

Technology transfer and diffusion: Critical elements of effective innovation systems -- and how to strengthen them

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1. A systemic perspective at innovation and technical change

Key insights from research on technology and innovation

- Innovation is not invention
- Innovation is a process, not an event
- Innovation is based on learning -- there is no “off the shelf” technology
- Innovation is path dependent
- It is important to distinguish incremental and radical innovation
- The behaviour of organisations regarding technical change and innovation responds to incentives
- Foreign Trade Policy and Anti Trust Policy have a stronger impact on innovation than Technology Policy
- Innovation happens in a systemic context

What is innovation?

- Innovation can be
 - doing things differently
 - a new and different way of doing things (process innovation), for instance introducing 5S or Kaizen, preparing for ISO 9000, acquiring a new machine
 - doing different things
 - producing a different product than before
- Innovation can be
 - incremental: improving what you already have
 - radical / disruptive: substitute what you already have with something fundamentally different

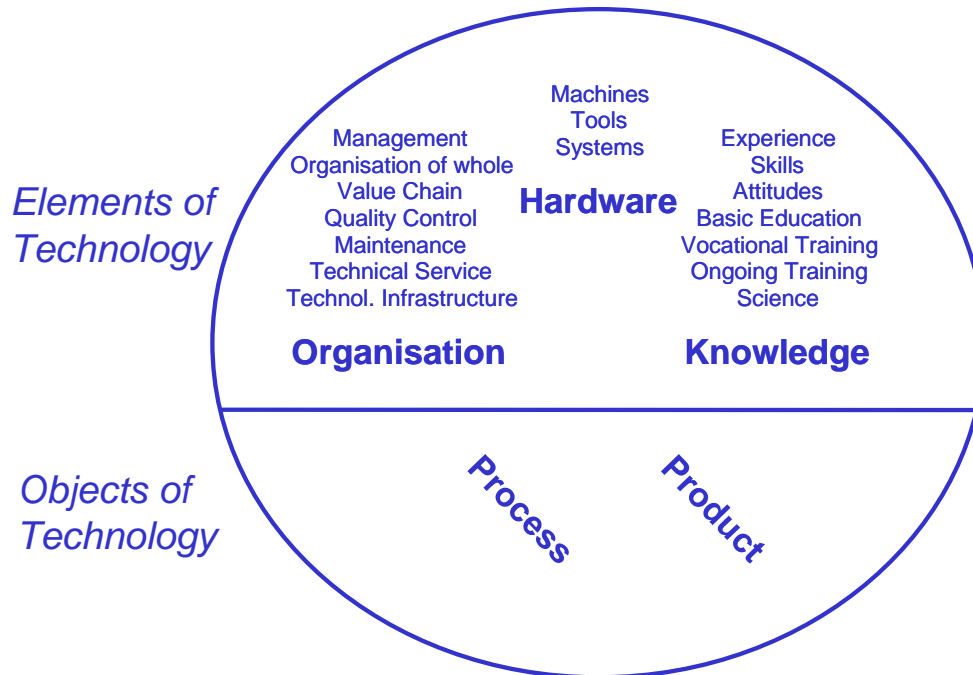
What is the focus of innovation?

- Technological innovation is only one field of innovation
 - there is also art, music, architecture
 - there is also social innovation, for instance NGOs playing an increasing role in society
- There is also innovation in business models
 - sometimes independent of technological innovation, e.g. Ikea, Aldi, WalMart
 - sometimes as a result of technological innovation, e.g. Ebay, Amazon
- An innovative business model can have a major effect on the growth of not just a company, but also the location where the company is based

What is the relationship between innovation and technology?

- Innovation emphasises the difference
 - something is new, different, and better than before
- Technology emphasises action
 - process technology: the arrangements needed to produce something
 - product technology: the elements involved in using something
- Technical change, based on technological learning, is one very important element of innovation
- Process innovation increases productivity and thus prosperity
- Product innovation generates new businesses and sectors, and thus growth, income, and jobs

