

Science, technology and Innovation in the 2030 development Agenda

by

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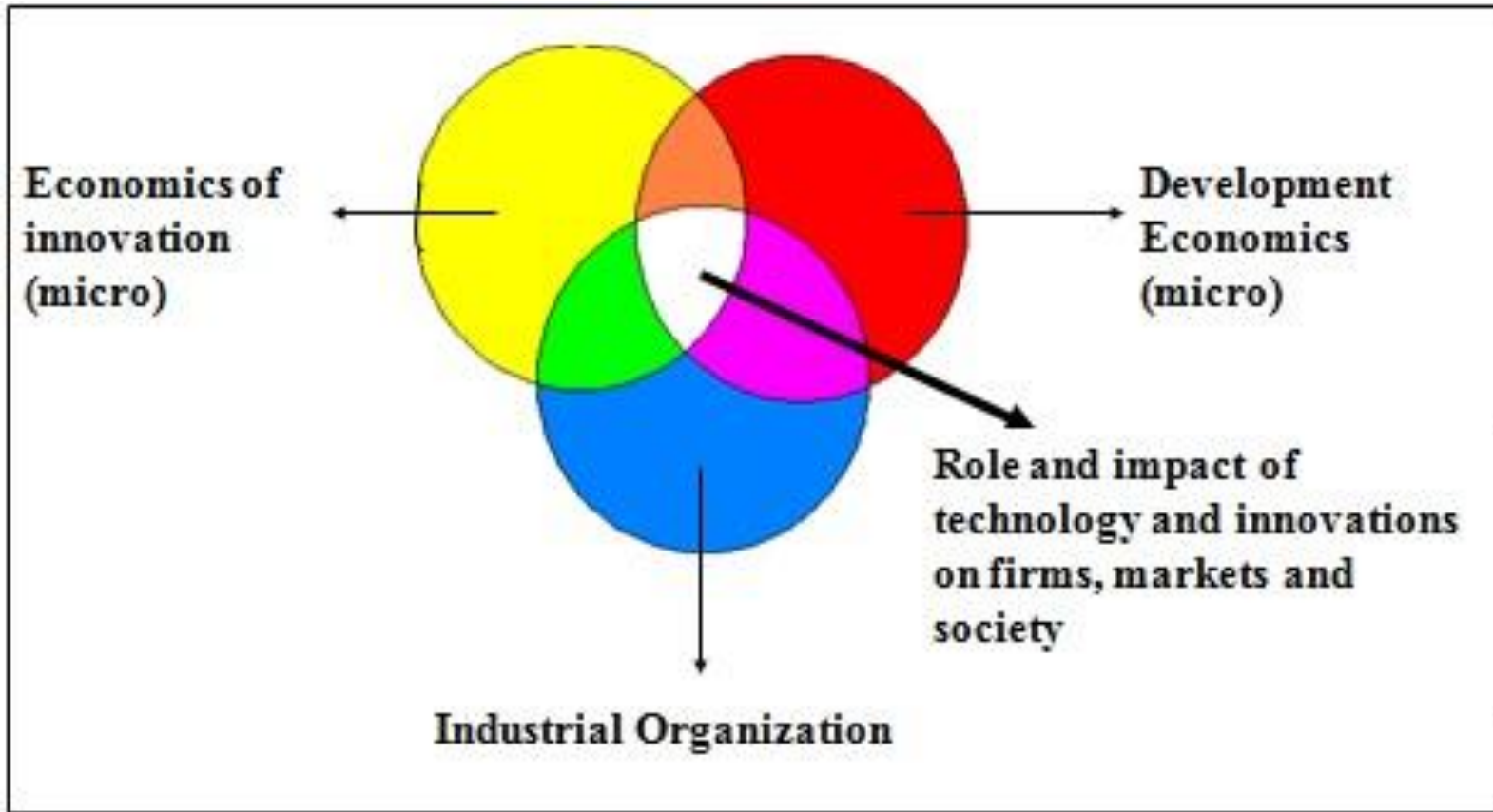
UNU-MERIT

Before coming to the slides....

- Thank you for your participation. It was a pleasure interacting with you.
- You are most welcome to send me a publication brief. Please see <https://site4society.wordpress.com/> and <https://www.facebook.com/SITE4Society/>
- I would love to have material on the Middle East and Latin America.
- The format of the brief is given here <https://site4society.wordpress.com/to-submit-a-brief/>
- Other research and training programs of UNU-MERIT is given here <https://www.merit.unu.edu/training/training-overview/>
- All feedback is welcome. My email is ramani@merit.unu.edu

Self Introduction

Specialisation and Focus



Technoconnexion

SITE4Society

Ganga Isère



I don't need to explain to you that science, technology and innovation are crucial for SDGs attainment...

1. We need to have knowledge

2. We need to be able to apply them

3. We need to make an impact



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But..



1. For this STI capabilities are favourable and important but not sufficient

We need appropriate and efficient.....

Industrial capabilities

+

Regulatory capabilities

Incentive Systems

+

Financial capabilities

+

Scientific, tech, innovation capabilities



And.??.



2. And we need many E's along with STI capabilities to attain the SDGs

E = {Engagement, Ethics, Entrepreneurship}



SITE4Society
An initiative by Shyama V. Ramani
@UNU-MERIT

STI4SDGs?

3. Let's debunk the common myths...

Myth 1: Lack of resources are the main the problem. More is always better.

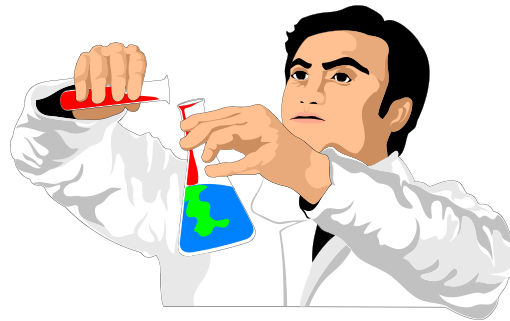
Myth 2: Invest funds in a science park and the triple helix model will come to life.

Myth 3: Build Industrial capabilities and watch development happen

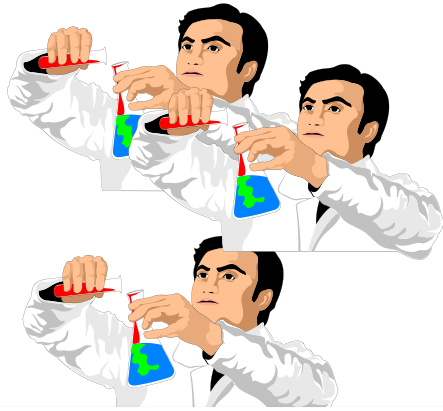
Myth 4: Lack of private finance is the main cause of slow catch-up.

Myth 5: Have a clear STI architecture and see STI based solutions emerge

4. Let's start with Science

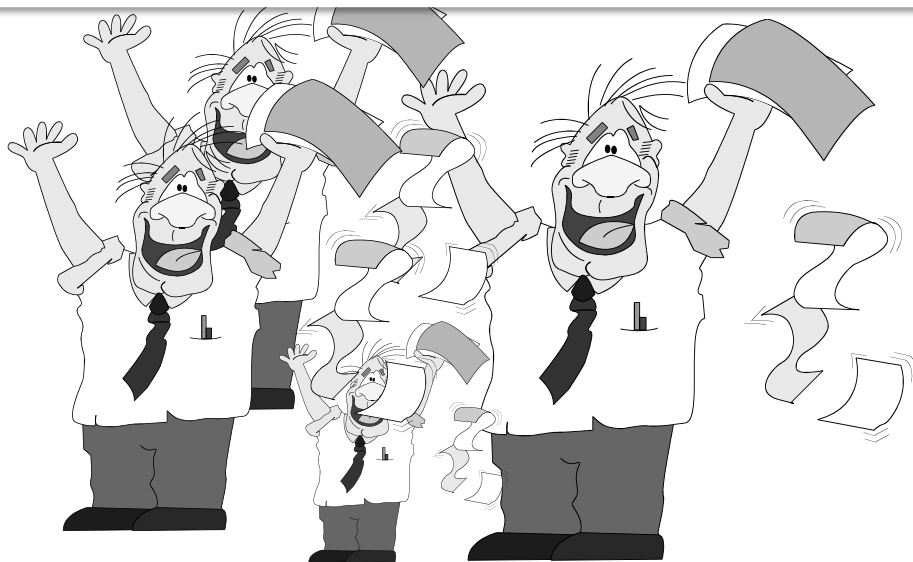


4.1 Science and Scientists: Thinking quantity without quality is myopic



Some countries might lack scientists.....

But in almost all emerging countries there is a lack of the right incentives...

