

# MUTUAL LEARNING EXERCISE ON R&I STRATEGIES AND POLICIES



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OACPS R&I

## Session 5: Technology Transfer

A process of economic and technological discovery

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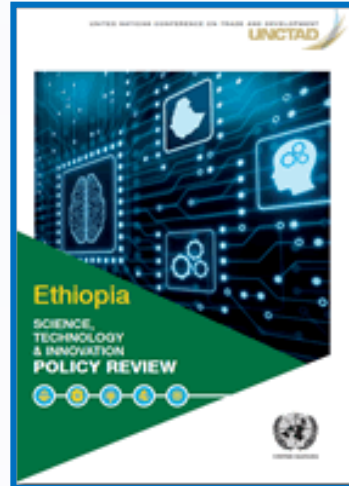
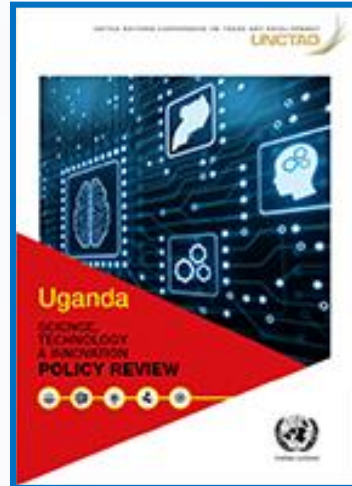
Addis Ababa, Ethiopia

14-17 February 2023



# UNCTAD STI Policy Reviews

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3. Dominican Republic
4. Uganda\*
5. Ethiopia
6. Panama
7. Rwanda\*
8. Iran
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Science, technology and innovation / Strengthening National Innovation Systems

## Strengthening National Innovation Systems

Science, Technology and Innovation Policy Reviews (STIP Reviews) are undertaken by UNCTAD at the request of member States.

Through a STIP Review, a country's STI stakeholders can identify the key strengths and weaknesses of their innovation systems and establish strategic priorities for its development.

The STIP Review report published by UNCTAD includes a diagnosis of the national system of innovation (NSI), an assessment of the STI policies in place, and is normally complemented by in-depth studies of specific sectors, institutions or STI-related problems that are of particular relevance to the country under review.

The STIP Review process is also intended to raise awareness and to stimulate a policy dialogue among stakeholders about the role of STI in national development and to encourage the emergence of stronger linkages among the STI players.

Another key goal of the STIP Review process is to identify practical actions that favour technological capacity-building (the capacity to generate, absorb and diffuse knowledge and to create and support dynamic linkages and learning processes among STI stakeholders) and the strengthening of their innovation capabilities (the practical and productive materialization of science and technology into socially or commercially valuable products and services).

STIP Reviews can provide the basis for capacity-building activities targeting various elements of the innovation system. In several beneficiary countries, STIP Reviews have ignited significant renewal in STI policy, helped raise its profile in national development strategies and facilitated the inclusion of STI activities in international cooperation plans.

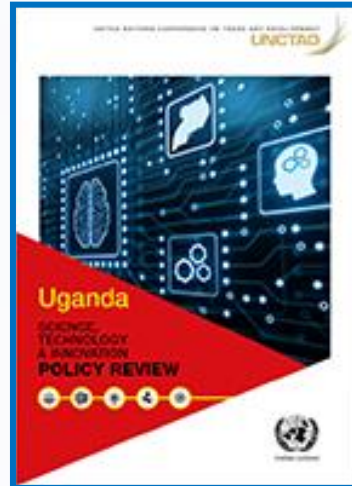
## Documents and Publications

Examen de las políticas de ciencia, tecnología e innovación : República Dominicana  
UNCTAD/DTL/STICT/2020/8 - 26 Apr 2021  
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**OBJECTIVE:**

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**1. Technology Transfer – a process of economic and technological discovery**

2. Absorptive capacities and innovative capabilities

3. Channels of technology transfer



# 1. Technology Transfer – a process of economic discovery

2. Absorptive capacities and innovative capabilities

3. Channels of technology transfer



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# 1. Technology Transfer – a process of economic discovery ... definitions not changed much

“... the systematic knowledge for the application of a process that results in the manufacture of a product or the delivery of a service.”

