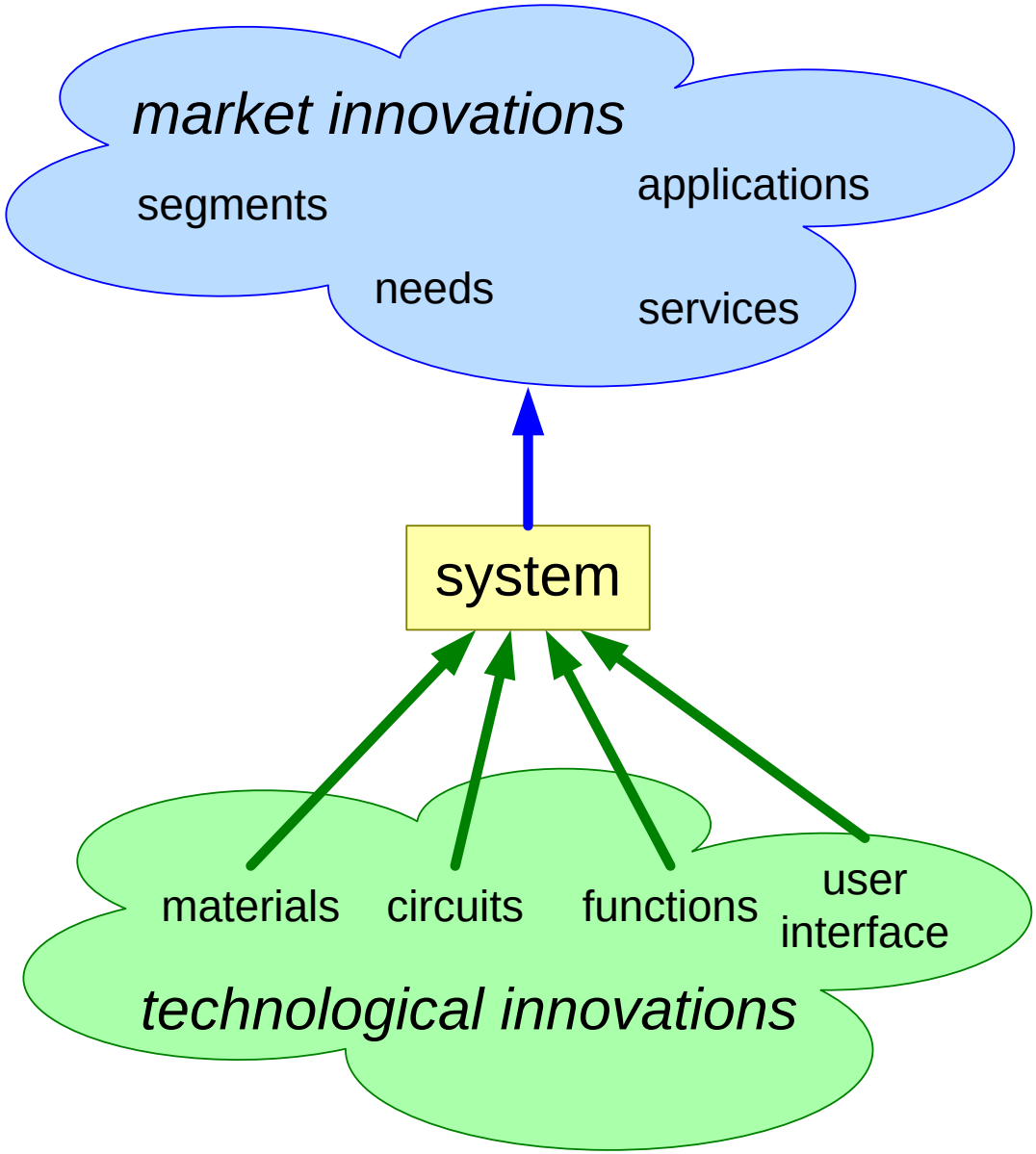
Re-use in New Unknown Market



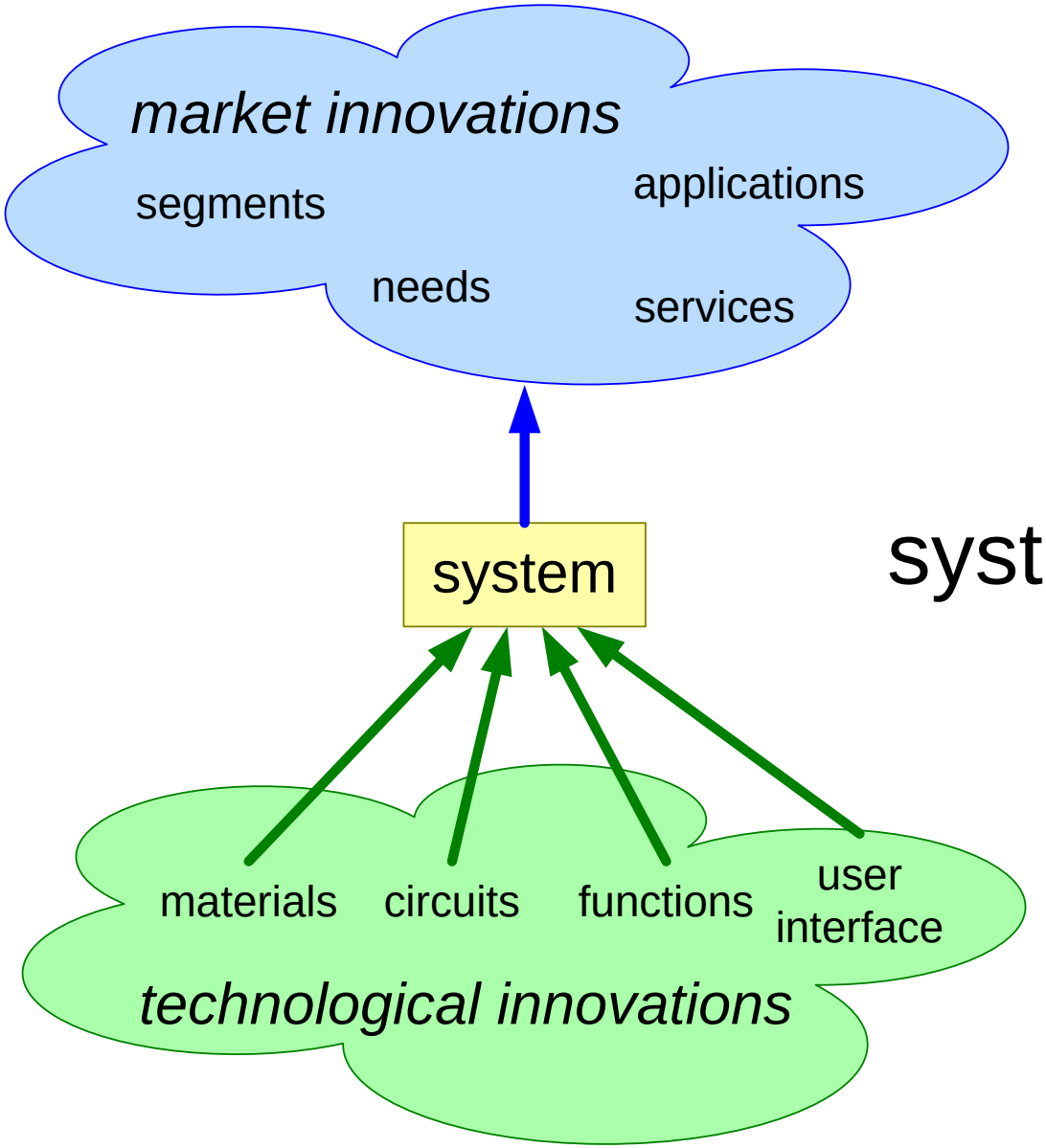
Various Roles in Innovation