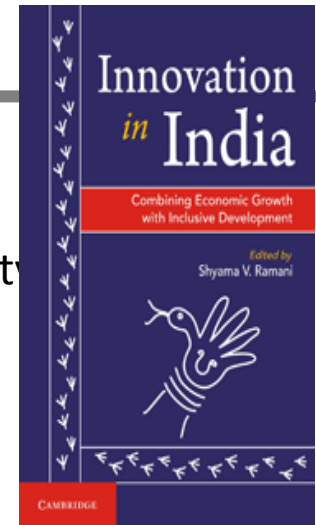


- to make scientists perform;
- to develop poles of excellence;
- to be able to control the quality and the quantity of science production.



Gita Surie

Associate Professor, Adelphi University;
Senior Fellow, Wharton School, University of Pennsylvania



Chapter 2: The University as a Catalyst of Innovation, Entrepreneurship, and New Markets in the Indian System of Innovation

“Firms in emerging and developed economies are collaborating more with academic institutions in terms of R&D and knowledge exchange due to heightened competition, abbreviated product life cycles, and rising costs together with increased connectivity.”

*“Improving the Indian system of innovation in terms of transforming scientific knowledge into technology with commercial potential requires that **institutions** become **more meritocratic and collaborative, less political** and foster higher order thinking skills and the social capabilities of graduates.”*

5. Let's go from Science to Technology and Industry



(5. STInd)

Thinking Technology or rather than Technology paradigm is myopic

5.1 STInd

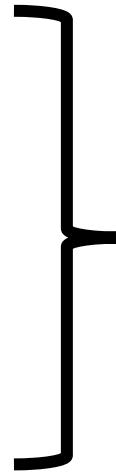
PROBLEM

TECHNOLOGY
SOLUTION

SCIENCE BASE

Technology paradigm = A vector
with components from four
spaces

DELIVERY
PLATFORM



Different Technology Paradigms in Agriculture have different systemic impact

5.2 STInd

Green Revolution

Genetically modified crops

Problem	Productivity – Food security	Productivity – Livelihoods
Solution package	HYVs/hybrids+ synthetic fertilizers + pesticides + practices	GM seeds + practices
Science Base	Plant breeding = Plant Sciences + Chemistry	Genetic Engineering + plant breeding =Molecular Biology + Genetics
Delivery Platform	International Public Sector Cooperation	Multinational Companies and Private companies

Ambuj Sagar



Vipula and Mahesh Chaturvedi Professor
of Policy Studies and the Director of the Center for
Affairs & International Policy
Indian Institute of Technology
India.

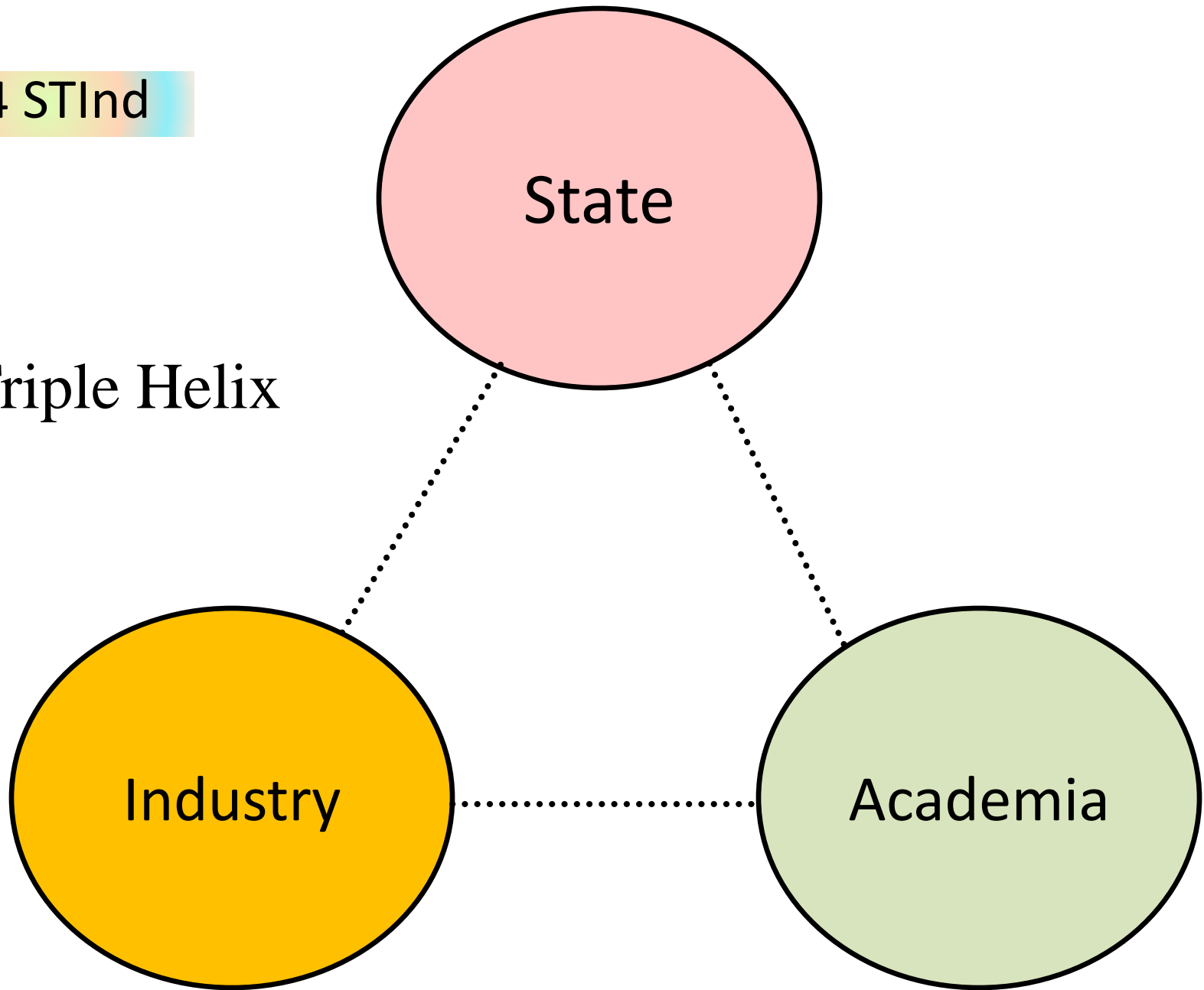
Energy needs in
India would be
met better today
if we had
examined tech
paradigms rather
than
technologies

Chapter 8: Energy innovation (sub)systems in India

“ There is a wide range of technologies that are involved in the extraction/capture, conversion, and utilization of energy across different application areas. The development and commercialization of these technologies often involve very different innovation processes and there is very little examination of these, despite the urgent need for energy innovation for any country. “

5.4 STInd

Triple Helix





Forge Niosi

Professor in the Department of Management and Technology at the 'Université du Québec à Montréal' and Canada Research Chair on the Management of Technology. He is the author, co-author, editor or co-editor of 14 books published in Argentina, Canada, France, the United Kingdom and the United States.

Chapter 9: Nanotech after Biotech in Emerging economies: Déjà vu or a new form of catching up?

"After nearly 30 years of engagement, the diffusion of biotechnology among the emerging countries, including those in the Latin American region remains highly uneven."

"Even if scientific capabilities are built, there is no magic bullet to get the private sector to move, though efficient science-technology-innovation (STI) institutions may be helpful."

Nanotechnology and Development

What's in it for Emerging Countries?

Edited by
Shyama V. Ramani



CAMBRIDGE

Not only
resources but
efficient STI
Institutions
matter – see
Latin America

Dominique Vinck



Professor of Science and Technology Studies at Lausanne University. He is also the Director of the Laboratory for Cultures and Digital Humanities (Social Sciences Institute) at Lausanne University.

Chapter 3: How is a regional technology cluster created? Insight from the construction of the nanotech cluster in Grenoble

"The case study clearly confirms that interactions between the state, industry, and academia are necessary for a technology cluster to emerge in an endogenous fashion."

"Collective conversations are necessary for the transformation of expectations into tangible infrastructure."

Triple Helix is important but Heroes are much more important



Can Huang

5.7 STInd

Professor, School of
Management, Zhejiang
University

Chapter 5: Sure Bet or Mirage? On the Chinese Trajectory in Nanotechnology

"China has performed well in areas such as strengthening basic research, constructing nanotechnology-related databases, and developing national standards; in establishing national key laboratories and research centers in the field with substantial government investment. However, China has encountered enormous difficulty in commercializing new technology and upgrading traditional industries through nanotechnology."

Government
can help to
only to some
extent – there
must be
private sector
enthusiasm

STI4SDGs?

3. Let's debunk the common myths...

Myth 1: Lack of resources are the main the problem. More is always better.



Myth 2: Invest funds in a science park and the triple helix model will come to life.



Myth 3: Create incentives for firm innovation and watch industrial capabilities happen. Build Industrial capabilities and watch development happen

Myth 4: Lack of private finance is the main cause of slow catch-up.

