ARAB REPUBLIC OF EGYPT
MINISTRY OF FOREIGN AFFAIRS

ACADEMY OF SCIENTIFIC
RESEARCH AND TECHNOLOGY

WIPO
WORLD **INTELLECTUAL**
PROPERTY ORGANISATION

Second WIPO Inter-Regional Meeting on South-South Cooperation on Patents, Trademarks, Geographical Indications, Industrial Designs and Enforcement

Supporting Innovation, Technology Transfer, Patent Information and Knowledge Dissemination. National and Regional Experiences

IP for Development – Indian Approach

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OPEN SOURCE DRUG DISCOVERY

CSIR INDIA

Innovation is Market Driven

Technology: Push and Pull Factors

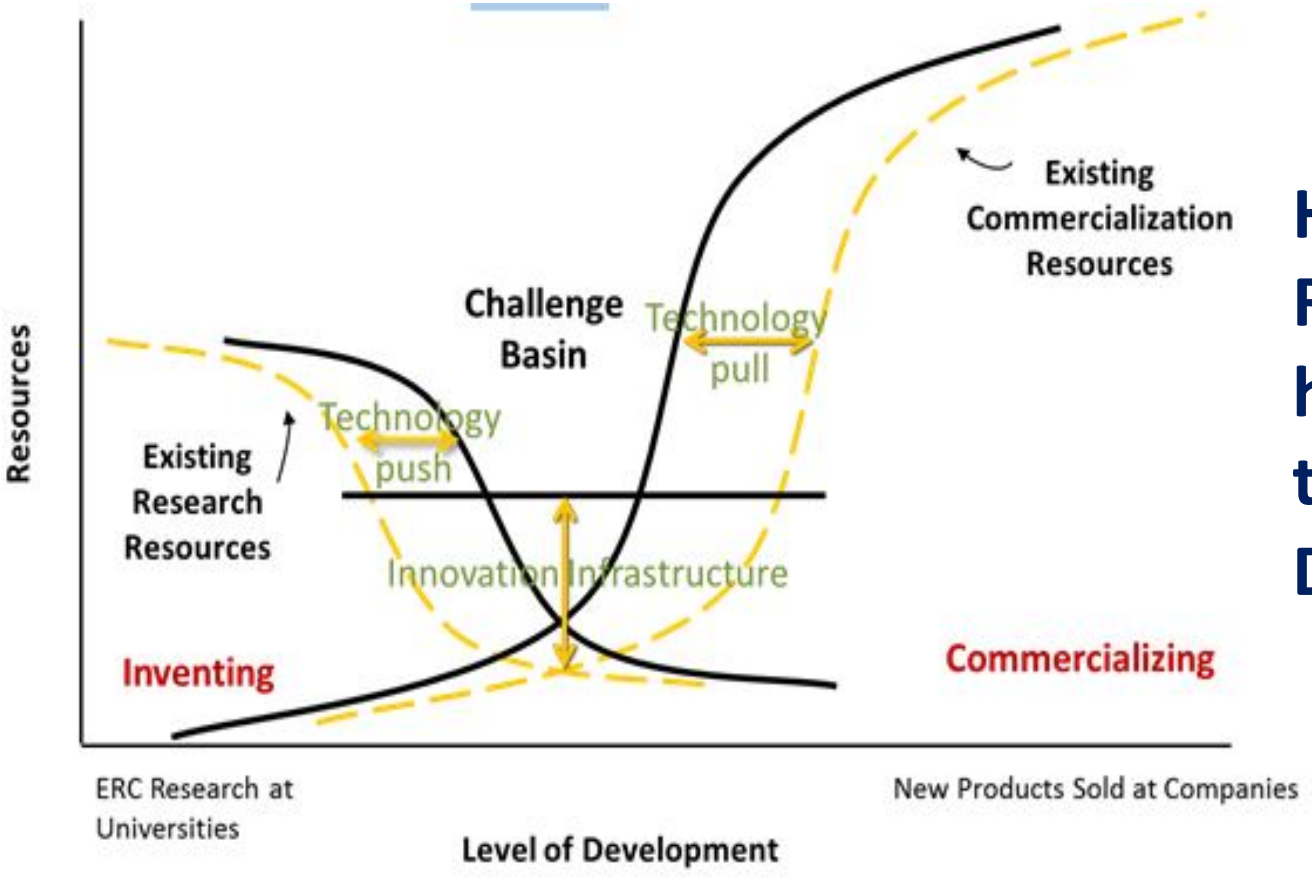
Most Developing Nations need Technology Push as local demand for technology is not there in all sectors;
Need to support Technology Push

Innovation Ecosystem

Components/Requirements

- **Market Forces**
- **Skilled Human Resource**
- **R&D Infrastructure and capability**
- **Legal System supporting innovation, including regulatory and IP framework**
- **Availability of venture capital**
- **Policy Environment**

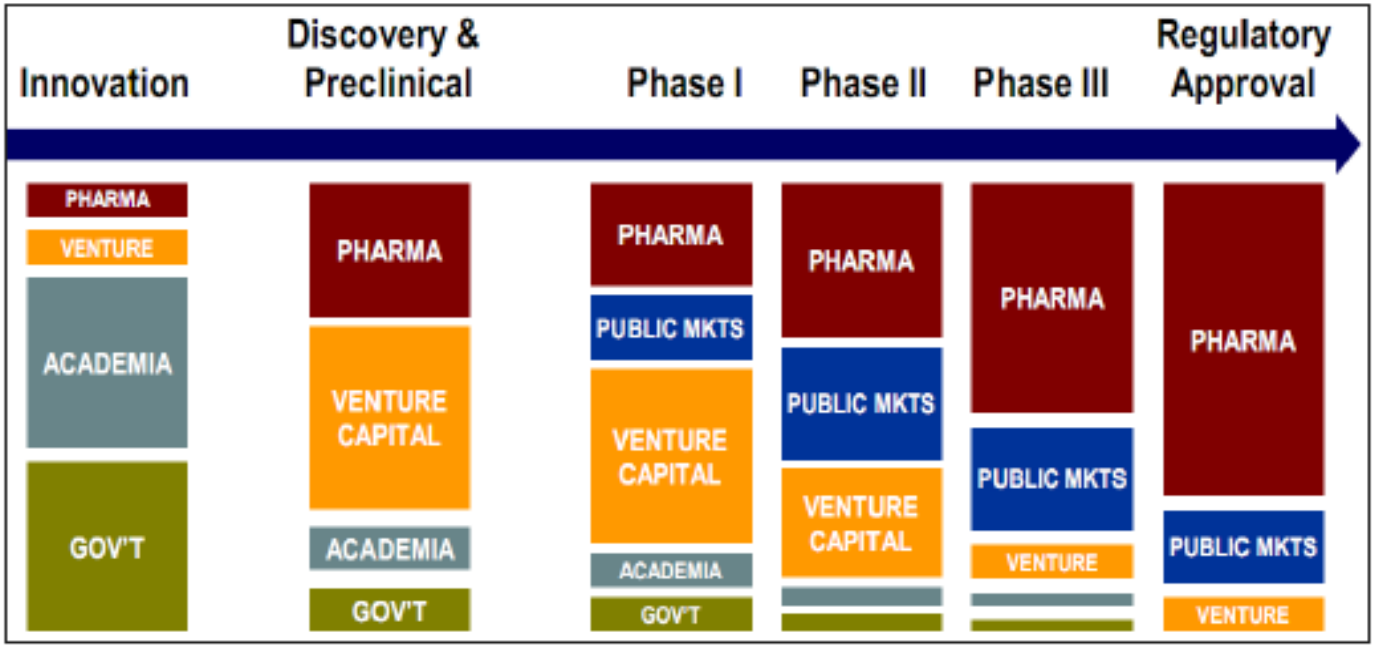
Converting Valley of Death into a Risk-Opportunity Pool



Handholding Required to help out of the Valley of Death

http://www.erc-assoc.org/best_practices/53-building-innovation-ecosystem

Who is Innovating?