(UNCTAD, 1985, 2014)

“... systematic, theoretical, and practical knowledge and skills, used in the process of development, delivery and implementation of a service or product.”

(Burgelman, 2008)



# 1. Technology Transfer – a process of economic discovery ... *transactions* also not changed much

- Purchase or lease of machines, **equipment**
  - Purchase of intellectual property (**licences**)
  - Transfer of systematic **knowledge** for the:
    - ✓ manufacture of a product
    - ✓ application of a process
    - ✓ rendering of a service ...
- ... and often includes:
- transfer of knowledge to **install and operate** equipment
  - transfer of technical cooperation, technology transfer **agreements**

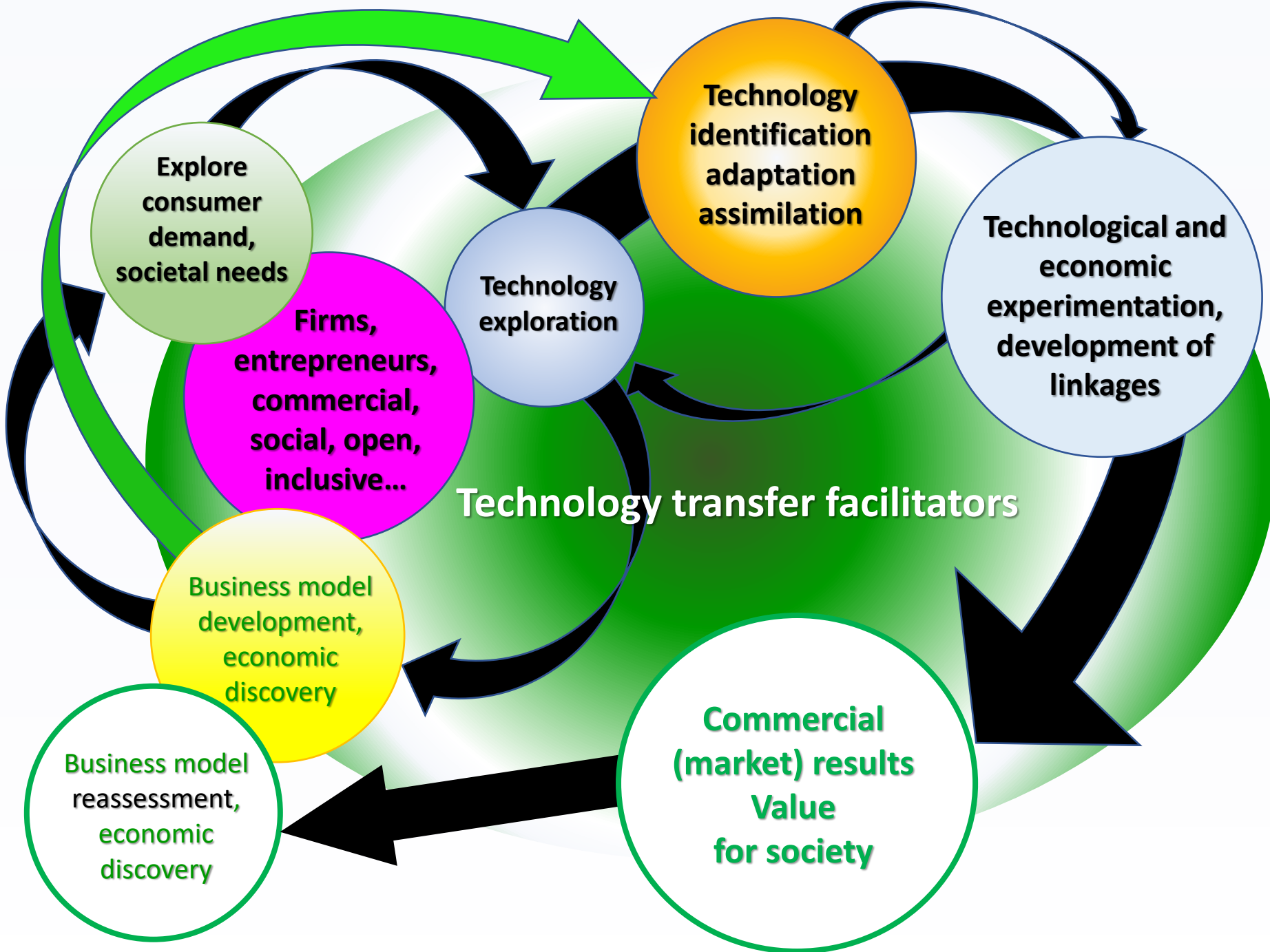


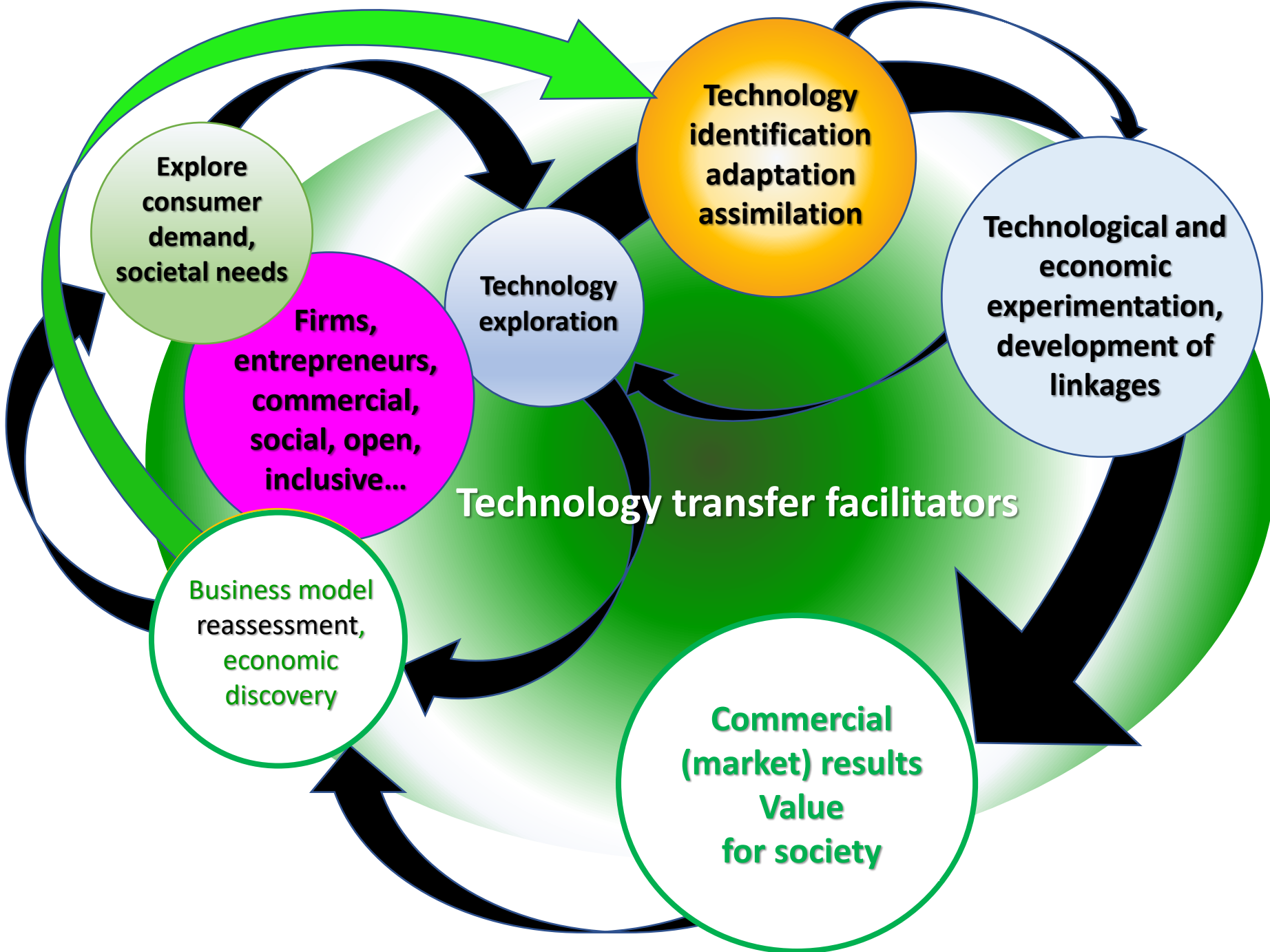
# 1. Technology Transfer – a process of economic discovery