Successful Innovation = Technological + Market



System Architect links technology and market



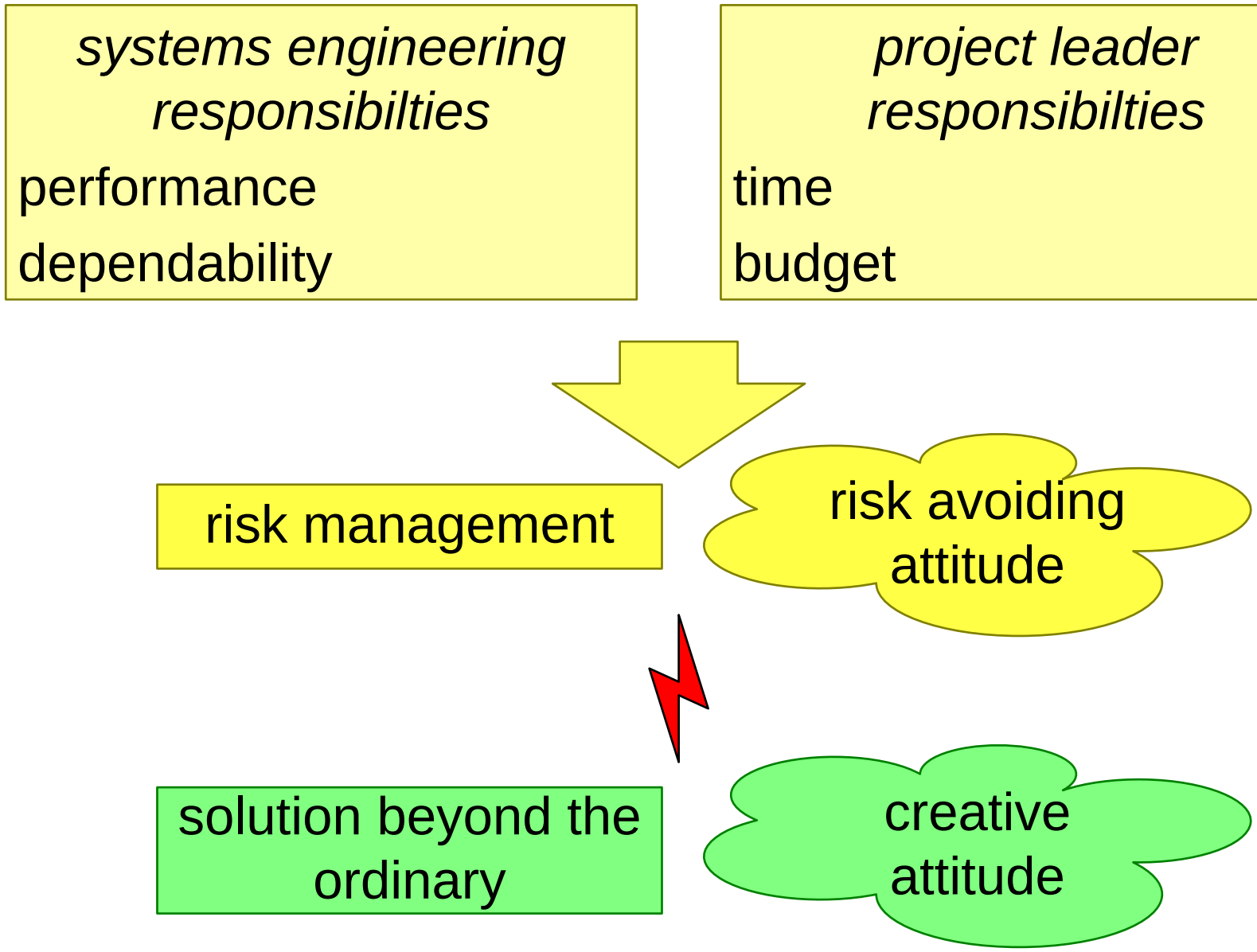