What is technology? A broad definition



Hardware, organisation, knowledge

A practical example: embroidery

Knowledge



Organisation



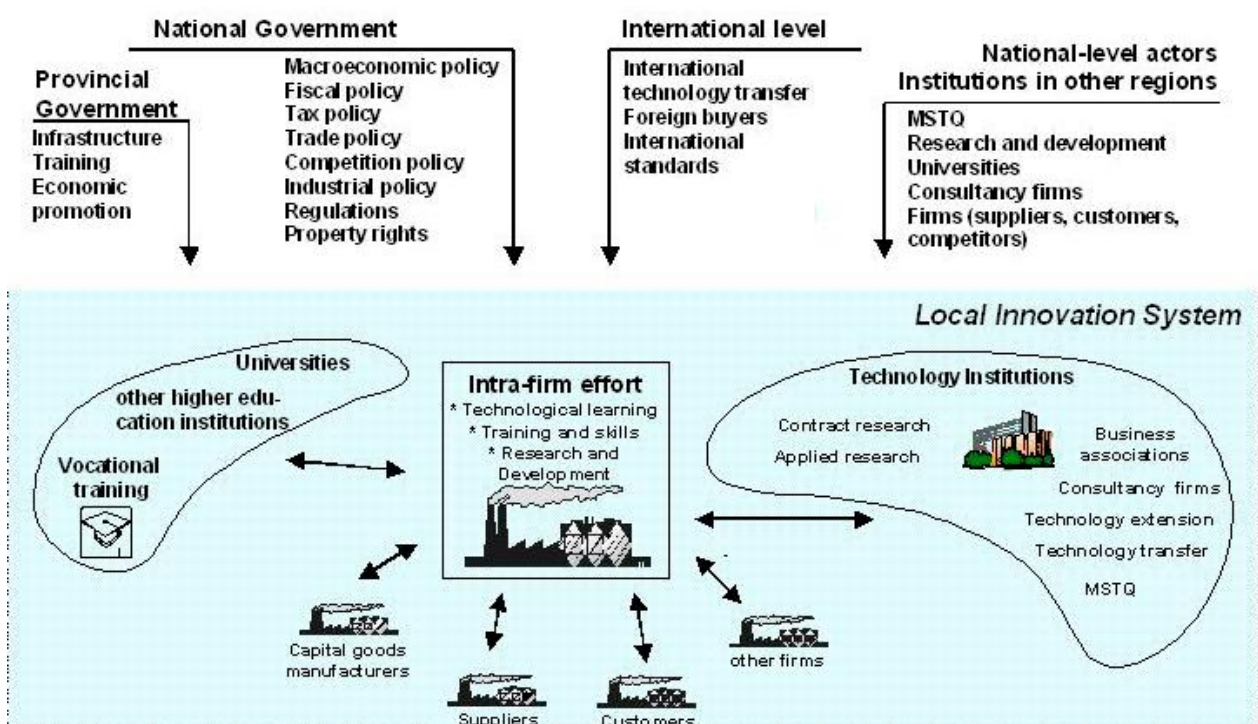
Hardware



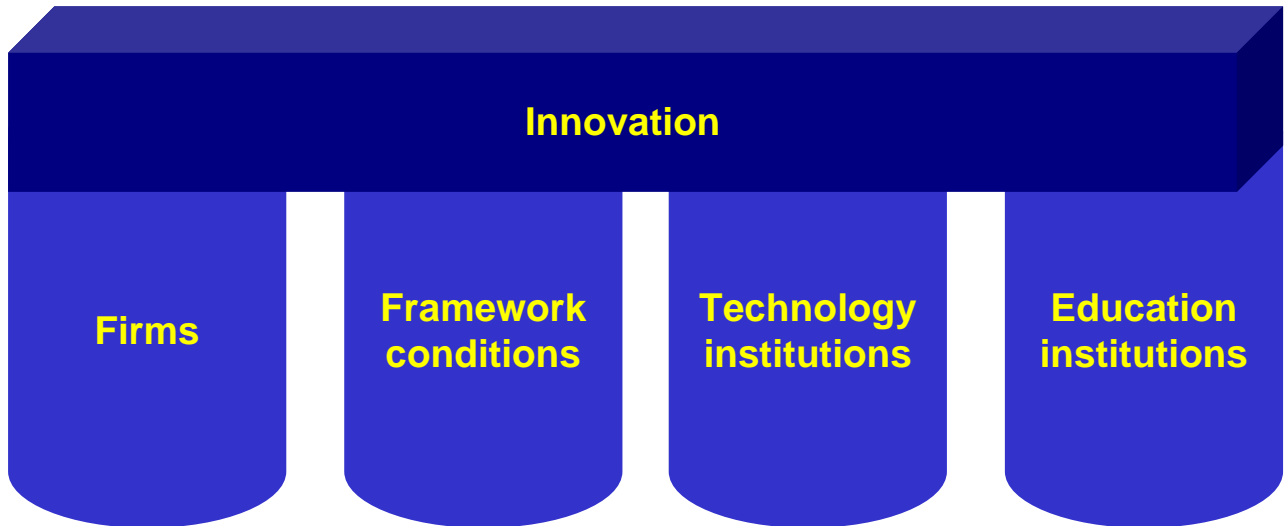
The innovation system perspective

- Innovation is driven
 - by opportunity (establishing a strong position in the market, creating a new business)
 - by necessity (responding to competitive pressure, responding to government regulation)
