
| I & P - RTIP 2023<br>Program Schedule | |
|---|---|
| 09.00 - 09.30 am | Registration |
| 09. 30 - 09.40 am | **Workshop Opening** - Dr. Vikram Gota (Convener) |
| 09.40 - 09.50 am | **Need of a 'Patent Cell' at ACTREC** |
| 09.50 - 10.00 am | **Opening of 'Patent Cell' at ACTREC and its functioning** |
| 10.00 - 10.10 am | **Workshop Highlights and Deliverables** |
| 10.10 - 10.20 am | **Vote of Thanks** - Dr. K. Manjunath Nookala (Joint Organizing Secretary) |
| 10.20 - 11.00 am<br>11.00 - 11.40 am | **Session 1**<br>➢ **Innovation and Technology Commercialisation (What, why and how?)**<br>➢ **Nuts and Bolts of Patenting**<br>Intellectual Property Facilitation Centre. NCL – Venture Centre, Pune |
| **11.40-11.50 am**<br>**------ Break for Tea ------** | |
| 11.50 - 12.30 pm<br>12.30 - 01.10 pm | **Session 2**<br>➢ **Establishing and running a patent cell**<br>➢ **Understanding IP and Tech Commercialisation policies**<br>Intellectual Property Facilitation Centre. NCL – Venture Centre, Pune |

# TechEx.in

Tech Transfer Hub at Venture Center
Supported by NBM - BIRAC

## Topic: Innovation & technology commercialization – what, why, how?

**Speaker: Premnath V, PhD; Founder Director, Venture Center; Chief Scientist, CSIR-NCL**

VENTURE CENTER

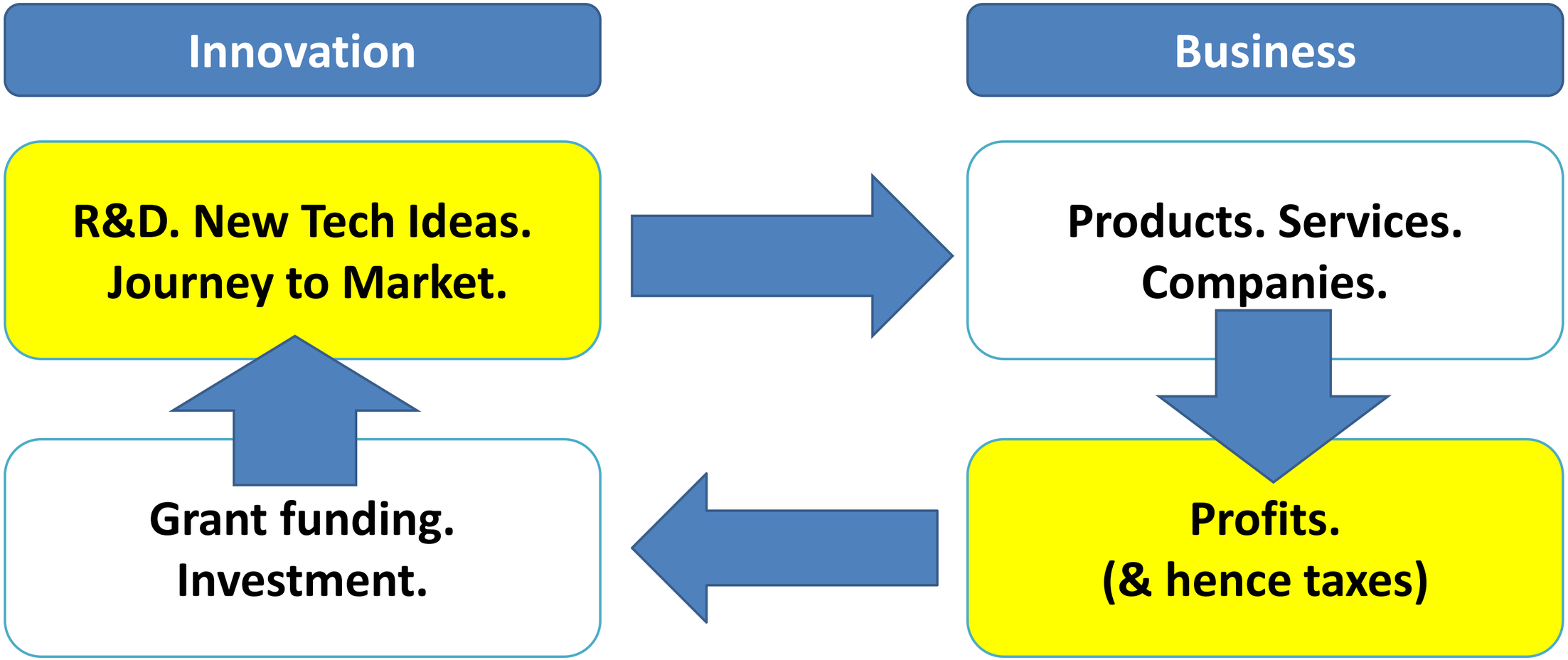
nbm NATIONAL BIOPHARMA MISSION innovate in India for inclusiveness (i3)

birac Ignite Innovate Incubate

# Technology commercialization: Why?

# The satisfaction in empowering people with solutions. Seeing your science in use.


# Two sides of the Innovation economy!



# Alert:

Most researchers who pursue technology commercialization pursue it to see their **ideas reach fruition**, **realize their own full potential** and **get satisfaction**.

Most institutions who promote technology commercialization do it to meet their **socio-economic mandate** of the organization and to demonstrate **significant diffusional impact**. Ex – Boston/SV area institutions

**Direct financial returns** to people or institutions is rarely the goal. It is an occasional happy by-product.

# Understanding invention, innovation and entrepreneurship

# Invention

Problem/ Pain/ Need

Solution (single or as a group of components)

