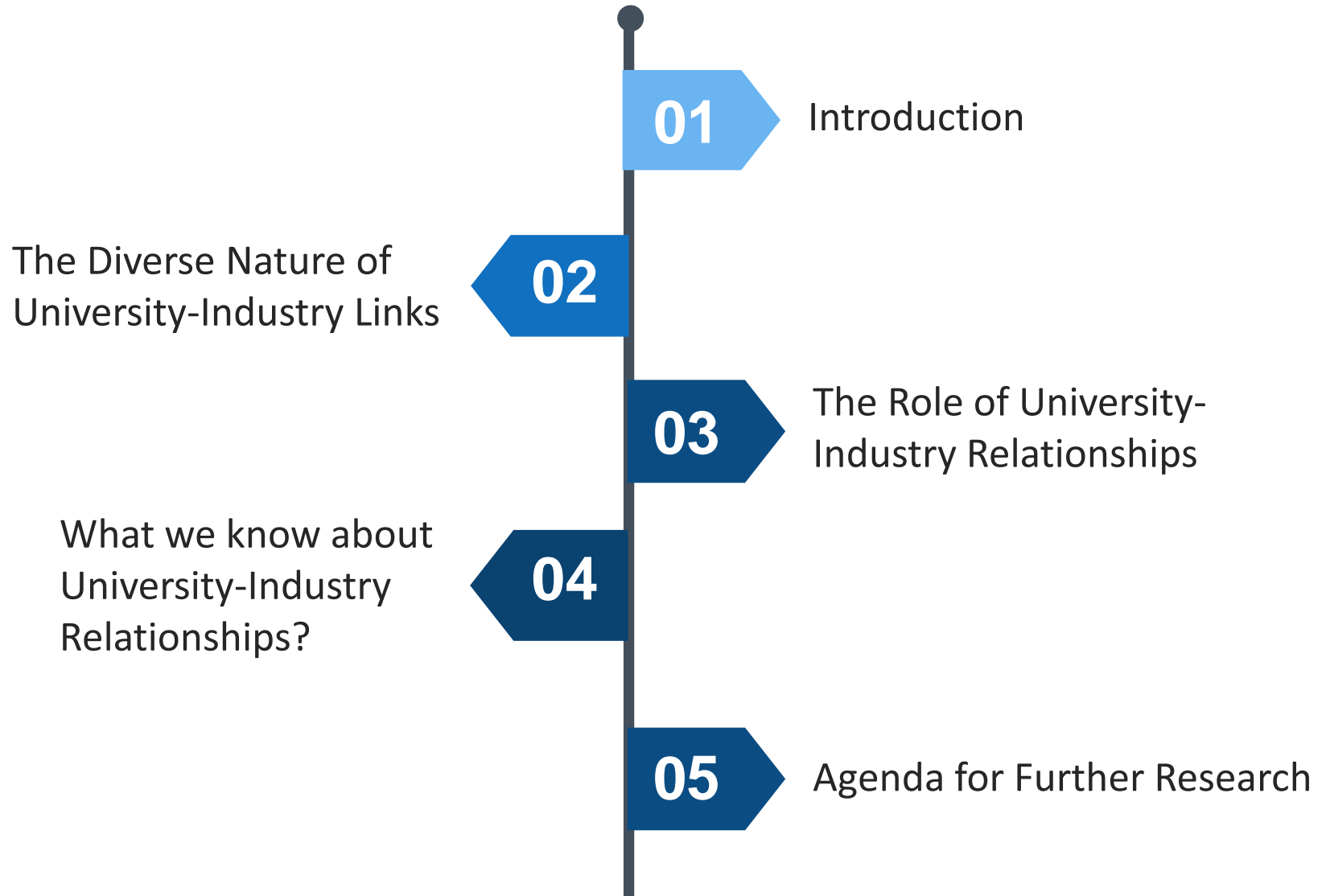




# **University-Industry Relationships and Open Innovation: Towards a Research Agenda**

Markus Perkmann and Kathryn Walsh (2007)