 - Innovation is not an event but a process, based on constant interaction between various actors
 - Innovation is not only based on an intra-firm effort, but also
 - on interaction with other companies (suppliers, customers, sometimes even competitors)
 - on interaction with technology and training institutions
- **Innovation systems** are crucial for innovation to happen

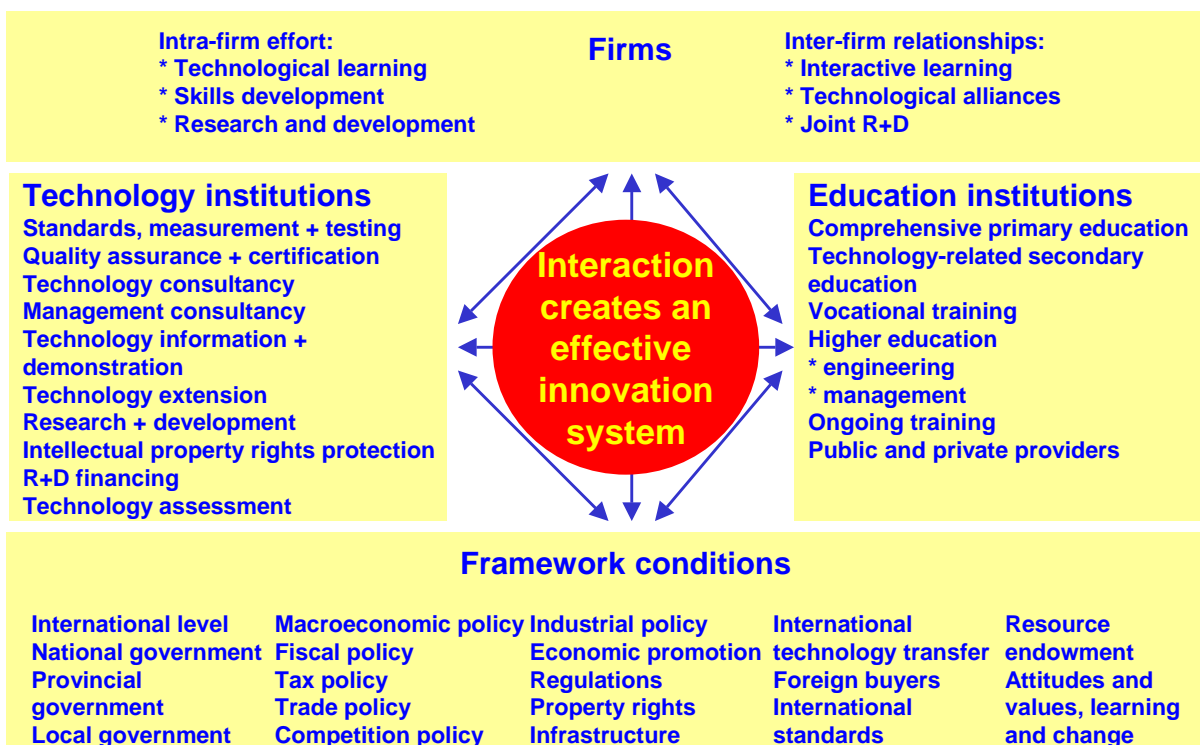
What is a Local Innovation System? A descriptive perspective