**NOVELTY in problem or solution or both**

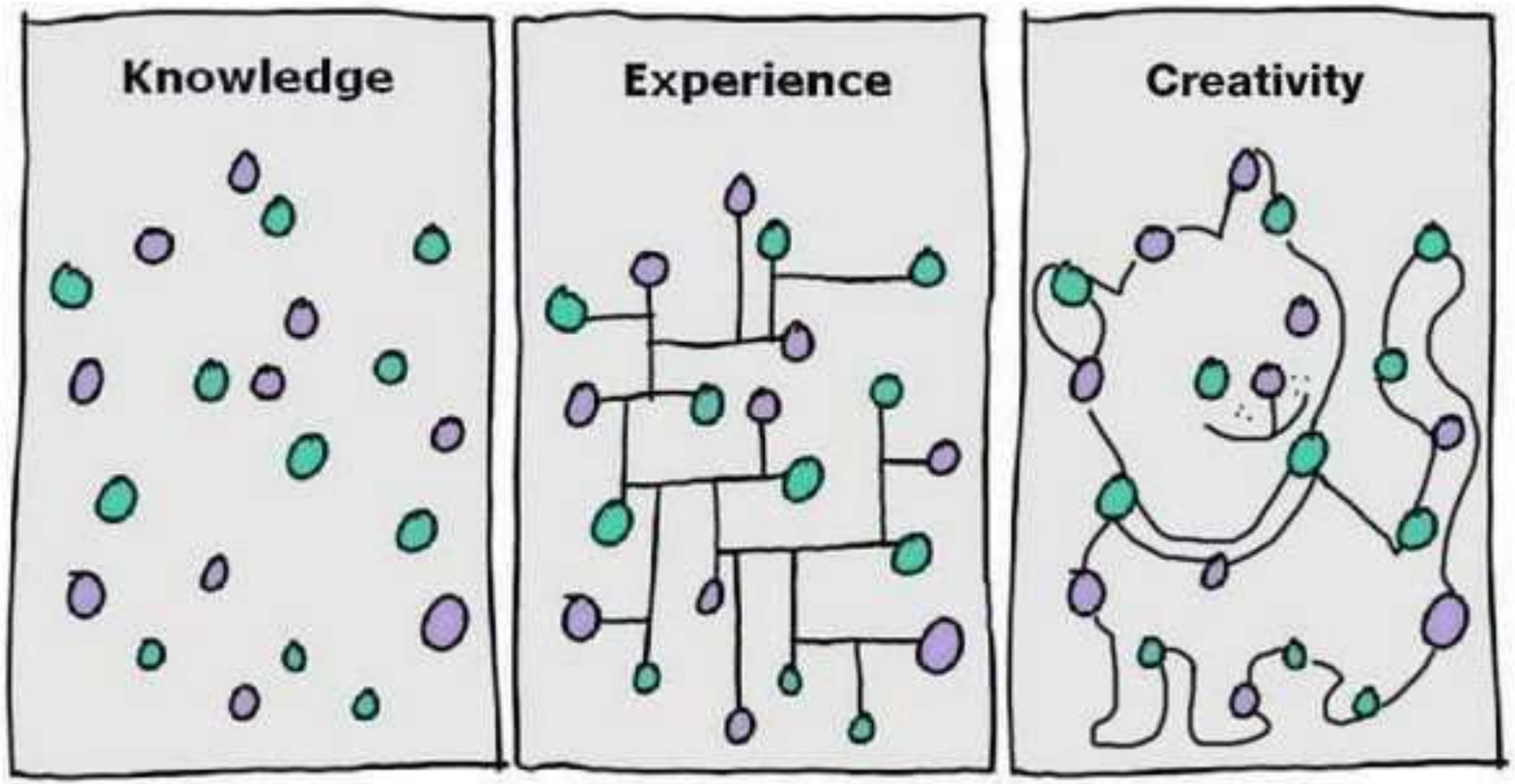
Invention

## Examples:

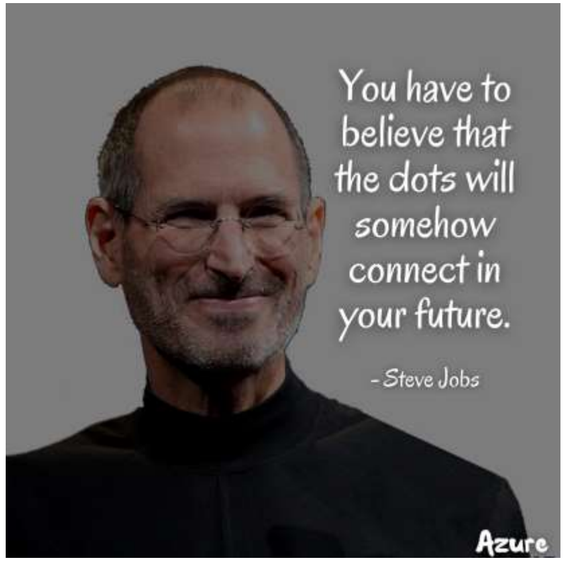
-- Zip/ Velcro/ Bundling tie

-- (Science-led) Vaccines, drugs

# Secret sauce: How you connect the dots



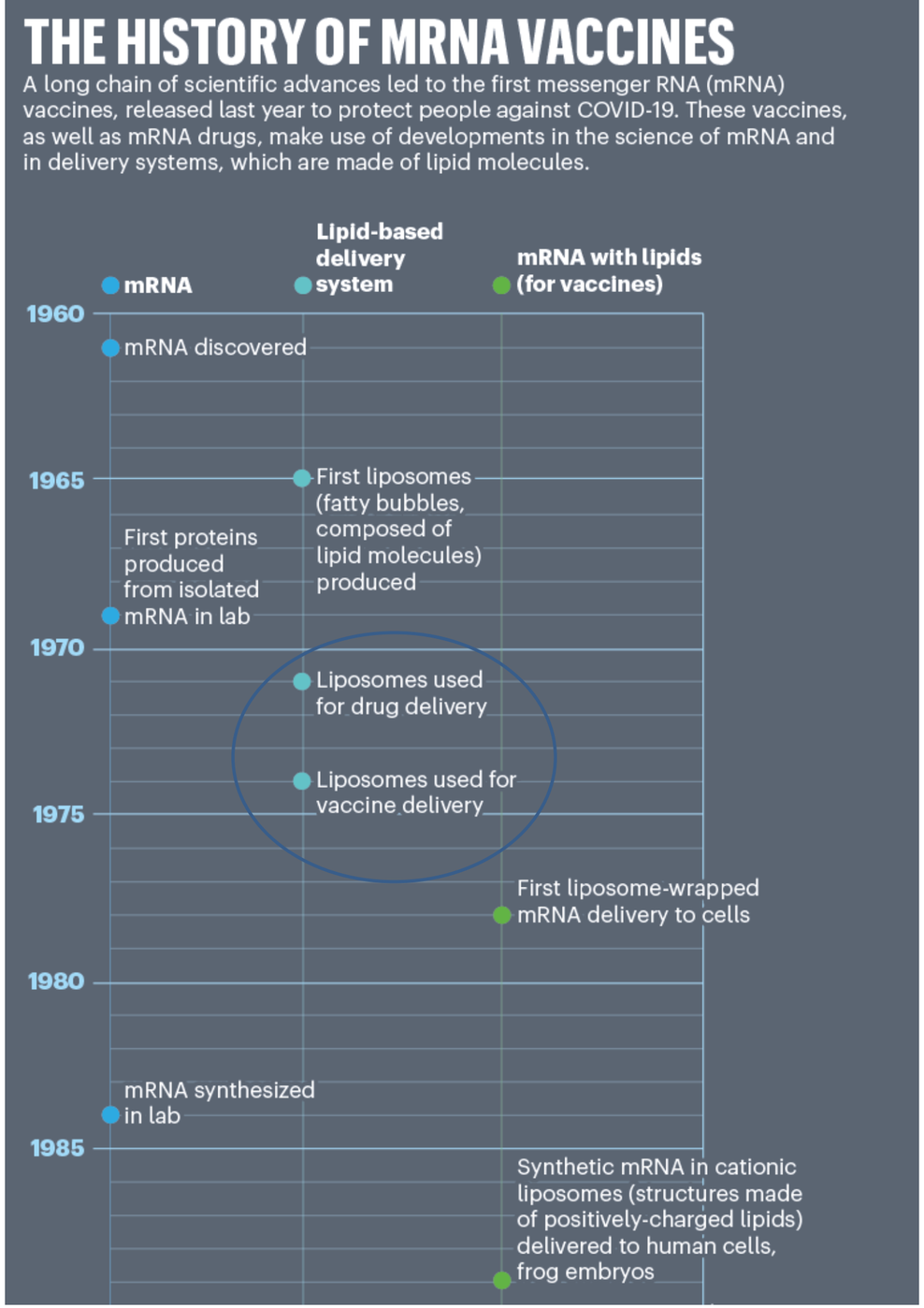


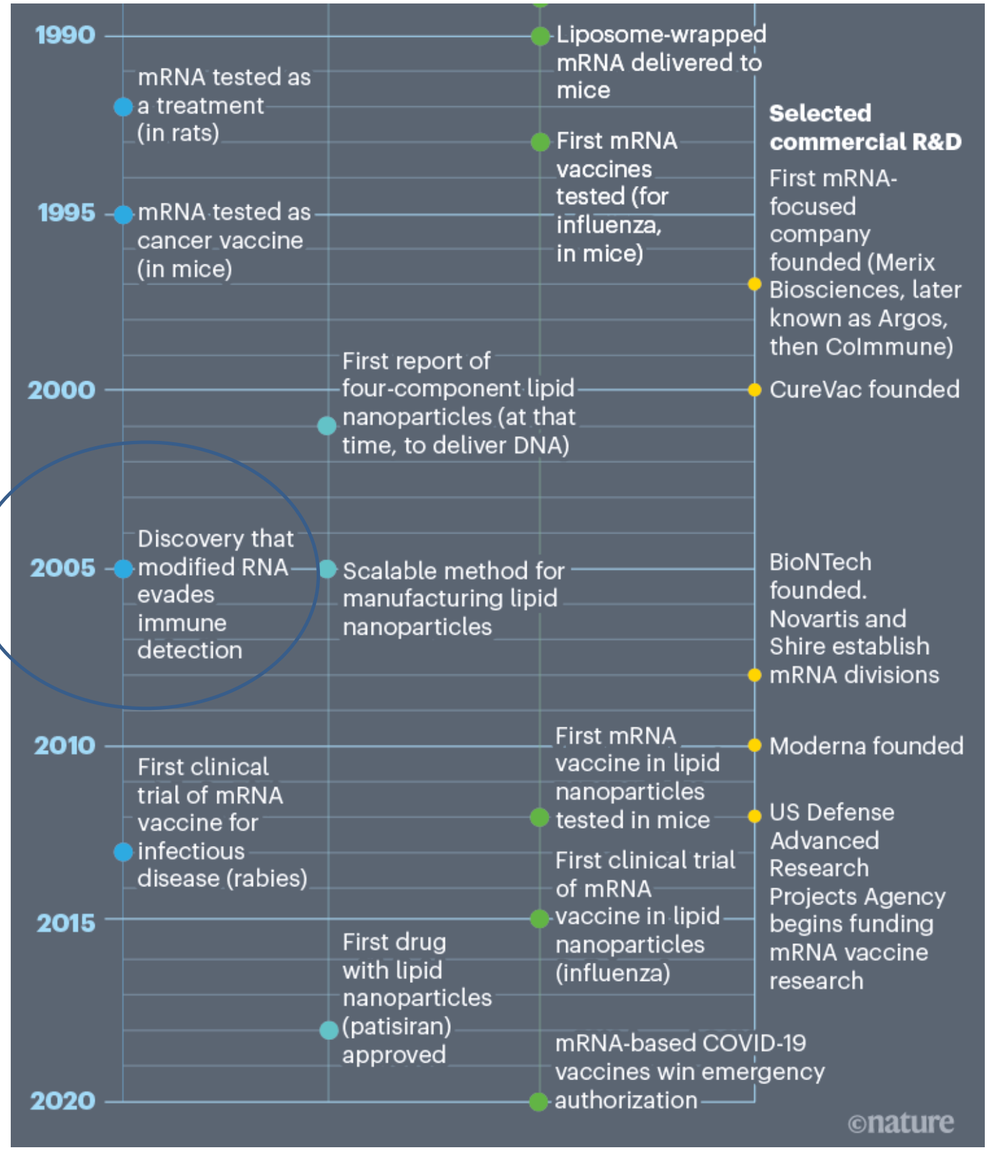



https://www.linkedin.com/pulse/knowledge-experience-creativity-dr-anadi-sahoo/

# mRNA Vaccine

Source: https://www.nature.com/articles/d41586-021-02483-w




