

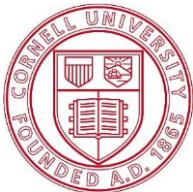
Beyond the “Disruptive Innovation” Trap

HEIs and Regional Clusters as Knowledge Sharing Networks

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First Principles: What are We Trying to Achieve?

For Enterprises:

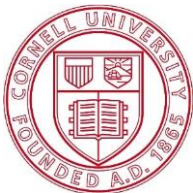
- Increases in productivity
- Competitiveness in global markets

For Regions:

- Job creation
- Economic development through specialisation and branding for value

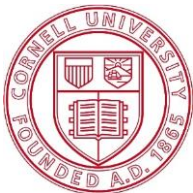
Nationally:

- A diversified, sustainable economy



What Do We Know?

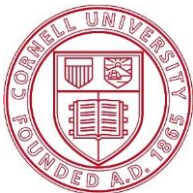
For some industries localized supply networks are critical to the process through which knowledge is transferred between enterprises, creates new industries, and used to transform existing industries. These localized networks are frequently described as industry “clusters”.



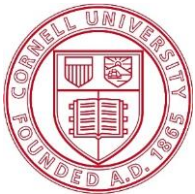
What About Clusters in Ireland?

What makes Ireland a distinctive policy-making environment?

- Foreign direct investment-led economic development strategy for manufacturing in an export-platform island economy.
- MNEs have followed regional incentives and local enterprises have followed them. Example: electronics and ICT.
- Niche market industries (dairy, music) demonstrate different location patterns and compete on value-added, knowledge, and creativity. They represent the Irish “brand”.

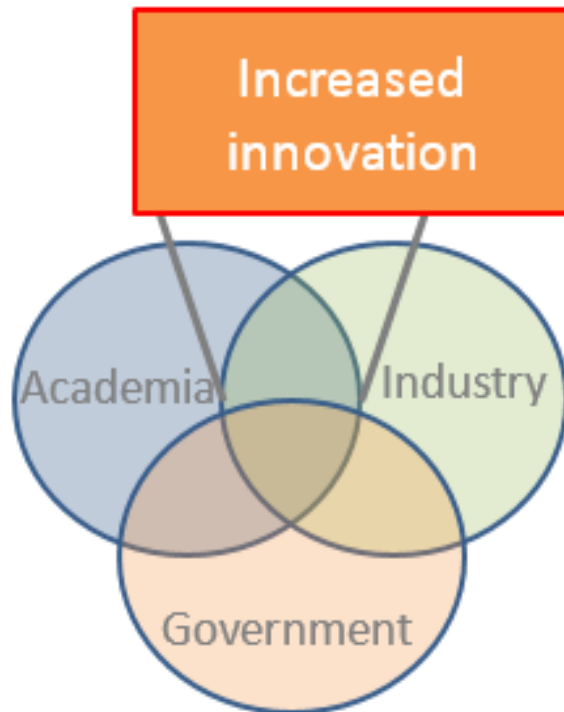


Where Do We Start?

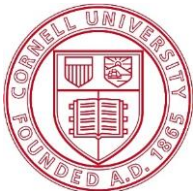


The Vision of Collaboration

Assumptions

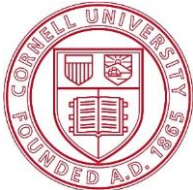


- “Innovation” is the key to achieving both enterprise and regional goals.
- Universities are the source of innovation through incubators, centers of excellence, technology centers and parks.