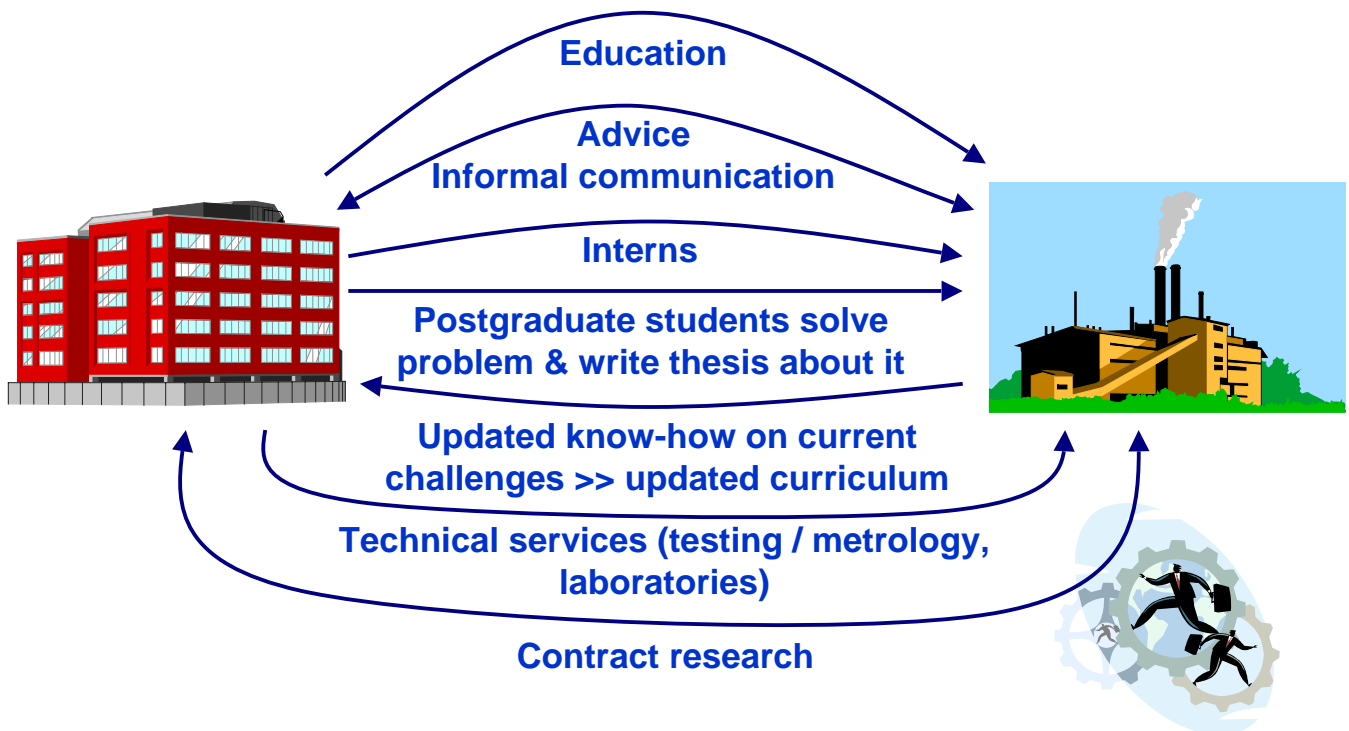
The analytical view at innovation systems: The Four Pillar Model