**Lesson:**

**Innovation thrives in tangled co-developments in other fields. Connecting the dots is key. Interfaces are key.**

**Collaborations and staying connected is key.**

# Innovation


***"market introduction"***

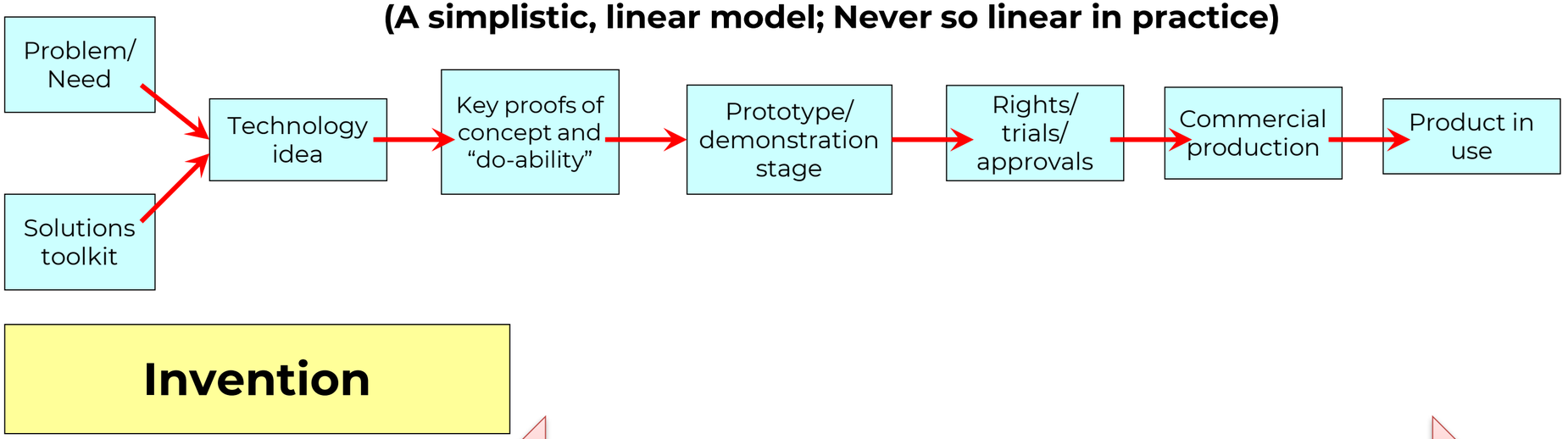
***"novelty"***

Organizational novelty


Technical novelty

# Innovation: Taking to the market

**(A simplistic, linear model; Never so linear in practice)**




**Invention**

~ 80% of work, time, investment

**Entrepreneurship – The vehicle for delivering innovations in a sustainable and scalable manner!**

In larger companies, **intra-preneurship and corporate venturing** play the same role.