Myth 5: Have a clear STI architecture and see STI based solutions emerge

6. Let's go to Innovation Now

6. Innovation



Mirror Mirror on the wall – which is the best innovation of them all?

Ps- for the SDGs?

Thinking only incremental or radical is myopic

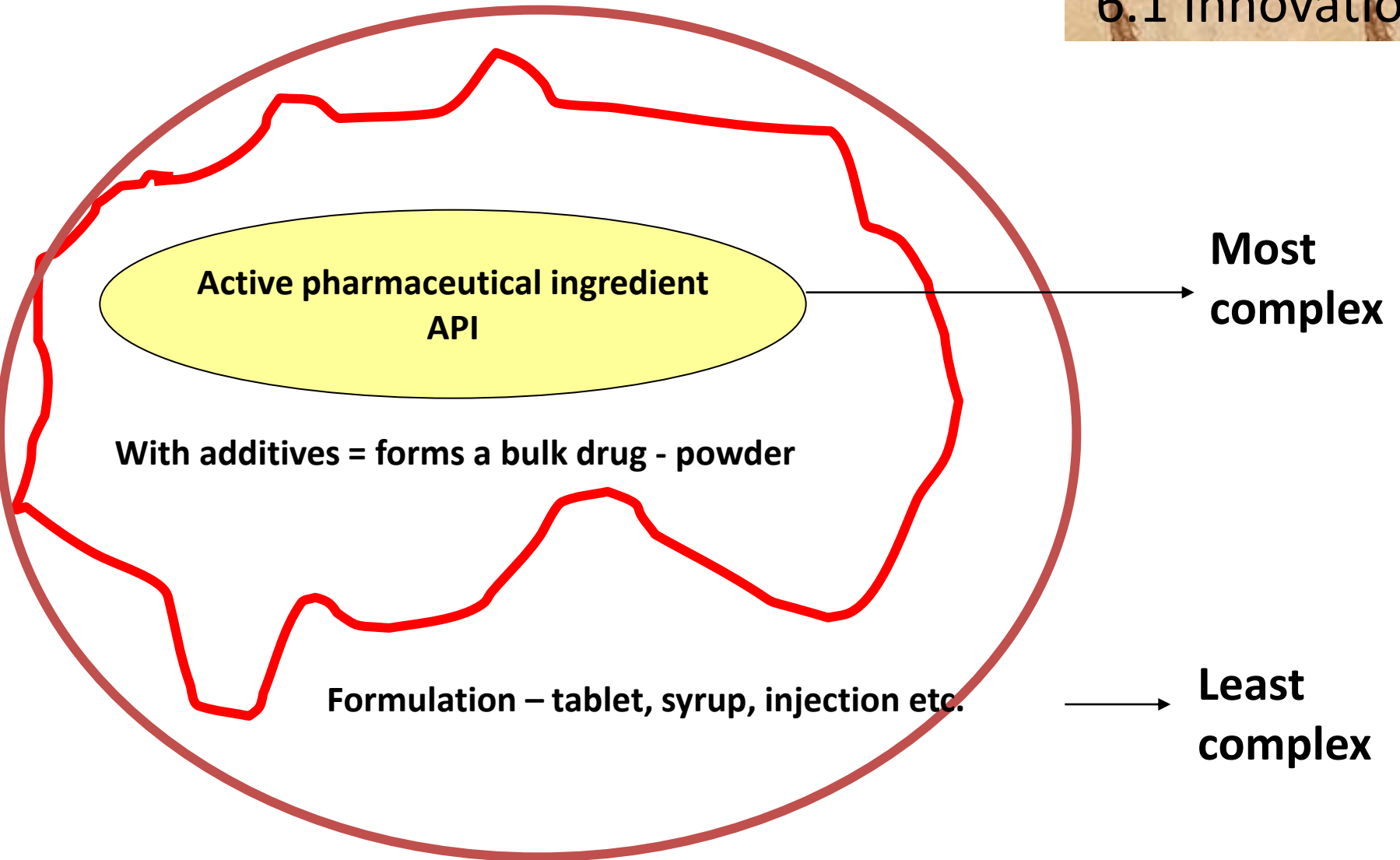
6.1 Innovation

- Incremental innovations
- Radical technological innovations
- Radical second generation or reengineered technological innovations
- Disruptive innovations
- Frugal/Grassroots innovations
- BoP & Pro-poor Innovations
- Social Innovations



What goes into the making of a drug?

6.1 Innovation



6.1 Innovation

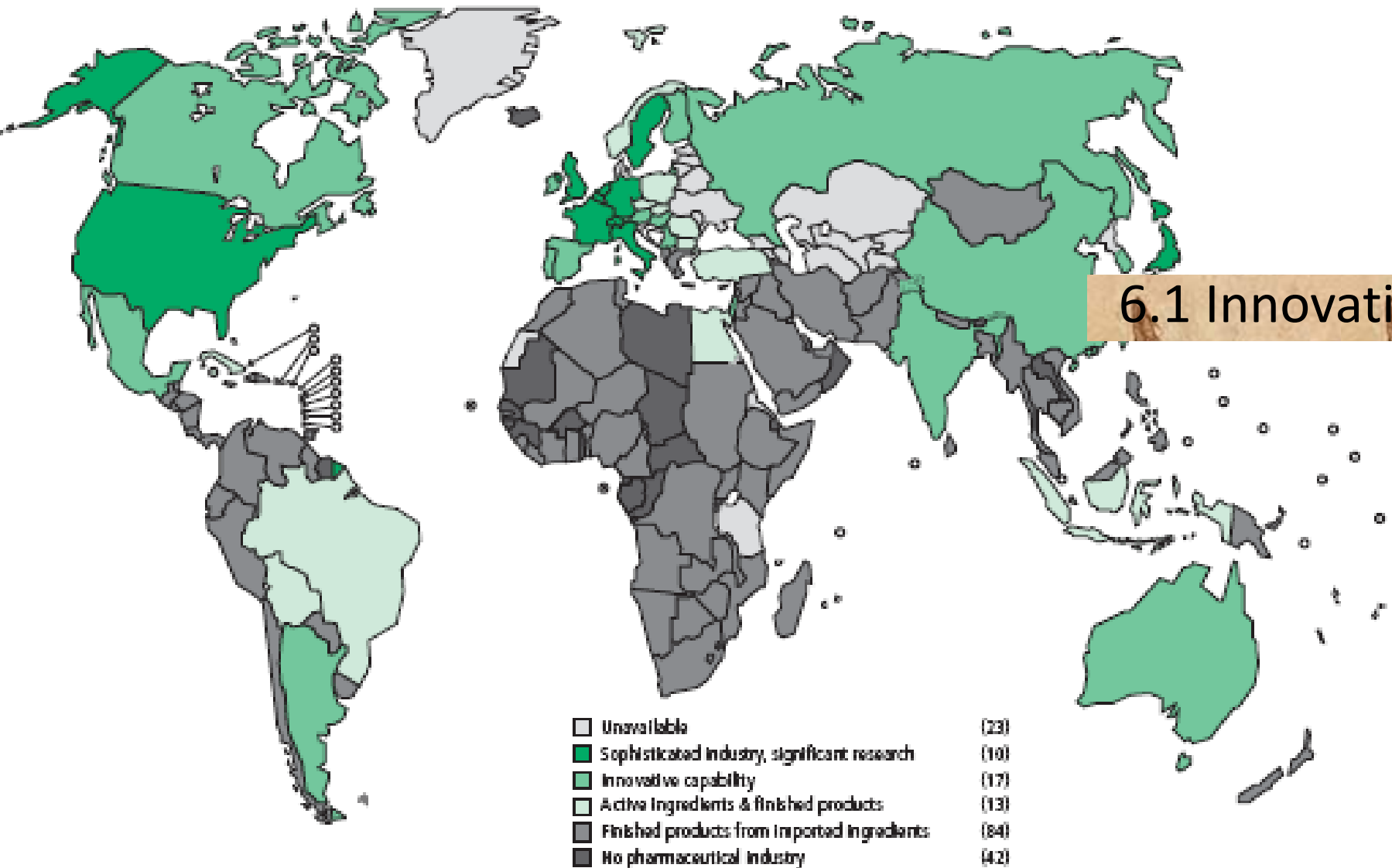


Figure . Local pharmaceutical production capacity among countries

Source: WHO, 2004

6.1 Innovation

Common objective

Ensuring access to drugs
And health care

INDIA

BRAZIL

Private sector fulfills
objective with public
sector help

1950-2005

Private sector does not
fulfill objective and so
Public sector fills in

Market logic – max profit

- Cooperation with MNCs;
- Penetrate Western regulated markets;
- What about local needs?