# Contents

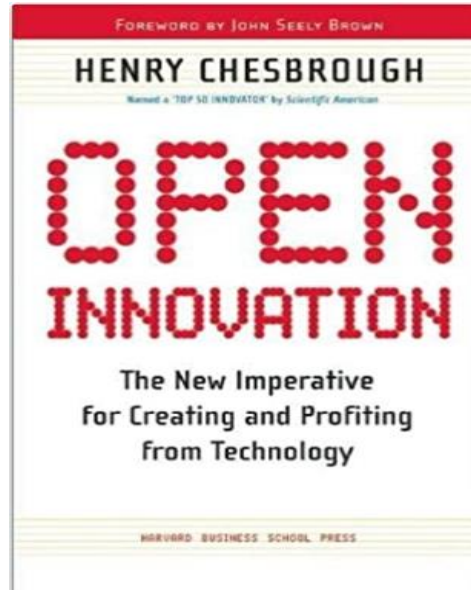




01

# Introduction

# What is Open Innovation?

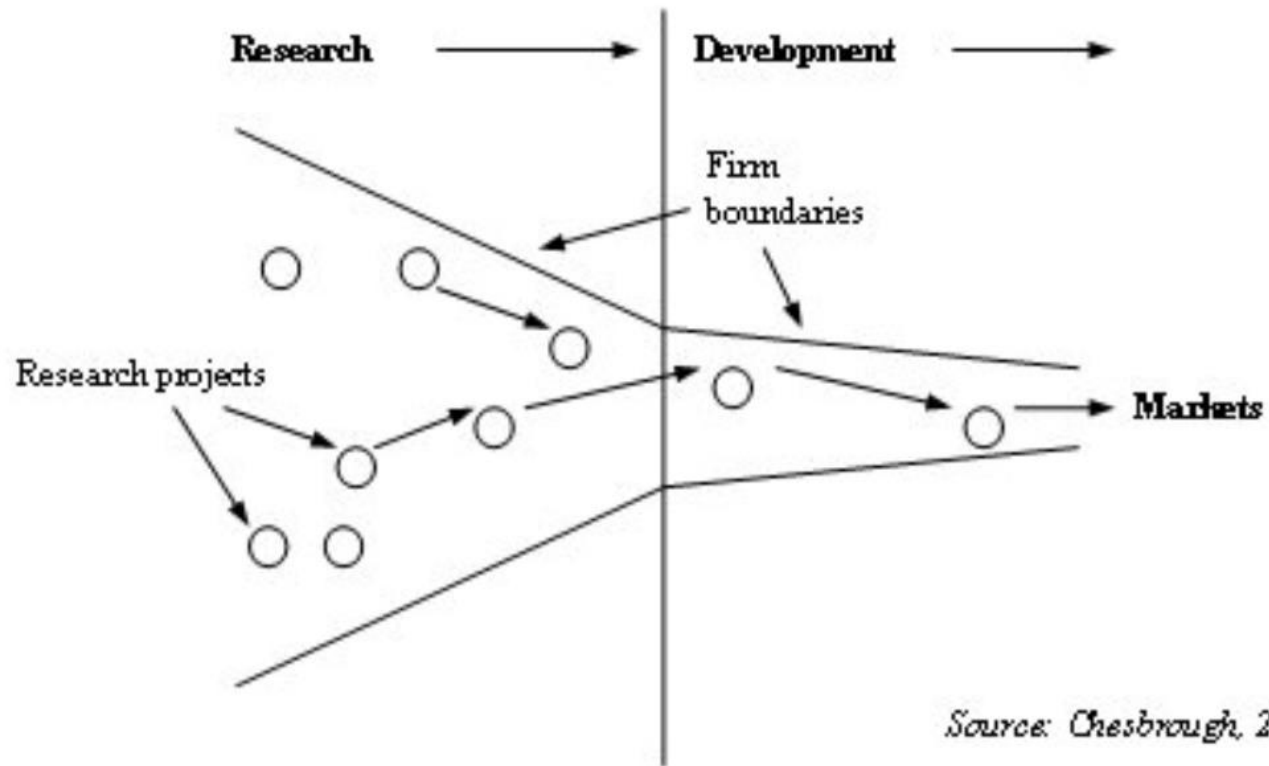


Open Innovation:  
The New Imperative for Creating  
and Profiting from Technology  
**by Henry Chesbrough**

