

Innovation and entrepreneurship



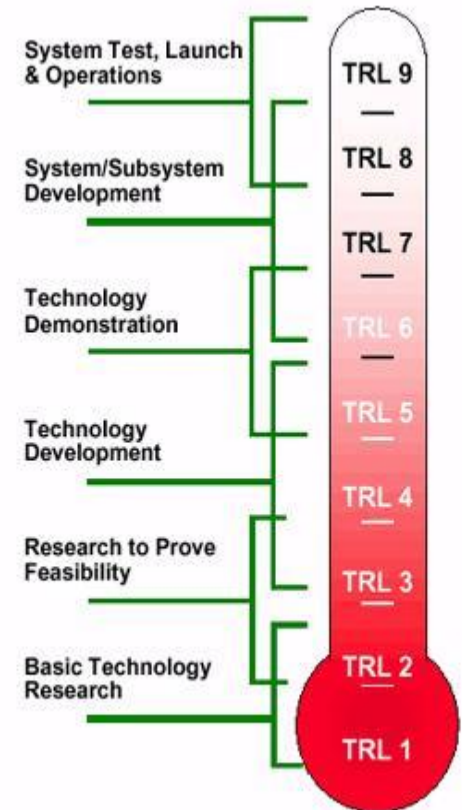
Success for MEDICIS-
PROMED

Menu

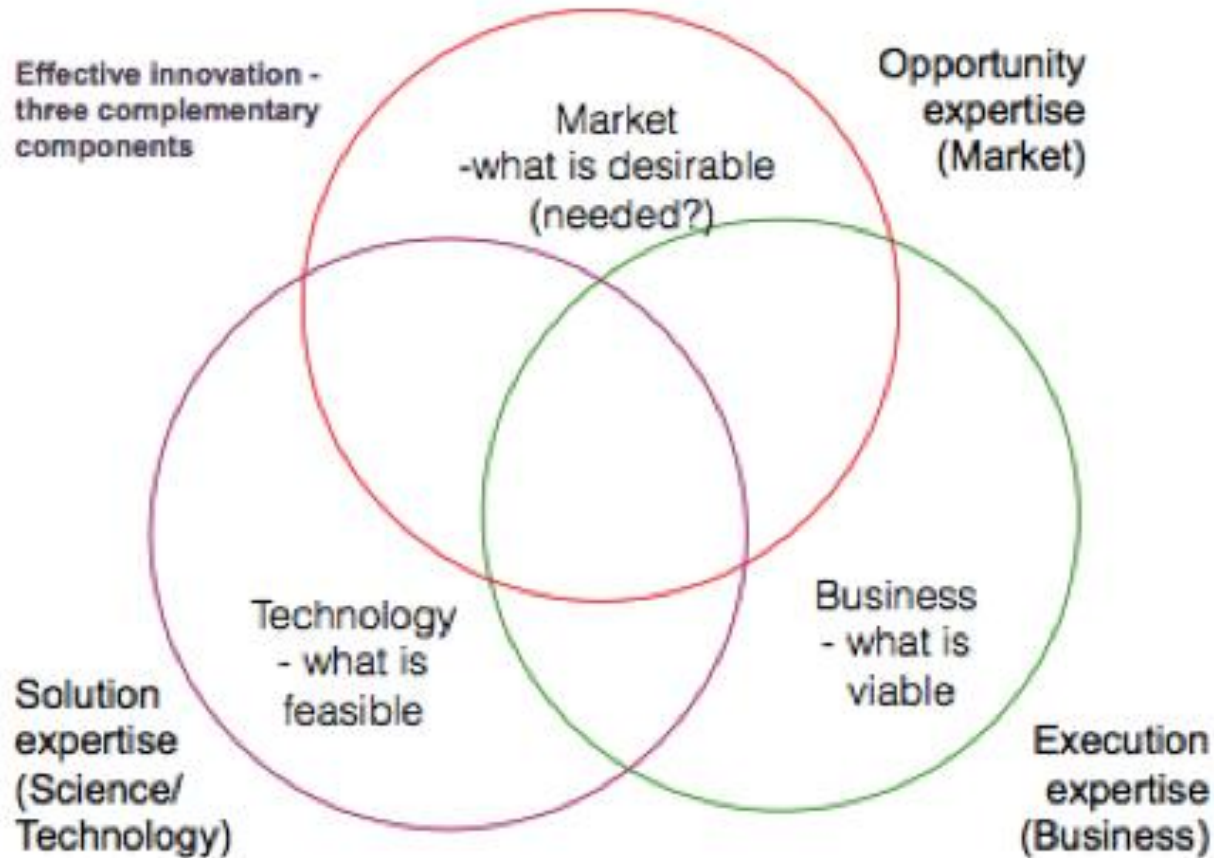
- Three things
 - Plus a little on market and organisational behaviour
 - Plus something on intellectual property
- ➔ This is how business is
- ➔ So you can work with it

Revision slide

- What's more important people or ideas?
- What's the difference between customers and end users?
- When is an idea not an opportunity?
- What's the difference between a patent and a licence?
- ✓ Every sector reveals opportunity, if you understand the dynamics
- ✓ 'Received opinion' on opportunity is not always the most valid



Francisco's Question



REVERSE
INNOVATION

Three opportunities, which one? You are an investor

OPPORTUNITY RECOGNITION

Overview of intellectual property

Legal right

What for?

How?

Patents

New inventions

Application and examination

Copyright

Original creative or artistic forms

Exists automatically

Trade marks

Distinctive identification of products or services

Use and/or registration

Registered designs

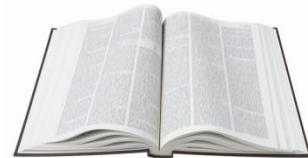
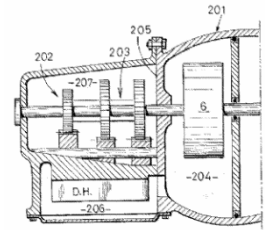
External appearance