Health Policy logic – max access

- Regulation to assure quality improves capabilities;
- Private actors come in finally

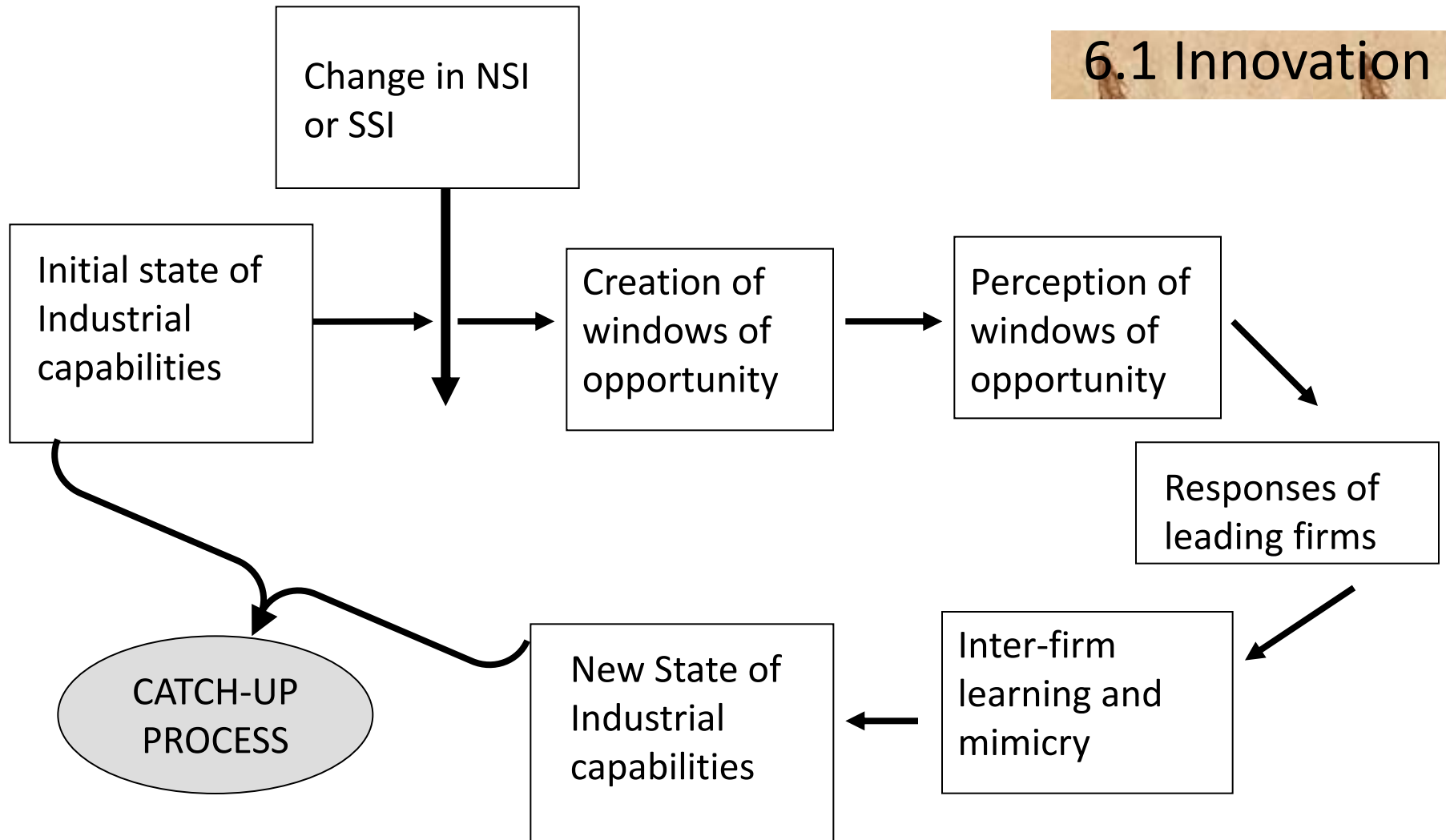
2005 -----



Now more similar because tech retard
And lack of funds pose similar problems.

Dynamics of catch-up at meso level

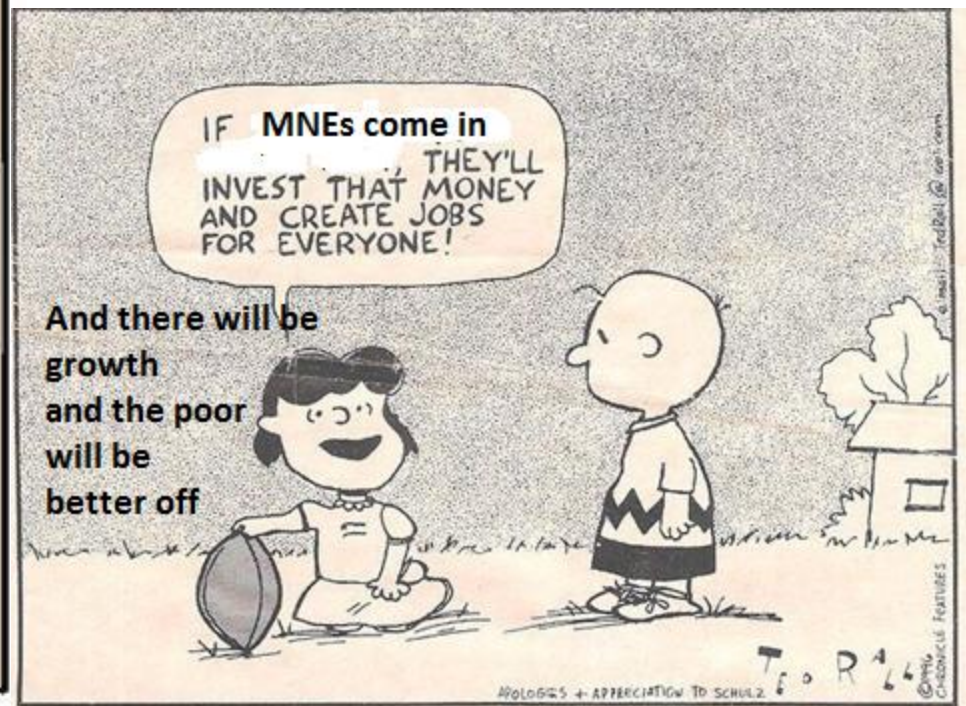
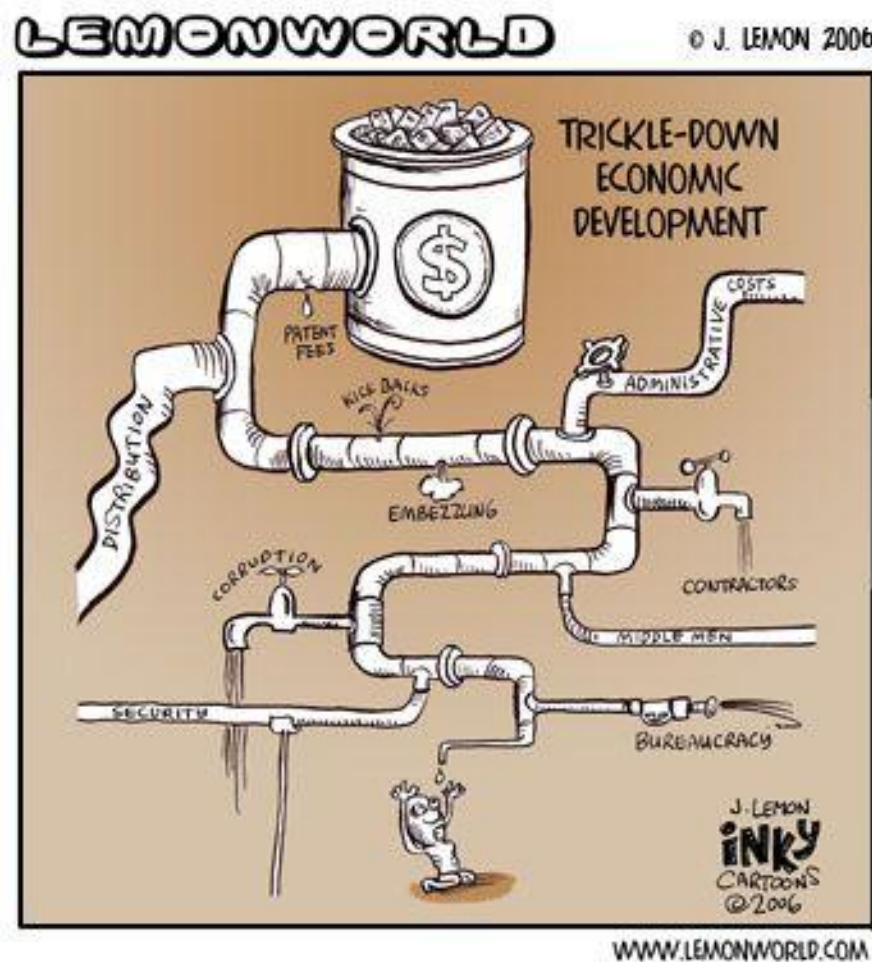
6.1 Innovation



Do industrial capabilities build-up always reduce Poverty?

