University-Industry Relationships

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Convegno AlmaLaurea 2019
Università e mercato del lavoro

Rome, 6 June 2019

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Part I

University – Industry relationships

Why U–I relationships

- From a general equilibrium perspective, U–I knowledge exchange positively contributes to reducing R&D market failures
- From an evolutionary perspective, U–I knowledge exchange positively contributes to enhancing variety
- Hence, relationships of this kind are relevant because they
  - realise the full social benefits of R&D investments
  - combine heterogeneous partners and, more importantly, heterogeneous types of knowledge

Gains from U-I relationships

- From a microeconomic perspective, both universities and businesses benefit from exchanging knowledge:
  - Universities
    - obtain financial support from the private sector
    - increase the experience and employment opportunities of students and faculty professionals
  - Firms
    - access university research infrastructures and expertise
    - gain opportunities of recruiting high-skilled personnel
    - keep abreast of cutting-edge academic research

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The science and technology relationships

- U-I relationships are deemed crucial at least since the establishment of the technology–push linear model of science
  - Vannevar Bush 1945 report: *Science. The Endless Frontier*

- However, "Innovation requires considerable communication among different actors – firms, laboratories, academic institutions and consumers as well as feedback between science, engineering, product development, manufacturing and marketing"
  OECD (1996), *The Knowledge-Based Economy*, Paris
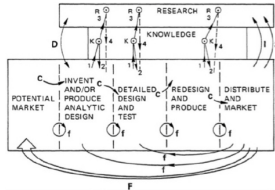
Source: Kline S. & Rosenberg G. (1986), An overview of innovation, In Landau, R., Rosenberg, N. (eds.), *The Positive Sum Strategy: Harnessing Technology for Economic Growth*, National Academy Press

U-I relationships are complex

- As partners that are part of U-I relationships speak different languages they can get enriched
- But they cross different boundaries, and common meanings are maybe difficult to establish
- Therefore boundary-crossing becomes the central challenge for inter-organisational collaboration
- Studies on university-industry relationships have highlighted a host of several different incentives and obstacles to its implementation
- See for instance the Special Section of the *Journal of Technology Trasfer*, 2017, Vol. 42.

The new economics of science

- U-I collaboration has been characterised by "cultural divide" between partners in terms of goals, perspectives, motives and routines; therefore, such collaboration is highly multifaceted
- P. David e P. Dasgupta (1994) Towards a New Economics of Science? *Research Policy*, Vol. 23
- Science and technology pertains to two different domains:
  - Republic of Science
 - Kingdom of Technology

The new economics of science

- The fundamental differences are structural
- Although both pursue and produce knowledge they differ in:
  1. The legitimate aims of the two different community of practitioners
     - Science aims to widen the domain of public knowledge
     - Technology aims to produce knowledge to gain profits by using private knowledge
  2. The norm of behaviour, especially as far as knowledge disclosure is concerned
     - Scientists are completely free to decide their topic
     - Technologists are more limited in their freedom to choose the topics of their research and to divulge their results
  3. The characteristics of the reward systems
     - Reputation and priority of the discovery reward scientists
     - Applicability is the main aim, thus the more applicable the knowledge the higher the salaries

Difference in focus — Universities vs Firms (Italy, 1987–2014)

R&D performed by Higher Education

R&D performed by industry
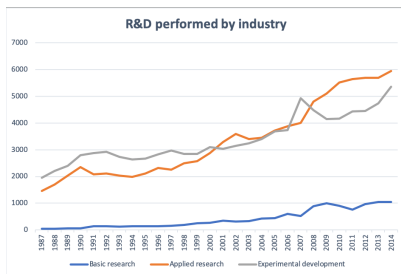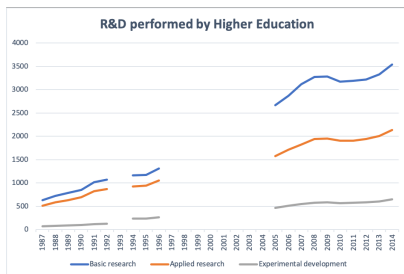
Source: OECD.Stat

A "final caveat"

- "Formal" collaboration giving rise to "formal and codified" results, is the most visible but maybe not the largest and most promising way to consider U-I relationships

- Maybe it is only the tip of the iceberg, below which the vast majority is made-up of "tacit and informal" relationships

- In some studies, it emerged that firms consider that the most of the results in terms of innovative activity from U-I interactions come from informal contacts

- Would it not be better to address relationship-based indicators?

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Part II

A tentative framework

University–Industry relationships

	Time horizon		
	CLOSE		DISTANT
Degree of knowledge appropriability	HIGH	FIRM	
	LOW		UNIVERSITY

University–Industry relationships

	Time horizon		
		CLOSE	DISTANT
Degree of knowledge appropriability	HIGH	Technology transfer	
	LOW		Research support

University–Industry relationships

		Time horizon	
		CLOSE	DISTANT
Degree of knowledge appropriability	HIGH	Technology transfer	Cooperative research
	LOW	Knowledge transfer	Research support

University–Industry relationships

		Time horizon		
		CLOSE		DISTANT
Degree of knowledge appropriability	HIGH	Technology transfer	← Address specific needs	Cooperative research
				↑ More directed RS
	LOW	Knowledge transfer		Research support

University–Industry relationships

		Time horizon		
		CLOSE		DISTANT
Degree of knowledge appropriability	HIGH	Technology transfer		Cooperative research
		↑ Personnel exchange		
	LOW	Knowledge transfer	← Fellowships to students	Research support

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University–Industry relationships

		Time horizon		
		CLOSE		DISTANT
Degree of knowledge appropriability	HIGH	Technology transfer		Cooperative research
			↖ Spin-off Joint patenting	
	LOW	Knowledge transfer		Research support

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