Registration*

Trade secrets

Valuable information not known to the public

Reasonable efforts to keep secret



Transfer of Intellectual Property

Inside the research organisation

Assignment of intellectual property rights

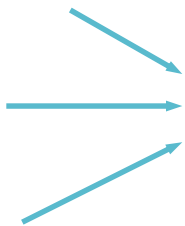
Outside the research organisation

Research funding source

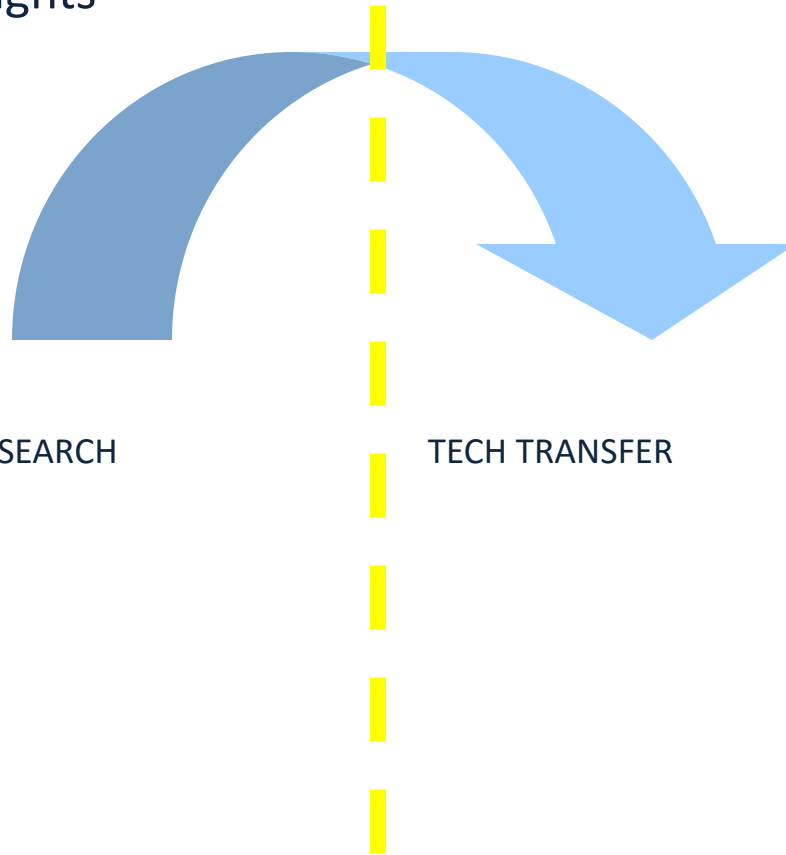
Government

Charities

Industry



RESEARCH



TECH TRANSFER

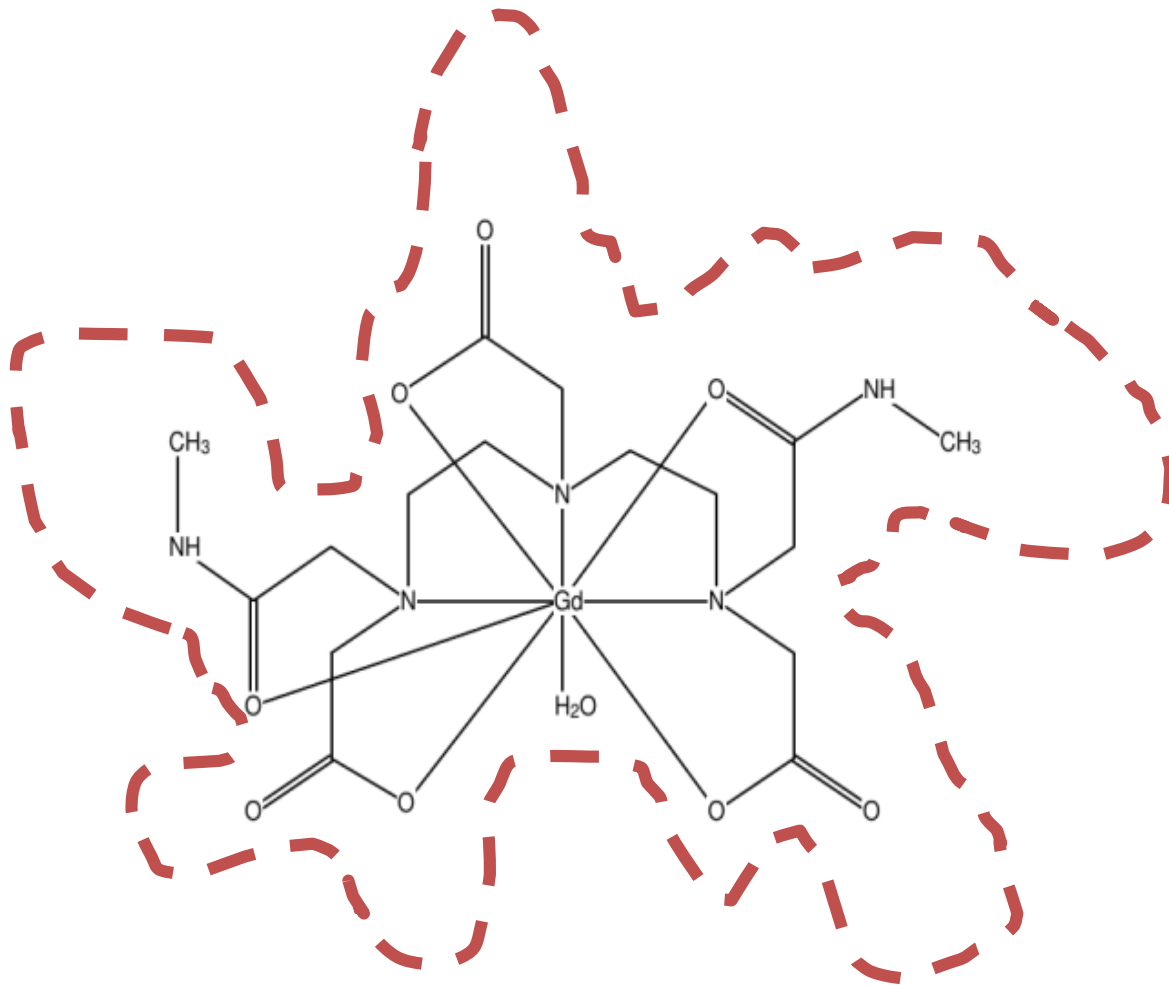
New ventures

Consulting

Licenses



Something simple in intellectual property:
It's easier if you can draw a line around it



Another simple rule: it's only worth it if you can fight it...





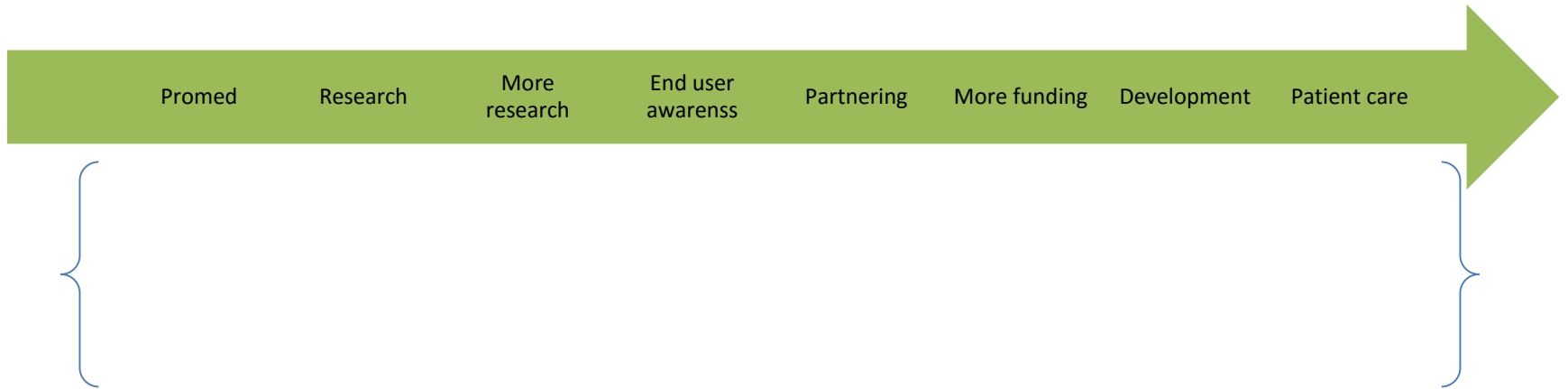
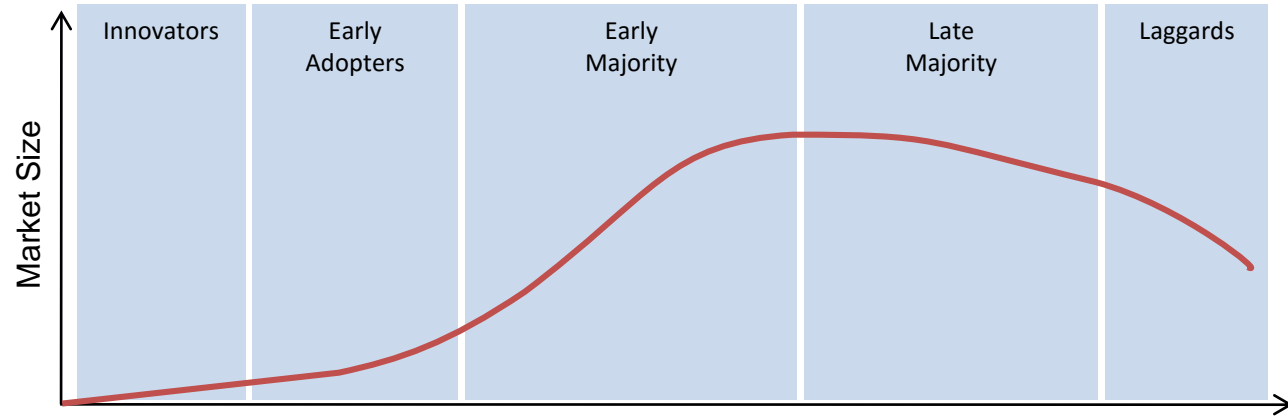
“ Roche makes access to its PCR patent portfolio readily available worldwide through licensing programs. Roche offers companies rights to make PCR products for human or veterinary diagnostic testing, and also licenses labs to perform PCR-based testing. Roche's out-licensing programs encompass not only the field of diagnostics but that of diagnostics research as well, which applies to activities related to research, development and improvement of products and processes for the human diagnostics field. Our *in-licensing* efforts focus on supporting the development of innovative, novel molecular diagnostics tests. ”

- Invented by Kay Mullis, working for Cetus Corp 1983.
- Hoffman LaRoche buys patents in 1992
- Broad applications, including analysing Egyptian mummies
- Patent controversy

Three things from where you are

- Thinking of yourself as a science **innovator**
- **Outside world** interaction that will progress
PROMED → Patient
- **Communicating** to gain support – less outreach and more end-users