6.2 Innovation

Traditional View – Inter-linkages, Employment, Income Generation & Trickle down to the poor



Question for a champion: Are BoP innovations and Pro-poor innovations the same thing?

6.3 Innovation



Scratch cards for mobiles

Beauty saloon with shampoos



Eco-Toilet



Innovative roof but faulty vent pipe

Pro-poor Innovations need not always be produced by the public labs and universities

6.4 Innovation



7. Let's go to Engagement Now



7. Engagement



Nédson Antônio Campos

Professor in the Department of Industrial and Mechanical Engineering at the Federal University of Viçosa, Brazil.

Chapter 6: Panorama of Nanoscience and Nanotechnology in Brazil

"Scientists were able to introduce the NST in the priority investment portfolio of the Brazilian government, but the lack of arguments in favor of NST- as a differentiated technology - did not ensure exclusivity in relation to other strategic technologies such as biotechnology."

7. 1 Engagement between scientists and technocrats

Risk:
Competition between technologies



Christopher Newfield

Professor in the English Department at the University of California, Santa Barbara.

Chapter 2: Learning From Solyndra: Changing Paradigms in the US Innovation System

"The 'early-stage public subsidy,' model presides over the U.S. innovation system and its intellectual foundation is sometimes called the linear model—a model that has been much criticized in theory, but remains operative in practice. We propose a general shift from a linear innovation model to our social innovation model, which we call the Social Innovation of Technology (SIT)."

7. 1 Engagement between scientists and technocrats

US lost out in solar energy because of linear model of innovation in a market driven system



Daryl Boudreaux

President, Boudreaux & Associates
Emeritus Chief Scientific Officer, NanoHoldings LLC.

7. 1 Engagement between scientists and technocrats

Chapter 2: Learning From Solyndra: Changing Paradigms in the US Innovation System

"To convey an idea of how the linear model operates in practice, we summarize the corporate history of our case study, Solyndra."

"Our story illustrates how guarded communications are particularly damaging to the process of knowledge creation, in which disclosure of all core issues, data in all possible detail, and discussion of minute anomalies may be important to forming and testing new approaches."

Sometimes cooperation is better than cut-throat competition for everybody



Nupur Chowdhury

Associate Professor, Centre for Environment and Climate Change, Jindal Global Law School, O. P. Jindal Global University.

7. 1 Engagement between scientists and technocrats

Chapter 8: *On India's plunge into Nanotechnology: What are good ways to catch up?*

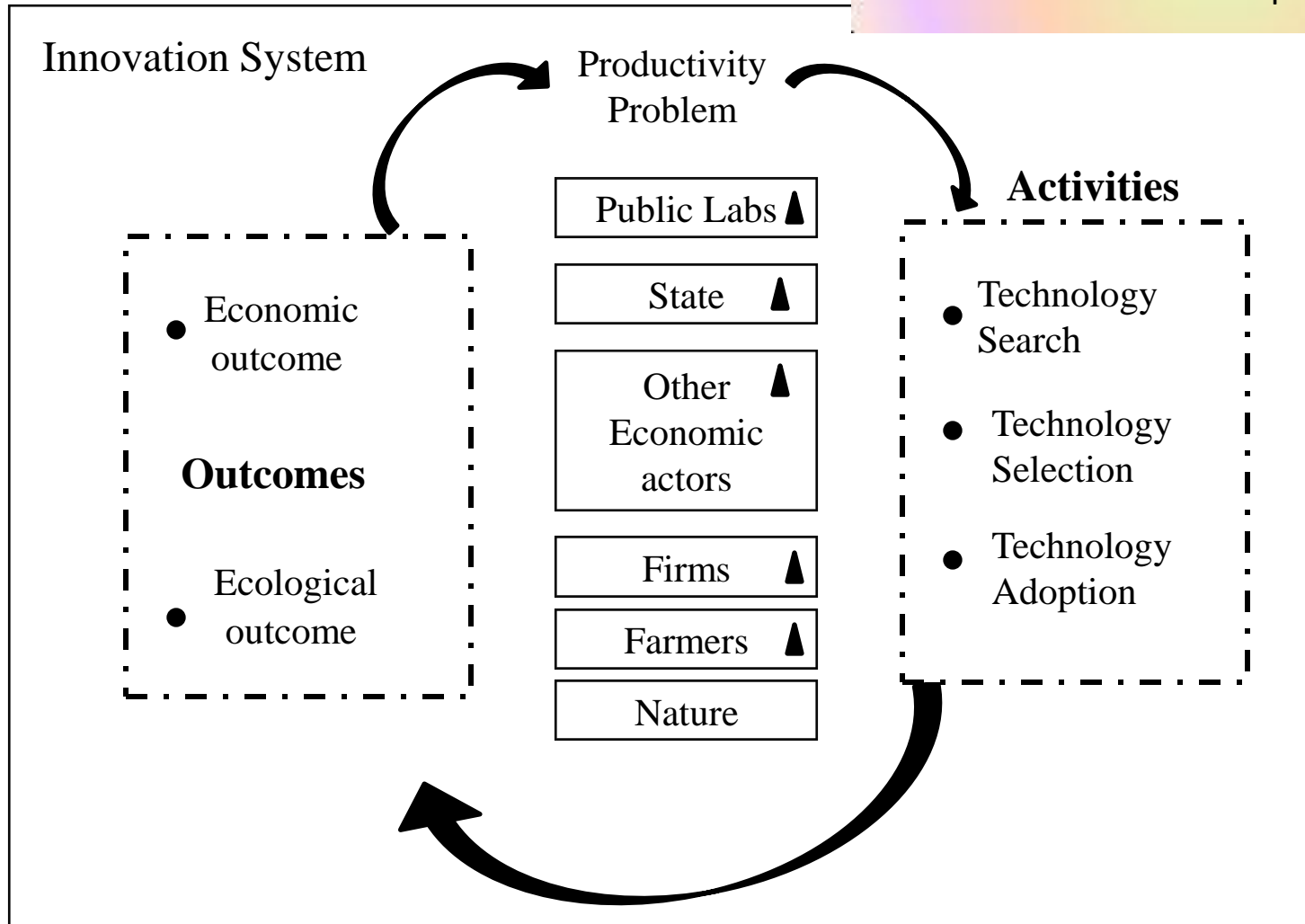
"Strategically speaking, the improvement of linkage between the actors involved in public research funding, technology development, technology transfer, and risk regulation is critical to the future success of nanotechnology in India."

Less Silos thinking and more interaction between different actors

Sources of Controversy

7.2 Engagement Between systemic stakeholders

Ramani and Thutupalli (2016)

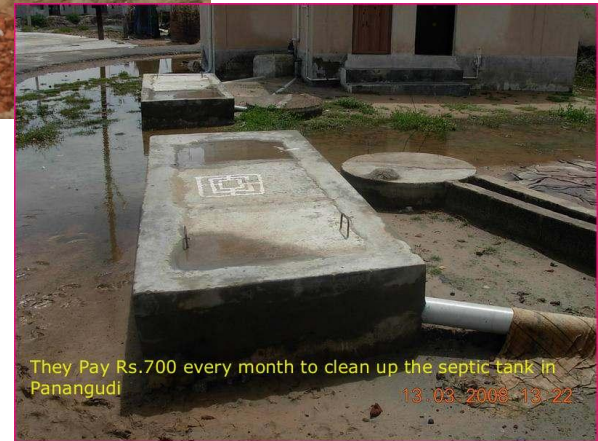
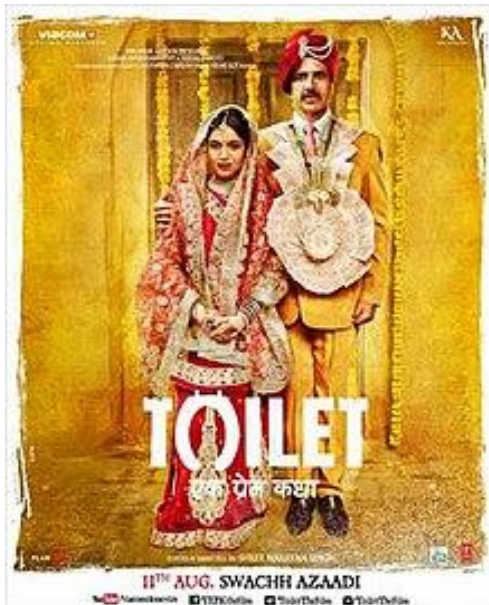