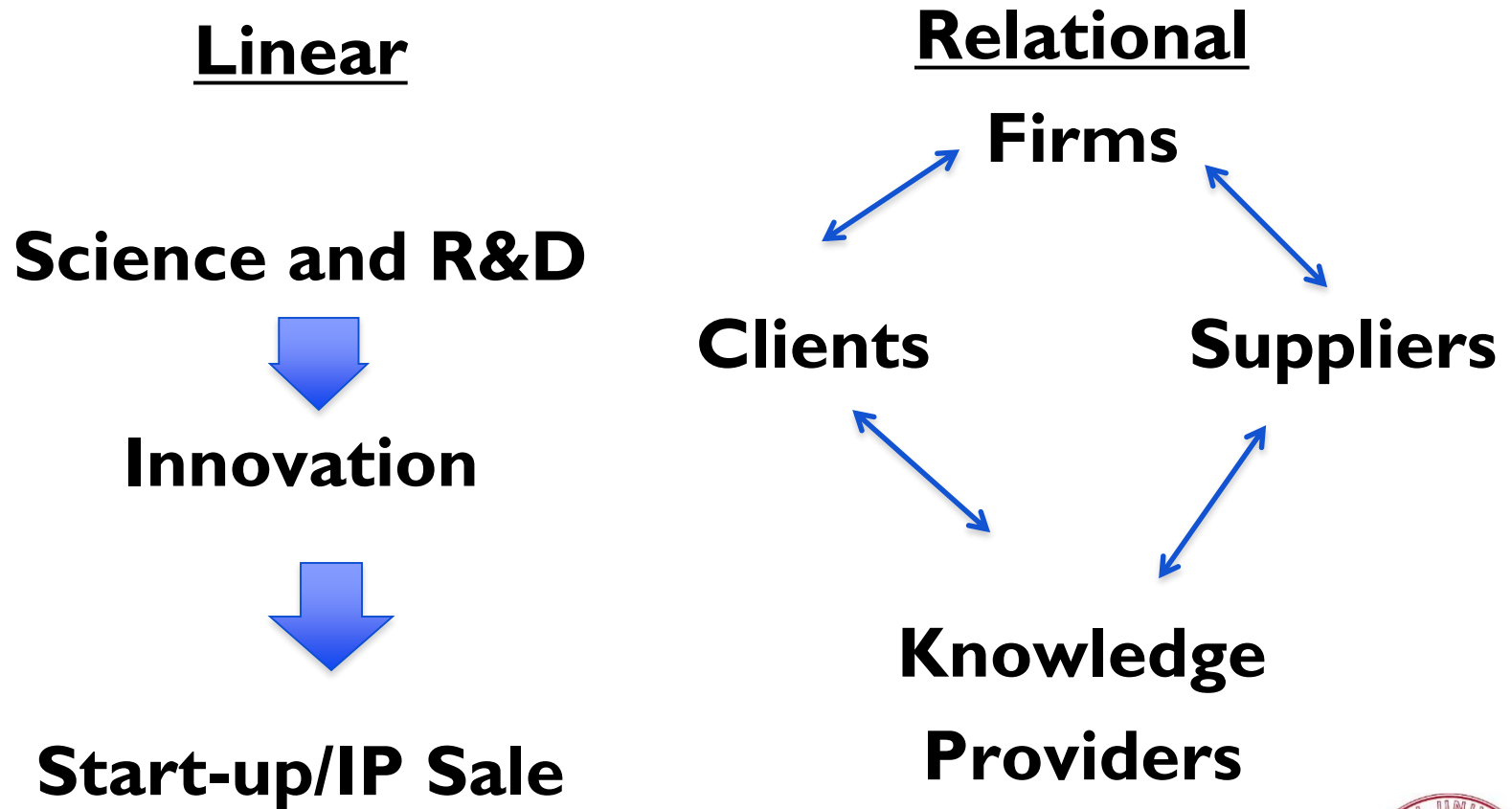


What Have We Learned About the Limits to This Model?

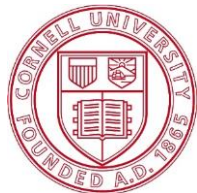
- “Innovation” can take many forms – disruptive inventions, new products that improve on existing products, or advances in productivity and quality through changes in process.
- Incentives matter -- HEI technology transfer models may lead to saleable intellectual property and start-ups but rarely produce enterprises that grow in the region and contribute to economic development. Key high-tech IP industries – bio-tech, bio-sciences – produce few jobs.
- **Knowledge-sharing that leads to the outcomes we want takes many forms (Kenney and Mowery, 2014).**



Linear and Relational Models of HEI Technology Transfer and Knowledge Sharing



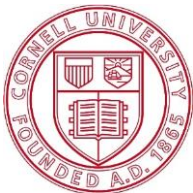
Adapted from P. Marques, 2010



Higher Education Institutions Are Recipients as Well as Originators of New Knowledge

The intensive focus of policies (including the Bayh-Dole Act) on patenting and licensing of university research...overlooks the interactive nature of university-industry research relationships, which embody considerable feedback and iteration, rather than operating as a unidirectional flow of fundamental knowledge into industry application. (Kenney and Mowery, 2014:2)

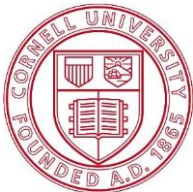
Provost Frederic Terman of Stanford encouraged William Shockley to locate his new firm near Stanford to expose Stanford engineering faculty to new research in solid state physics and electronics.



Two Iconic Models Approach Knowledge Sharing Differently

In the business network / industrial district model:

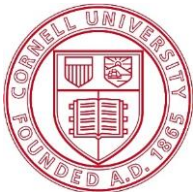
- ✓ Innovation is a product of shared continuous learning and likely to be incremental.
- ✓ Innovation may take the form of process as well as product innovation – to compete on the basis of quality, for example.
- ✓ Science-based market disrupting innovation is rare.
- ✓ Shared mid-level skills (generalized skills) are important to enterprise profitability.