Innovation systems: The Four Pillar Model



The contribution of higher education institutions



The reality in emerging countries: Three types of innovation

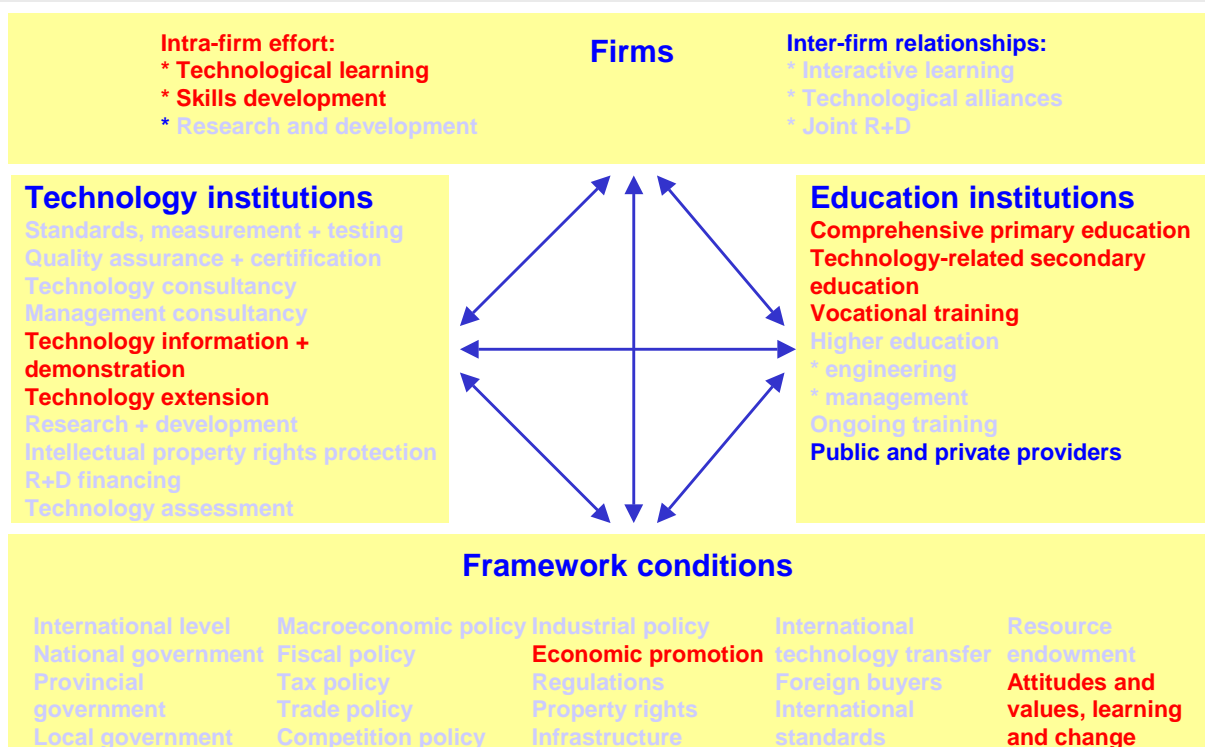
- The big leap into 20th century
 - producers that are far behind good practice
 - Racing to stay at the same place
 - producers that innovate just enough to keep their position in a domestic or global value chain
 - Strategic innovation
 - producers that are at the leading edge
- Each type and pattern has specific requirements in terms of innovation systems

1. The big leap into 20th century



- Move producers closer to the minimum level of efficient production
- Expose potential entrepreneurs to tested business models
- Sources of innovation:
 - vocational training
 - CEFE
 - Good Housekeeping
- ☞ Approaches that are **not** promising:
 - link up producers with technology institutes and universities

The Four Pillar Model and “The big leap into 20th century”