● Locus of Controversy

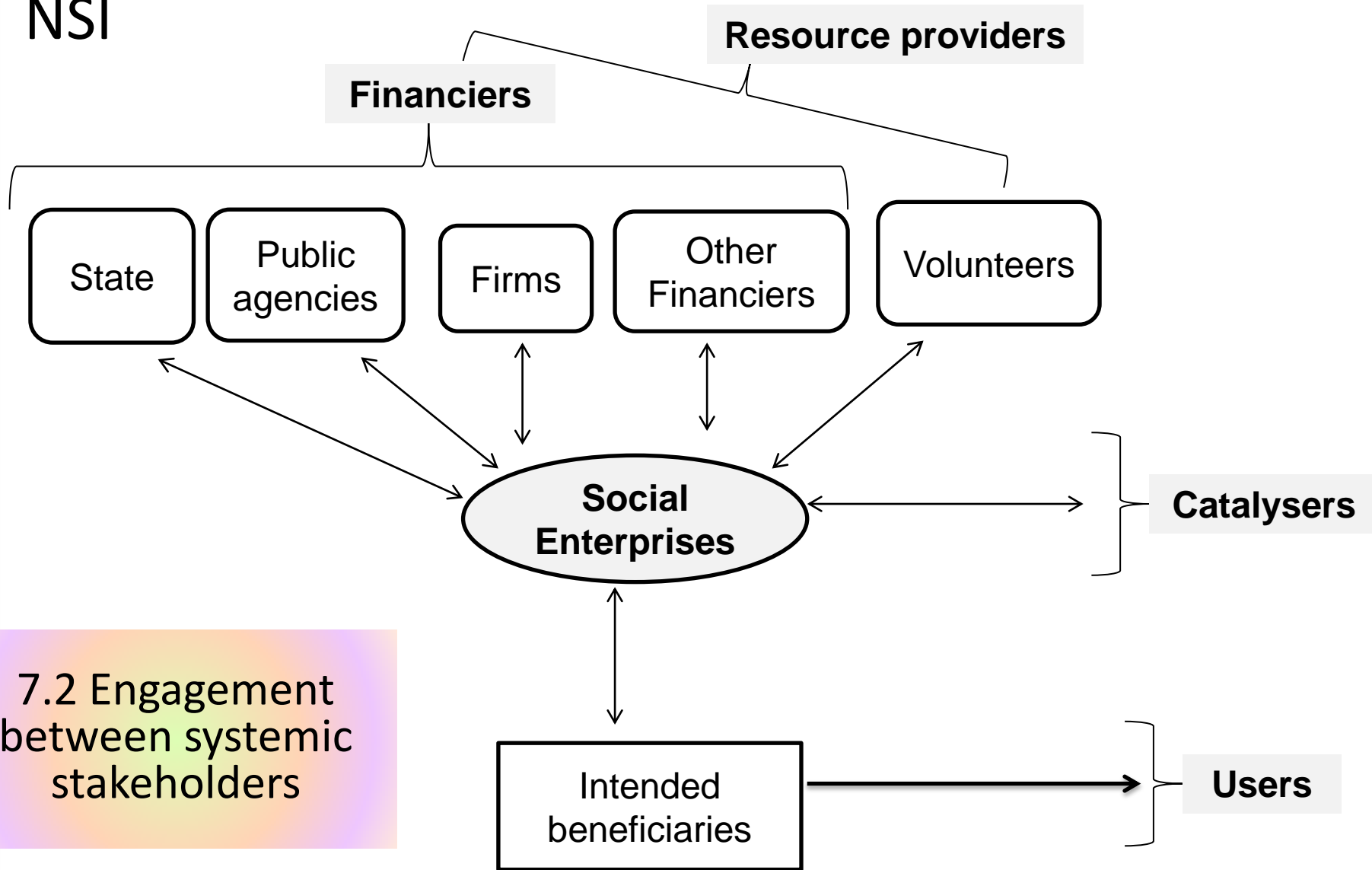
▲ { Belief , Strategy }

7.2 Engagement between systemic stakeholders

Diarrhoea is a major health burden in many emerging countries
Need for safe, long lasting toilets and toilet usage



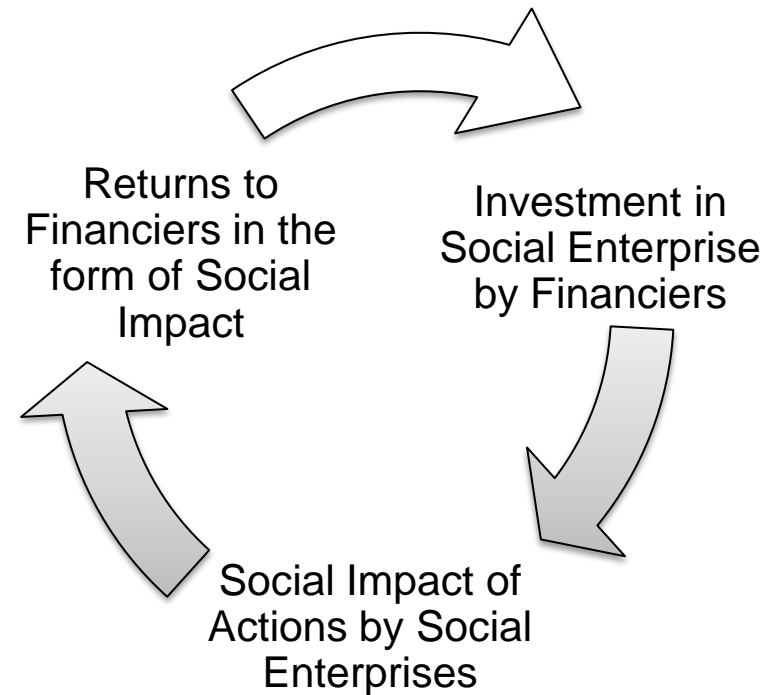
NSI



7.2 Engagement between systemic stakeholders

NSI – Product and Systemic Challenges from Supply and Demand Sides

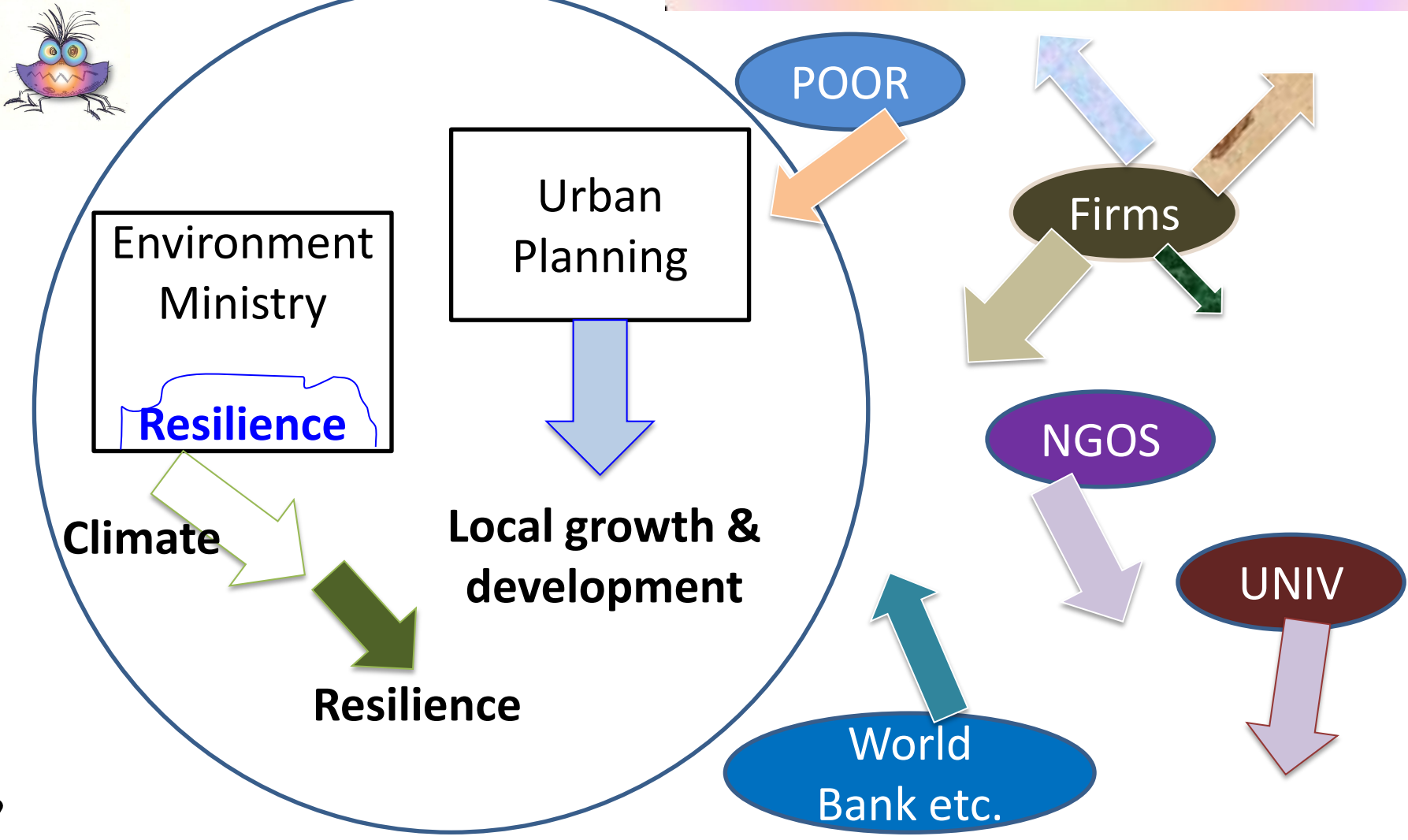
- Inappropriate product design
- Unaffordable price
- Incompatible with local resources, capabilities and culture



