

Empirical indicators

Entry - % of total 1986-91 patents by firms applying for the first time in a given industry in the period 1986-91

Stability – rank correlation coefficient between hierarchies of firms patenting in 1978-85 and firms patenting in 1986-91

C4 - % of total 1986-91 patents of the top for patenting firms in a given industry

Size - % of total 1986-91 patents accounted for by firms with more than 500 employees in a given industry

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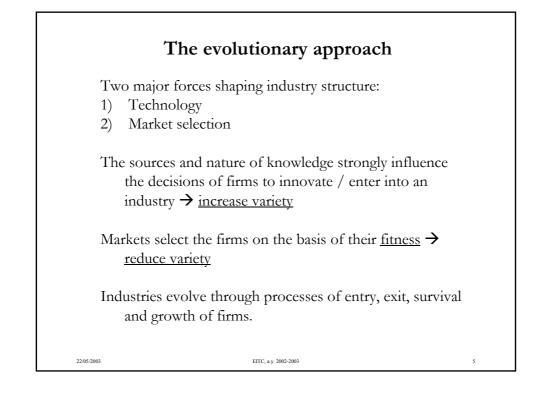
Results

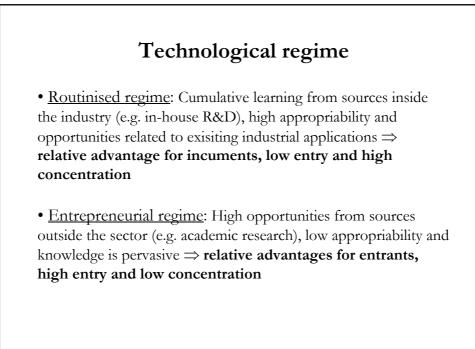
• Strong differences across industries within each country

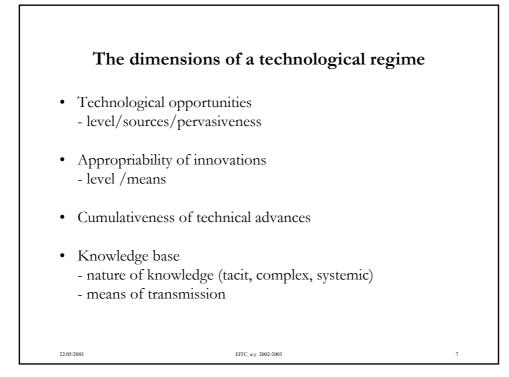
· Strong similarities across countries within each industry

Empirical evidence suggests that <u>industry-specific</u> factors, rather than <u>country-specific</u> factors account for differences in the <u>organization</u> of innovative activies in industries

 \rightarrow How do we explain that?







-	-	etween technolog tterns of innovati	
	Opportunity	Appropriability	Cumulativeness
ENTRY	+	-	-
STABILITY	+/-	+	+
C4	+/-	+	+
SIZE	+/-	+	+
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Measuring technological regime

PACE questionnaire survey to 713 European R&D managers

Appropriability: sum of scores on effectiveness of patents and secrecy

Opportunity: sum of scores on importance of external sources of knowledge for innovative activities (universities and PRO, suppliers, users, joint ventures)

Cumulativeness: score on importance of frequent technological improvements in making innovations more difficult to imitate

Knowledge base: score on relevance of applied (specific) and basic (generic) sciences for innovative activities

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Inter-industry technology flows: Pavitt's taxonomy

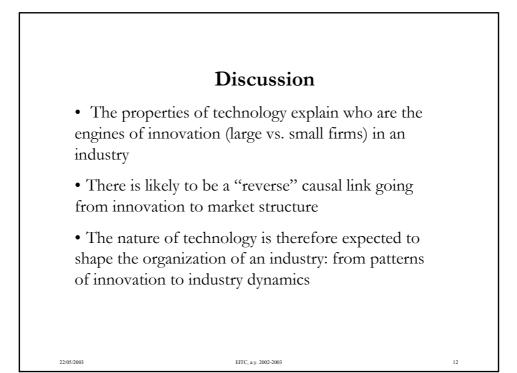
-the largest part (>75%) of new technologies is produced by 'core' industries: chemicals, electronics, machinery, transports

-most innovations produced by 'core' sectors are product innovations, i.e. they are adopted by 'user' industries

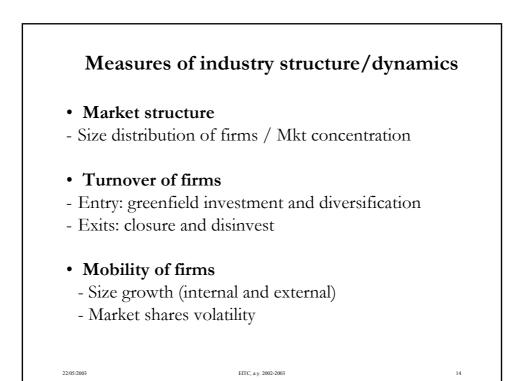
-main user sectors are: textiles, food, paper and printing, wood and furniture. User industries also contribute to the development of own process innovations