580+ Pharmaceutical Deals were struck in 2011 involving Academic Institutions / Governmental Agencies

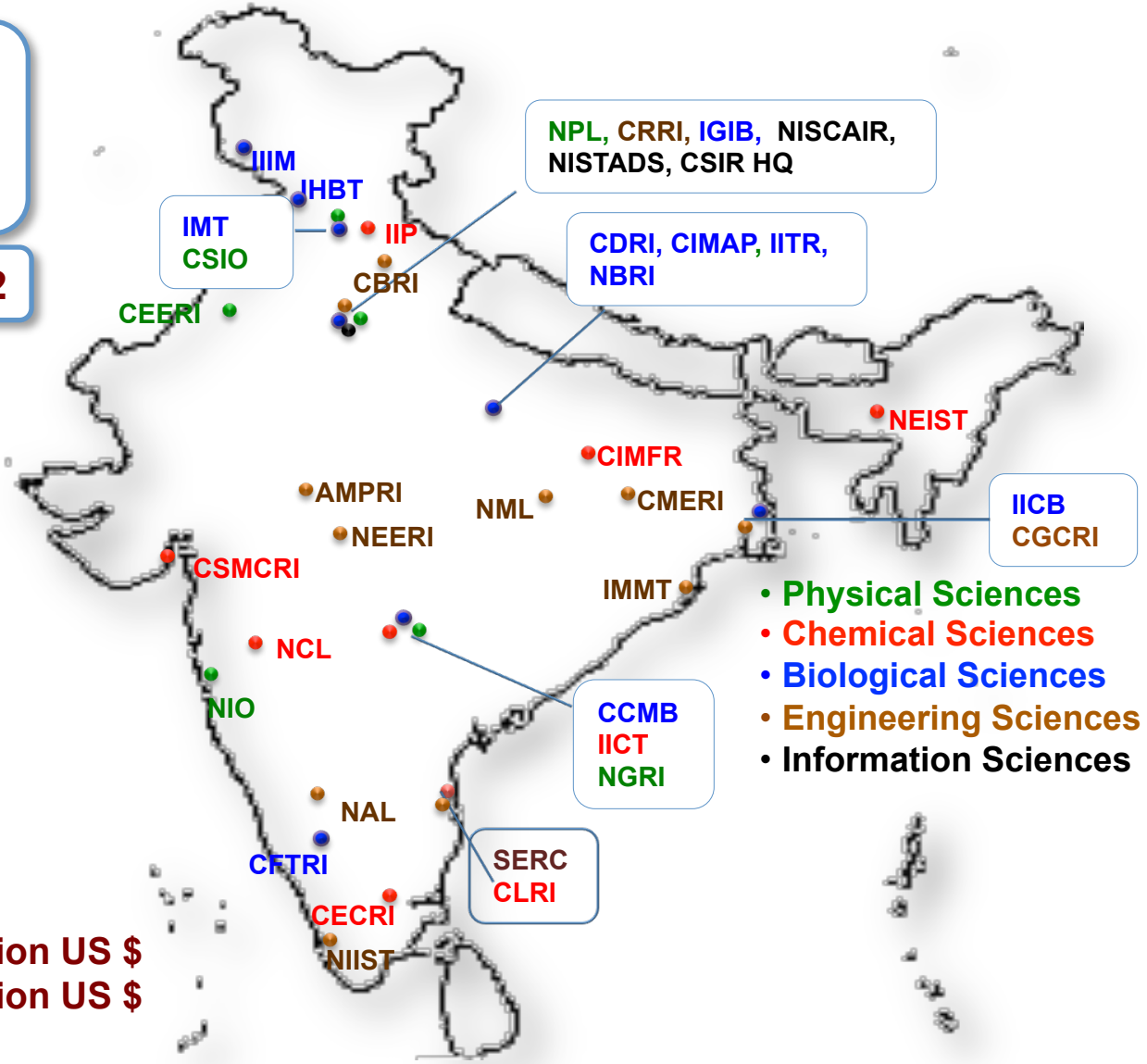
Source: Thomson Reuters

Council of Scientific and Industrial Research

Total No. of Laboratories/ Institutes: 37

Outreach Centres: 39

CSIR Society formed in 1942



- Physical Sciences
- Chemical Sciences
- Biological Sciences
- Engineering Sciences
- Information Sciences

Scientists	~ 4,600
S &T Support	~ 8,000
Total manpower	~ 17,000
PhD Students	~ 3,300
Research Asst	~ 7,000
Annual Budgetary Support	~ 600 Million US $
External Earning	~ 100 Million US $

Utilization of CSIR's Inventions

Total Patents in force (India)	2350
Total patents in force (abroad)	3250
Total Patent granted (India)*	1507
Total patents granted (abroad)*	1282

* Figures for 11th FYP only

US Patents Granted (till September 2011)

Organisation	No. of Patents Granted	% Contribution
CSIR	1231	90.32
IITs + IISc	43	3.15
Others	89	6.53

Utilization of CSIR's Patents in Force : 9 %

Worldwide Rate of Patent Utilization : 3-5 %

Source: USPTO

Increasing Technology Depth in MSME Sector

Developing Economies Need to Support MSME sector for Job Creation

Preferred Mode of licensing adopted by CSIR:
Non Exclusive transfer of technology without motive of financial returns

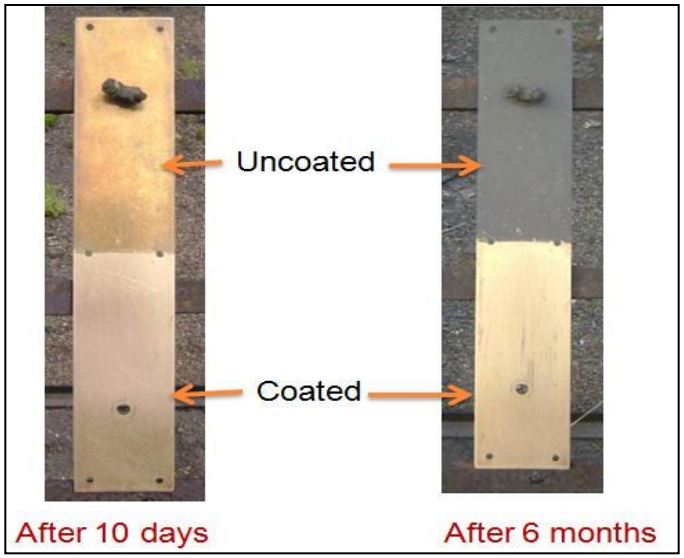
Moradabad Brassware Cluster : New Sheen to Brassware