Note: All the inventions that are remembered have successfully navigated this process!

## The real story behind penicillin

Source: https://www.pbs.org/newshour/health/the-real-story-behind-the-worlds-first-antibiotic

Alexander Fleming
Observation: 28 Sep 1928

- 1928: First observation by Dr Alexander Fleming, Bacteriologist
- **1938: Prof Howard Florey, Prof of Pathology; Dr Ernst Chain, Biochemist; Dr Norman Heatley, Biochemist; isolating the active ingredient of the penicillium mold juice, purifying it, figuring out which germs it was effective against, and how to use it. Producing adequate quantities for testing.**
- 1942: Anne Miller became the first civilian patient to be successfully treated with penicillin

# Technology Transfer: When it works

Problem/ Need

Solutions toolkit

Technology idea/ opportunity

Key proofs of concept and "do-ability"

Prototype/ demonstration stage

Rights/ trials/ approvals

Commercial production

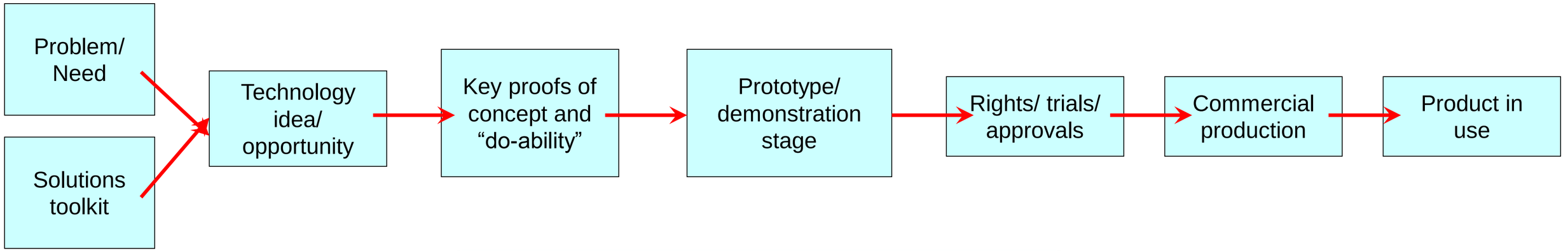
Product in use

Industry

Academia/ R&D



# The gap: Interests, motivations, expectations, trust

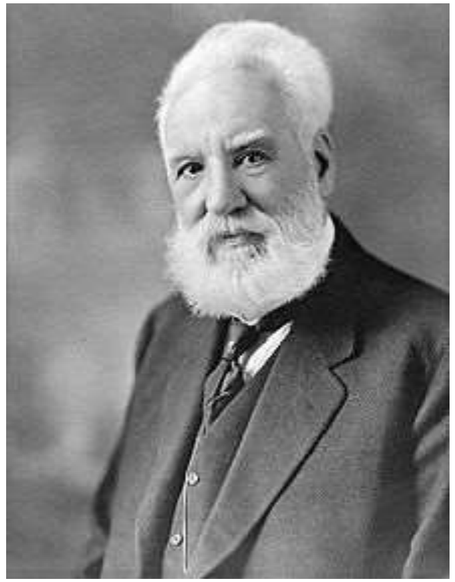



Inventors

**Gap**

- Potential opportunity and importance; Foresight
- Alternative investment opportunities
- Understanding of risk vs reward
- "Not made here"; Lack of champions

Business



Alexander Graham Bell

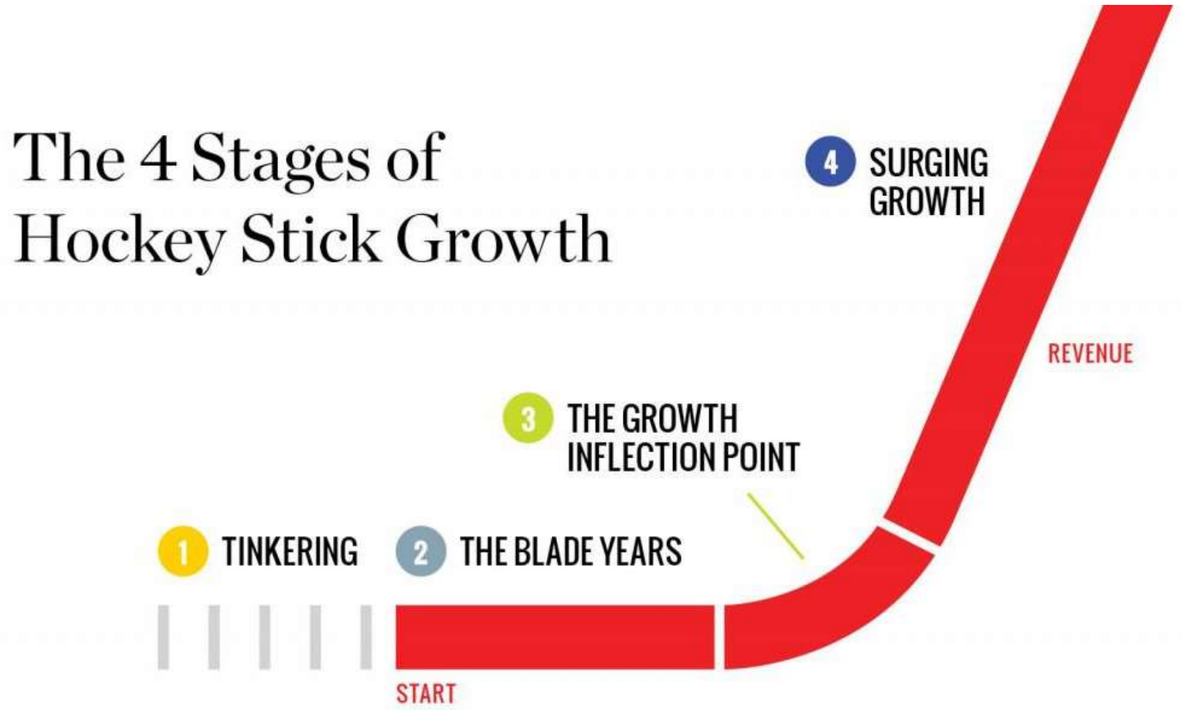

https://www.theguardian.com/technology/2007/aug/06/bellvwestern

# What are Startups?

# Essential elements in every business

- **Solve** a **problem** or meet an unmet need
- **Revenue model** built around the solution for the problem
- A **mechanism to pay for its cost**; eventually needs to be sustainable.