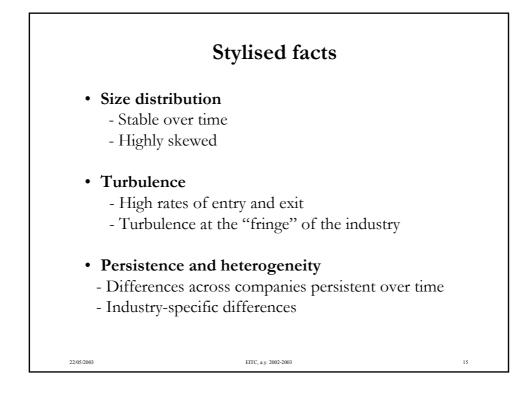
- Four types of industries: science-based, scale-intensive, specialised suppliers, supplier dominated

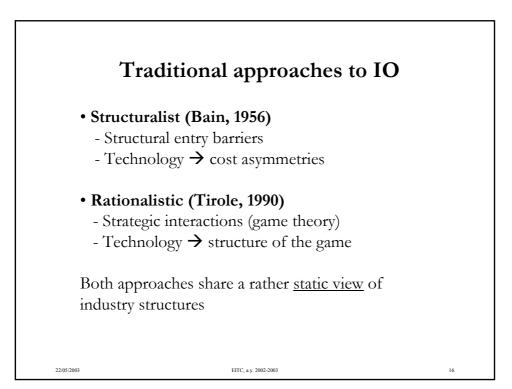
	Sources of technology	<i>Type of</i> users	Means of appropriation	Tech. Trajectories	Innovation	Size
Supplier dominated	Suppliers /Big users	Price sensitive	Non-technical	Cost-cutting	Process	Small
Scale intensive	Production engineering; Suppliers; R&D	Price sensitive	Secrecy, know- how, dynamic learning economies	Cost-cutting, product design	Process	Large
Specialised suppliers	Design and development; users	Performance sensitive	Design, knowledge of users, patents	Product design	Product	SME
Science- based	R&D, public science, production	Mixed	R&D, patents, secrecy	Mixed	Mixed	Large /Small

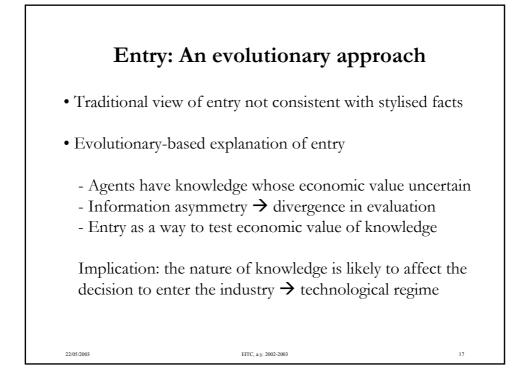


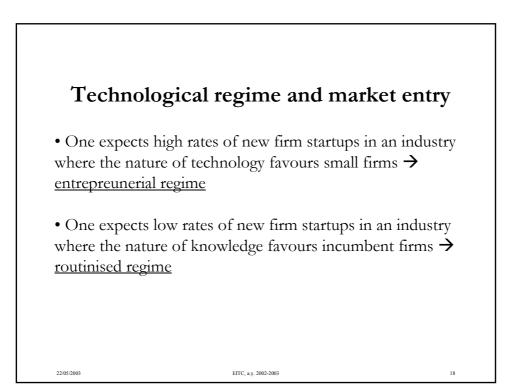












Results

• Entry of new firms

- high where small firms' share of innovations is high -not deterred by high K intensity and economies of scale

• Survival of new firms

- low in industries with high K intensity and economies of scale
- high in industries where small firms' share of innovations is high
- increasing with firm size and age

• Growth of surviving firms

- higher in industries with high K intensity and scale economies
- higher in industries with higher rates of innovation (and uncertainty)

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⇒ New firm start-ups more prevalent where knowledge favours small firms
⇒ New firms start at sub-optimal scale, if successful grow if unsuccessful exit from the industry
⇒ In industries where MES is high, surviving firms grow faster, but the probability of surviving is lower
⇒ In industries where the probability of innovating is greater, one would expect higher rates of new firm formation, higher growth rates of surviving firms, but lower likelihood of survival

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Models of industry dynamics

• Are there models capable to explain the overall dynamics of an industry in terms of entry, exit, growth, size distribution, product and process innovation?

- Simulation models (history-friendly models)
- Industry-life cycle model (ILC)

• Traditional version of the ILC model based upon the notion of a **dominant design**

• Steven Klepper's model

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	Exploratory	Development	Mature
Turbulence	High	Medium	Low
Survival	High	Low	Low++
Innovation	Radical / product	Incremental / product+process	Incremental / process
Equipment	General purpose / production inefficient	Specialised / segmentation	Large scale plants / automation
Concentration	Low	Medium	High
Entry barriers	Low	High	High++
Competition	Functional performance / new products	Price / product differentiation	Low / collusion