CSIR-NInC Initiative for Technology depth for MSME Clusters

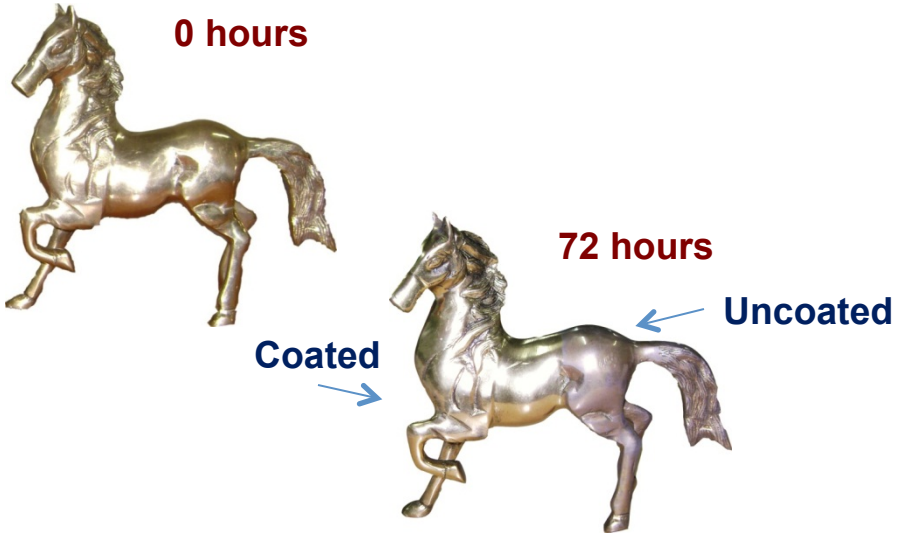
CSIR–NML New Lacquer Product Innovation:

- 2-4x less time (15min) to dry. No baking oven needed
- 50x more storage time (2 years) for lacquer formulation
- 25-30% less cost of lacquer
- Low gloss (natural metal) finish rather than high gloss finish (plastic-like)
- Moradabad products now compete in global market

Outdoor Exposure test



"Flower of Sulfur Test" (ASTM B 809)



Agartala Bamboo Cluster

Before – After Scenario		
Parameter	**Before Intervention**	**After Intervention**
Minimising use of Jiget	100% Jiget dependency	Minimised the use of Jiget by about 30% through Formulation-A and about 60% through Formulation-B
Availability of raw material used as adhesive	Litsea glutinosa Tree (Source of Jiget) take 5-6 years to mature)	Aromatic plant used in the improved Formulation-B is a short duration crop of 4-5 months and easily ciltivable
Use of other floral bioresource or aromatic plants	Only coal powder used with Jiget powder in Agartala	Use of bioresources available in Agartala such as Bamboo, saw dust powder and easily cultivable aromatic plants can be used
Burning time of Agarbattis	25-30 minutes	40-45 minutes

Envisaged Impact of CSIR-CIMAP Technology

- 2.5x increase in production
- Increase in livelihood opportunities
- 13-20% reduction in cost
- 100-120% increase in turnover
- 20-30% increment in monthly family income

Litsea glutinosa- Jiget plant; Bark (in set)