marketeers

systems architect

engineers

inventors

Conservative SEs and PLs



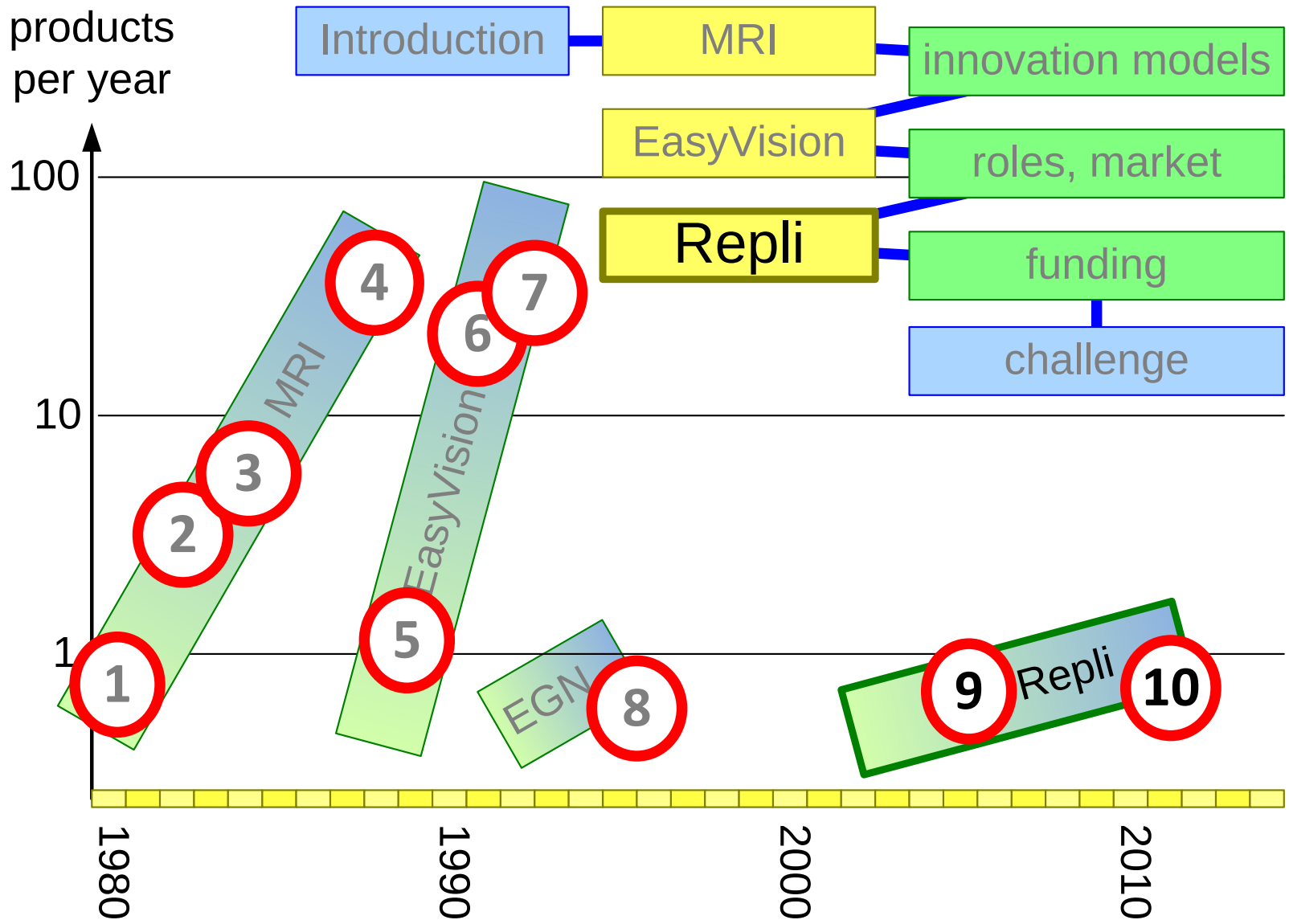
Marketing <> Sales!