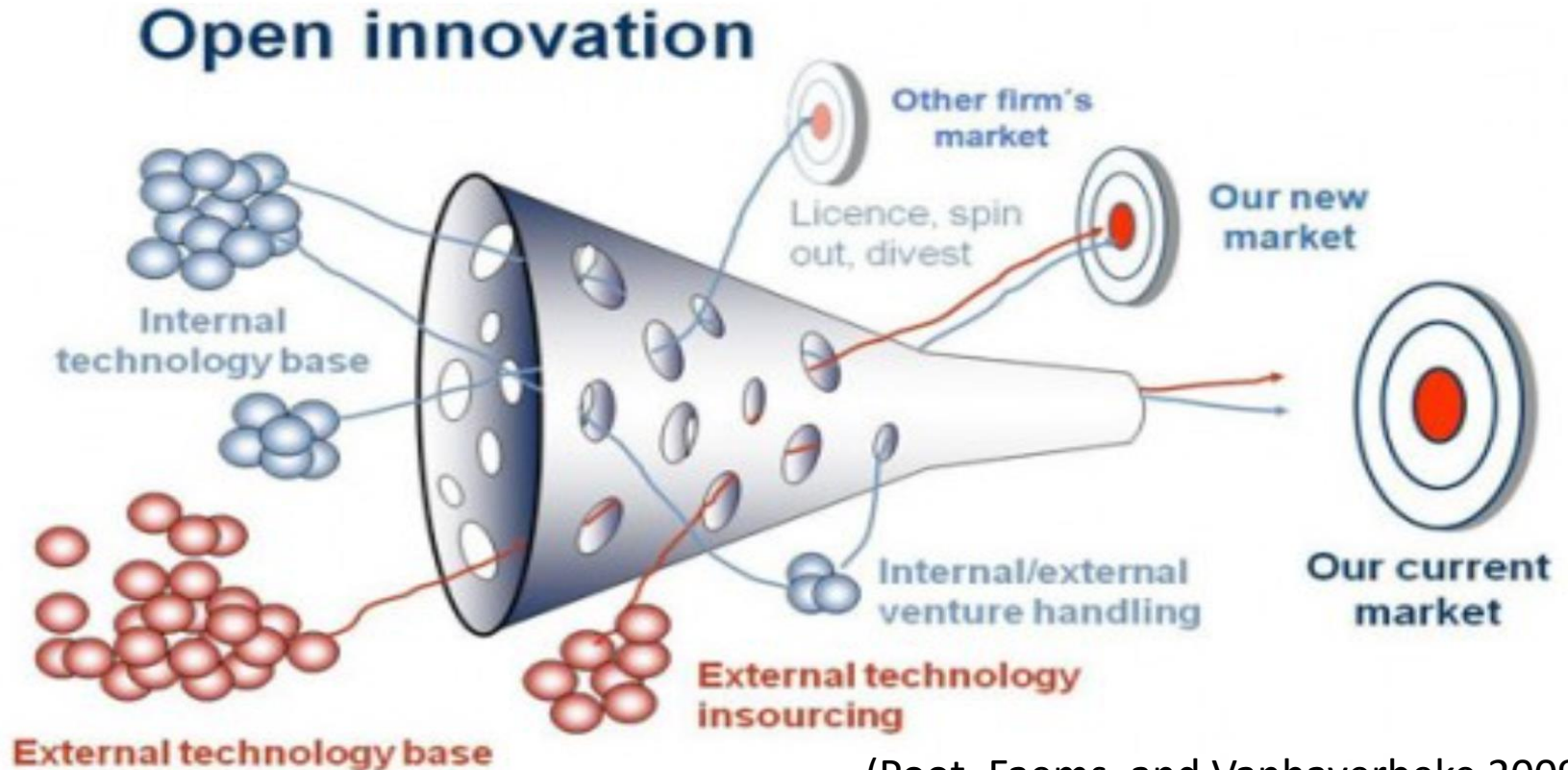
- the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation (Chesbrough, 2003)
- new paradigm for managing corporate research and bringing new technologies to market
- articulates the ideas and how they connect to each other, weaving several disparate areas of R&D, corporate venturing, spin-offs, licensing, and intellectual property into a single coherent framework

# Open Innovation Model

Closed Innovation ( <-> Open Innovation)



# Open Innovation Model



- Rather than relying on internal R&D, organizations are reported to increasingly engage in 'open innovation' (Chesbrough, 2006) -> distributed inter-organizational networks > single firms

# Objective



- to explore the diffusion and features of collaborative relationships between universities – industry
- to develop a research agenda informed by an 'open innovation' perspective

A faded, grayscale image of a city skyline with numerous skyscrapers, likely San Francisco, serves as the background for the top portion of the slide.

