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Sectoral systems of innovation
and economic development
Catch up in six different sectoral systems

1. Innovation, catching up and innovation systems

2. Common factors

3. Specific factors

4. The research challenges ahead
The meaning of catching up for a sector

Same trajectory and specialization of the leading country?
Catching up by countries in income per capita has been associated with the emergence and growth of some leading sectors

Germany XIX century and chemicals
Japan in 1970s and auto and electronics
Korea and auto and electronics
Taiwan and electronics
Countries performance within the global value chain in some sectors

Vertical disintegration and countries international specialization in stages of the vertical chain is quite relevant in several sectoral systems.

Countries tap into intermediate international demand in various ways.

Processes of specialization and of integration and coordination of knowledge take place. Modularity is necessary.
THE CATCH-UP PROJECT
F. Malerba and R. Nelson

Pharmaceuticals
Agro-food
Software
Telecommunications
Auto
Semiconductors

Countries:  China, India, Korea, Brazil, Taiwan, Nigeria.
Costa Rica, …
The meaning of catching up for a sector here is taken in a broad way

Possibility of different trajectories and specialization with respect to the leading countries

The features of catch up may be different in mature and in new sectors

Products within sectors may regard:
- standard products
- custom products
- system products
- global product niches
- products for local demand (particularly for large countries)
- products with the global value chain
Common factors across sectors affecting the catch-up of a country
COMMON FACTORS ACROSS SECTORS

Learning and the formation of capabilities of domestic firms

The stages of learning

But in the same sector there are often cases of different trajectories of capability development, because of:

-the type of knowledge base and product niches
-the size of countries
-the presence of unique actors
-historical accidents

The case of software
COMMON FACTORS (2)

Access to foreign knowledge and international networking

Development of advanced human capital

Government policy
Specific factors affect catch-up and differ across sectors
SECTOR SPECIFIC FACTORS (1)

Industrial structure: large firms and new SMEs
  software vs telecom

Multinational corporations
  global value chains
  licences
  competent local branches

Demand: exports, domestic, segmented.
  Dynamic relationship

Channels of networking: vertical networks, JV, specialization within the global value chain
SECTOR-SPECIFIC FACTORS (2)

Universities and public research organizations
Telecom
Finance: internal funds, venture capital
Types of government policy
Standards, regulations and norms
health systems

SYSTEMIC AND DYNAMIC RELATIONSHIPS AMONG FACTORS
The interplay between sectoral systems and national innovation systems

Country differences matter

Korea vs India
THE RESEARCH CHALLENGES
CHALLENGE 1

EXPAND OUR KNOWLEDGE TO SECTORS OTHER THAN MANUFACTURING

Services

Traditional or low tech sectors

Agro-food

Some very interesting studies have already been done
CHALLENGE 2
DEVELOP TAXONOMIES OF SECTORAL SYSTEMS

Some examples of potentially useful taxonomies from which to build upon:

Pavitt taxonomy

Schumpeterian patterns and technological regimes
CHALLENGE 3

UNDERSTANDING THE DYNAMICS AND EVOLUTION OF SECTORAL SYSTEMS

Understanding
The emergence of new sectors
The transformation of sectors
The trajectories of a sector
Lock-ins, development blocks, self reinforcing mechanisms in sectors

Coevolutionary processes are at the base of change and growth in sectors