RIETI-NISTEP Policy Symposium

Open Innovation as a Key Driver of Japan's Industrial Competitiveness

Handout

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University – Industry Technology Transfer: Overview & Continuing Challenges

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Why University – Industry Collaboration & Technology Transfer?

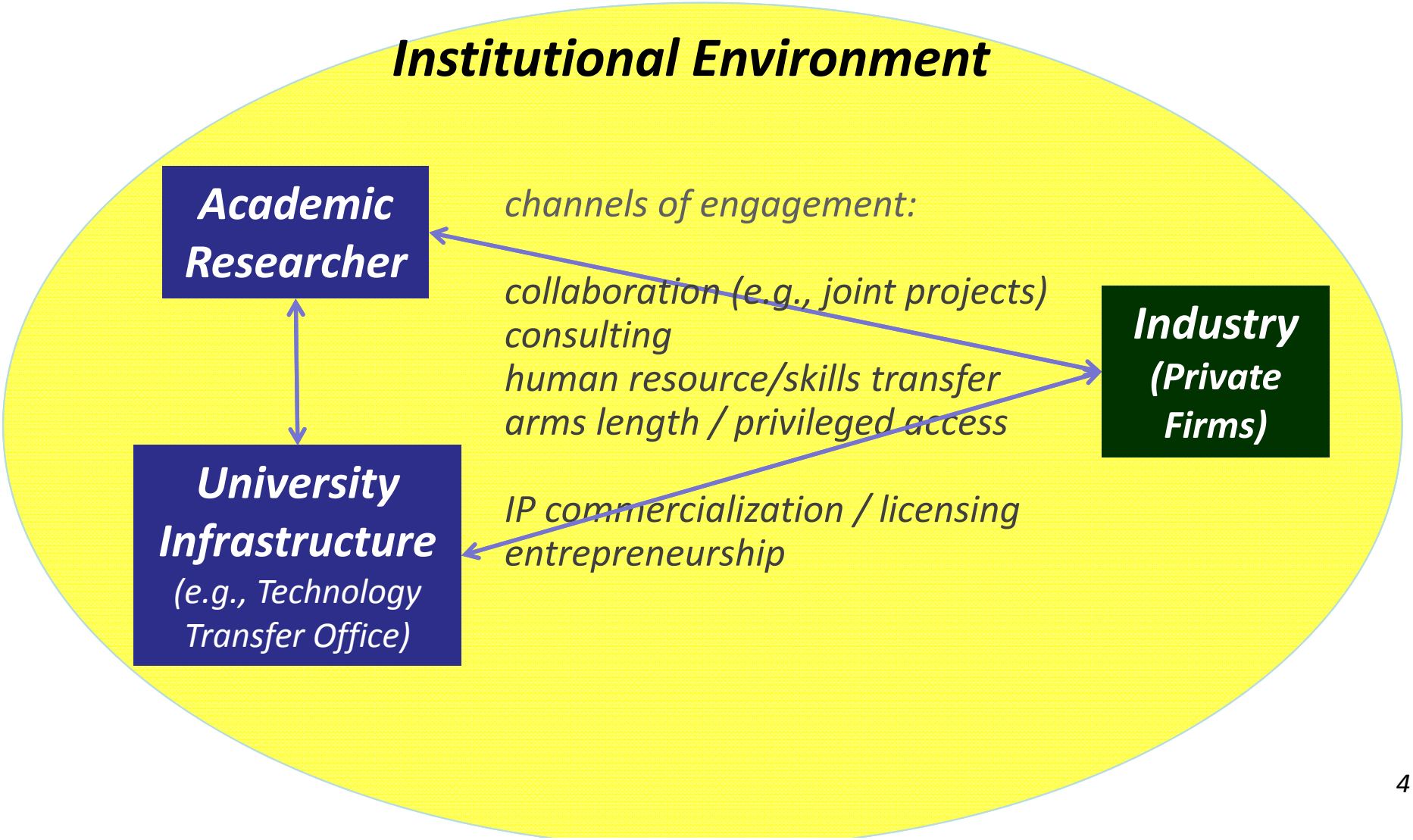
- *Background*
  - *for centuries, universities have been homes for research at global frontier of knowledge*
    - *create new firms (e.g,. Genentech)*
    - *create IP that is licensed to create new firms or products*
  - *for centuries, firms have leveraged leading-edge techniques and knowledge for competitive success*
  - *for nearly 150 years, universities and firms have collaborated*
    - *e.g., chemicals in Germany (1880s)*
    - *e.g., Haber-Bosch Process (1910s)*
- *Benefits to firms*
  - *knowledge, technology, human capital, prestige, public relations, …*
- *Benefits to universities/researchers*
  - *funds ($$$), equipment & facilities, ideas/problems, techniques, feedback, market, labor market, faculty satisfaction & retention, prestige*
- *Benefits to society*
  - *ideally, uni-industry collaboration → knowledge generation, transfer, & accumulation*
  - ***university-industry collaboration of particular interest to policy-makers who would like to boost economic growth and regional development!***