Innovation to impact path



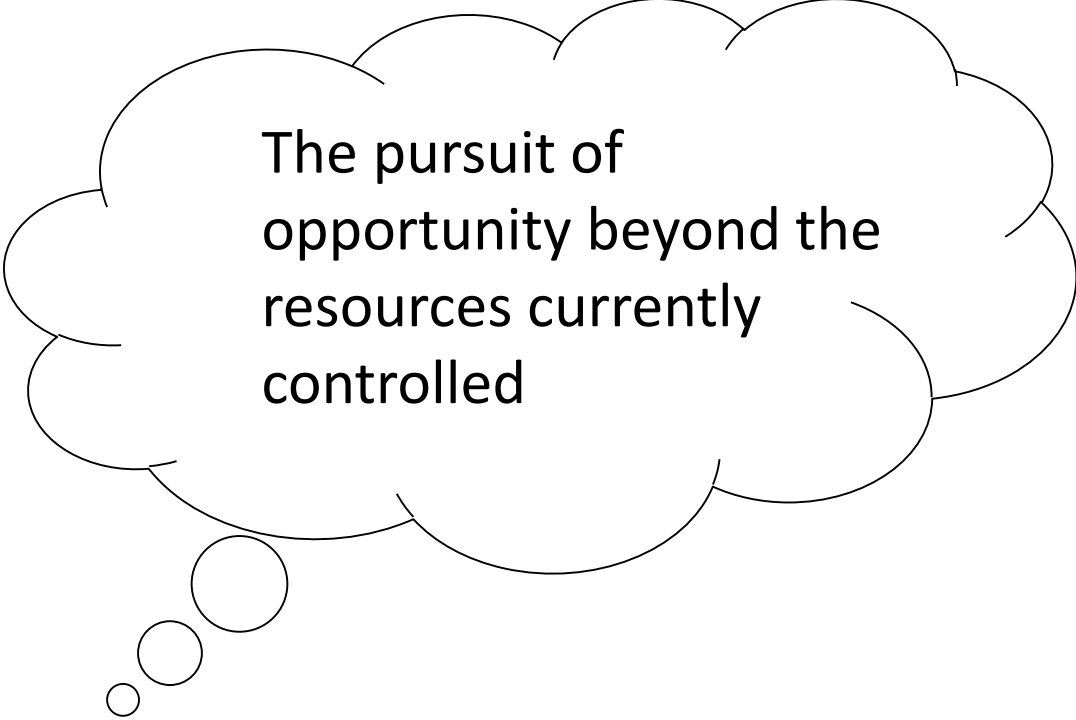
High-performance academic teamwork

- Factors associated with high achievement: strong leadership, finding and motivating talent, *network connectedness* centrally facilitative in mobilizing resources
- Mode 2 knowledge production – non-linear, multi-disciplinary, heterogeneous skills and experience.
- As external environment becomes more complex, a flexible approach is most successful, requiring an increasingly complex internal environment
- Entrepreneurial behaviour: in operating beyond the resources currently controlled

⇒ **Intellectual and commercial forms of entrepreneurship present.**

Determinants of research group performance, Journal of Management Studies, Sept 2012, Harvey, Pettigrew, Ferlie

Definition

A large, irregular thought bubble with a scalloped border, containing text. Three smaller circles of increasing size lead from the bottom left of the main bubble.

The pursuit of
opportunity beyond the
resources currently
controlled

Research from social science

- Creative Rebel
- Anxious
- Unusual relationship with authority
- Suspicious/acts defensively
- Need for control
- Organised
- Ability to see problems as opportunities
- Calculates risk – take it
- Motivated, motivates others
- Money less of a driver than independence, good for society, passion
- Ethnicity – immigration
- Humility/ego
- Always learning

Entrepreneurial Mindset

“There are no problems,
only opportunities”

Effectuation

- Evaluating and developing innovation into opportunities has lots of unknowns, uncertainty, have to make lots of guesses about the future
 - Ratio of **assumption to knowledge** is very high
 - Assumption therefore often wrong = big deviations from plan
- This is perfectly normal. Discovery becomes knowledge....becomes adaptation of plan;
- Don't assume other peoples' assumptions work for you
- There is a difference between management expertise in situations of risk and management in situations of uncertainty

Fail fast – can it be used?

- Can users trial it?
- Is scalability in line with demand?
- Complexity – how many layers need to be integrated; platform relationships – how integrated with a second product eg cameras, software
- Packaging – how much extra infrastructure is needed to make invention useful?
- Strength – is it robust enough, will the software crash
- Adaptation – how can end users alter the technology for their personal needs.

Benefits & Features

- How desirable a feature is, depends on the end user, good question is: Who will be using it?



Dominant design



Shifting the dominant design is harder than the innovation process itself

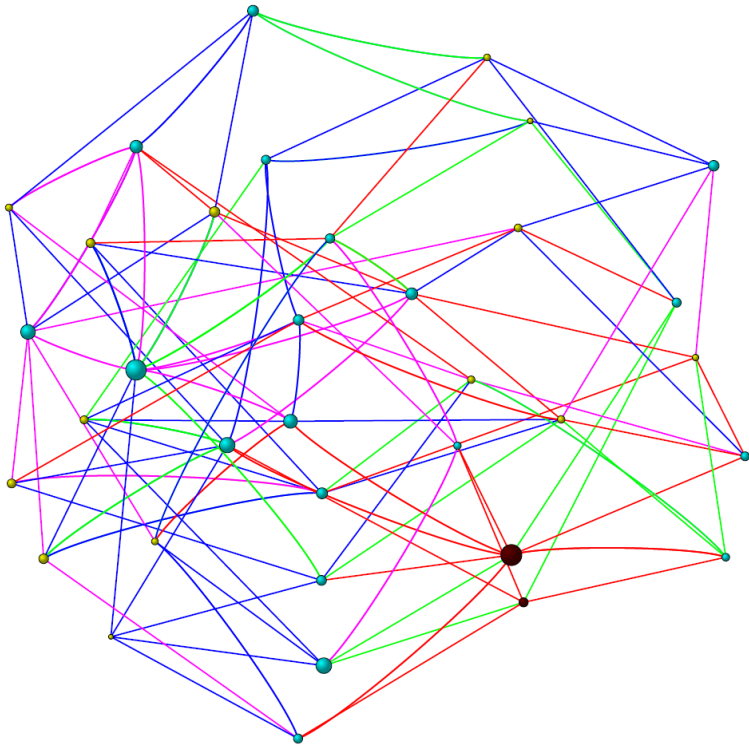
Being together

- Consider yourself a team
- That team has a collective mission
- Talk about what you're doing, challenges
- Share end-user information