7.2 Engagement between systemic stakeholders

Lower the development level =
More Complex the Governance
Architecture

7.3 Of Government to People: Multiple and Parallel Discourses – Impacting Same Outcomes



Systemic Risk: Climate NOT embedded efficiently in development process



*Rebeca de Gortari
Rabiela*

7.3 Of Government to People

Full time researcher at the Institute for Social Research National Autonomous University of Mexico, Mexico. Editor of book entitled 'Computad Internet en la biblioteca pública mexicana.'

Continuity of
political
engagement
matters

Chapter 7: NST without NII ? The Mexican Case Study

"Three lessons are worth noting from the Mexican experience.

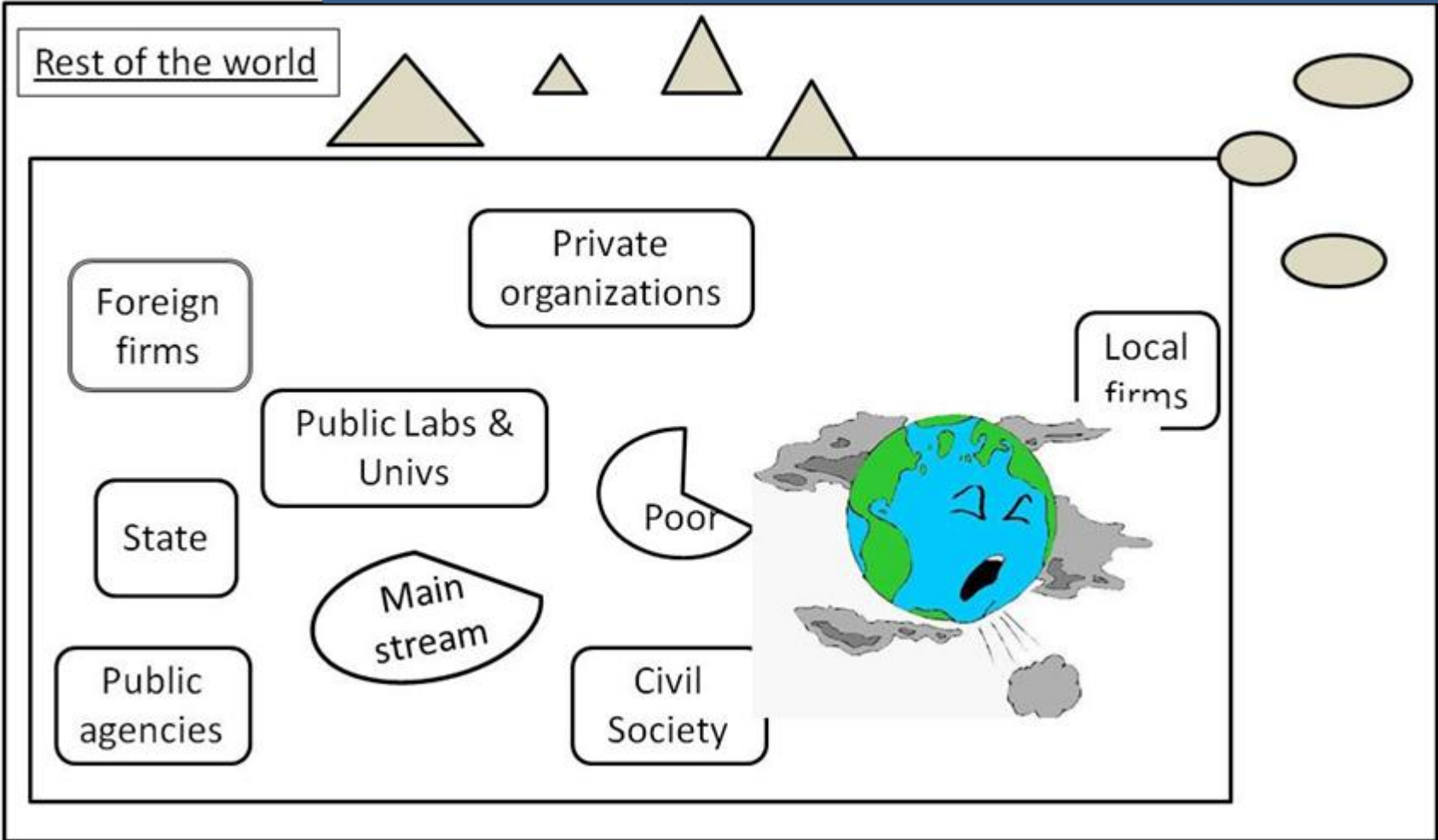
First, people matter.

Second, history matters.

Third, continuity matters and this is the weakest point of the Mexican innovation system. "

7.3 Of Government to People

What's the price to pay of progress along one direction?
What are the externalities generated?
Via market? Outside of market?

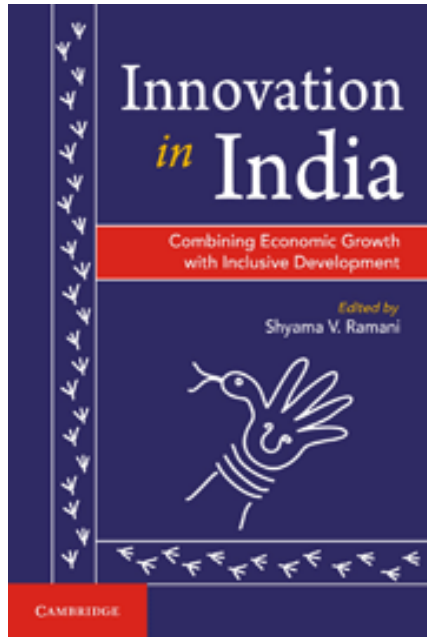


Last Thoughts:

We need to think more "Indian".

The country is ridiculously imitative in policy.

We have to figure out politically how to move forward together, not a technocratic innovation policy that does not recognise Indian reality. (i.e. not run by techno-bureaucrats and politicos alone).



All of you can be change makers at home, work and/or community!

Our Motivation - Gandhi : "Be the change that you want to see"



New Role: Universities as pivotal societal connectors for positive change

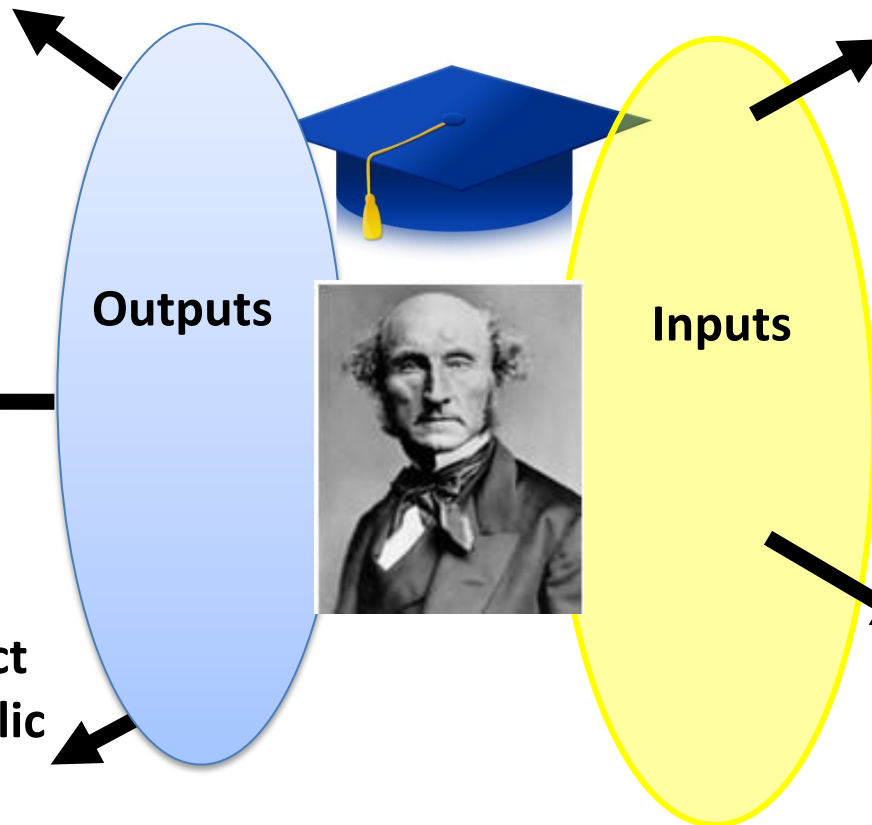
SITE4Society



Homo Economicus Academicus of the Social Scientificus Tribe

Teach and Train
youth to enter
labour markets

Study secondary data



Outputs

Inputs

Produce scientific
Knowledge =
Publications

Engage in contract
Research for public
agencies

Compile and
analyze primary
data

Other Problems being addressed

- Post-Truth World, Post-Trust World
- Knowledge Divide



Rajat Rai Handa
@rajatrainhanda

This is ¹⁰⁰ true. Family and community whatsapp groups can be the largest propagators of #fakenews.