Two Iconic Models Approach Innovation Differently

In the science-driven, technology transfer model:

- ✓ The goal is development of intellectual property or a product that “breaks through” and alters markets.
- ✓ Knowledge is captured for the profit of an individual enterprise not shared among firms in an industry.
- ✓ Process innovation is not on the agenda because of the investment time frame (short)
- ✓ High skilled workers trained in the sciences are preferred by enterprises.



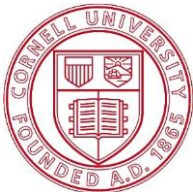
Evidence from Cases: #1 The Italian Industrial District

Assets:

- ✓ Regional resilience and ability to absorb labor in SME base
- ✓ History of adaptation through moving higher on the value chain
- ✓ Emphasis on regional social cohesion

Limitations:

- ✓ Individual firms have limited technical or science-based capacity to produce breakthrough products
- ✓ Technical personnel in regional industries have a low level of degree attainment by comparison with other comparable European regions.



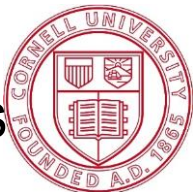
Evidence from Cases: #2 Anglo-American Science-based Technology Transfer

Assets:

- ✓ University-based research and development capacity is used to develop new, potentially market altering, products.
- ✓ Spin-off firms have high science-based and technological capacity.

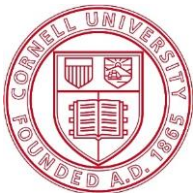
Limitations:

- ✓ University research and development is focused on IP industries, particularly bio-sciences and computer sciences and is disconnected from mature industries that require technological reinvention in order to compete.
- ✓ The benefits of research and development flow to a few regions that are combined R&D and financial centers.



What are Alternative Ways to Share Knowledge That Achieves Policy Goals?

What Role Can Higher Education Institutions Play?

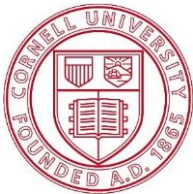


Approach: Connect to Regional Industries in More Strategic Ways

HEI programs ally with local industry organizations to assess needs in product innovation, process innovation and human capital development and ways to strategically respond to those needs.

Examples:

- ✓ Milan Polytechnic University technology transfer office work with industrial designers.
- ✓ Connections between the University Rovira I Virgili (URV) in Catalonia and the regional chemical industry, include human capital development and research on new technologies and process innovations.
- ✓ The Science University of Malaysia is engaged in bio-science research on the nation's key industry, agriculture, to increase its productivity and develop new industries, such as bio-plastics.
- ✓ Rochester regional photonics cluster works with Monroe community college
- ✓ to transform the mid-level technical training program for the industry.

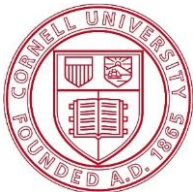


Approach: Make R&D Capacity More Accessible to Regional Enterprises

HEIs recognize the wide variation in faculty research and development interests and potential, and adjust practices to make more types of collaborations possible.

Examples:

- ✓ The University of California at Berkeley has identified a variety of approaches to research transfer, including open collaboration, philanthropy and industry affiliates. The university has altered contractual requirements to fit these different approaches.
- ✓ University College London has expanded services and support to faculty wanting to transfer process or product innovations with long-term potential for commercial success.
- ✓ Translational research projects in health care and services.



Recommendations

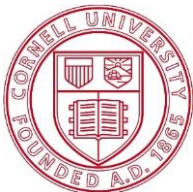
The key to change is looking for realistic points of leverage that can:

1) make HEI-based research and development on new technologies and process innovation easier to access in the regions where the HEIs are located.

2) create ties between all types of higher education institutions and regional industries. Maximize potential interaction.

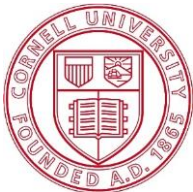
More specifically:

- Develop strategies for different types of industries, particularly those with a regional or national brand.
- Develop regional inter-institutional cooperation between research institutions and polytechnics. Dampen competition among HEIs
- Evaluate and reform strategies for transferring the full range of process and product innovations, including in the social sciences.
- Develop a capacity to foster low tech and “frugal” innovation.



What Does This Mean for Ireland?

- HEIs support the human capital development required to adopt and apply process and product innovations in addition to disruptive intellectual property inventions.
- HEIs work with local SMEs to help them reach and expand in global markets as well as with large corporations that are already established in global markets.
- Measure success in terms of the sustainability and transformation of regional industry, and employment growth.



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