marketing	sales
understands and sees many (potential) customers	sells what is available
smells (latent) needs	convinces customers
transforms them in business	poor sales people only demand more from D&E
creates the future	determines today's business

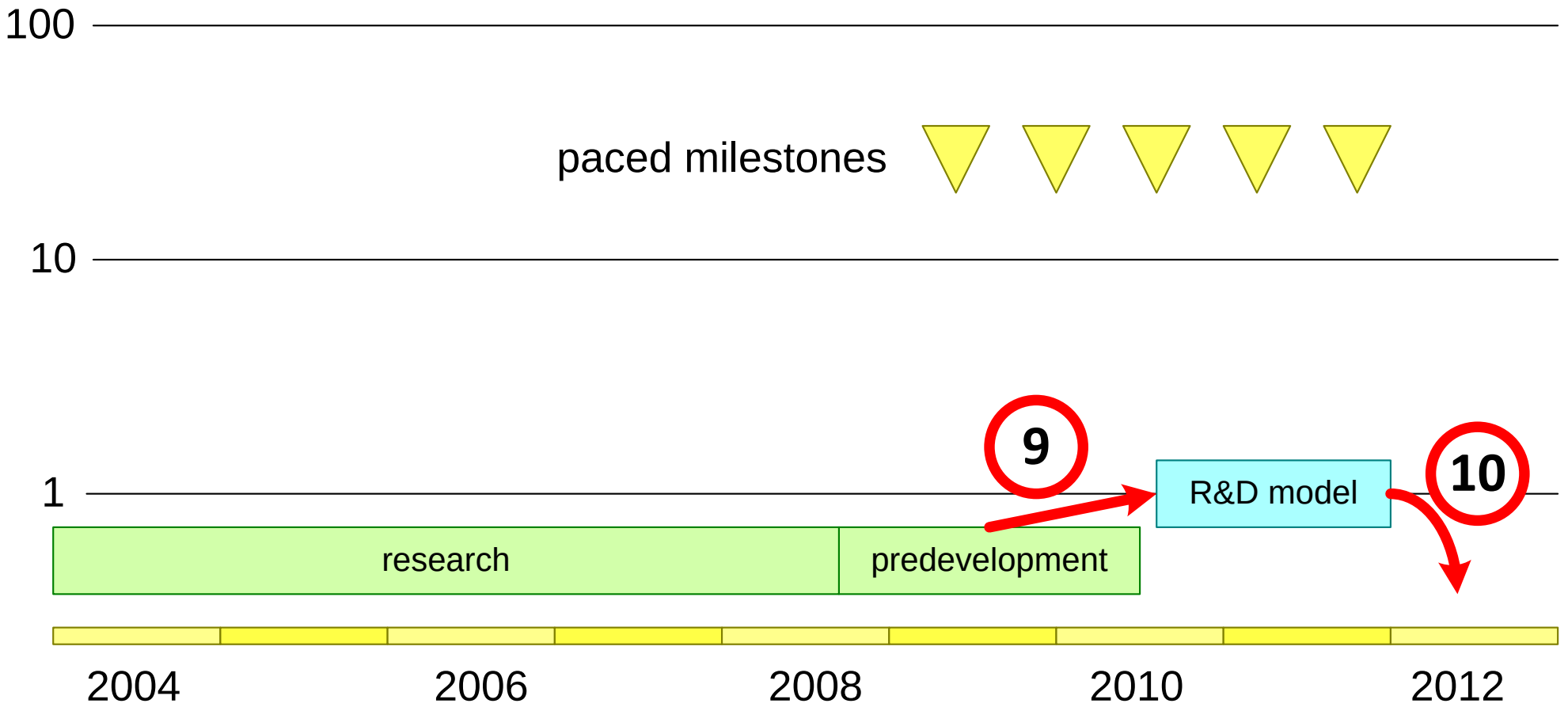
Requirements discovery: Market-as-Laboratory