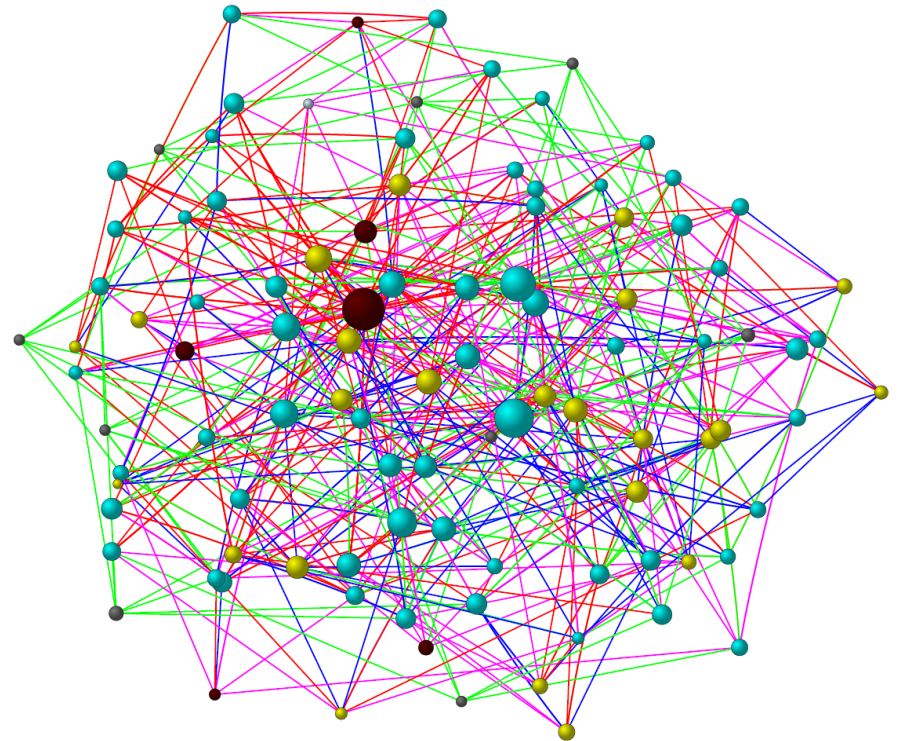
the Oxford Boat Race crew



Network strength

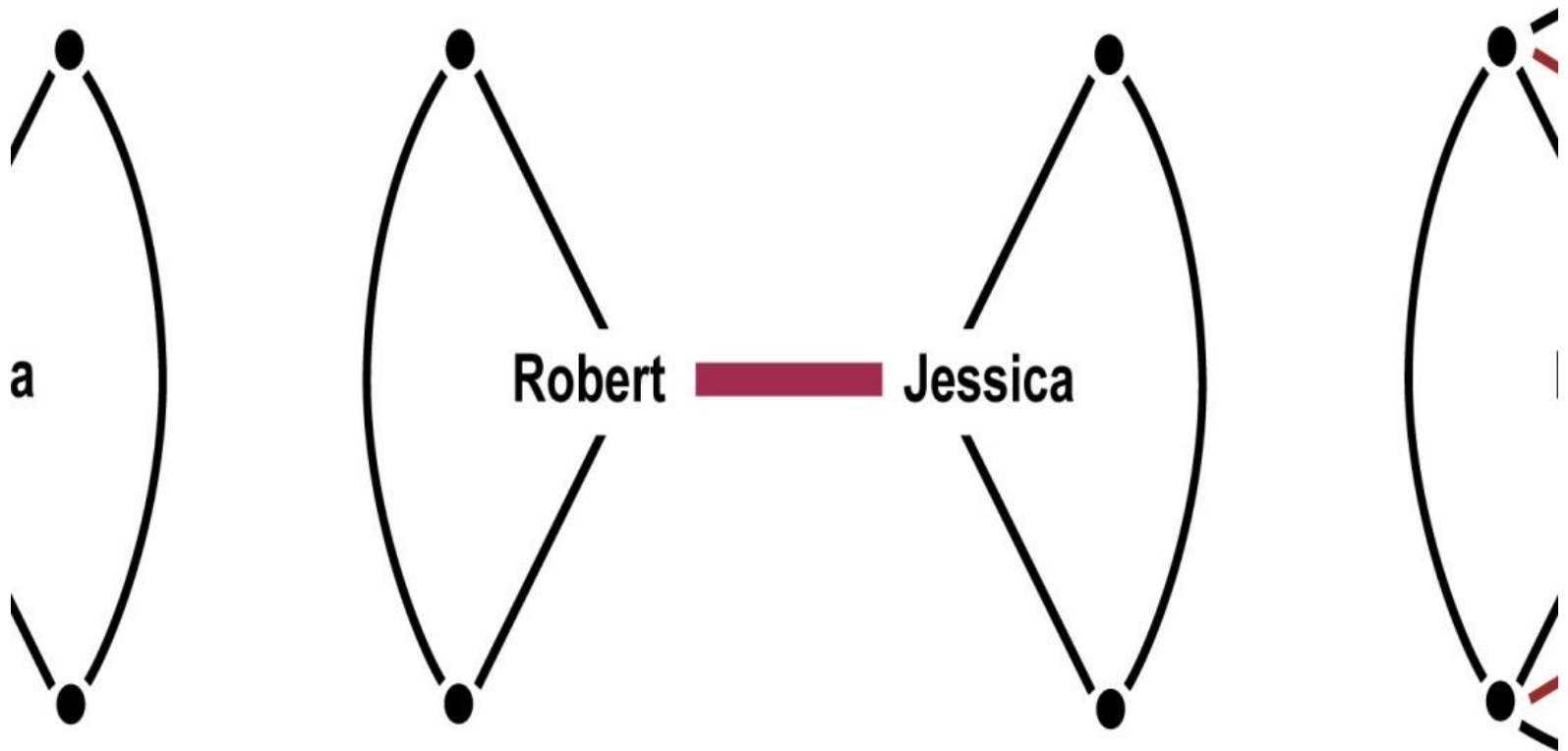


A Fragile Elite



A Robust Elite

Networks, Reputation & Trust



Types of innovation that people in books and business schools like to talk about:

- Disruptive
- Radical
- Incremental
- Reverse innovation
- Collective invention

How to be an innovator – Understand the importance of timing

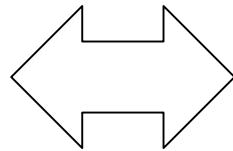
- Time value of money
- Timing of intellectual property processes
- Market entry
- Growth v raising finance
- Investor fashion, eg graphene



Time factors in the market

- Market Dynamics – Think newtonia

Buyers

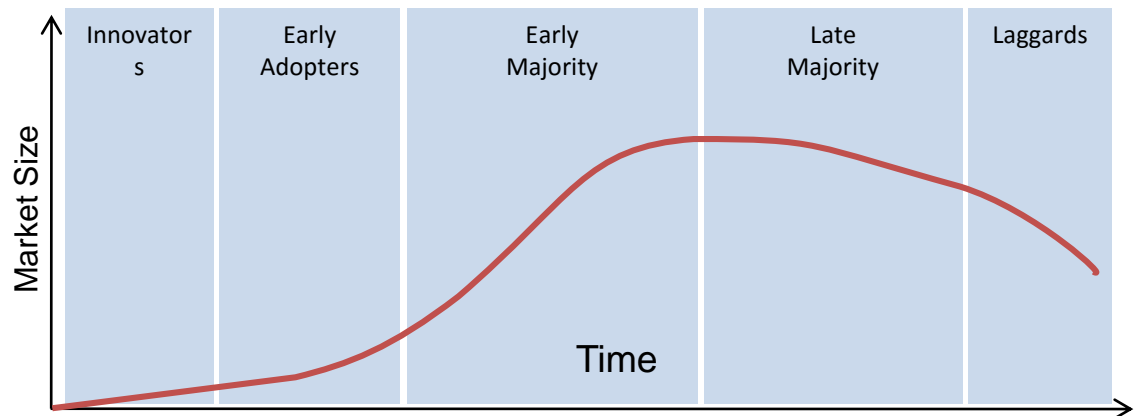


THE
DEAL

Sellers

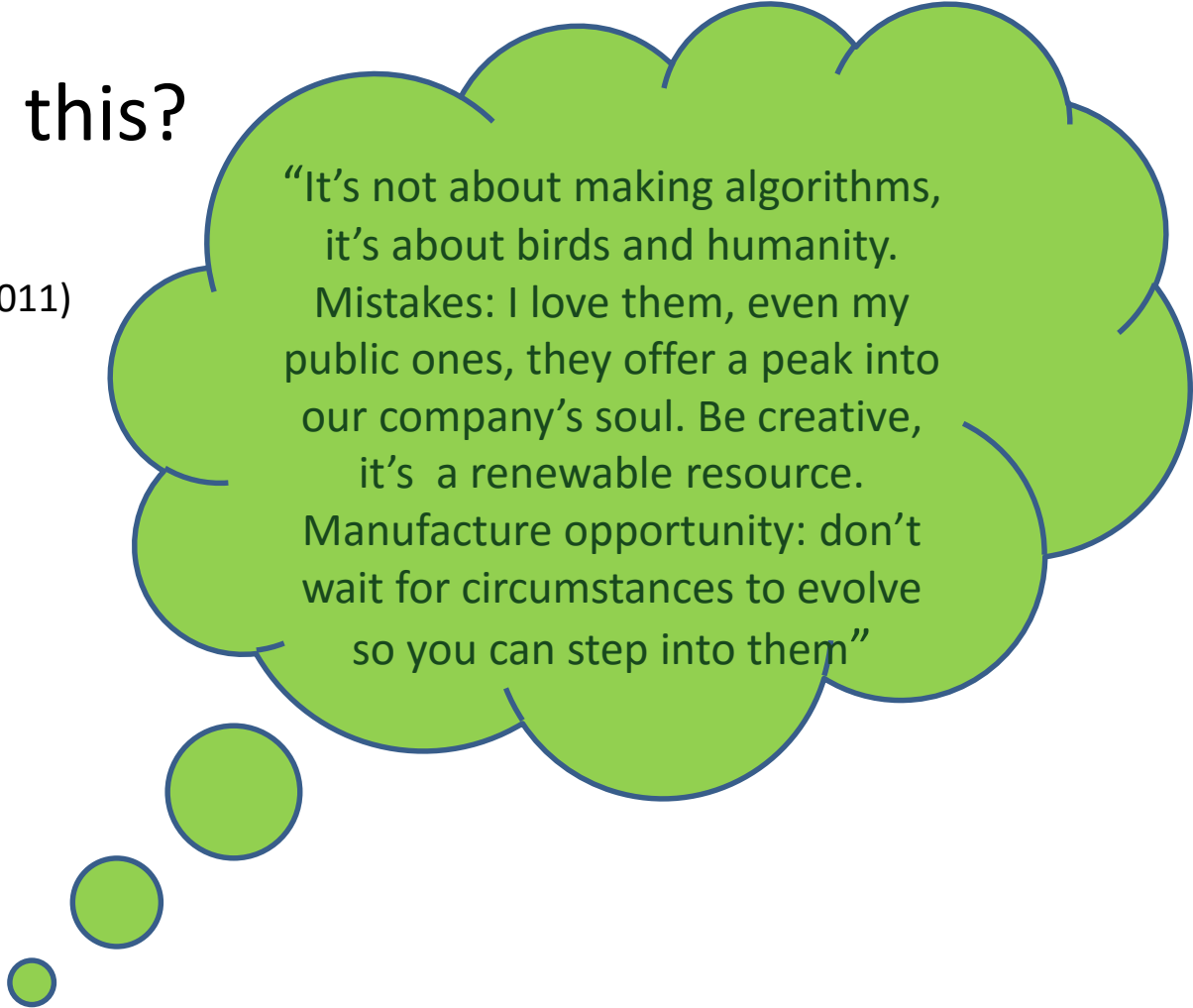


- What will the market look like when you have product available?