Floral bioresource

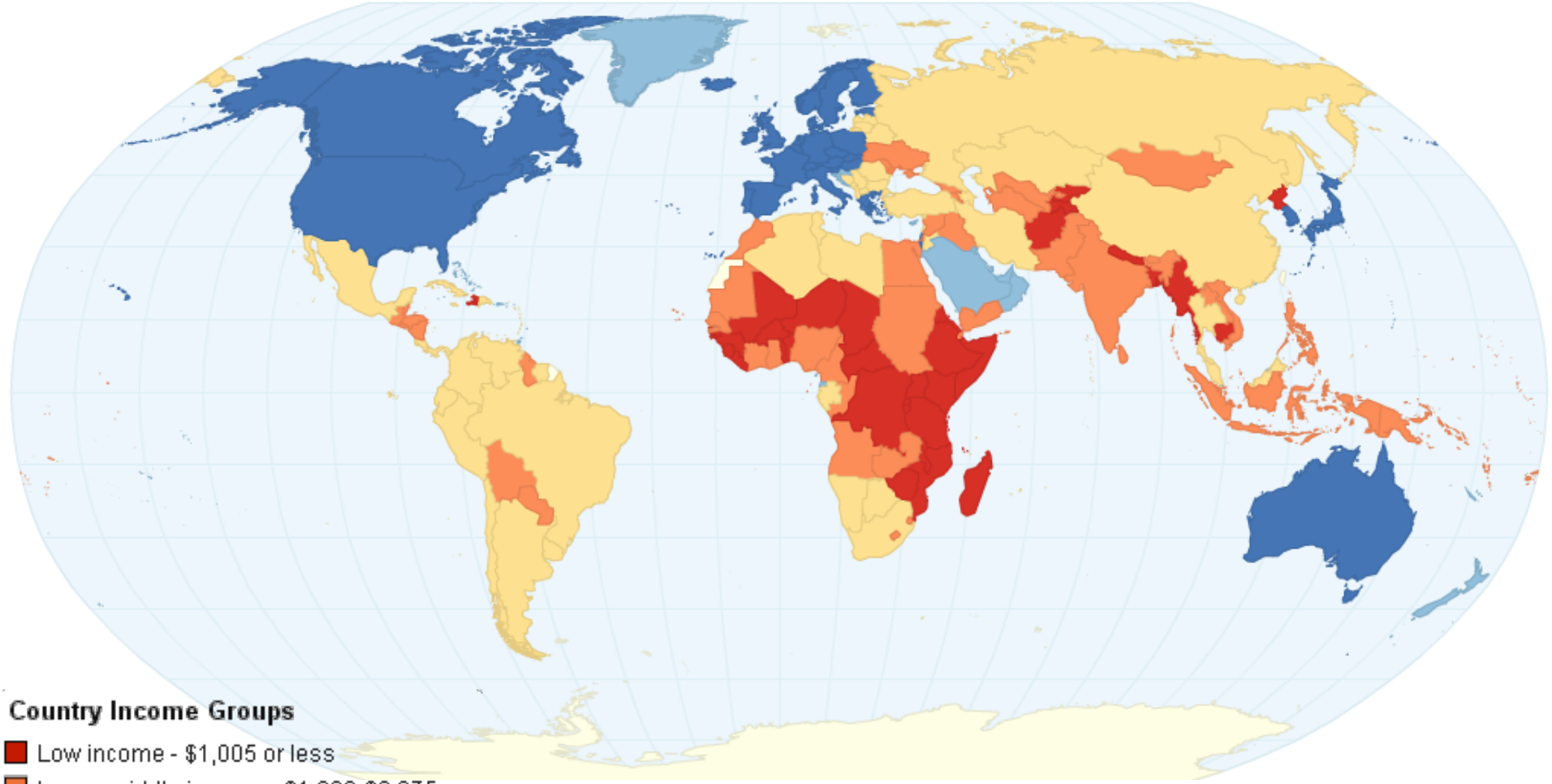
Aromatic plant seeds

Technology demonstrated to the women artisans

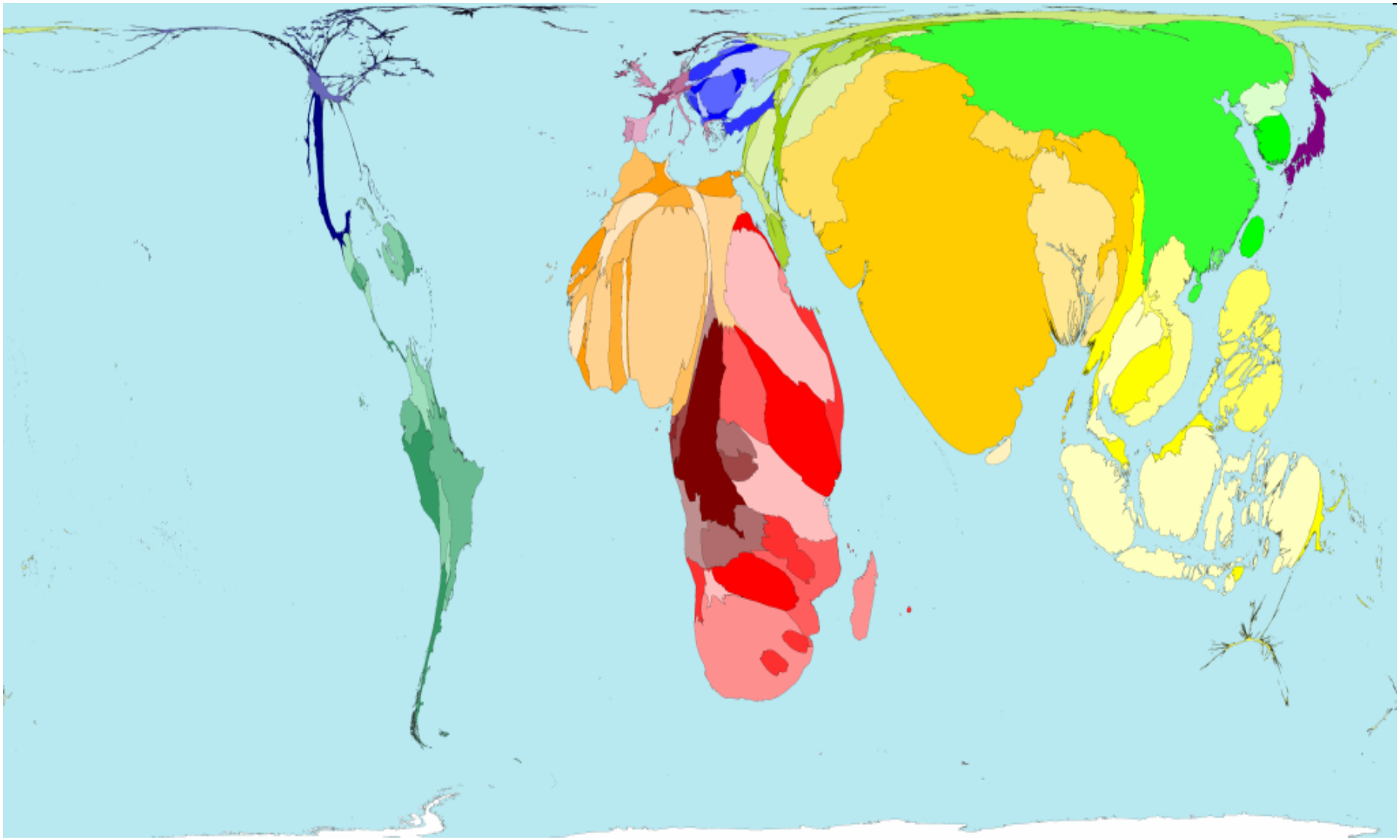
Innovating where Markets do not Exist

Open Source Drug Discovery

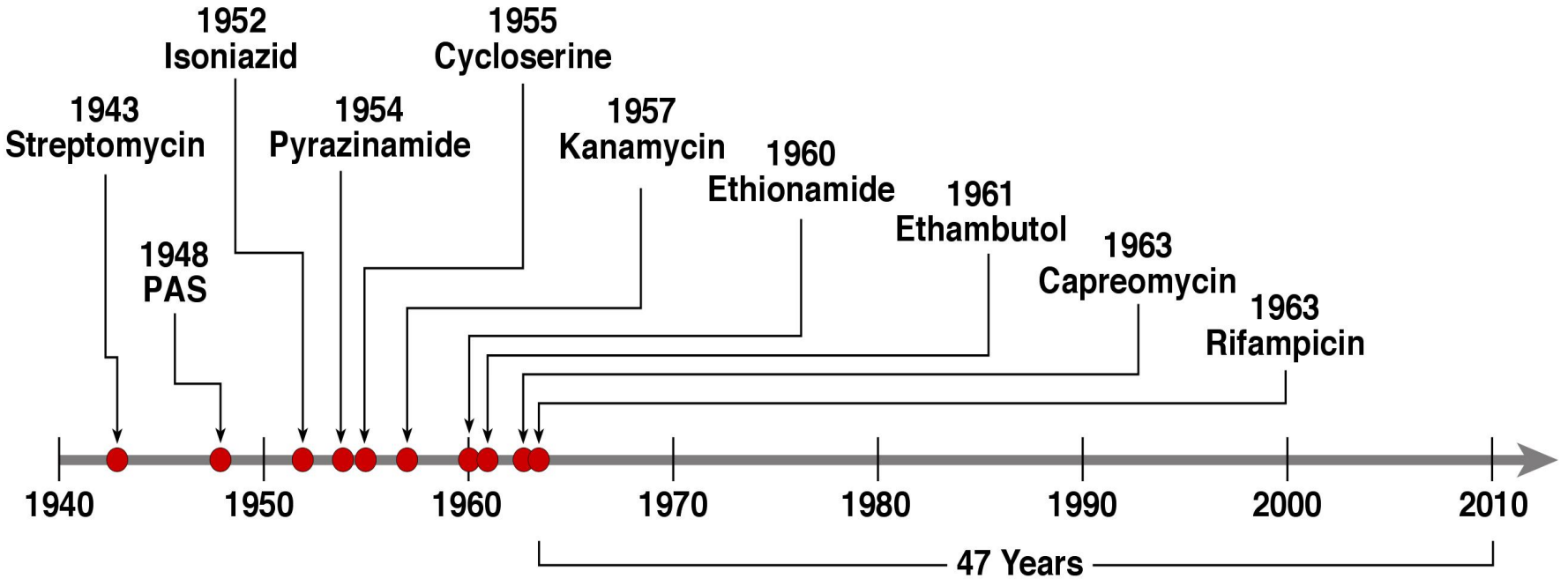
Incidence of TB: Country Income Groups
(World Bank Classification)