02

# The Diverse Nature of University - Industry Links



# The Diverse Nature of University - Industry Links

- Traditionally: focused on the transfer of intellectual property such as patenting, licensing, commercialization



- focusing more on **multi-faceted nature** (Agrawal, 2001; Bonaccorsi and Piccaluga, 1994; Grossman et al, 2001)
    - ‘channels’ or ‘mechanisms’ as informational or social pathways through which information, knowledge and other resources are exchanged or co-produced across universities and industry -> sociologically imprecise
    - Cohen et al (2002) distinguish between the following channels relevant to industrial innovation: patents, informal information exchange, publications and reports, public meetings and conferences, recently hired graduates...
    - Scharinger et al (2002) identified 16 types of ‘knowledge interaction’ into 4 categories: joint research, contract research, mobility and training
-

# The Diverse Nature of University - Industry Links

- Generic category ‘university – industry links’

**Table 1.** University–industry links

Research partnerships	Inter-organizational arrangements for pursuing collaborative R&D
Research services	Activities commissioned by industrial clients including contract research and consulting
Academic entrepreneurship	Development and commercial exploitation of technologies pursued by academic inventors through a company they (partly) own
Human resource transfer	Multi-context learning mechanisms such as training of industry employees, postgraduate training in industry, graduate trainees and secondments to industry, adjunct faculty
Informal interaction	Formation of social relationships and networks at conferences, etc.
Commercialization of property rights	Transfer of university-generated IP (such as patents) to firms, e.g. via licensing
Scientific publications	Use of codified scientific knowledge within industry

-> Fail to grasp the relational aspect of university-industry link

# The Diverse Nature of University - Industry Links

- A typology of university – industry links

Extent of relational involvement		
High: relationships	Medium: mobility	Low: transfer
Research partnerships Research services	Academic entrepreneurship Human resource transfer	Commercialization of IP (e.g. licensing)
Use of scientific publications, conferences and networking (can accompany all forms)		

- Links with **high relational involvement** include situations where individuals/teams from academic and industrial context work together on specific projects and produce common outputs (= **relationships**)
- **Low relational involvement** (e.g., use of scientific publications and the licensing of university-generated IP) -> 'knowledge/technology **transfer**'
- **Mobility** can be permanent (graduates taking up position in industry) or temporary (industrial scientists working in a university lab) so **intermediate relational involvement**

# The Diverse Nature of University - Industry Links

- Open innovation -> particularly 'high relational involvement',
    - Facilitate the building and maintenance of inter-organizational relationships over a prolonged period of time
  - Which means that this paper focused on 'university-industry relationship'
  - Promotion of collaborative research and university-industry research centers and the involvement of industrial partners in academic research projects have become important concerns for government
    - Income of HEIs from collaborative research > income from IP x 13 times (Department for Employment and Learning, 2005)
    - Income from consulting activities > income from IP x 7 times (Department for Employment and Learning, 2005)
-

A faded, grayscale image of a city skyline with numerous skyscrapers, likely San Francisco, serves as the background for the top portion of the slide.

03

# The Role of University – Industry Relationships

# The Role of University – Industry Relationships

1

How frequently and under what circumstances are relationship-based mechanisms used?

2

How important are university-industry relationships compared with other links, notably transfer-based mechanisms?

3

What is the contribution of relationships to industrial innovation in more general terms, beyond the 'supply' of scientific inventions and technology breakthroughs?

4

Why do firms engage in university-industry relationships?

# The Role of University – Industry Relationships



1

How frequently and under what circumstances are relationship-based mechanisms used?