# Startups: An important category of business for a country aiming to pole vault ahead




- An early bet on uncertain, emerging/ **future opportunities** by a committed **entrepreneur**
- A new way to solve a problem; **Innovation**
- Systematic **de-risking** while you wait for the tide to turn
- Rapid **scaling**
- Raise/ attract **risk capital** to fuel rapid growth in a timely manner

https://www.forbes.com/sites/sageworks/2016/10/23/navigating-the-make-or-break-years-as-you-create-hockey-stick-growth/

# Examples

UBER

Unmet need:
Easy, predictable transport from A to B

**Vision of the future:**
**Nobody will want to own a car**

Solution:
App-based taxi hailing

**Innovation:**
**Business process innovation**

Revenue model:
Commissions

Type:
Disruptive, high risk

Resourcing:
- Venture Capital investments
- Partner (driver) investments


Unmet need:
Way to reduce COVID19 risks

**Vision of the future:**
**Human body manufacturing biopharma molecules**

Solution:
Vaccine for COVID19

**Innovation:**
**Technical innovation**

Revenue model:
Sale of vial of vaccine

Type:
Disruptive, high risk

How costs are covered:
-- Grants
-- Venture Capital investments
-- Strategic partnerships
-- Forward POs, sovereign indemnity
-- Now revenues

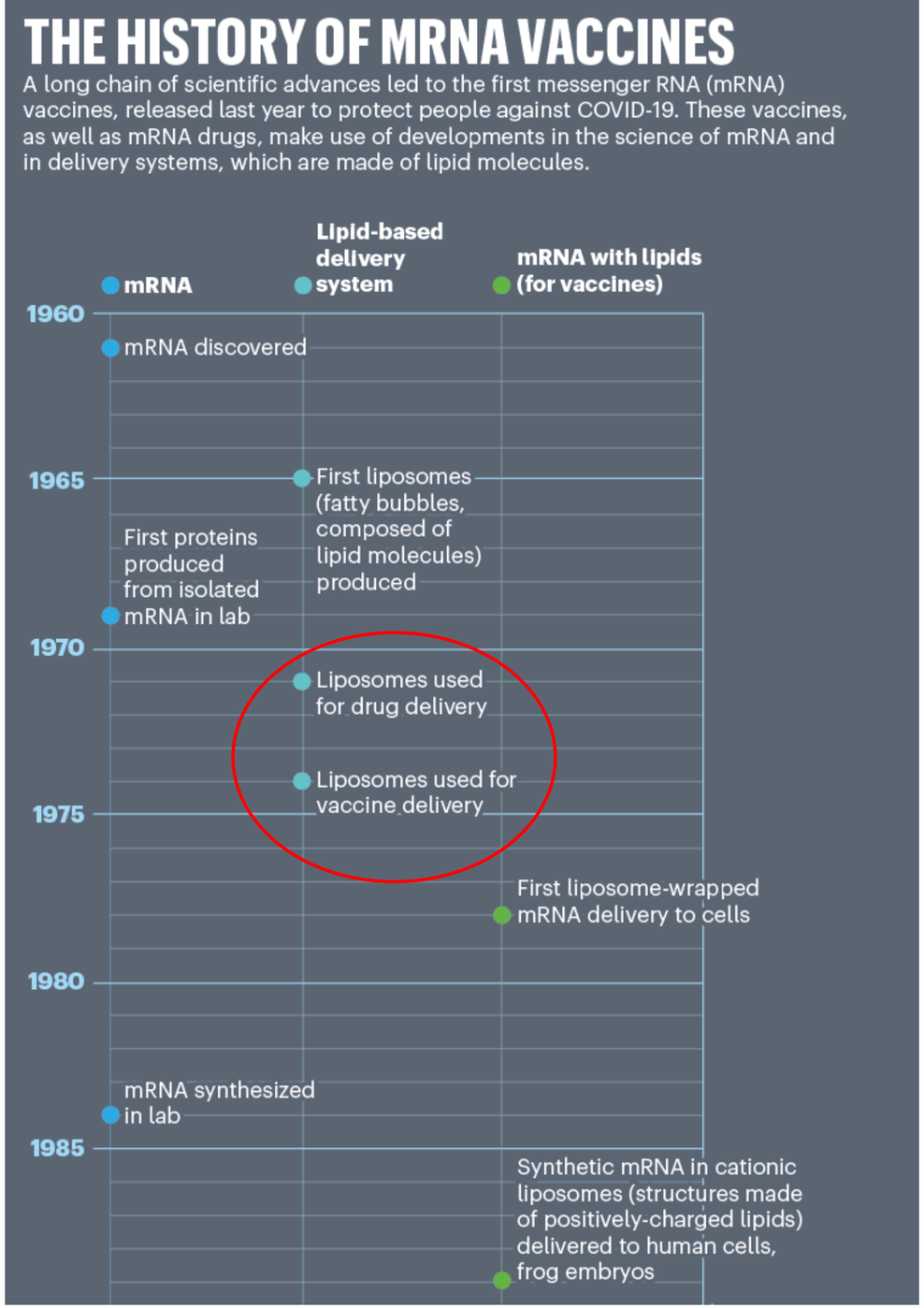
# Science-led Startups?