- **Who Said this?**

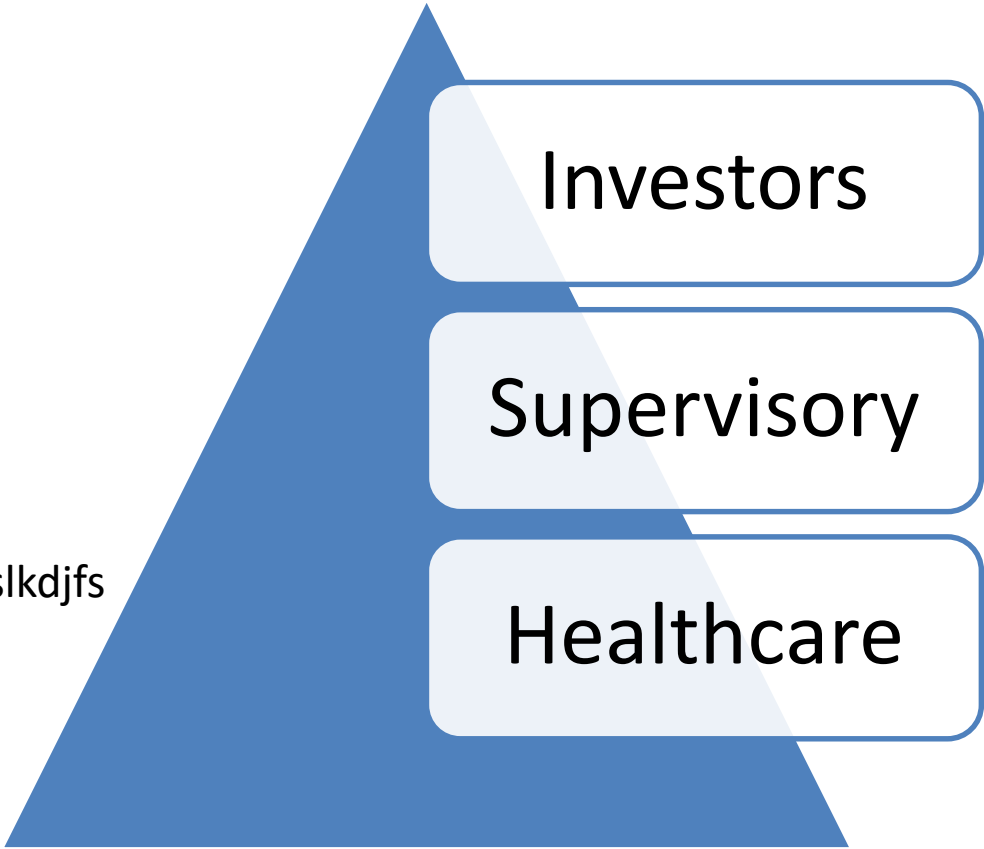
(talking to aspiring
entrepreneurs in 2011)



“It’s not about making algorithms,
it’s about birds and humanity.
Mistakes: I love them, even my
public ones, they offer a peak into
our company’s soul. Be creative,
it’s a renewable resource.
Manufacture opportunity: don’t
wait for circumstances to evolve
so you can step into them”

OUTSIDE WORLD INTERACTION

sdfksjdlfkjsdlfjslkdjfs



Evidence, practice, hype, difference

GROUP	What do they want	Individual
INVESTORS	Return on investment, social and financial, share price	Excitement Save the world Accountability Safety
SUPERVISORY	Clear understanding of risk Evidence Peer +ve support	Network trust Shared responsibility Public acceptance
HEALTHCARE	Ease of use, cost, patient benefit/safety integration	Doing everything they can, saving lives, pioneer

The organisations

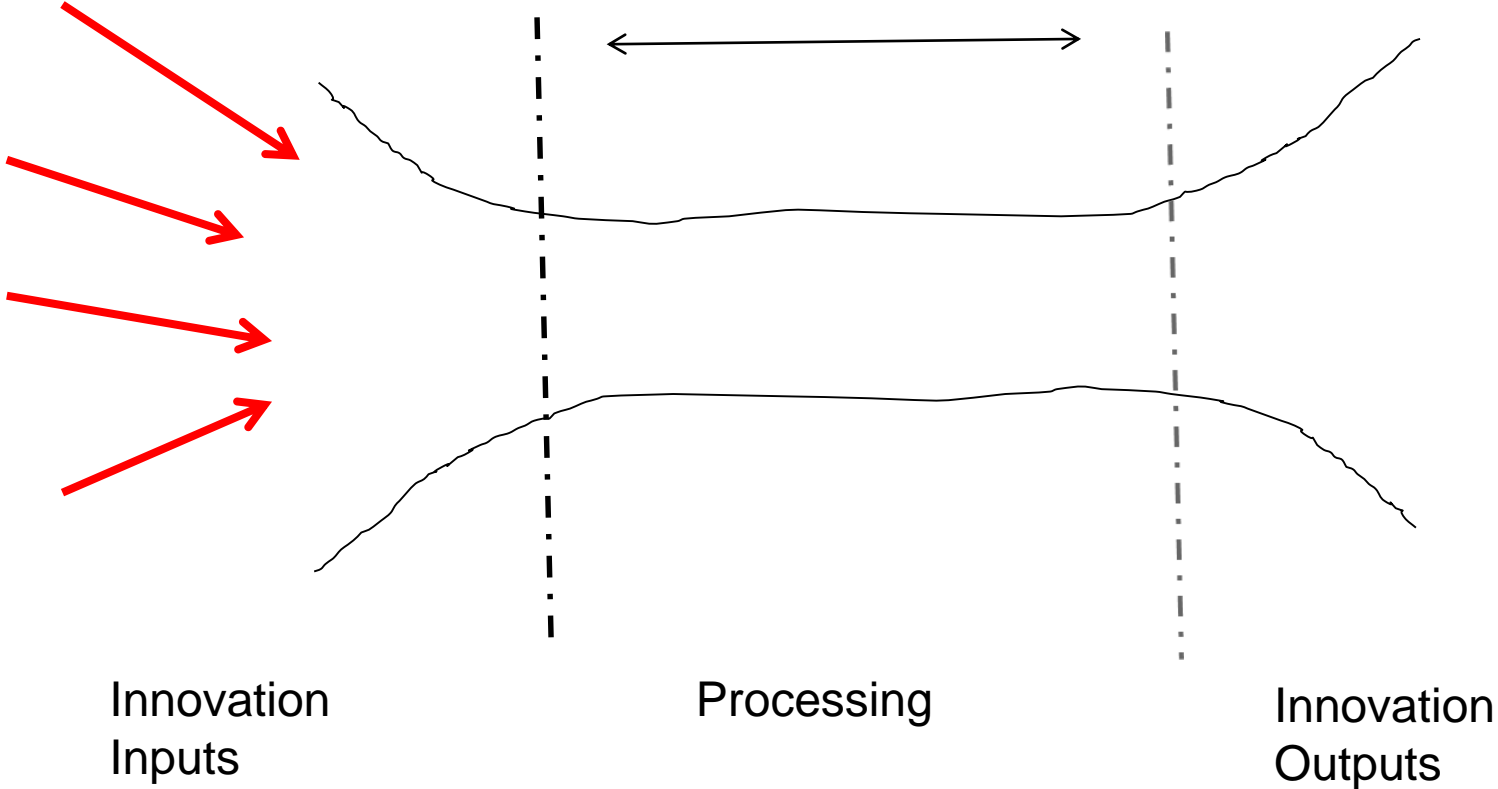
- CERN, EC, government
- Philips Siemens GE (General Electric)
- Pharmaceuticals eg Sanofi, Bayer, Roche
- Specialist SMEs like Lemur Pax
- Specialist larger suppliers like AAA

- Not-for profits, foundations
- Individual - HNWs

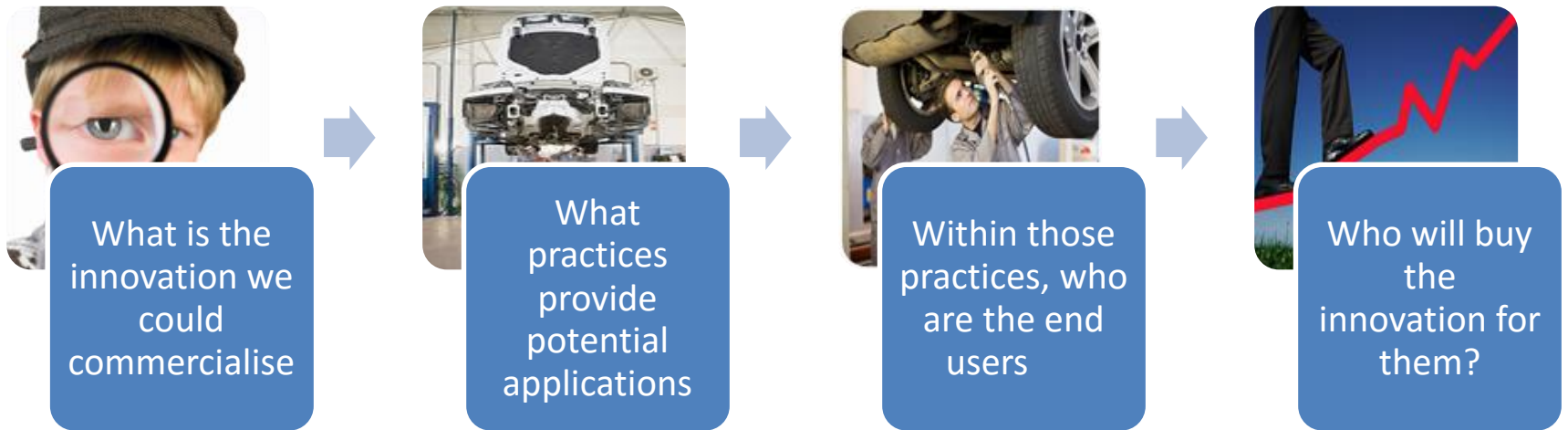
What do they want

- DRAW
- Impact. ROI, profit, reputataion, better patient care, status for the hospitals
- Reputations: of CERN, bureaucratic, not worth it.