A World Map Based on TB Incidence

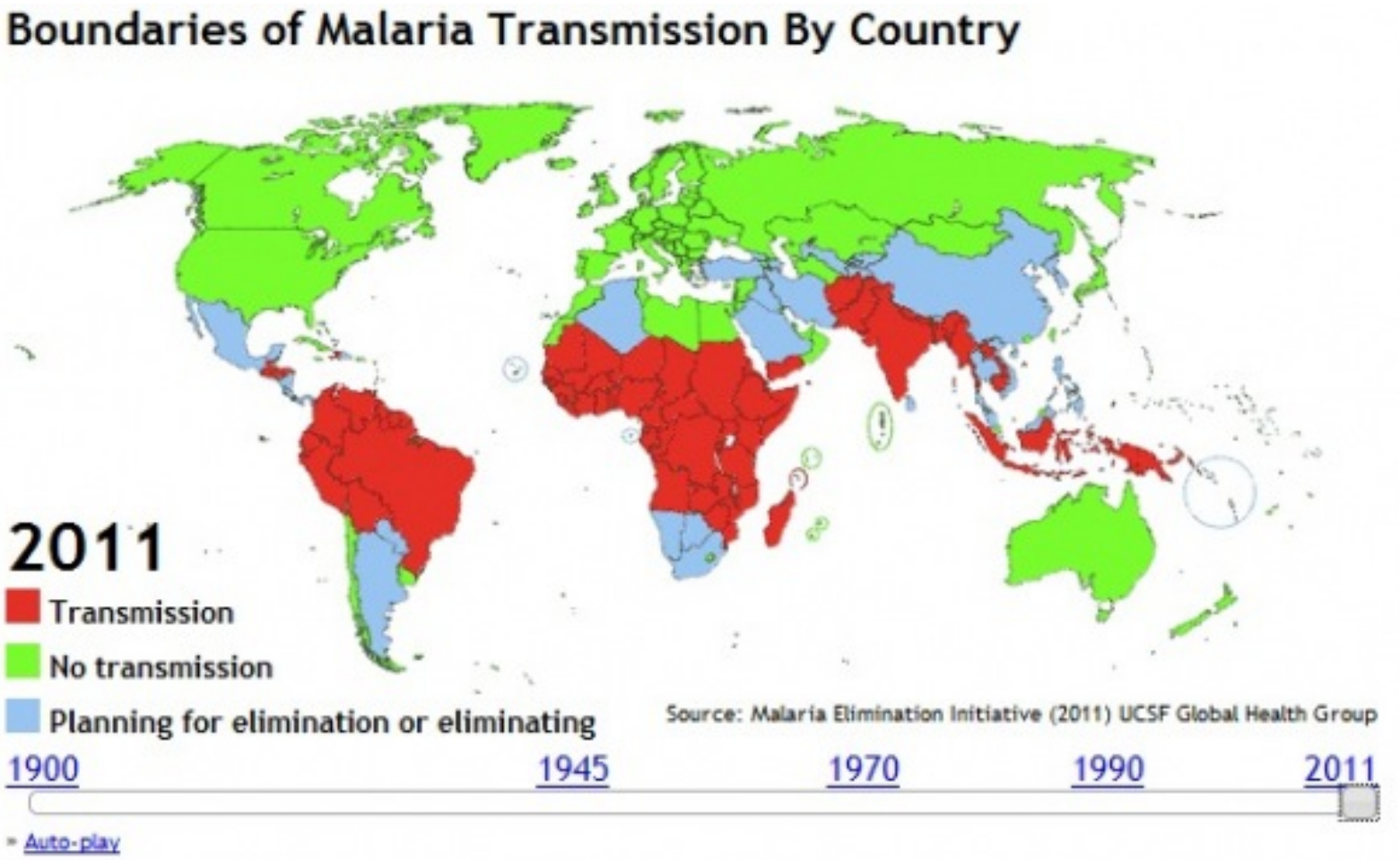


TB Drug Discovery

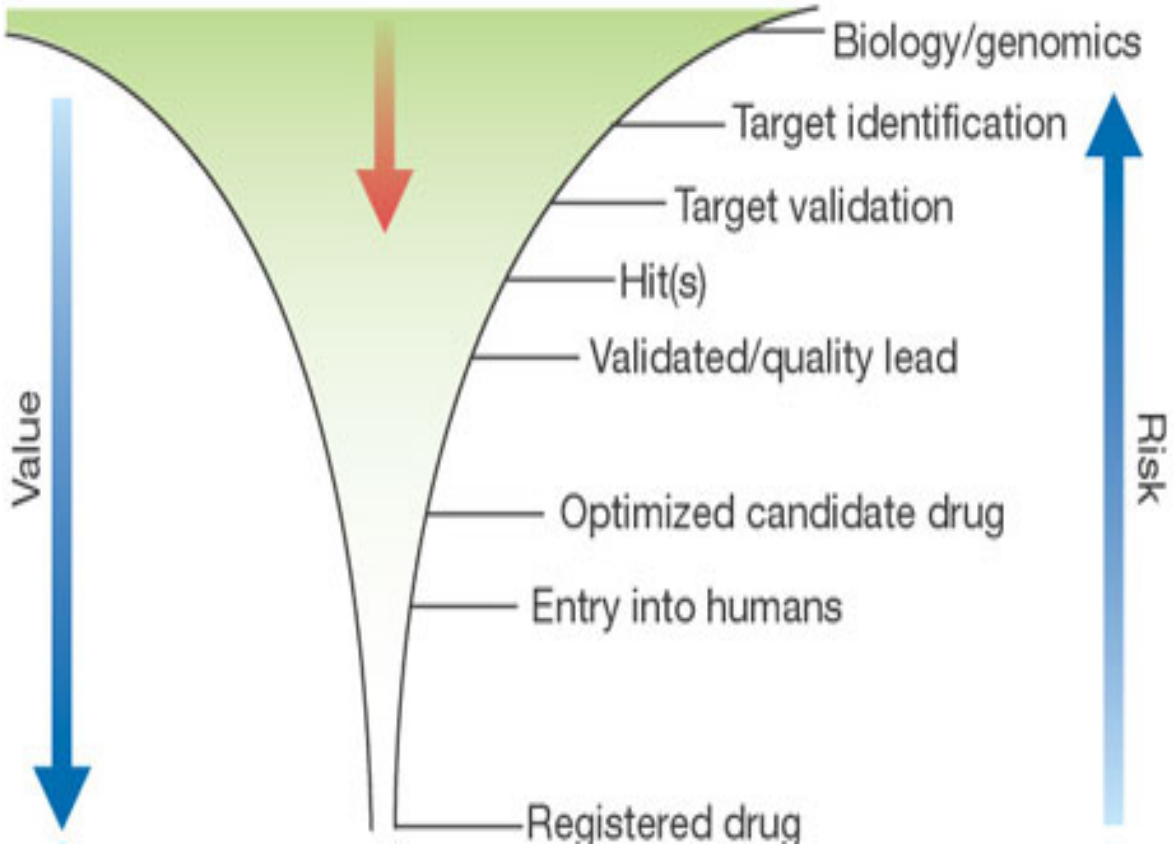


Source: Ma and Lienhardt, *Clin Chest Med*, 2009

Malaria Transmission, 2011