#SDGglobalFest

Chintan @ChintanIndia

I'm from India, and have a large family and the kind of (fake) news being spread on family groups online proves that we are living in a post-truth world. - Shyama Ramani from @UNUMERIT #SDGglobalFest

22/03/2018, 09:59



Olívia d. Junqueira
@livydj

#posttruthworld "a real life example, in a very large family, with well educated people, it's amazing the nonsense that gets forwarded in the family groups on what's app!" @unumerit #SDGGlobalFest #act4sdgs #WhatsApp #sadbuttrue



22/03/2018, 09:58



Jennifer Crago
@JensMischief

Are we living in a 'post truth world?' Asked at #SDGglobalFest Complex, there are many, many more stakeholders and "nobody can know all of the knowledge generated".

#Data4SDGs



22/03/2018, 09:55

The activities of SITE4Society

Designed conversations
in workshops



Publication Briefs



Outreach via Facebook
& Twitter



Workshops: Conversations between economic actors changing the world and academics studying change



Next one on circular economy June 13-15

How SITE4Society Publication Briefs Work

1. Researcher publishes article



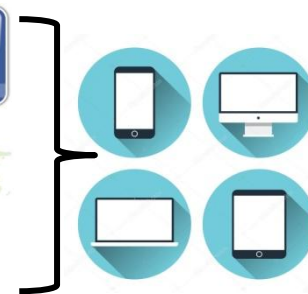
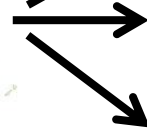
2. Researcher converts it into brief according to SITE4Society format



3. SITE4Society team works to edit if/as necessary and publishes brief



4. SITE4Society team works to publicize brief via Facebook and Twitter



<https://www.facebook.com/SITE4Society/>



<https://site4society.wordpress.com/>



APRIL 11, 2018 ~ LEAVE A COMMENT ~ EDIT



By Dr. Arijita Dutta, Department of Economics, University of Calcutta, dutta.arijita@gmail.com

Gitanjali Hajra, PhD research scholar, Department of Economics, University of Calcutta,

gitu.hajra@gmail.com



with 353 other amazing people
([manage](#)).

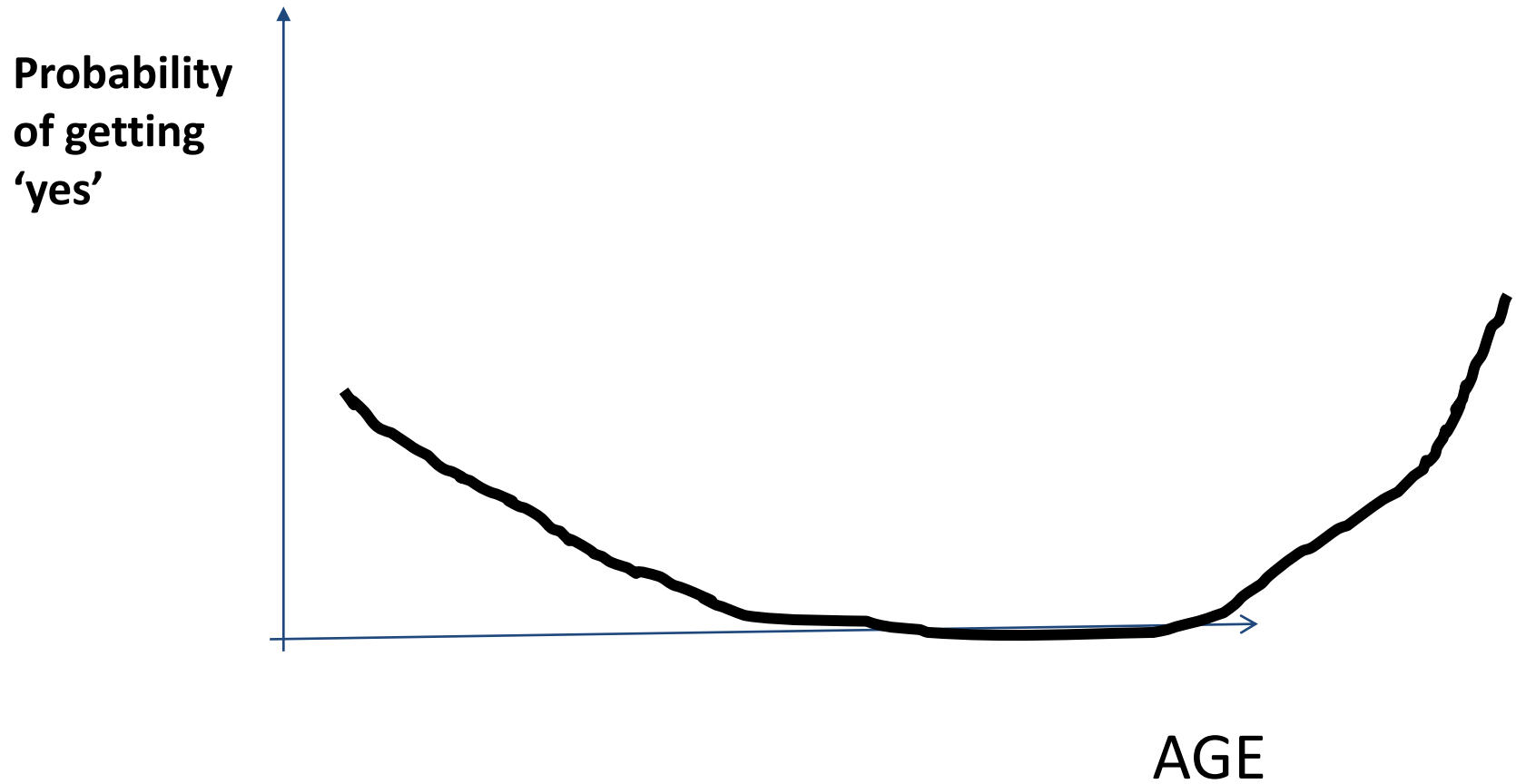
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Based on work at <https://site4society.wordpress.com/>.

Who is willing to write a Publication brief for 'SITE4Society'



Conclusions..

Why do we need to attain the SDGs?

- Because it's not fair that people should live without basics?
- ...No, this is just a little bit of the explanation.....
- It is because we all have a LOT to gain from changing the present reality ...
- It is the SMARTEST way to fight polarization, targeted hatred against groups, distress emigration, terrorism and climate change...
- It is the ONLY WAY to restore the position of women in society after thousands of years as a partner of man with equivalent opportunities for development.
- We can achieve a good quality of life for all
- We can get a warm glow from doing good and we can all learn from serving society

**At the micro-level - for mobilizing science,
technology and innovation for any solution -
Think - SAAAARS - for the SOLUTION**

- **S**ustainability – over time and for environment = Quality
- **A**ailability – over space in sufficient quantity;
- **A**ffordability – within their budget;
- **A**spirational – it should symbolize catching-up and not being
....poor;
- **A**tractive – things for the poor are too often ugly;
- **R**epairability – **R**ecyclability – to reduce global waste;
- **S**afe – things for the poor are usually low in quality.

At the macro-level - for Sustainable Development for all - Think PIIPLE



- **P**olicy – there is a need to rewrite policies, regulatory frames, public programs; enabling environments.
- **I**ndustrial capabilities – keep in mind technology paradigms – problem, technology solution, scientific base, delivery platform
- **I**ncentives – via Industrial policy, Competition policy, S&T policy; Education policy; Management of edu. institutions
- **P**artnership – Need for creative partnerships;
- **L**eaders – Leaders among firms, among bureaucrats, among scientists and among social enterprises must emerge.
- **E**ntrepreneurship – of all kinds – institutional, techno, business, scientific is needed.

Thank you!

நன்றி!

Merci!

! شكر لكم

All feedback welcome:

Write to ramani@merit.unu.edu