Want innovation



They want innovation to deliver customer benefit



What benefit could probed innovation deliver?

Research

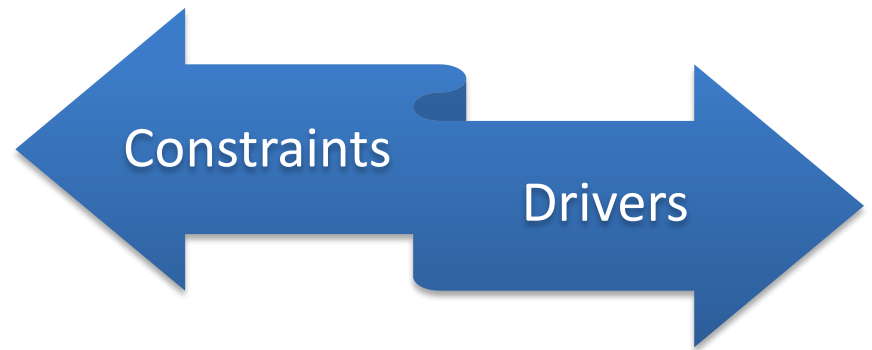
- Small field-portable units
- Limit dose in entrance region
- More pronounced Bragg peak
- Better tracking
- More precise control
- Facilities to deliver range of nuclear medicine
- Safer production

Benefit

- Customer base up
- Reduce collateral organ damage
- Toxicity – treatment balance
- Evidence
- Improve systemic treatments
- Weapon against hard to reach tumours, eg ovarian, melanoma
- Metabolic targeting Iodide, Ca

Some technologies, sectors in MEDICIS-PROMED

- Accelerator technologies
- Isotope mass separation
- Radiotherapies
- Functional imaging & treatment combinations
- Pharmaceutical – radiopharmaceuticals
- Clinical trials
- Healthcare provision
- **Regulators**
- **Insurance**
- CERN, EC



PROMED - two sets of “customers”

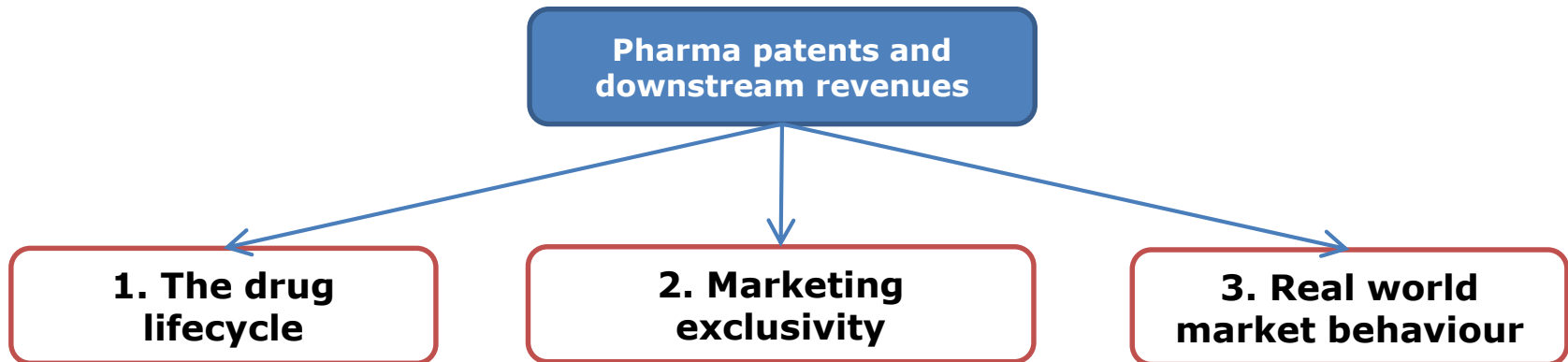
- Customer = partner (s) who can de-risk the technologies as it proceeds towards the patient with £
 - End user requirements – you can never know enough
- ➔ Understand the drivers and constraints of partners/buyers

Market considerations for MEDICIS- PROMED areas

- Cost-benefit
- Public-private
- Partnership/risk management
- Skills, maintenance
- Alignment with existing practice, machinery
- Few customers/partners
- Cost of sales
- Existing behaviours/safety considerations
- Medical acceptance

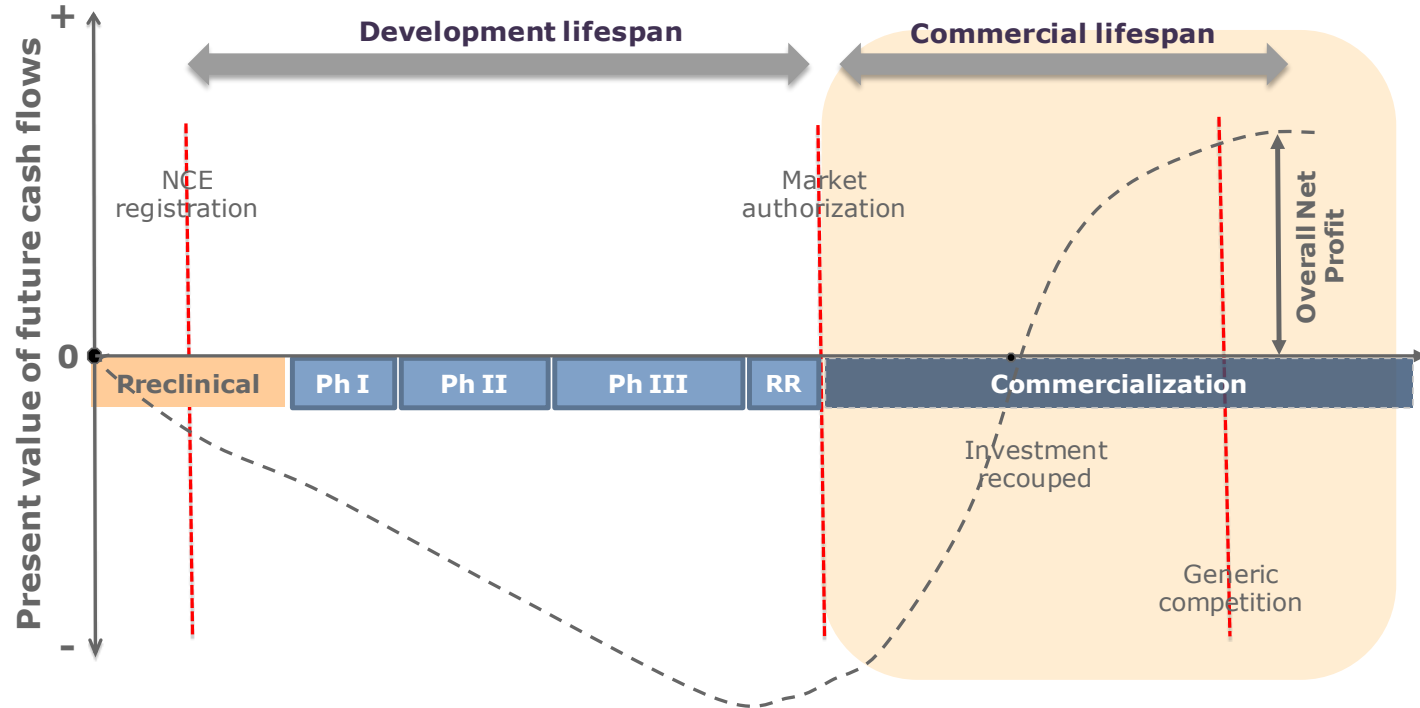
A special case of market behaviour - Pharmaceuticals

Innovation – in sales & marketing; end of life, share price volatility around reputation, pipeline; some CSR activity, influencing doctors.