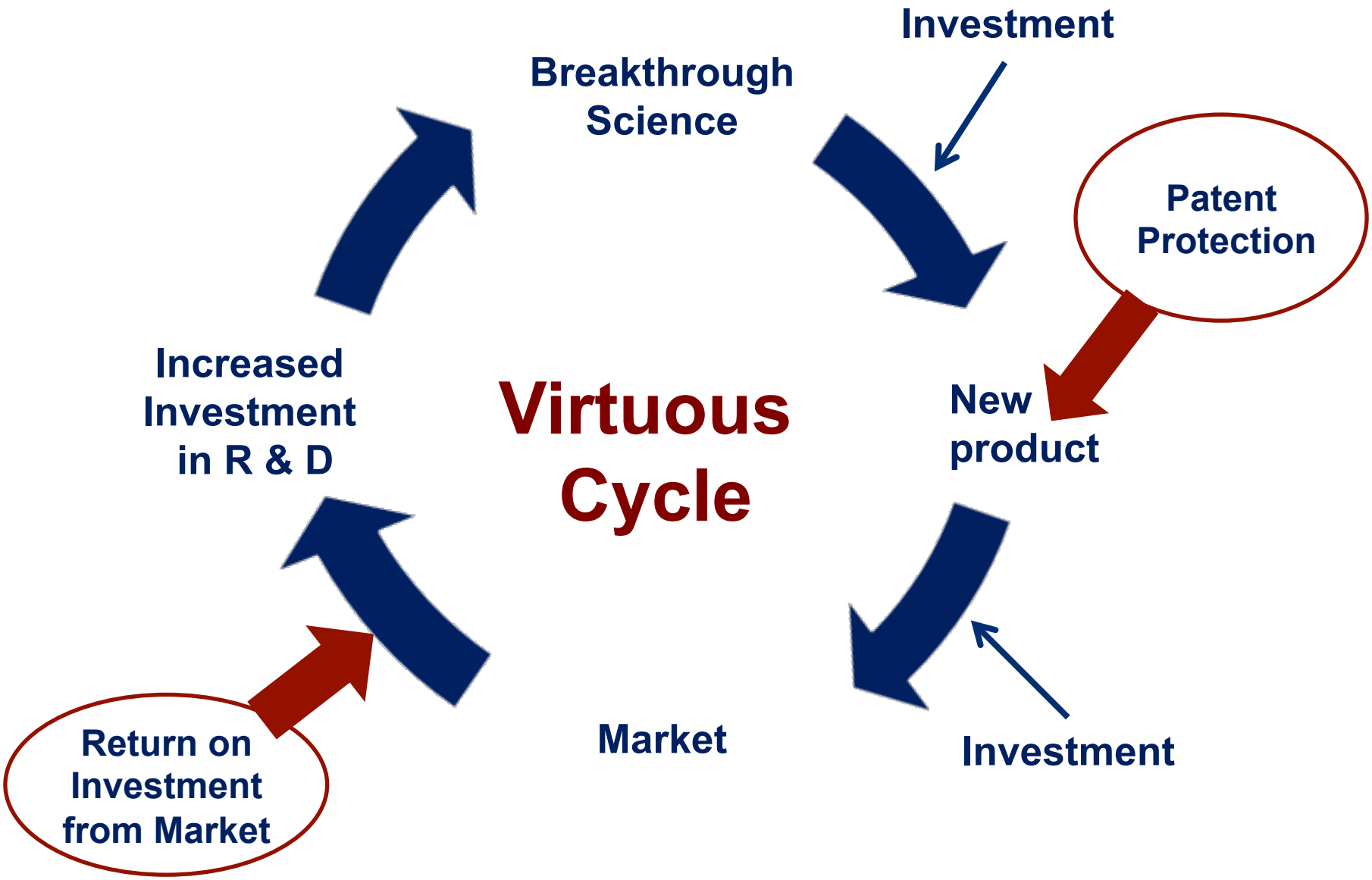


Neglected Diseases Drug Discovery: Issue with the Funnel

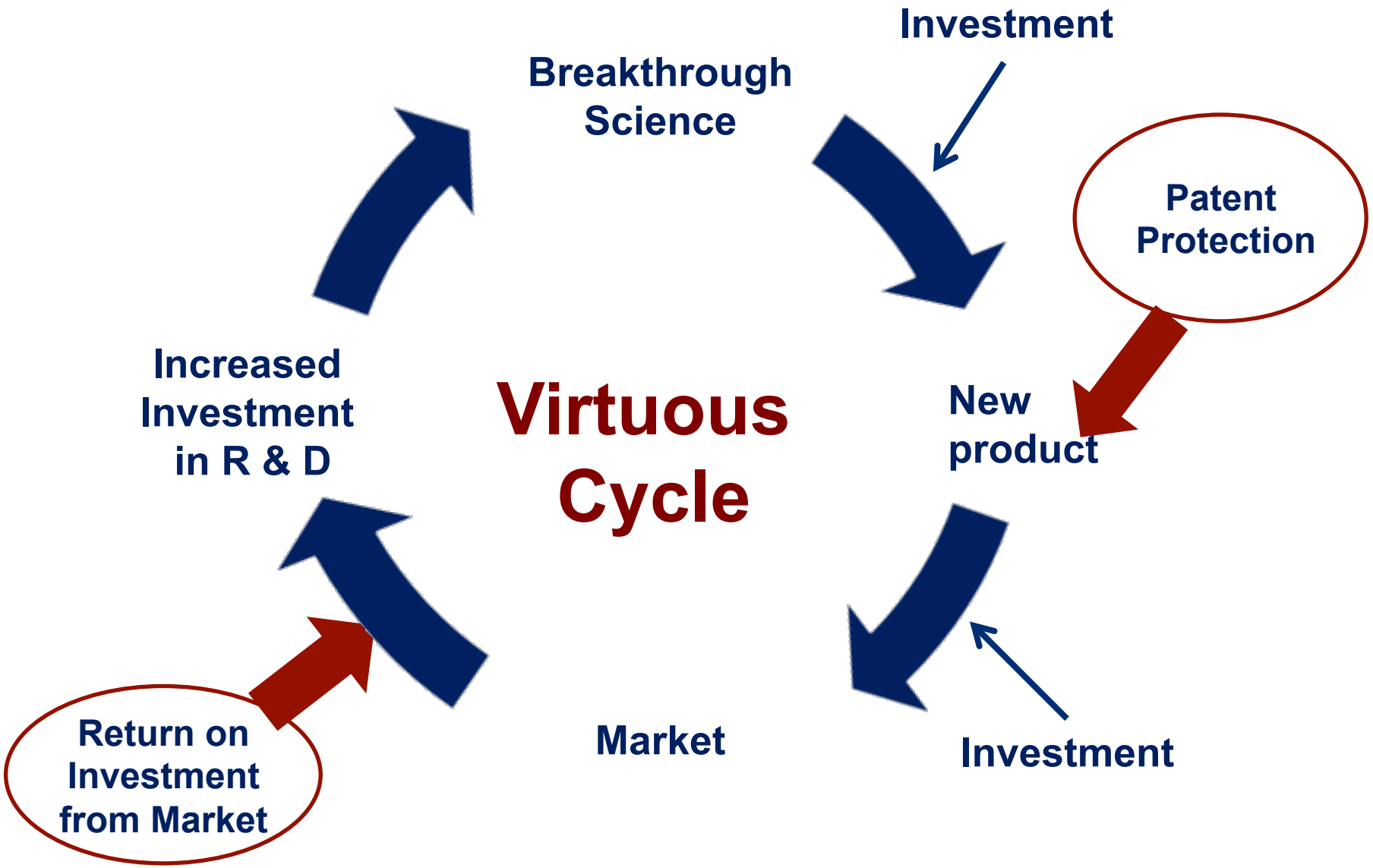


Robert G. Ridley: Medical need, scientific opportunity and the drive for antimalarial drugs, *Nature* 415, 686-693