extreme: test Internet responses

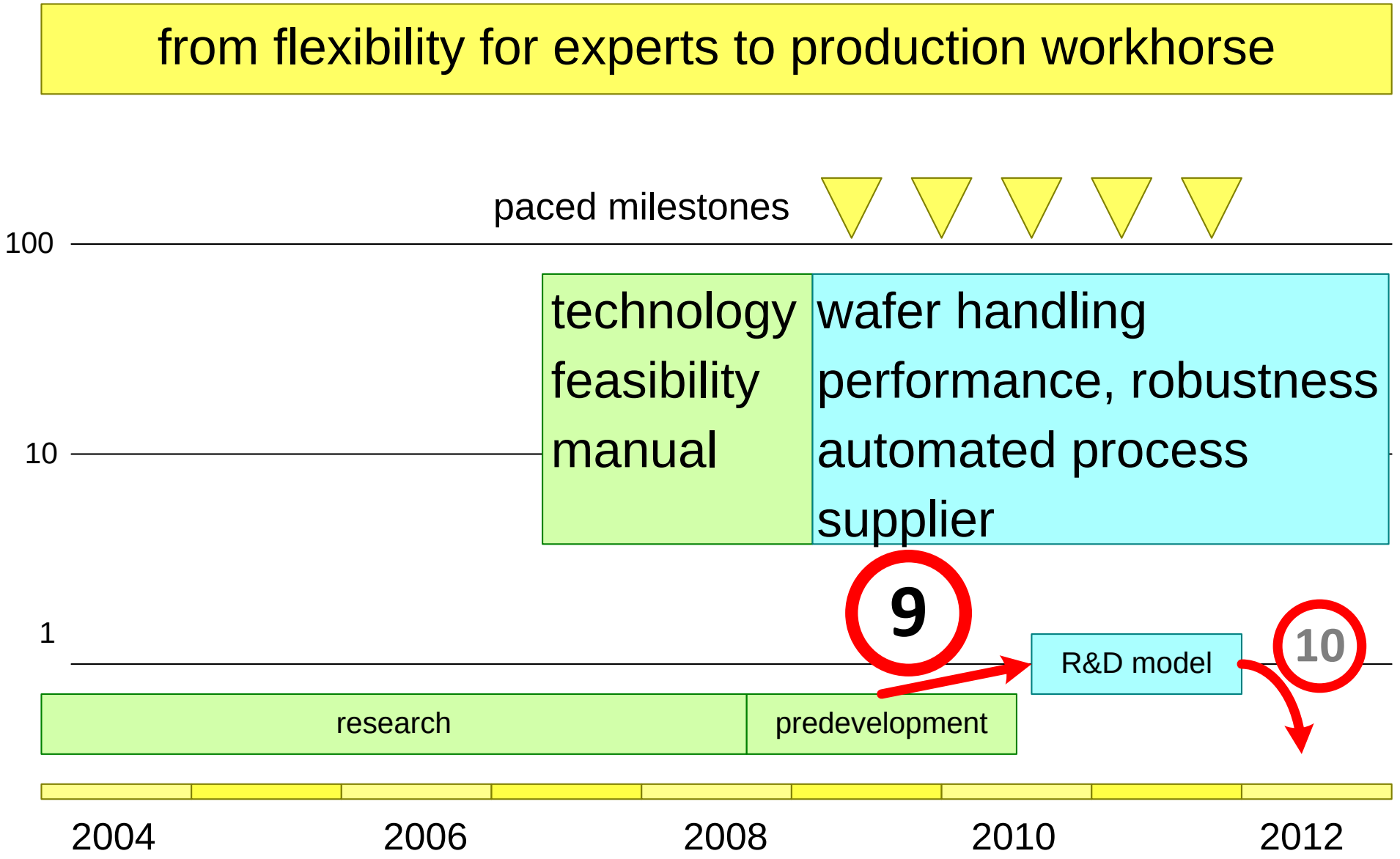
Semiconductor Equipment Start-up



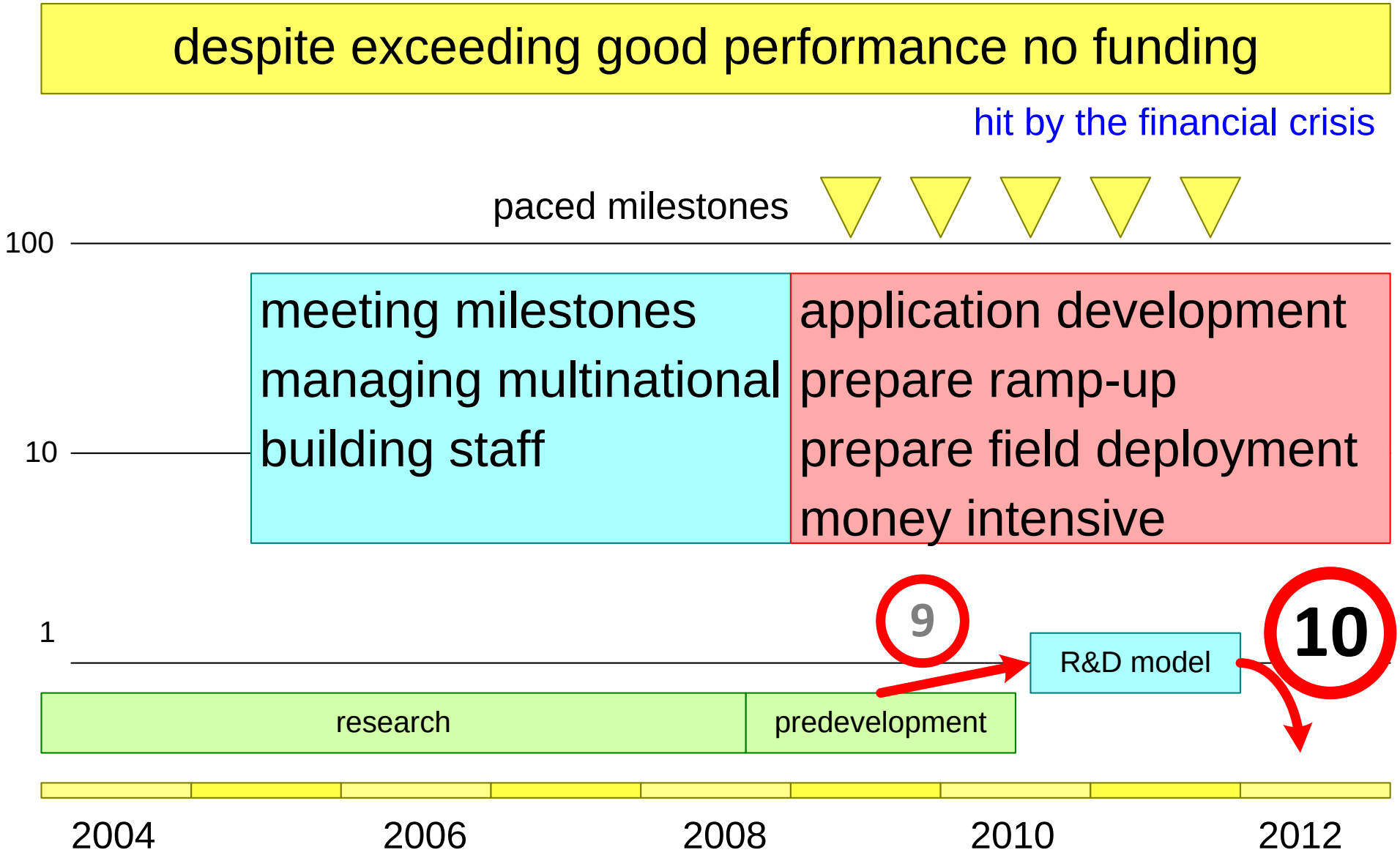
The Tragedy of a Technology Start-up



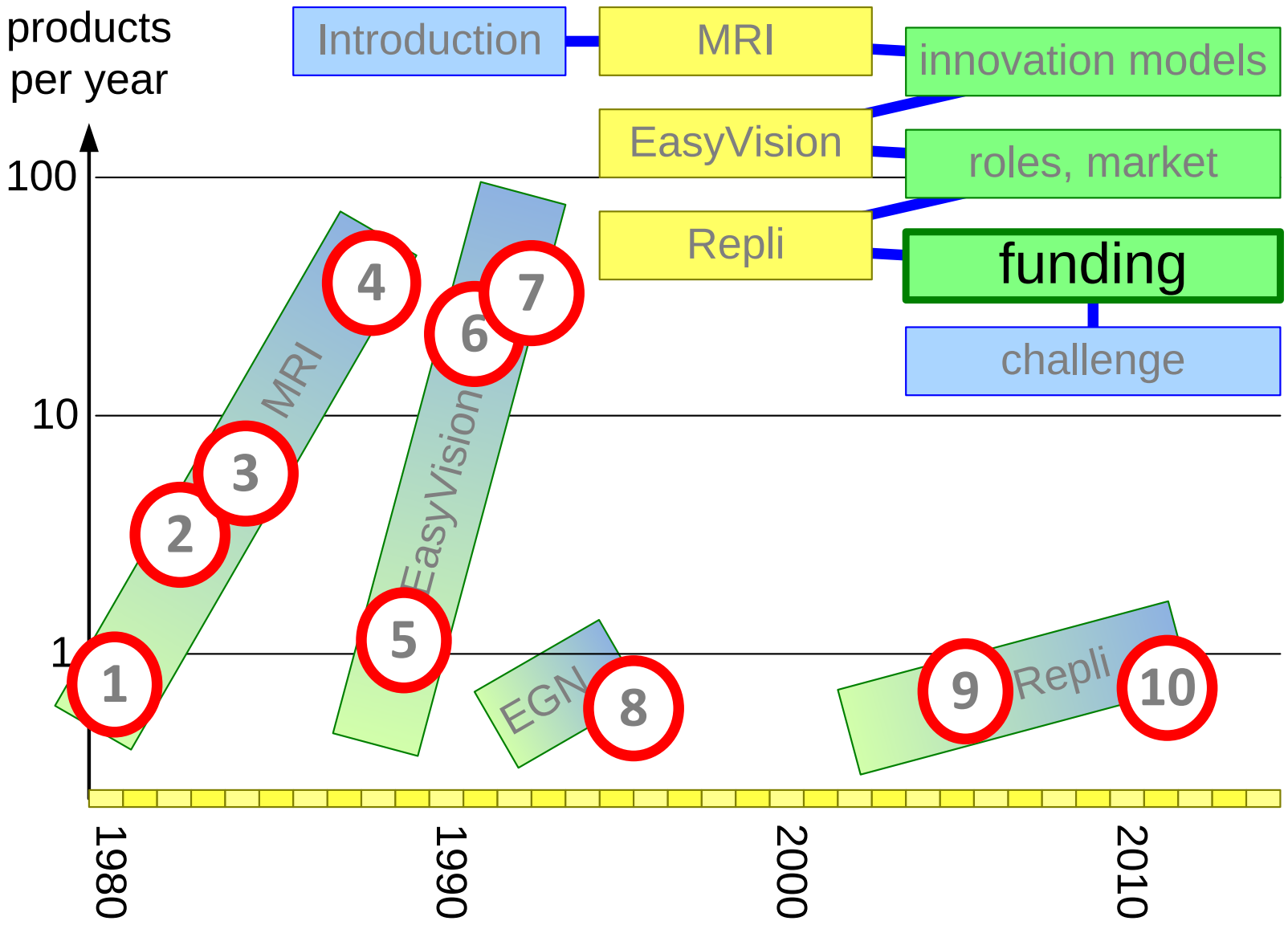
From research to RD model