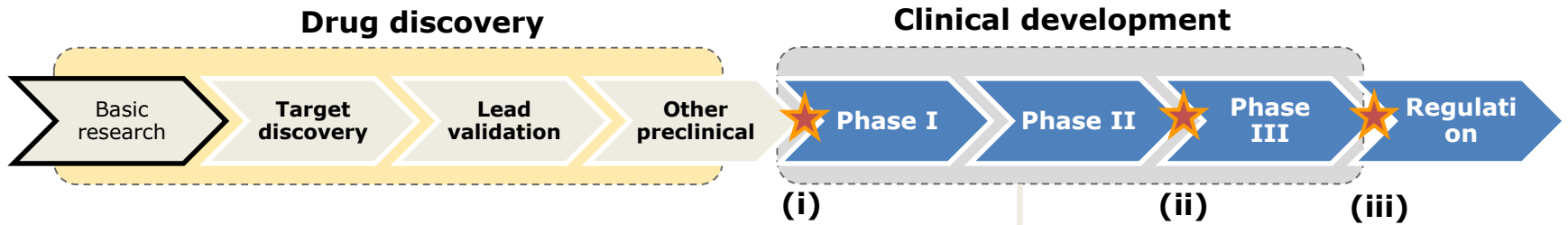
The drug lifecycle revolves closely around marketing exclusivity

- Product lifecycle is composed of development and commercialisation stages
- Goal is to reduce development time and extend exclusive time on market
- **This determines the profit potential of a clinical initiative/ investment**



Development lifespan has high levels of project failure across the value chain

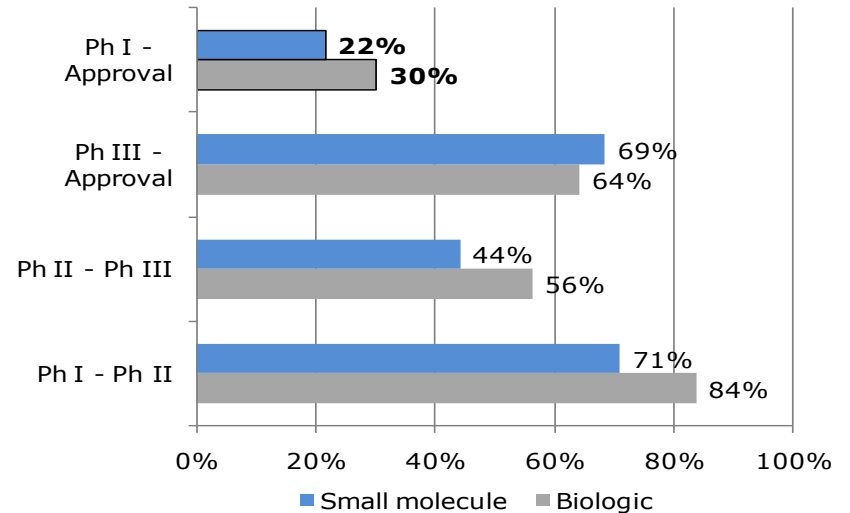
- **Discovery** is about innovation
- **Development** is more about operations and 'translation'



★ Key value inflection points:

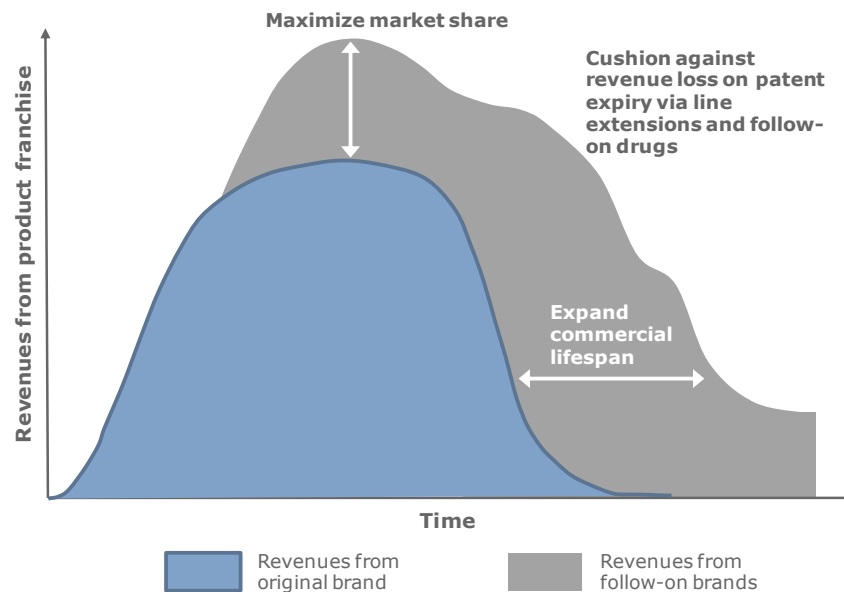
- (i) Clinical trials begin
- (ii) Good Ph II data (Proof-of-concept)
- (iii) Certainty of regulatory approval

Probability of success



Commercial lifespan is about winning market share and delaying generic competition

- Carefully designed IP strategies are used to protect a basket of “attributes”
- Such protection creates a group of products around a single clinical breakthrough
- A product franchise approach increases revenues and delays generic incursion



Cushioning the patent cliff via line extensions

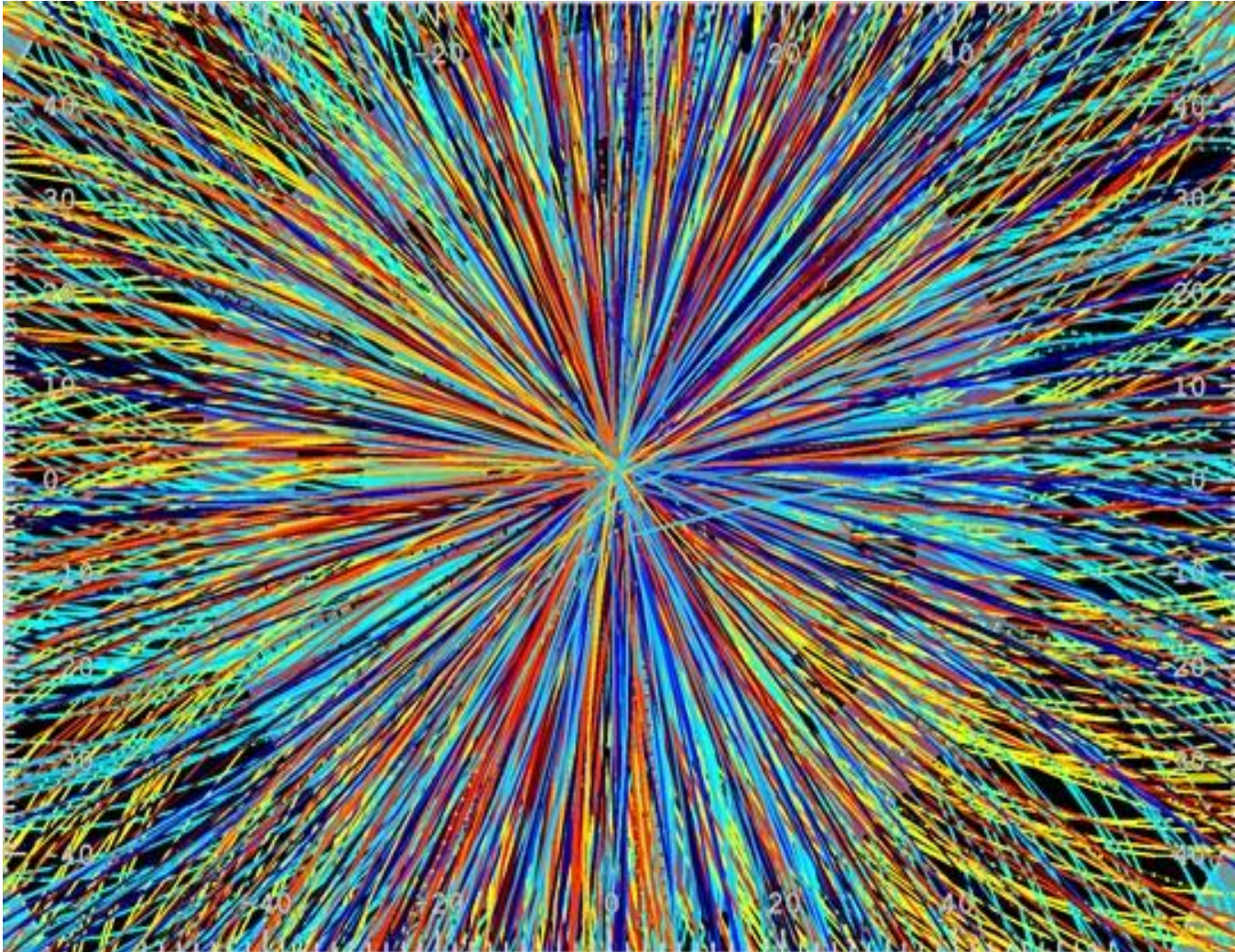
Pharma patent claims come in many shapes...

Drug developers claim every advantageous attribute of their molecules to delay generic competition.

- The molecule/ chemical entity itself
- The drug entity combined with a delivery device
- Use of a certain drug class in a specific clinical context
- Use of a drug in a specific clinical indication
- The manufacturing process
- Combination therapies
- The formulation
- Salts, esters, polymorphs, active metabolites
(non-exhaustive list)

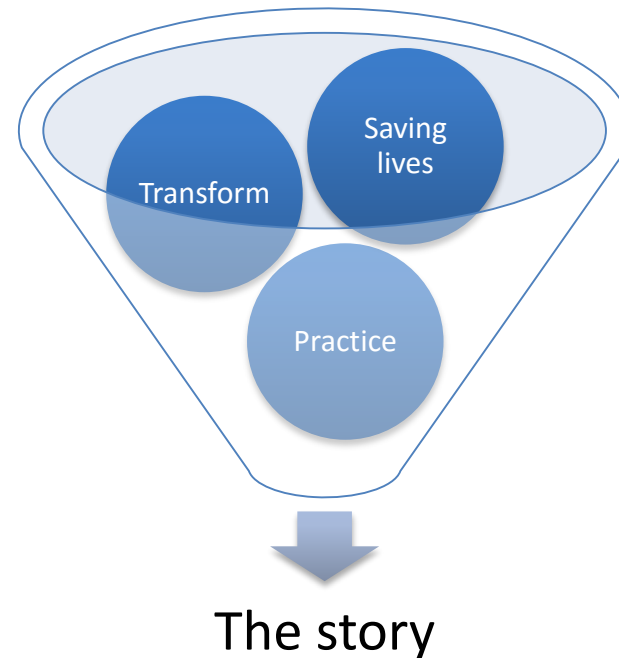
Such a strategy has been called “evergreening”, “erecting patent thickets”, etc.