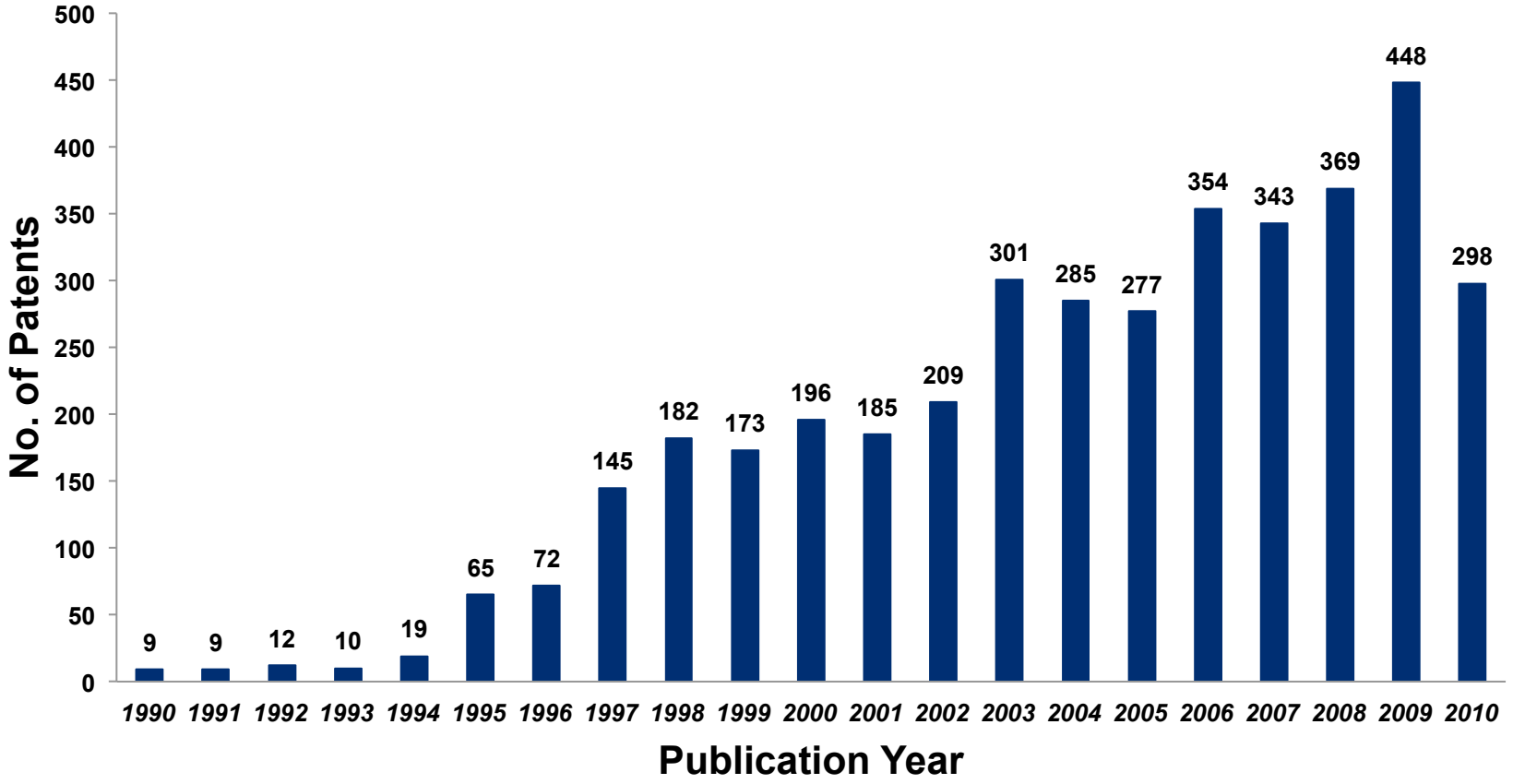
Issue with the Innovation Model



Issue with the Innovation Model

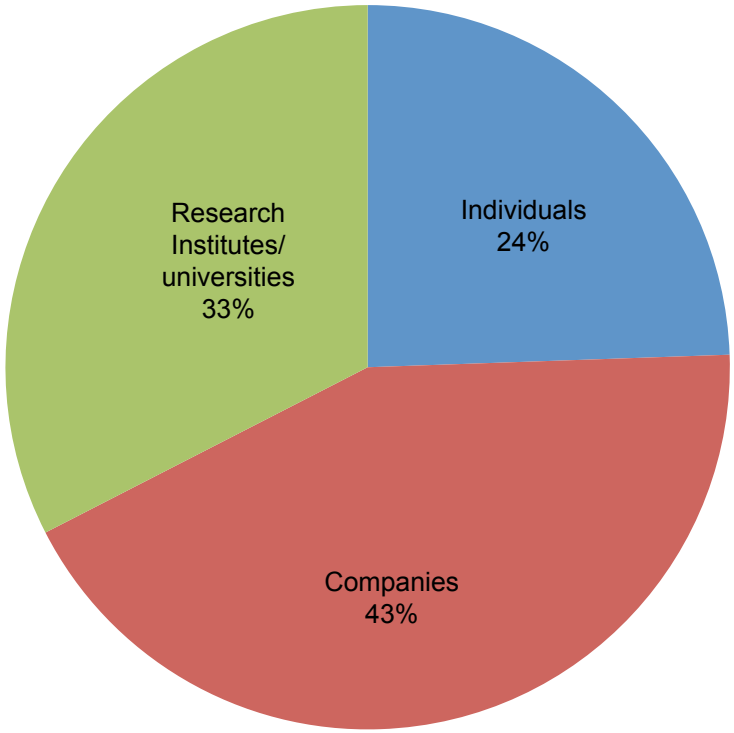


TUBERCULOSIS RELATED PATENTING TREND

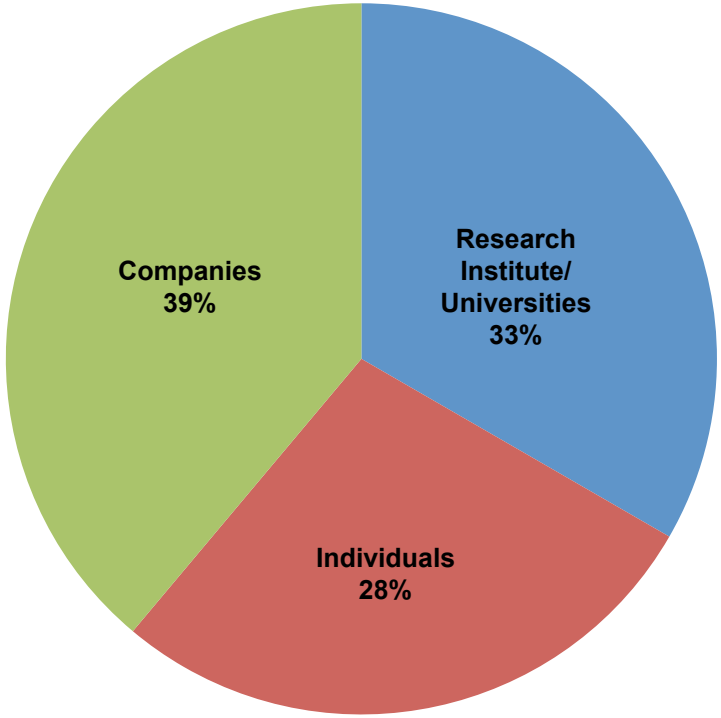


Assignment of TB Related Patents

Categories of patent assignees and their share in total patents



Category of patent assignee and their share in India



More Patents….but drying pipeline of drugs / diagnostics

Math Just Doesn't Add Up!