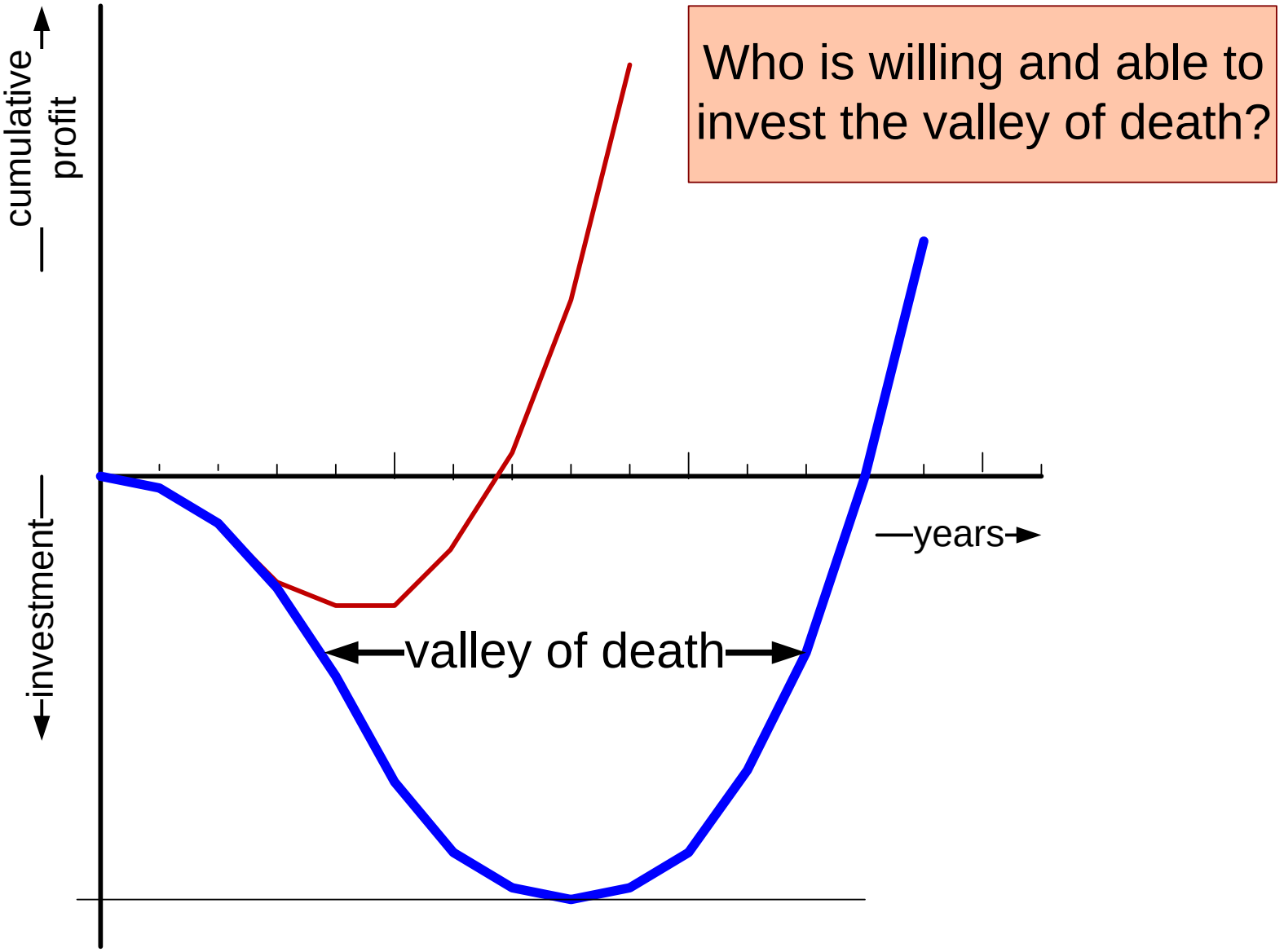
From RD model (not) to Market Intro



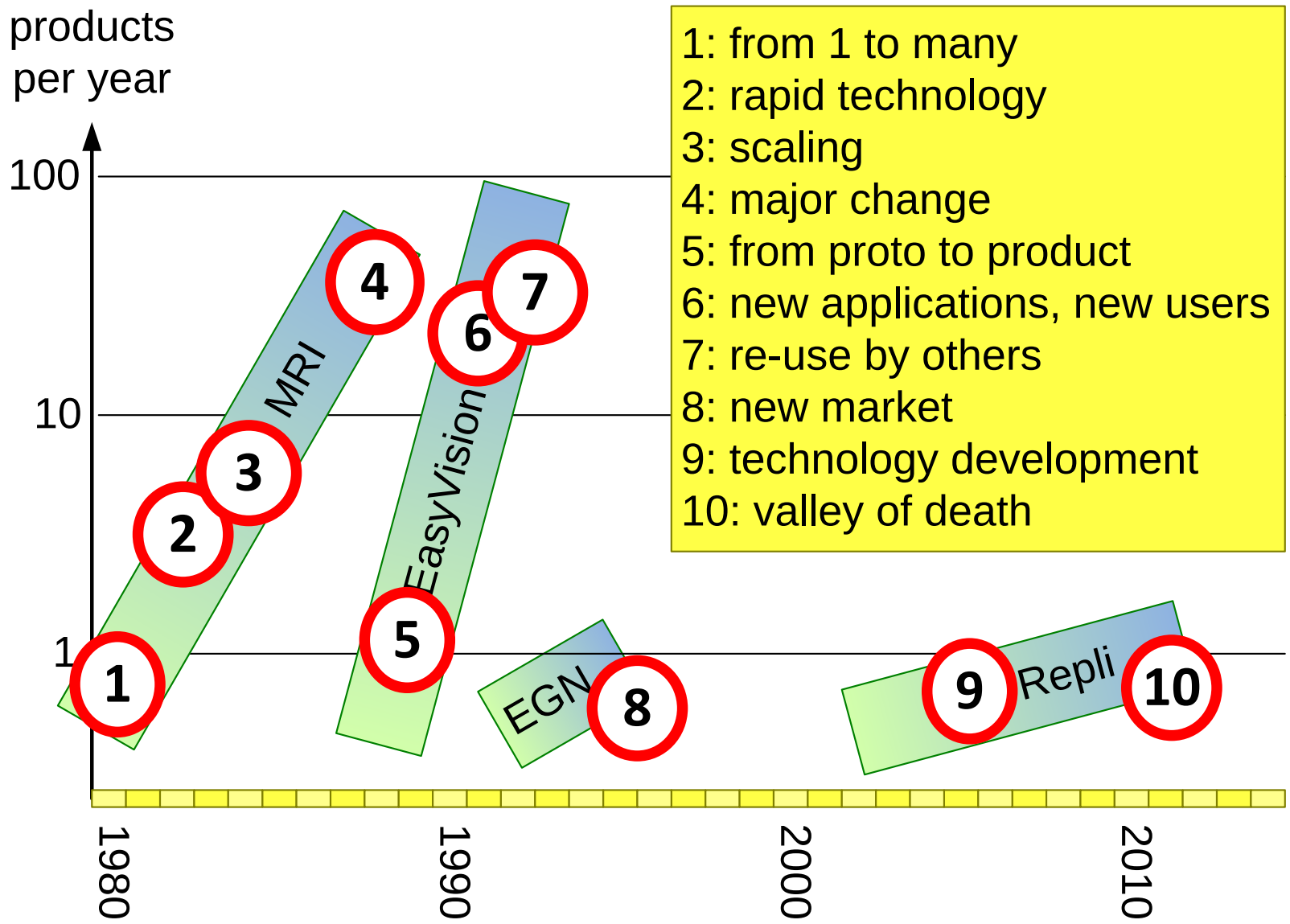
How to get the Money?



Valley of Death



Summary of Experiences



Lessons Learned

R&D

Research: *inspire* rather than *constrain*

Predevelopment: *when* start *including* process *constraints*?

Early development and deployment: *requirement discovery* (market-as-laboratory)

Development and engineering: how to *scale* in all directions?

management

How to *foster long term* under short term pressure

How to survive the *valley of death*?

Pacing as early phase progress method

Final Challenge

Challenge

How do we prepare Kongsberg/Norway successes for the next 30 years?

Who will take all hurdles and create tomorrow's solutions beyond the ordinary?