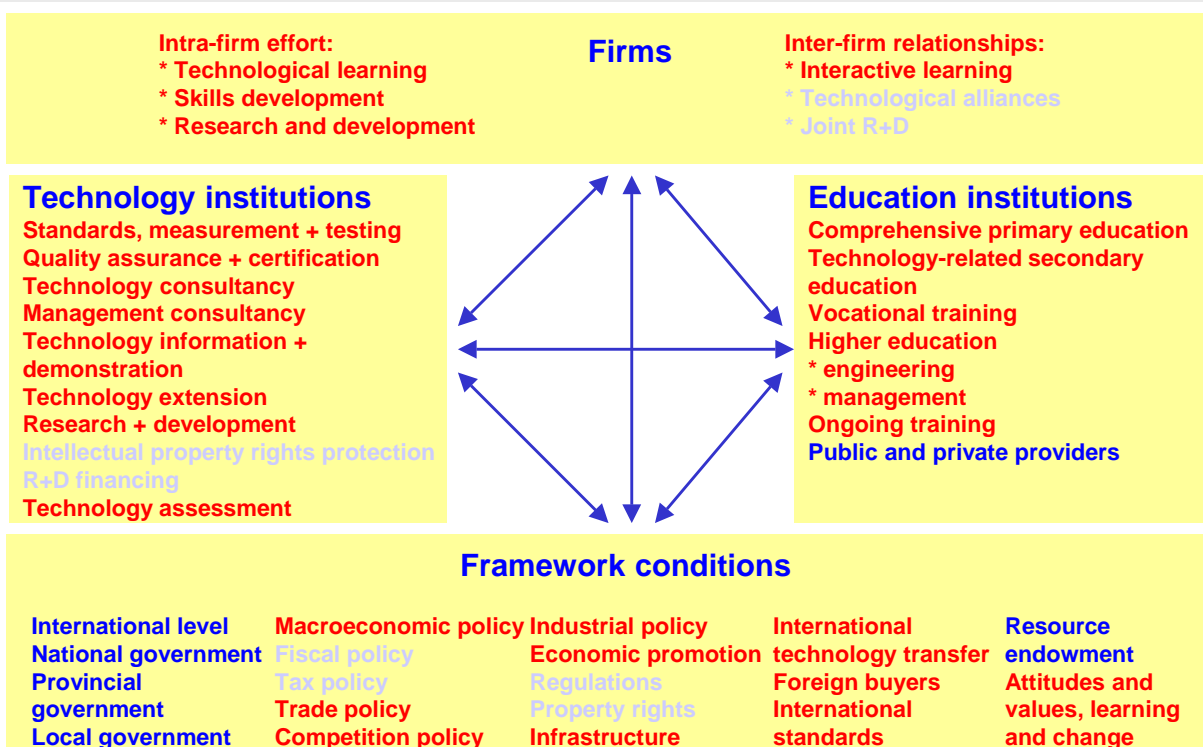


2. Racing to stay at the same place

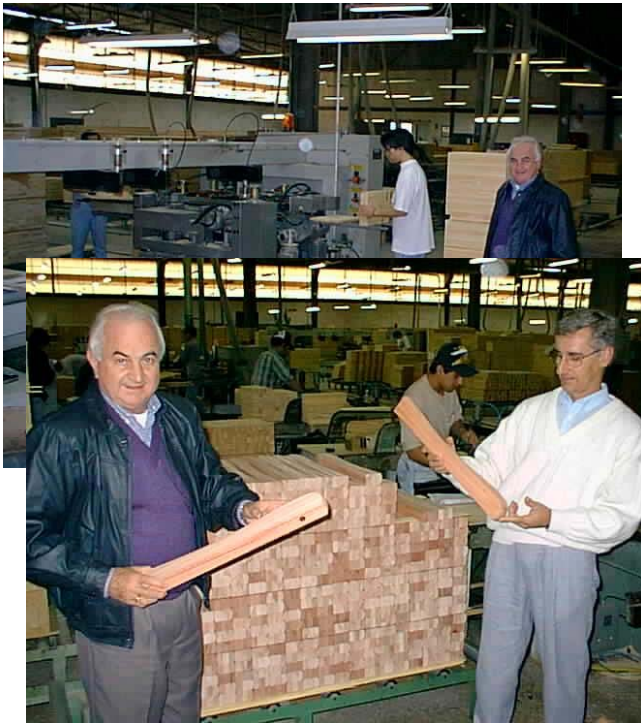


- Necessity to innovate due to pressure from customer: reduce prices, improve quality
- Main sources of innovation:
 - information by suppliers of machinery and inputs
 - information and suggestions from customers
 - training institutions
- Other relevant approaches:
 - PRUMA
 - strengthening the quality and metrology infrastructure

The Four Pillar Model and “Running to stand still”