- relationships-based mechanisms are widely used by PROs and industrial organizations
  - Systematic differences between industrial sectors and academic fields in terms of the predominant linking mechanisms
  - Science-based sectors (e.g., pharmaceuticals, biotechnology or chemicals) with strong complementarities between academic research and firm R&D, firms tend to rely on collaborative research – an open science channel – as well as research services (contract research, consulting) -> stronger commercial features
  - Sectors emphasizing incremental improvement (e.g., mechanical engineering, sw development) show a preference for research services
-

# The Role of University – Industry Relationships



2

How important are university-industry relationships compared with other links, notably transfer-based mechanisms?

- Pharmaceutical and biotechnology industries (where university-generated IP is more important than in other sectors), relationship-based links are considered relatively more important by R&D executives (Dohen et al, 2002)
  - Bidirectional knowledge interaction mechanism (based on relationships) are judged as more important than unidirectional knowledge transfer (Meyer-Krahmer and Schmoch, 1998)
  - US – industry funding provided for university research has risen strongly over the 1980s – 1990s (Hall, 2004) and 20-25% of academic research might be directly influenced by industrial funding (Behrens and Gray, 2001)
-



# The Role of University – Industry Relationships



3

What is the contribution of relationships to industrial innovation in more general terms, beyond the 'supply' of scientific inventions and technology breakthroughs?

- Relationship-based mechanisms contribute to industrial innovation processes in a broader sense than just delivering university-generated inventions and breakthrough technologies
    - Pubic research provides ways of solving problems rather than suggesting new project ideas (Cohen et al, 2002)
    - 'bread-and-butter' activities (e.g., consulting, contract research) are widely practiced and judged important by both academics and industrial R&D executives (Cohen et al, 2002; Meyer-Krahmer and Schmoch, 1998)
-

# The Role of University – Industry Relationships

## 4

Why do firms engage in university-industry relationships?

- Firms motives for engaging in university-industry links are informed by generic benefits (e.g., accessing students, gaining windows on emerging technologies, enhancing knowledge base) (Caloghirou et al, 2001; Feller, 2005)
  - Firms motives for generating tangible innovation outcomes from university-industry links
-

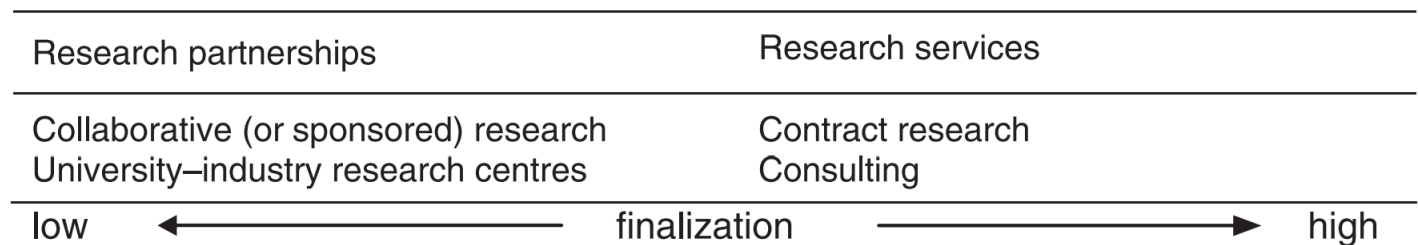
A faded, grayscale image of a city skyline with numerous skyscrapers, likely San Francisco, serves as the background for the top portion of the slide.