**Technology  
identification  
adaptation  
assimilation  
Transfer**









# Technology transfer: *economic, technological discovery process*

- Discovering what *works commercially, in the market*
- *If there is no product or service, the transfer has failed*
- Centrality: *transfer*, or *generation of value*?
- Experimentation and failure
- Demand, **market-driven** transfers **replace** research/R&D-push
- Three problems requiring policy support:
  - Information, coordination – *technology transfer facilitators*
  - Finance under uncertainty
  - Time gap: discovery, transfer, value generation





# Why?

- Truer to life: everything happens simultaneously, permanent feedback
- Innovators (entrepreneurs, firms) are included
- Avoids “solutions looking for problems”
- Addresses Lab-to-field challenges
- Rationale to engage financiers, investors
- Technology transfer facilitators recognized
- Consumers/citizens needs better understood
- More complete scope of stakeholders
- **Reflects NSI framework, networks for value creation**



# National System of Innovation

Linkages

Interactions

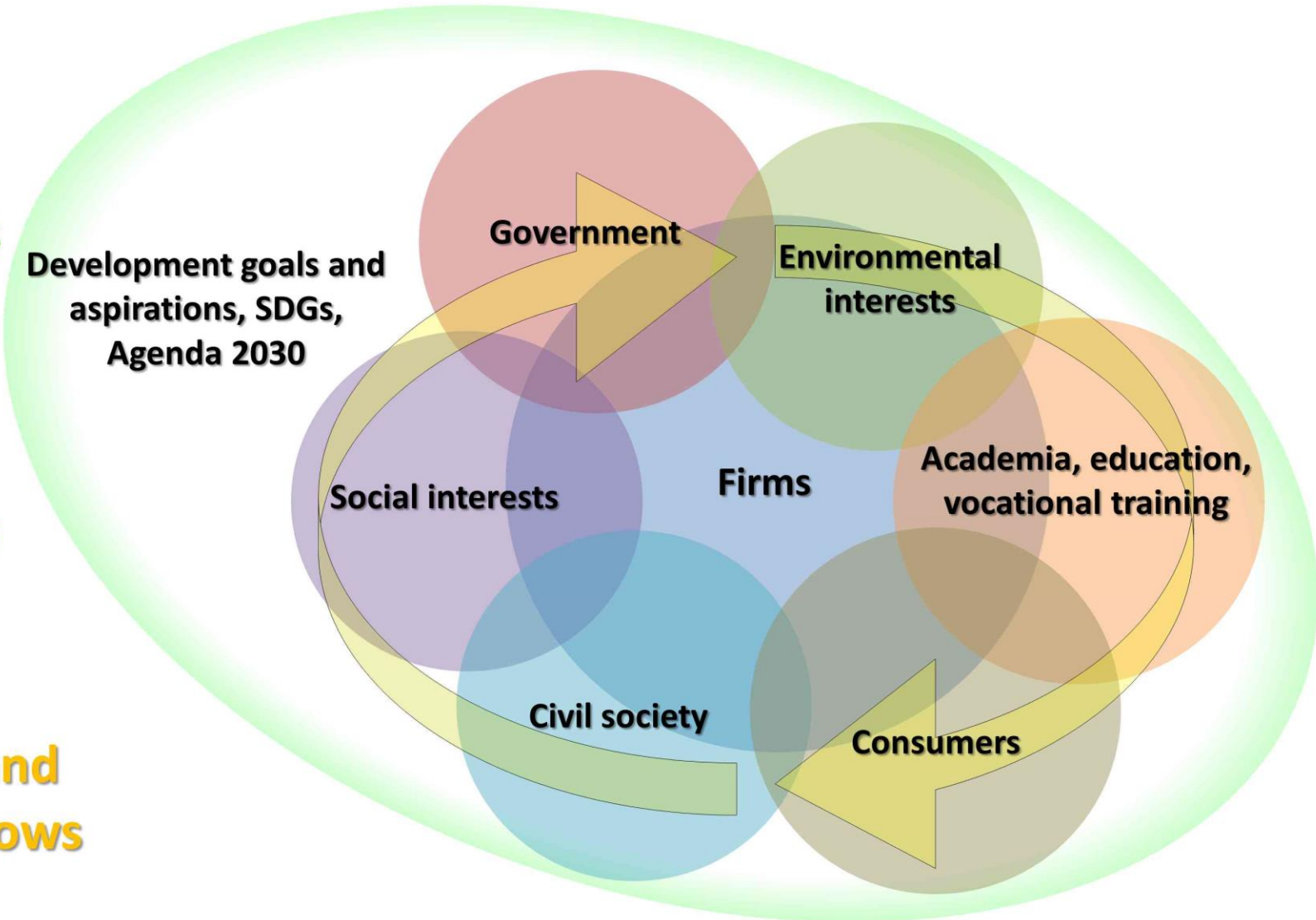
Relationships

Quantity  
Quality

Stakeholders

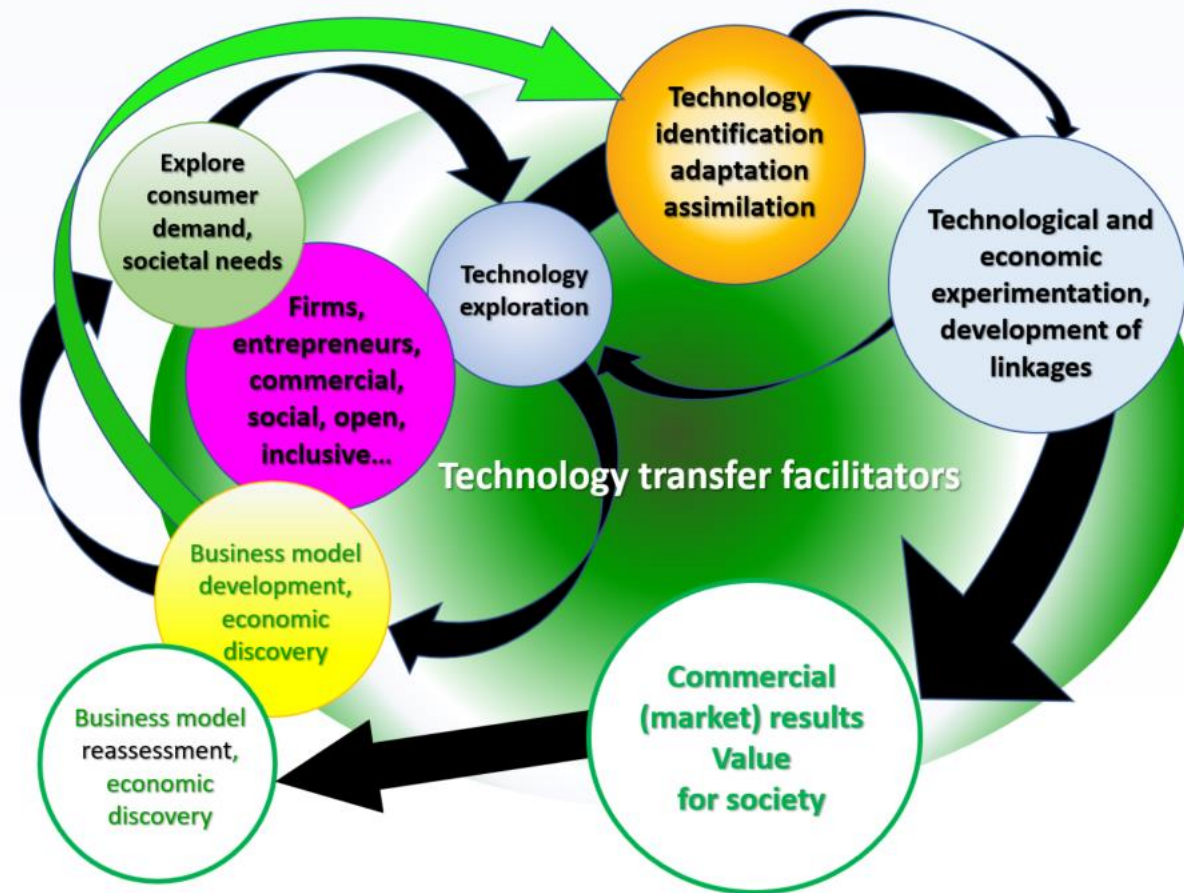
Capability  
Capacity

Learning,  
technology, and  
knowledge flows

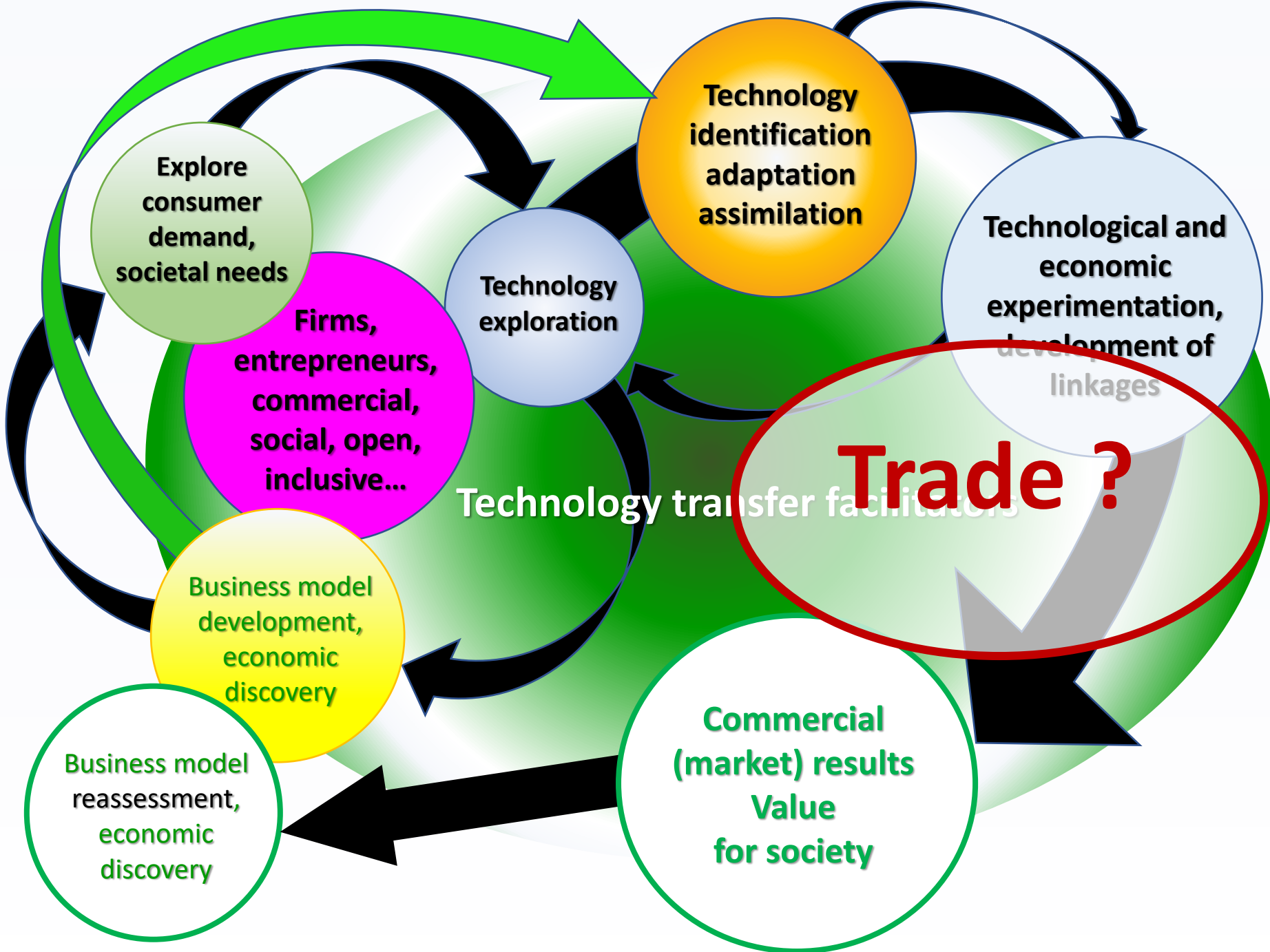




# So where is trade in all this?







# STI policy and trade policy (agreements) links

- Intellectual property rights
- Market access – import tech, export tech products
- Standardization: common standards and technical regulations, compatibility and interoperability of technologies
- R&D collaboration
- Competition policy
- Support for SMEs, participation in GVCs



# Thank you!



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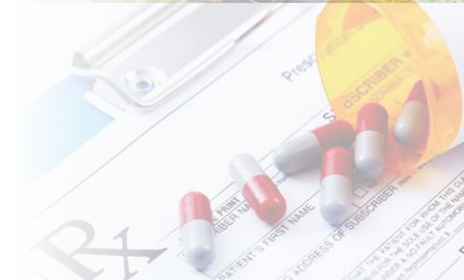
## 2. Absorptive capacities and innovative capabilities

Technology transfer is dependent on...