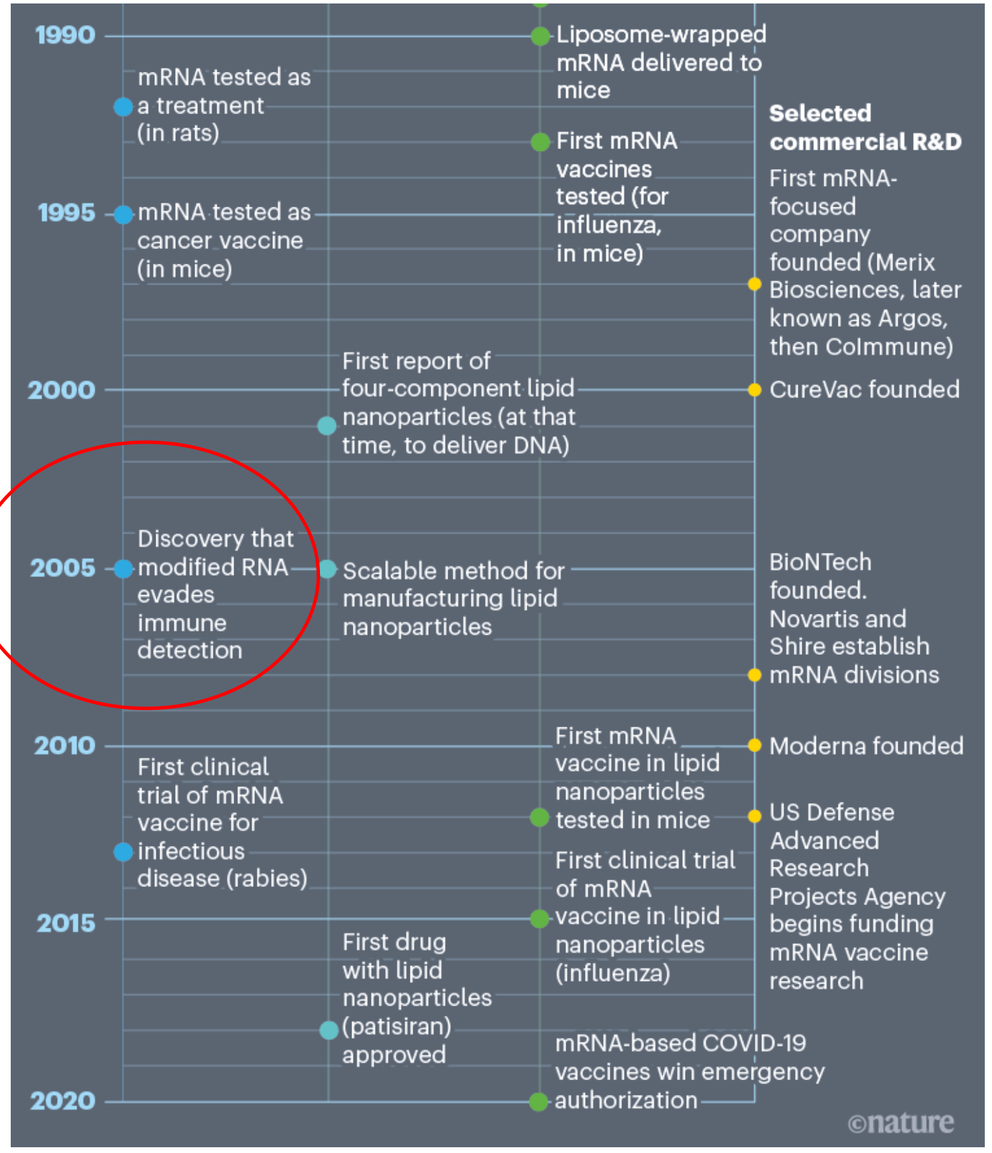
# What are science-based deep-tech startups?

- Commitment towards a vision of future opportunities inspired by developments in science and technology. **(CHAMPIONS, VISIONARIES)**
- Technical novelties or inventions making possible the new solution being proposed. **(INVENTORS)**
- Rigorous and systematic scientific studies guiding the de-risking and validation process; Role of key opinion leaders. **(RESEARCHERS)**
- Key differences and complexity in timelines, resourcing and ecosystems **(INNOVATION MANAGERS)**

# mRNA Vaccine

Source: https://www.nature.com/articles/d41586-021-02483-w

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15 years of service to the Nation

# Inventors are important!


Dr. Drew Weissman (U Penn)
Dr Katalin Karikó (UPenn; RNARx; BioNTech)

Inventors: Non-immunogenic, nucleoside-modified RNA

Lasker Award 2021;  Breakthrough Prize 2021; Nobel 2023

https://edition.cnn.com/2021/09/24/health/lasker-awards-mrna-weissman-kariko/index.html

# But technology commercialization champions are key!

Özlem Türeci (left) and Uğur Şahin (right) co-founded the mRNA vaccine firm BioNTech

https://www.nature.com/articles/d41586-021-02483-w

# Startups can be the ”best friends” of researchers

BULLETIN ON ENTREPRENEURSHIP: NO. 1, APRIL 2023 | Subscribe

## Startups Drive Commercialization of High-Impact Innovations

*Patents commercialized by startups are more likely to be disruptive than those commercialized by incumbent firms or universities.*

“Start ups have more incentive than incumbent firms to engage in potentially disruptive R&D because large, established firms have more to lose from the discovery of new technologies that replace traditional ways of doing things. With no existing operations, startups have nothing to lose and much to gain from disruptive innovation.”

NBER | NATIONAL BUREAU of ECONOMIC RESEARCH

https://www.nber.org/be/20231/startups-drive-commercialization-high-impact-innovations