04

# What we know about University-Industry Relationships?

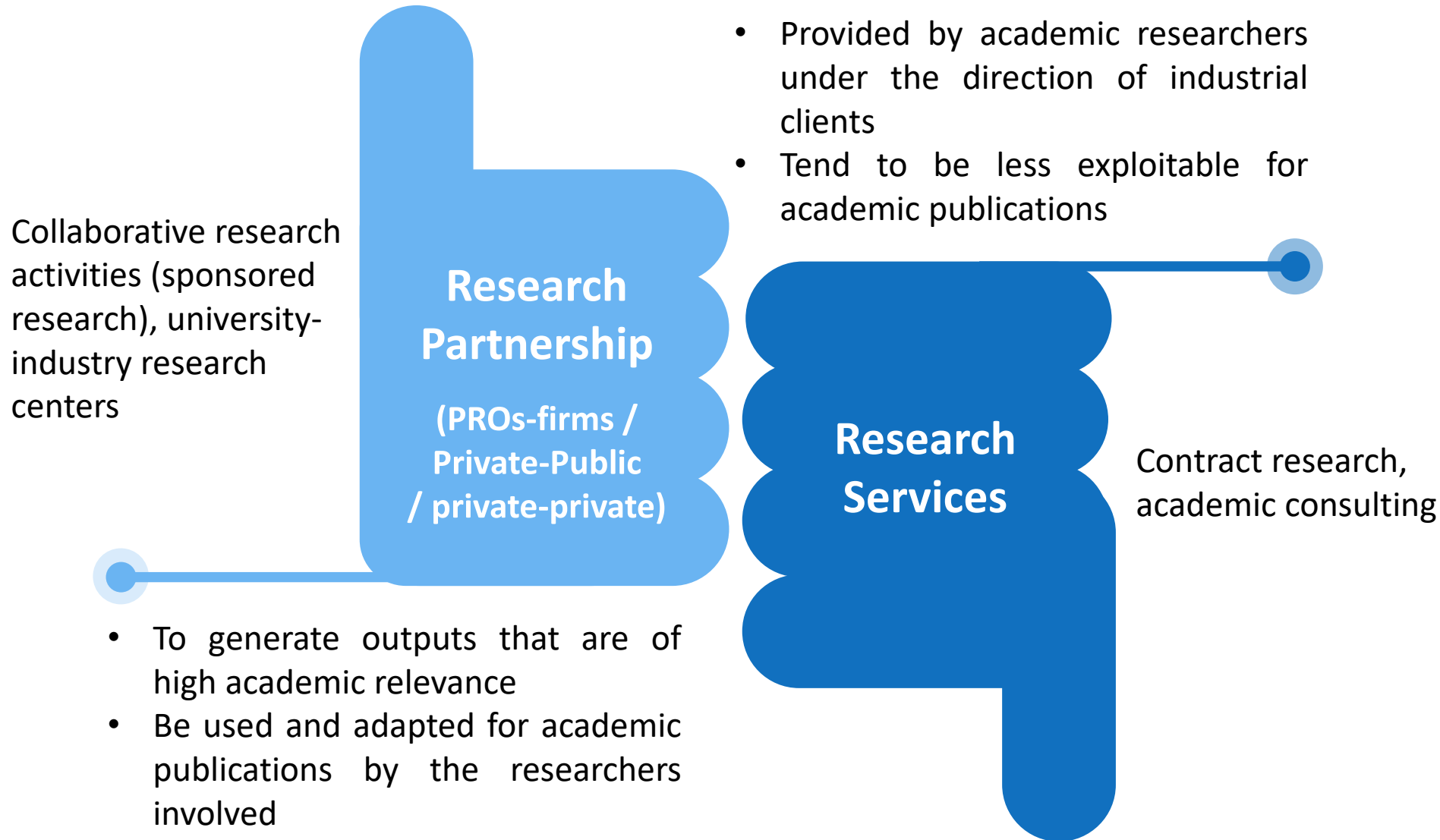
# What we know about University-Industry Relationships?

- Relationship-based forms of university – industry links
- Distinguish between two main types – research partnership / research services
  - depending on the degree of finalization of the research undertaken
  - finalization: the degree to which scientific research pursues a specific (technical, social or economic) purpose as opposed to gaining new knowledge for the sake of itself (Weingart, 1997)



**Figure 1.** Degrees of finalization in industry-funded research.

# What we know about University-Industry Relationships?





05

# Agenda for Further Research

# Agenda for Further Research

- Open innovation research agenda (West et al, 2006) suggests the following avenues of enquiry
  - Search and match processes preceding university-industry relationships;
  - Organization and management of collaboration arrangements

**Table 4.** Research agenda: university–industry relationships in an open innovation scenario

---

Search and match processes	Role of networks mechanisms: proximity, invisible colleges, education networks, user–producer relationships Relationship between precipitating social networks and type of innovative activity/outcome Role of brokers and intermediaries
Organization and management of relationships	Variation of individual-level incentives and motivations across different types of university–industry collaboration Variation of organizational models and innovation-relevant outputs Firm strategies for exploiting university knowledge in an open innovation scenario Impact of institutions on shape, extent and effects of university–industry relationships