Case of United States: A model but not the model

- *U.S. University System*
  - *heterogeneous*
  - *no history of central administration*
  - *unusual degree of competition*
    - *over resources, students, faculty, prestige, ...*
- *Government support for research (& development)*
  - *esp biomedical & military*
  - *series of Federal programs: SBIR, NIH, NSF, DOE*
  - *many state programs as well*
  - *private funding essential for even public universities!*

- *Key institutional features*
  - *Long history of collaboration*
    - *especially in biomedical research*
    - *e.g., DuPont & University of Delaware*
    - *e.g., Philadelphia College of Pharmacy & PA/NJ pharma cluster*
    - *e.g., university-military-industrial complex (MIT/MA & Berkeley/CA)*
  - *Bayh-Dole Act*
    - *coincided with but prob did not cause boost in licensing, revenues, & university-industry collaboration*
  - *Technology Transfer Offices*
    - *wave of foundings in 1960s & after Bayh-Dole*
    - *highly skewed revenues (both across unis and within unis)*
    - *tradeoff: revenue vs. diffusion*
  - *Complementary institutions*
    - *VCs, culture of risk, mentoring,...*

University-Industry Collaboration



University-industry collaboration: Some sources of friction

- *Norms & culture*
  - *universities: Mertonian norms & logic of Open Science*
    - *project selection = "interesting"*
    - *goal = diffusion*
    - *fear = corruption of research (evidence = mixed)*
  - *firms: commercial logic, restriction, & secrecy*
    - *project selection = "valuable"*
    - *goal = profit*
- *Management challenges: getting to efficiency frontier takes time*
  - *TTOs take time to become efficient*
  - *TTOs take time to figure out mission*
  - *Universities need time to figure out incentives & infrastructure*
  - *Faculty (& firms) take time to figure out collaborations*
  - *Faculty-firm & University-firm relationships develop over time*
  - *Faculty mentoring develops over time*
- *Incentives*
  - *insufficient for researchers...*
    - *to commercialize?*
    - *to work on projects with commercial potential (especially Big Challenges)?*
    - *e.g., Professor's Privilege*
  - *insufficient for universities...*
    - *to pay for diffusion*
  - *insufficient for firms...*
    - *to support Big Collaborative Projects?*
  - *insufficient for all...*
    - *to disclose licensing agreements & results of formal arrangements*
    - *opportunism/hold-up/Arrow Problem*
- *Emerging conflicts*
  - *firms beginning to complain about aggressive IP negotiations by US TTOs*
    - *increasing problem as uni budget pressures grow (& govt funding falls)*
  - *licensing more effective in biomedical than IT & other sectors*

Concluding thoughts

1. *Incentives key but difficult to get as right as possible*
2. *US system ≠ ideal model for the world*
   - *Bayh-Dole supports system but does not turn on switch*
   - *university TTOs are part of a complex ecosystem linking academic research & firms*
     - *licenses revenues are highly skewed & diffusion = more prominent goal*
   - *university-industry linkages are not formula for regional competitive advantage*
3. *Optimal system = not clear, but...*
   - *likely tailored to country & national institutions & institutional history*
   - *likely as open/transparent as possible*
   - *likely to take time to develop institutional capabilities*
   - *likely involve skewed outcomes*
   - ➢ *useful to remember that open science > formal university-industry relationships in impact on industrial R&D (e.g., through training, published research results, & informal knowledge diffusion)*