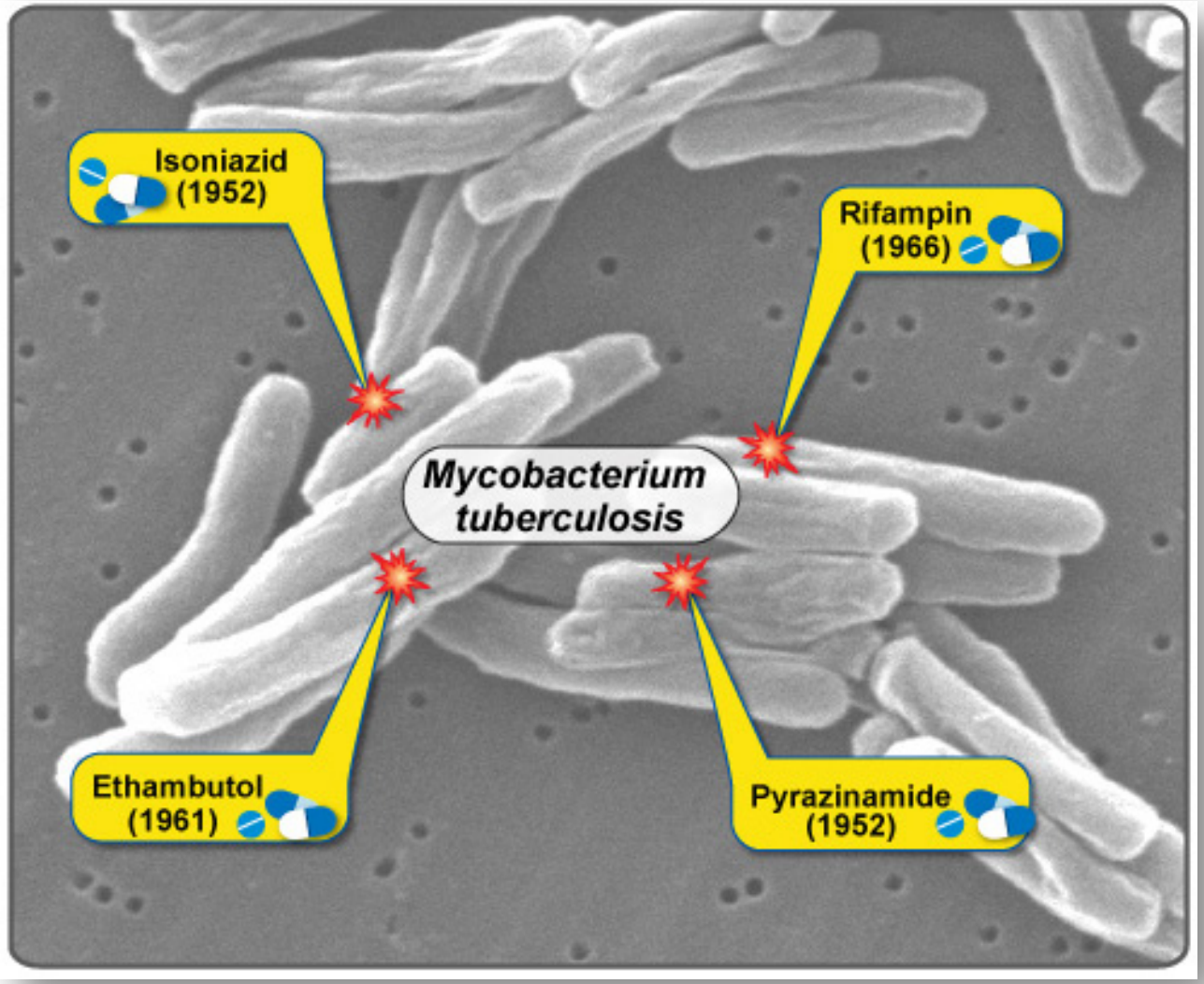
Global TB Market ~ $ 300-400 Mn

Limitations of the Classical Model

Do Patents ‘per se’ spur the components of an Innovation Ecosystem?

How to get medicines at the bedside in the absence of market forces?

First-Line Treatment of TB for Drug-Sensitive TB

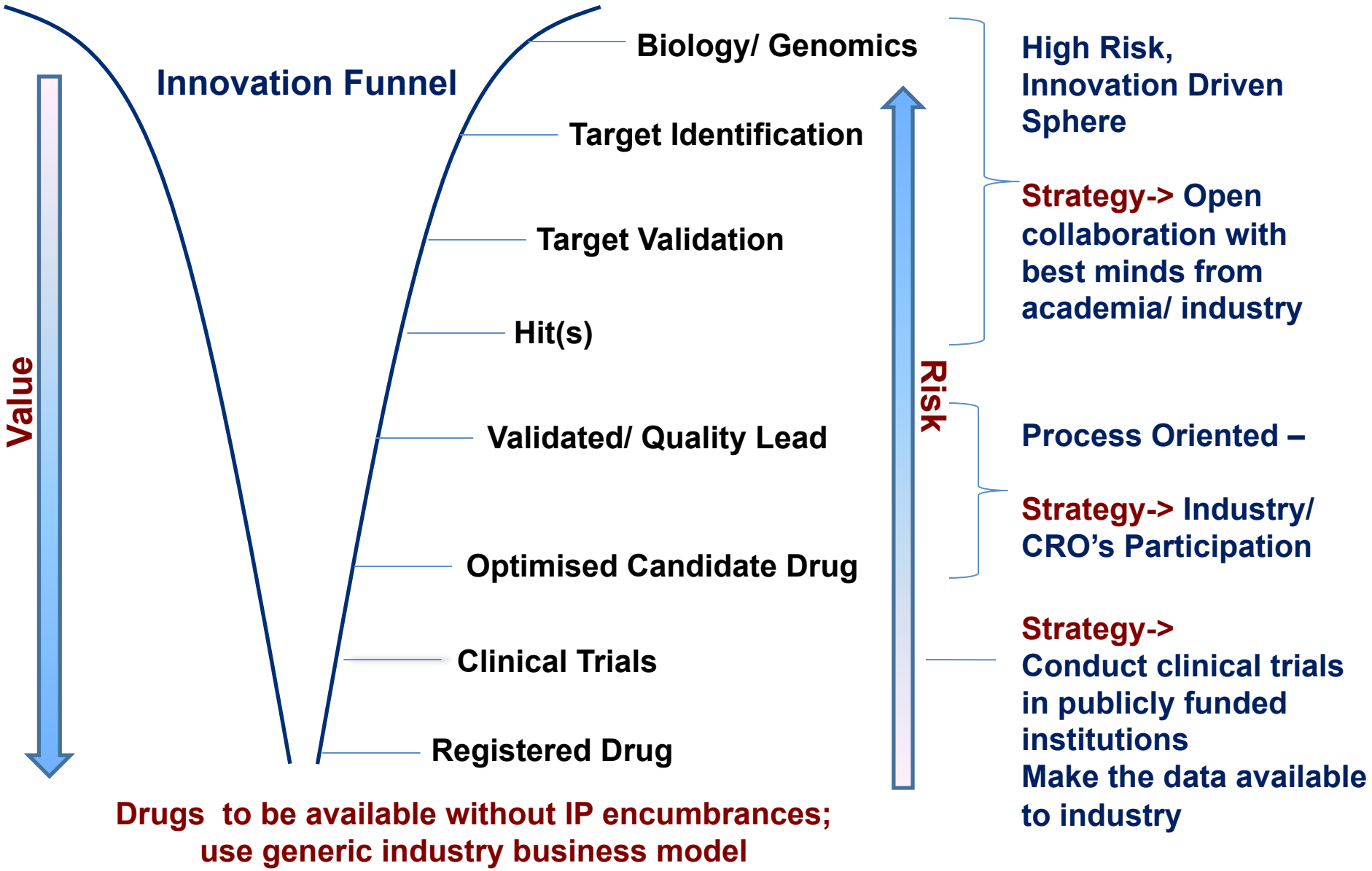


- standardized 6 month short-course chemotherapy requires direct supervision
- hepatotoxicity and substantial side effects in subsets of treatment populations
- not compatible with most common antiretroviral therapies (ART) used to treat HIV/AIDS

Needed : A shorter therapy with novel mechanism of action that are affordable and better manageable

Figure courtesy: NIH website

An Innovative Approach to Drug Discovery: A New Paradigm



OSDD: Approach to Patents

- **Two patent applied molecules in hit to lead phase**

- **Patent to ensure that:**
  - **Quality assurance in downstream processes**
  - **Subsequent innovations remain in open source**
  - **Affordability : through non exclusive licenses**

"When it comes to health, we need to have a balanced view between *health as a right and health as a business*"

Prof Samir Brahmachari

Director General, CSIR and

Chief Mentor, OSDD

(Ref: Cell (2008) v.133, pp. 201-203)

OPEN SOURCE DRUG DISCOVERY

Open Source Drug Discovery

A New Paradigm of Innovation for Neglected Diseases

- First Target: Tuberculosis launched in Sept 2008; extended to Malaria in 2012
- A Global Community - More than 7000 members from over 130 countries
- Actively working on all areas of Drug Discovery; several publications
- First time Clinical Trial in India of novel TB drug combinations in collaboration with Global Alliance for Tuberculosis – Protocol developed, trials to start by end 2012

www.osdd.net

OSDD Innovation Model Recognised Globally…

Science AAAS

Crowd-Sourcing Drug Discovery
24 February 2012
Vol. 335 no. 6071 p. 909

Forbes INDIA

How Open Source Drug Discovery Is Helping India Develop New Drugs
Apr 9, 2012

World Health Organization

Report of the CEWG of WHO Recognised OSDD as an Open Innovation Model
5 April 2012 | Geneva

TB ALLIANCE
Putting science to work for a faster TB cure

DNDi
Drugs for Neglected Diseases *initiative*

DNDi POLICY BRIEF recognised OSDD as part of Global Landscape for Neglected Diseases R&D
April 2012

National Innovation Council
Government of India
सत्यमेव जयते

Crowd Sourcing Innovation: CSIR portal for OSDD
2011

Does Exclusivity have Relevance in the Absence of Market Forces?

Thank You