---

# Agenda for Further Research

- Search and match processes
    - The benefits of open innovation for a firm is that specific technology needs can be better matched by searching for external assets or expertise as opposed to generating internally
      - > will only be realized if firms adopt search routines (Laursen and Salter, 2006) suitable to match their specific requirements
  - Organization and management of relationships
    - Individual: how the different incentive structures for academic researchers and industry staff can be aligned to produce mutually beneficial results
    - Organizational: what benefits are produced by different types of relationships, including formal innovation outputs / what strategies firms use to establish and manage university-industry relationships in an 'open innovation' scenario?
    - institutional level: how existing institutional structures and national innovation systems shape organizational arrangements for university-industry collaboration
-



# Reference

Chesbrough, H. W. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press.

Poot, T., Faems, D., & Vanhaverbeke, W. (2009). Toward a dynamic perspective on open innovation: A longitudinal assessment of the adoption of internal and external innovation strategies in the Netherlands. *International Journal of Innovation Management*, 13(02), 177-200.

Perkmann, M., & Walsh, K. (2007). University–industry relationships and open innovation: Towards a research agenda. *International journal of management reviews*, 9(4), 259-280.

Agrawal, A. (2001). University-to-industry knowledge transfer: literature review and unanswered questions. *International Journal of Management Reviews*, 3, 285–302.

Bonaccorsi, A. and Piccaluga, A. (1994). A theoretical framework for the evaluation of university–industry relationships. *R&D Management*, 24(3), 229–247.

Grossman, J.H., Reid, P.P. and Morgan, R.P. (2001). Contributions of academic research to industrial performance in five industry sectors. *Journal of Technology Transfer*, 26(1–2), 143–152.

---

# Reference

Cohen, W.M., Nelson, R.R. and Walsh, J.P. (2002). Links and impacts: the influence of public research on industrial R&D. *Management Science*, 48(1), 1–23.

Schartinger, D., Rammer, C., Fischer, M.M. and Fröhlich, J. (2002). Knowledge interactions between universities and industry in Austria: sectoral patterns and determinants. *Research Policy*, 31, 303–328.

DfEL (2005). Higher Education-Business and Community Interaction Survey 2002–03. London: Department for Employment and Learning.

Behrens, T.R. and Gray, D.O. (2001). Unintended consequences of cooperative research: impact of industry sponsorship on climate for academic freedom and other graduate student outcome. *Research Policy*, 30, 179–199.

Meyer-Krahmer, F. and Schmoch, U. (1998). Sciencebased technologies: university–industry interactions in four fields. *Research Policy*, 27, 835–851.

Caloghirou, Y., Tsakanikas, A. and Vonortas, N.S. (2001). University–industry cooperation in the context of the European framework programmes. *Journal of Technology Transfer*, 26(1–2), 153–161.

---

# Reference

Feller, I. (2005). A historical perspective on government– university partnerships to enhance entrepreneurship and economic development. In Shane, S. (ed.), *Economic Development through Entrepreneurship: Government, University and Business Linkages*. Cheltenham: Edward Elgar

Feller, I., Ailes, C.P. and Roessner, J.D. (2002). Impacts of research universities on technological innovation in industry: evidence from engineering research centers. *Research Policy*, 31, 457–474

Weingart, P. (1997). From ‘finalization’ to ‘mode 2’: old wine in new bottles? *Social Science Information*, 36, 591–613

West, E., Vanhaverbeke, W. and Chesbrough, H.W. (2006). Open innovation: a research agenda. In Chesbrough, H.W., Vanhaverbeke, W., and West, J. (eds), *Open Innovation: Researching a New Paradigm*. Oxford: Oxford University Press.

Laursen, K. and Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27(2), 131–150.

---

A faded, grayscale image of a city skyline with various skyscrapers and buildings, serving as a background for the top half of the slide.

# THANK YOU

STP510(a) National Innovation System  
20223534 Jieun Lee  
[junelee@kaist.ac.kr](mailto:junelee@kaist.ac.kr)