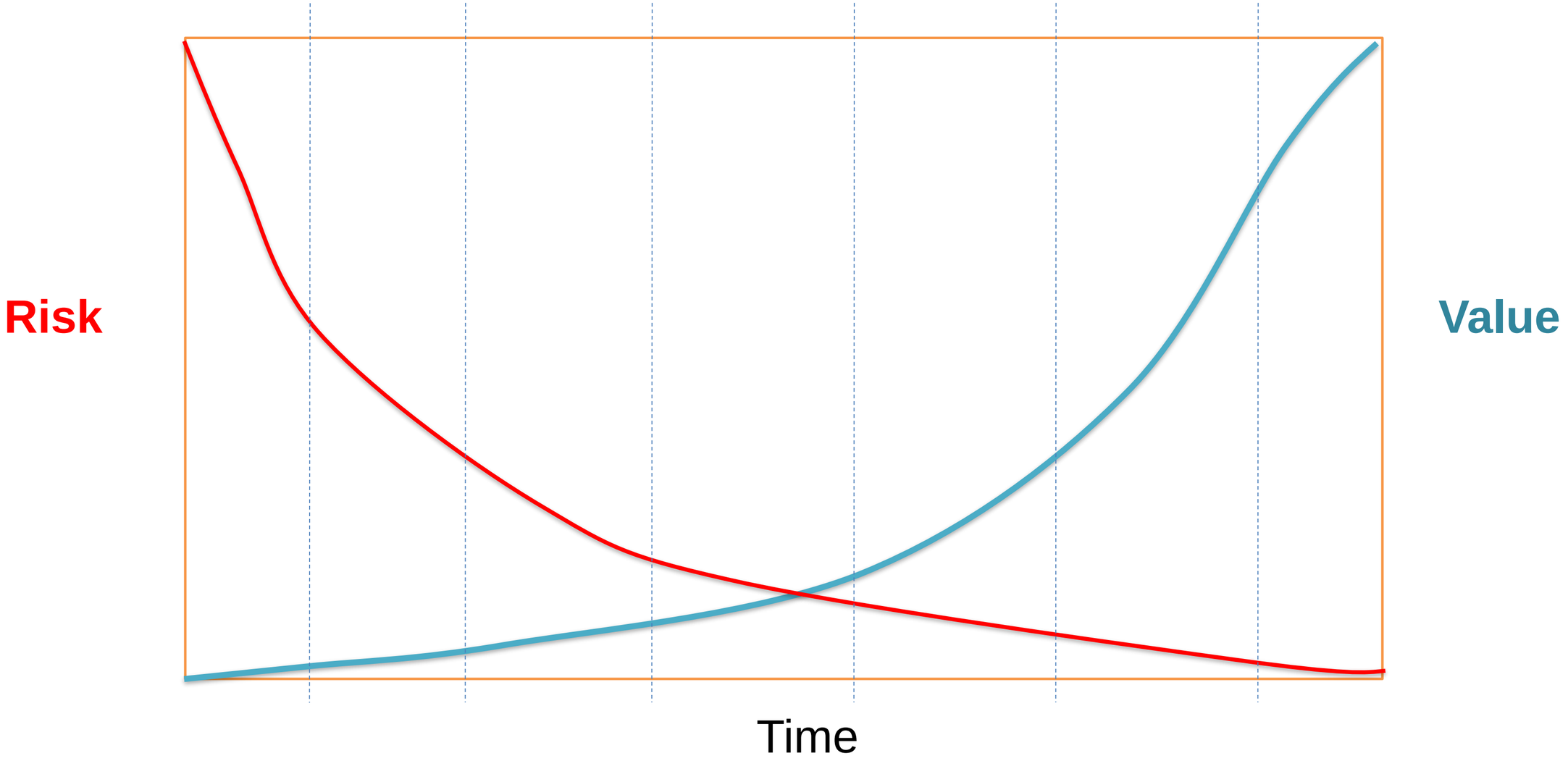
# A Few More Lessons for Researchers

# Innovation is a team sport!
# A marathon and not a sprint

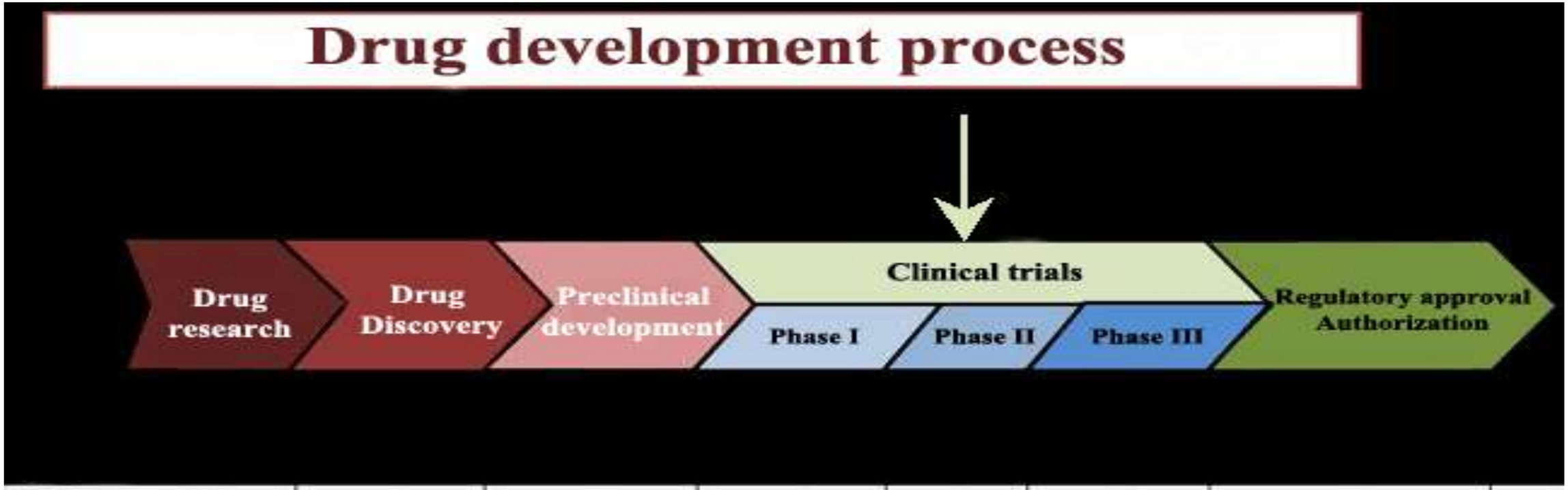
Usain Bolt
100 m dash


Eliud Kipchoge + 43 world class athletes
Marathon in 2 hours

# Innovation progresses as a sequence of de-risking steps



# Example: De-risking in drug development



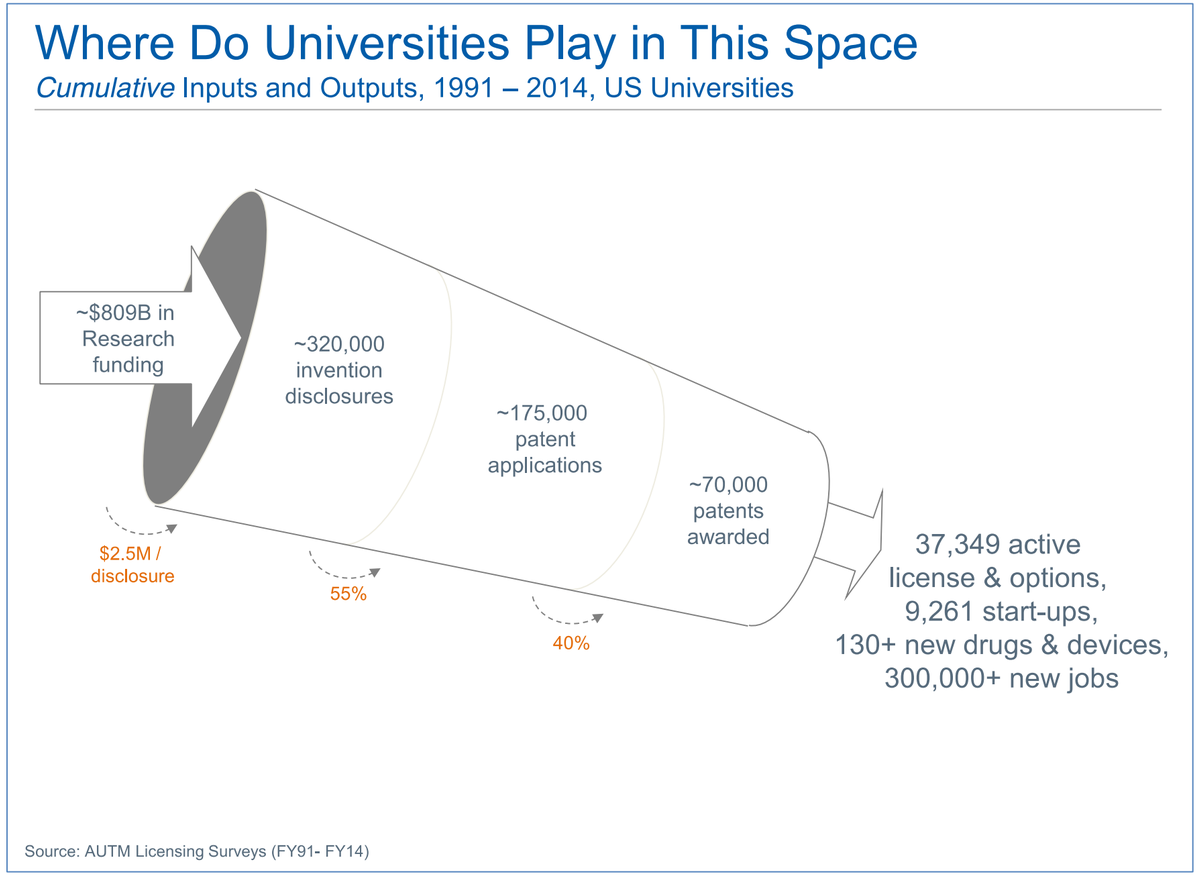

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Time (years)** | 2,5 | 3 | 1 | 1,5 | 2 | 2,5 | 1,5 |
| **Cost (% total)** | 4% | 15% | 10% | 15% | 22% | 31% | 3% |
| **Success probability** | | 0,0001% | 1-5% | 10% | 30% | 80% | 95% |

Source: http://www.davidfunesbiomed.eu/2016/03/141-clinical-research-overview.html

# Lesson: Innovation is a portfolio activity. It is difficult to pick winners upfront!

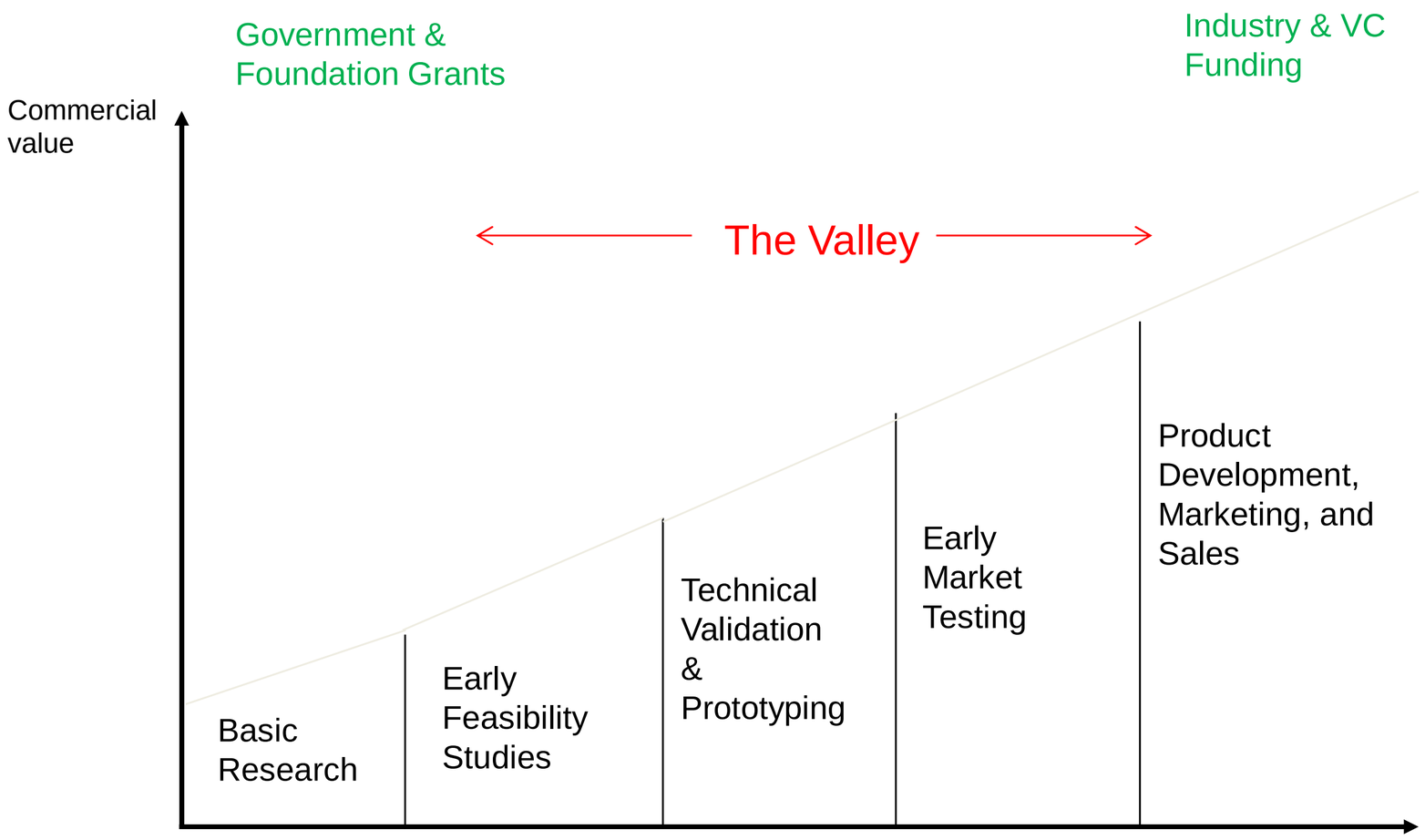
- Example: Google
- Example: Tesla
- Example: Ather

**Investment in innovation should not be treated as an investment in a production process. It is like an investment in a defense forces. It is done to create "options".**



# The challenges in India & approaches to address them

# What is “The Valley of Death”




Courtesy: Orin Hershowitz, Columbia Technology Ventures

# The typical problems

**Typically observed problems in the valley of death**

- Not identifying and defining problems well and carefully! Sometimes contrived or superficial problem definitions.
- Poor focus and poor commitment to the end-product
- **Difficulty finding the product “champion”; the “entrepreneur”; startup founder or champion in licensee companies**
- **People who have technology foresight and are comfortable with technology risk; experience with technology de-risking.**
- Inability to assemble key starting ingredients/ enabling resources for startups
- Key gaps in the ecosystem – financial resources, facilities, expertise, partners etc.
- Insurmountable barriers – ex: regulations, entrenched players, scale of investments etc.

# About TechEx.in

ABOUT

# TechEx.in

- TechEx.in is a Resource Center of Venture Center (India’s leading inventive enterprises incubator hosted by CSIR-NCL, Pune).
- TechEx.in is designated as a Regional Technology Transfer Office (RTTO) by BIRAC (DBT, Government of India) and supported by the National Biopharma Mission.
- TechEx.in aims to support Technology Commercialization journeys!
- It will facilitate exchange and transactions related to any science/engineering based technology ideas.

# CONTACT US

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