CERN



Market considerations for MEDICIS-PROMED areas

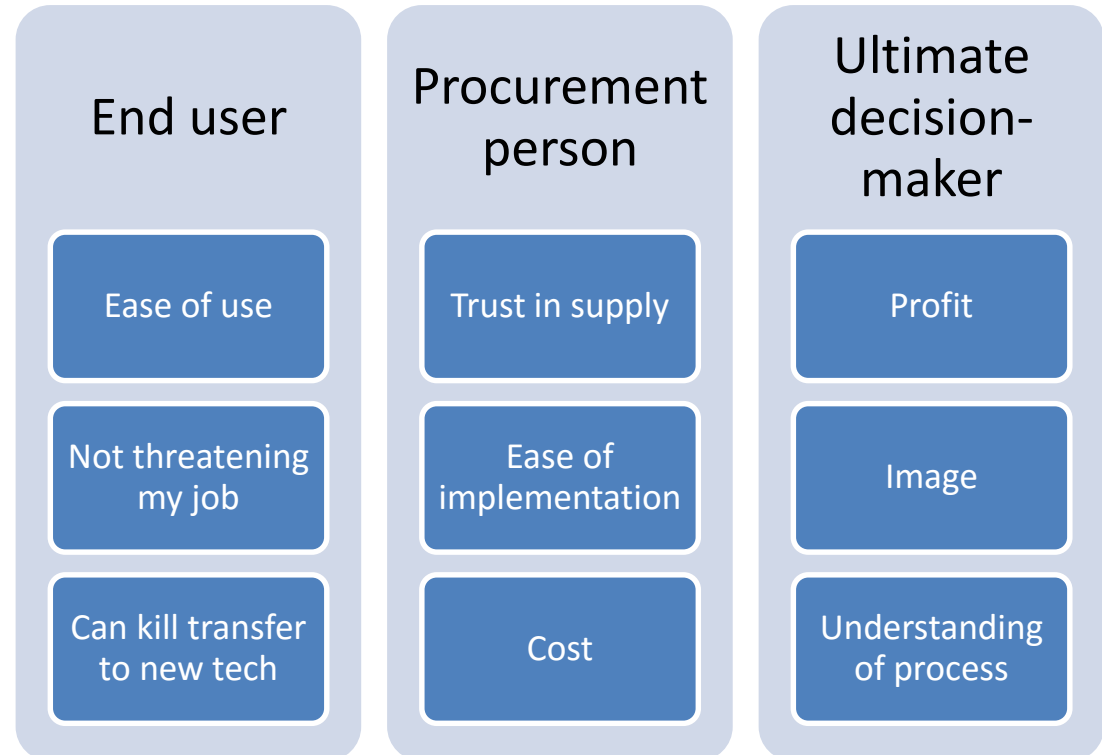
- Cost-benefit
- Public-private
- Partnership/risk management
- Skills, maintenance
- Alignment with existing practice, machinery
- Few customers
- Cost of sales
- Existing behaviours/safety considerations



Who are the buyers, what story

- 'Buyers' are often organisations, made up of multiple players
- Three roles:

➔ There are various players in the decision-making process, different roles and responsibilities



TALKING PROMED

YOU AS AN AMBASSADOR FOR PROMED

Context

- Society-wide attitudes towards innovation, entrepreneurship, nuclear medicine, have an influence on organizational behavior
- They affect external stakeholders such as investors as well as internal
- National policy such as taxation, local policy on Intellectual Property affect incentives
- Role models – companies, individuals – are very important

Guiding Principles

- Never underestimate how little people understand about science and technology
 - Don't be boring
 - Write for the audience –
 - This may not be value-free
 - Publicise success in transmissible chunks
 - Time manage news
 - Story-telling & mythology
- ➔ it's all about them, not you



Innovation contexts

Saviour, transformation technologies



Global innovation paranoia

Glorious invention



Scary science



Take-over



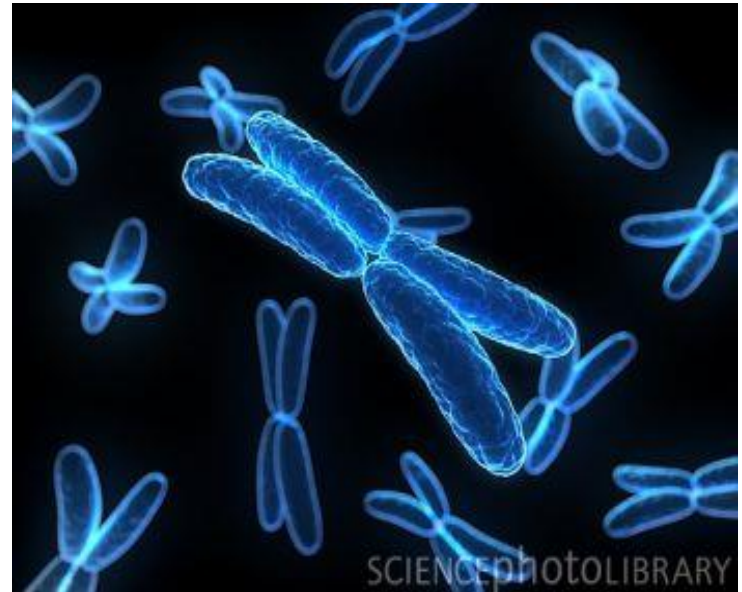
Rational, authoritative, unemotional

Ashya King - UK



Context affected by

- Demographics
- Values
- Religion
- National cultural aspects
- Political community



PROMED stories

- Trojan horse therapies
- Metabolic targeting (heart)
- Active, then disappears (miracle)
- Targetting = less toxicity, not the whole body
- Re-branding radioactive- curative
- Health economics
- Cure for hopeless cases
- Power-Zap-War metaphors

SCIENCE WRITING FEEDBACK

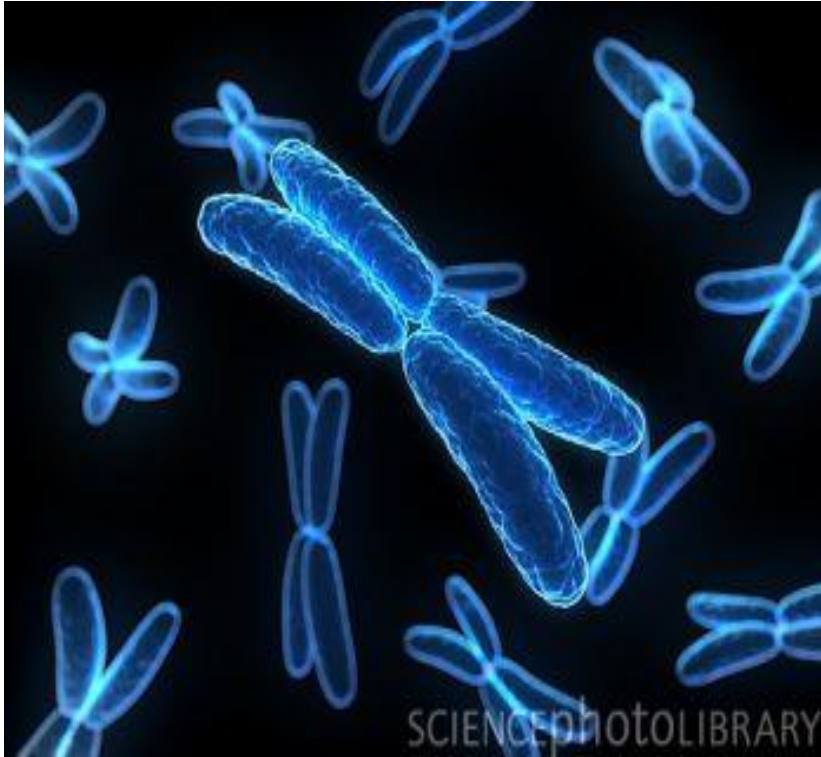
Brief introduction:

What is your piece about?

Who is your audience?

Talk about your choices, what was difficult...

Basics



- Identify who you need to target with your communications
- How to reach them
- What to say
- How to say it

Identifying the target

- REMINDER - probably two target customers for any PROMED innovation
 1. The customers as end user = the person who actually gets hands on technology and uses it
 2. The person who licences, invests, forms a joint venture, enters a strategic alliance or other vehicle to make money by moving technology forward in the market