**Absorptive capacity:** ability to identify, acquire, adapt and implement knowledge and technology

**Innovative capability:** ability to translate acquired knowledge and technology into innovation

- Assess technology gaps
- Evaluate the ability to catch-up



## 2. Absorptive capacities and innovative capabilities

### Key determinants: absorptive capacity

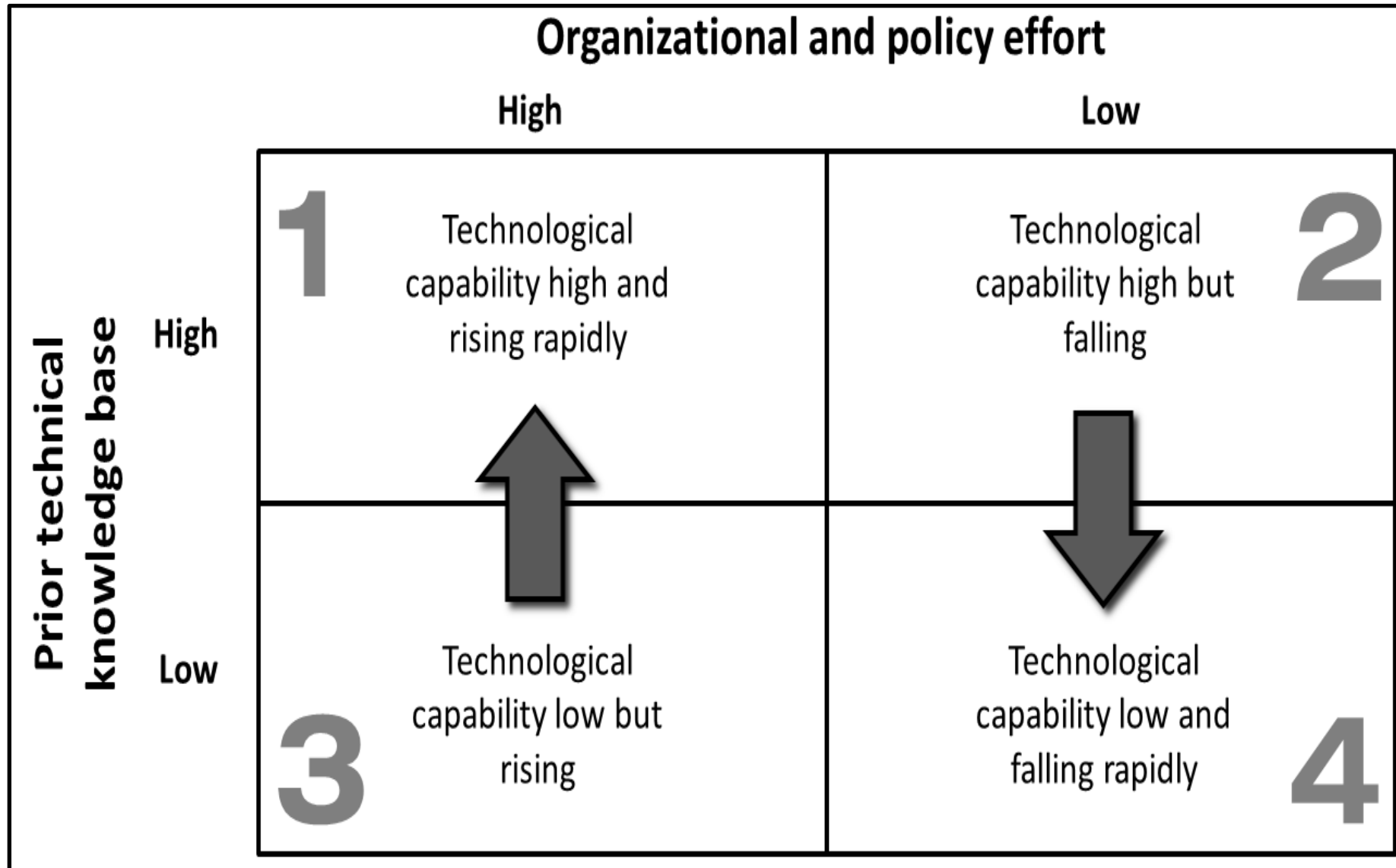
- knowledge base, human capital,
- support for technological learning, infrastructures (ICTs, energy, transport, etc.), openness to international trade
- quality of institutions and governance, social cohesion and equality

### Key determinants: innovative capabilities

- Ability, willingness, incentive to innovate
- Research, R&D outputs (public and private)
- technological outputs, mostly defined as IP



# Absorptive capacities





# 3. Channels of technology transfer

- **Trade**

- Tacit knowledge
- Open trade
- Importers perspective
- Exporters perspective



### 3. Channels of technology transfer

- **Licensing**

- Contract
- Similar access to information
- Comparable technological abilities
- Similar negotiating strength
- Risks for both parties



### 3. Channels of technology transfer

- **FDI**
  - Demonstration effects
  - Labour turnover
  - Vertical linkages
  - Internationalization of R&D





### 3. Channels of technology transfer

- **Movement of people**
  - Permanent – brain drain
  - Temporary – brain gain
  - Expatriates, dual cultures
  - Donor agencies experts?