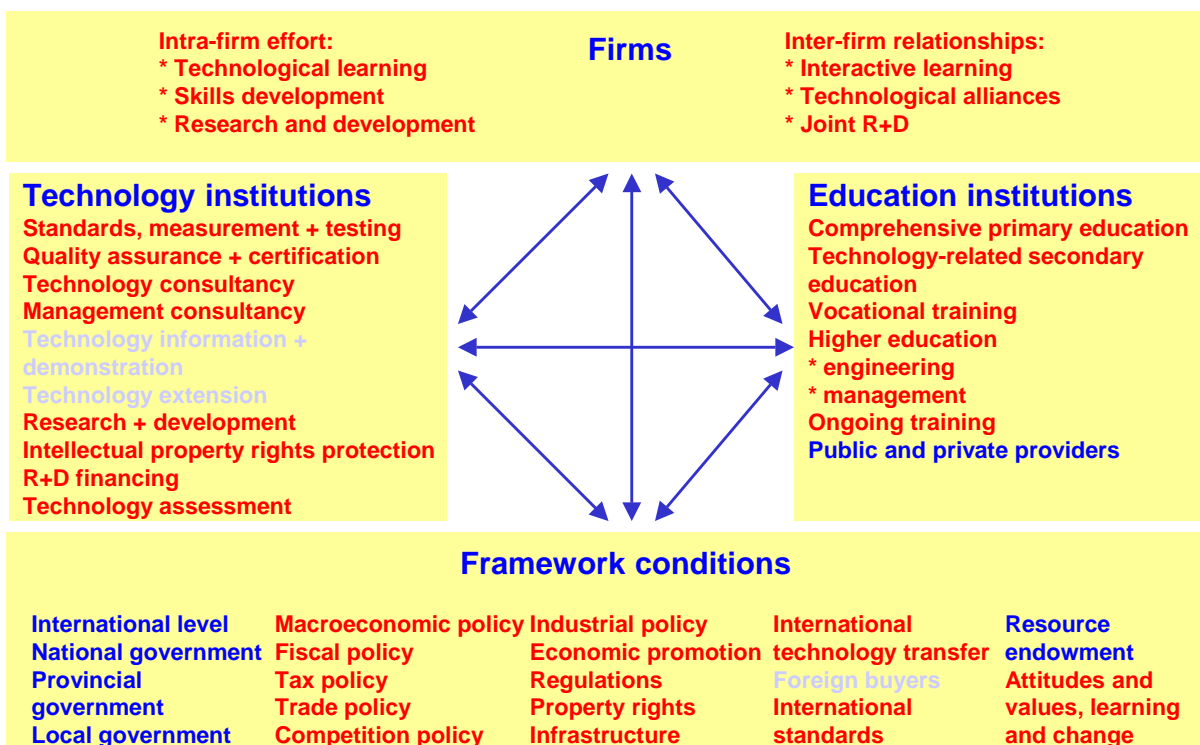


3. Leading Edge



- Innovation as a strategy to create specific competitive advantage (new technology, new business model)
- Precondition: a highly effective innovation system
 - highly specialised, constantly adjusted and upgraded services by vocational training providers and higher education
 - highly efficient, constantly updated quality and metrology infrastructure
 - specialised institutes for applied research and development
 - cluster advantages

The Four Pillar Model and “Strategic innovation”

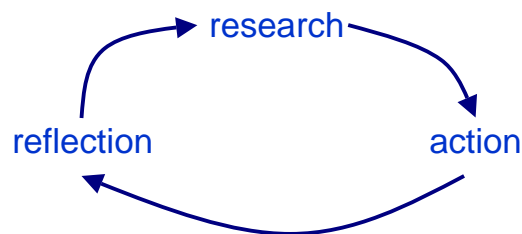


2. Strengthening local and regional innovation systems: The RALIS methodology



RALIS is based on “action research” principles

- “Objects” of research become the “subjects” of research
 - research is being conducted by those people who need the results, not by external consultants
- Research is driven by concrete interests and practical concerns
 - research is not guided by academic “fashions”
- A direct feedback loop is created



The “Rapid Appraisal” School of Thought -- Principles:

- offsetting biases
- rapid progressive learning - flexible, exploratory, interactive, inventive
- reversals and triangulation
- principal investigators' direct contact, face to face, in the field
- seeking diversity and differences
- optimal ignorance, and appropriate imprecision

The moderation method



What do you actually do when you conduct a RALIS?

- A group of facilitators (mostly local actors) conducts
 - mini-workshops
 - qualitative, structured interviews
 - both with relevant actors in the local innovation system (companies, public sector, universities and research institutions, etc.)
 - focussing at the entire local innovation system or one cluster or value chain
- in a given locality (municipality, district)
- within a short period of time (1 - 2 weeks)

1. Introduction, explanation of background
2. Presentation of participants
3. Introduction of concepts: definition of technology, Four-Pillar-Model
4. Mesocard exercise 1:
The four pillars in the location: strong + weak points
5. Mesocard exercise 2:
Benefits and risks of more cooperation among firms
6. Mesocard exercise 3:
Benefits and risks of more cooperation between firms and technology/training institutions
7. Conclusion

Qualitative, structured interviews

- identification of firms, institutions and individuals to be met: those that play a relevant role in the local innovation system
- structured interviews (“conversations”), usually with director / CEO / executive secretary
- based on open questionnaire and qualitative methodology
- notes about observations, minutes

Preparation of results

1. Documentation of observations
 - (Photo-) documentation of mini-workshops
 - Minutes of interviews
 - Tabulated summarized findings for each locality
2. Elaboration of findings
 - Group exercise
 - Facilitated workshop
 - Application of Mesocard methodology

Presentation Event and Way-forward Workshops

Presentation Event:

- Immediately after fieldwork and Results Workshop
- Summary of main findings
- Presentation of proposals for quick-win activities

Way-forward Workshops:

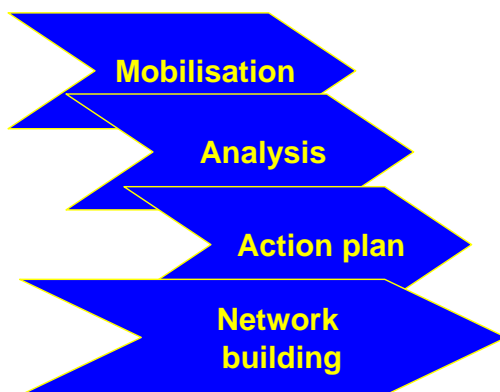
- Immediately after the Presentation Event
- Planning sessions with project champions

One specific feature of RALIS: Saving time and effort

The traditional approach



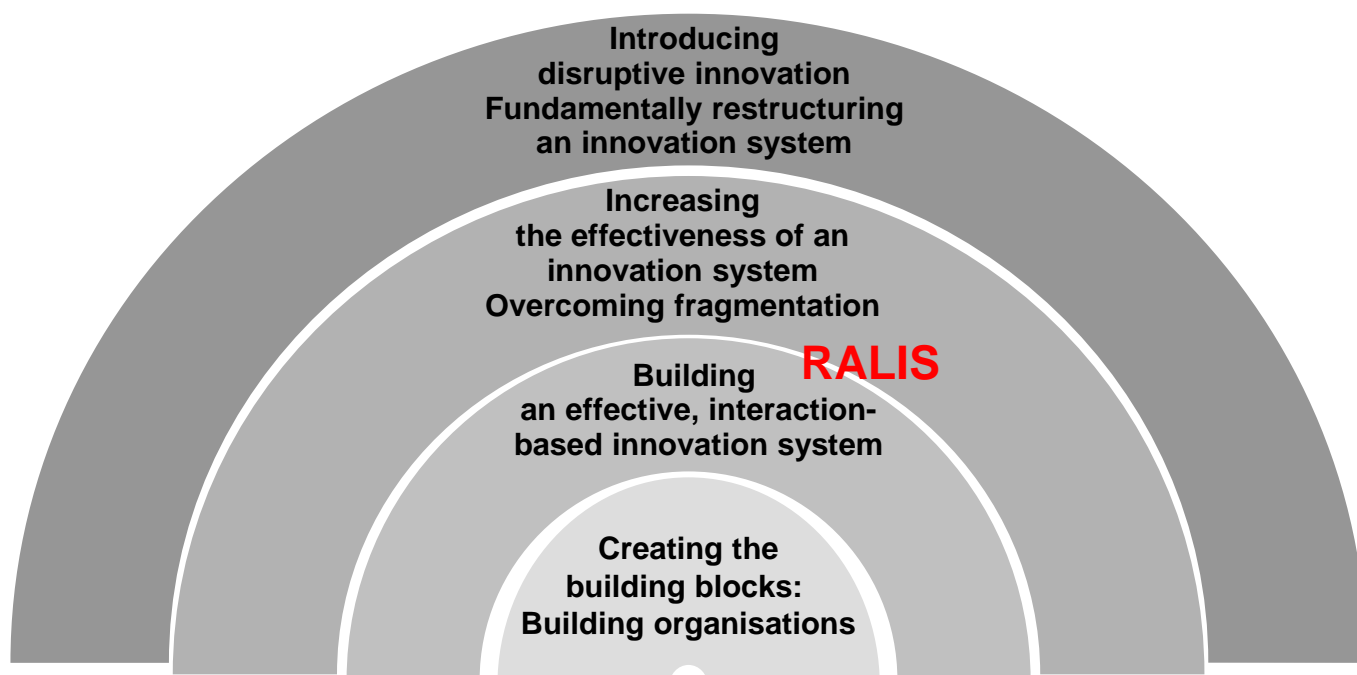
RALIS



A RALIS
Exercise takes
2 weeks



How does RALIS fit into the evolution of innovation systems?



Summary: What are the key features of RALIS?

- Combining research, mobilisation and action planning so that they directly reinforce each other: Quick & structured
- Focus at
 - understanding local supply and demand
 - identifying opportunities, bottlenecks, unmet needs
 - facilitating communication, building networks
- RALIS is a practical implementation of main insights of innovation research
 - innovation is based on direct interaction
 - innovation has a strong territorial component
 - local / regional innovation systems are a critical element in creating competitiveness, and thus prosperity

Thank you for your attention!

