Innovation Systems
Topic 3

Innovation Economics

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Previous approaches put the enterprise at the center of innovation

… is not exposed to competition?

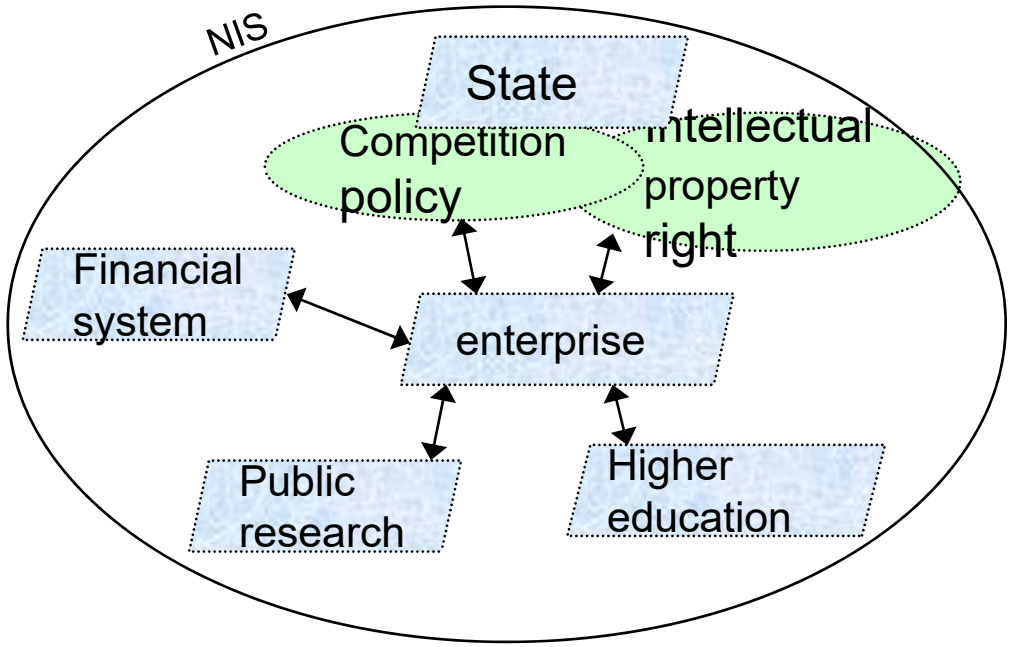
… can not appropriate its innovations ?

… can not find skilled workers on the labour market ?

… can not gain access to a scientific and technical knowledge base ?

… can not find financings for its innovating projects on capital market ?

; but if the enterprise…



↔ : importance of interactions between the different components of the system

With the NIS, we can explain observed disparities between countries according to their ***national capacities of innovation***

Definition NIS

- Freeman (1987): “network of institutions in the public and private sectors whose activities and interactions initiate, import, and diffuse technologies”
- Nelson (1993) : *National Innovation Systems: A Comparative Analysis*, OUP
- Lundvall (1992) : The structure of production and the institutional set up jointly define a system of innovation

Definitions

- National system of innovation
  - "The national innovation system essentially consists of three sectors: industry, universities, and the government, with each sector interacting with the others, while at the same time playing its own role." Goto (2000, p. 104)
  - Also called Triple Helix model, there are a number of ways to discuss/define basic idea but note: national innovation system is a complex conglomerate of interacting independent parties

Roles of the three players

- Universities
  - undertake basic science and technology research
  - educate scientists and technologists needed by business and government
- Governments
  - design IPR system for business and universities
  - commission science research e.g. for defense
  - finance universities, subsidise business R&D
- Business
  - conduct R&D to develop commercial products
  - launch innovative products
  - start up new firms to exploit new science

The Government-University Axis

- Knowledge is a public good (non-rival), hence market mechanism alone cannot generate optimal amount
  - Government funding of university research, and government research labs, are main solutions in modern economies
  - Discussion of historical origins (including your own university/college role in science)
  - Funding mechanisms – is there an optimal one?

Changing provision of basic science for knowledge economy

Historical system:

- Provision of basic science as a public good
- Discoveries were placed in the public domain without any private ownership
- Motivation of scientists was respect of scientific community or ‘peer review’
- Use of science base open to all types of business

Recent changes:

- Government finance for research is conditional on the research having more immediate application in industrial and commercial products

The University-Business Axis

- University-business links - many dimensions:
  - IPRs held by university
  - Research joint ventures
  - Spin-outs/start-ups
  - Personnel pooling
- Growth of university IPRs
  - US Bayh-Dole Act 1980 stimulated change
  - Before - government owned any patents on federally funded science and then issued non-exclusive licences
  - After – university/scientists own IPRs and can licence exclusively to key firms
  - Often achieved via technology transfer offices (TTOs)
  - Many EU countries have followed these changes

University-Business Linkages

Collaboration in Research

- Joint, contract, and commissioned research,
- Consultancy by academics

Spin-outs, Start-ups, Science Parks

- Formation of spin-outs and joint ventures
- Formation of university incubators
- Growth of science parks near to university

Personnel Linkages

- Formal and informal social and professional networks
- Continuing professional development and education, including public university lectures and workshops
- Academic-scientist exchanges with firms
- Recruitment of students from universities by firms

The Government-Business Axis

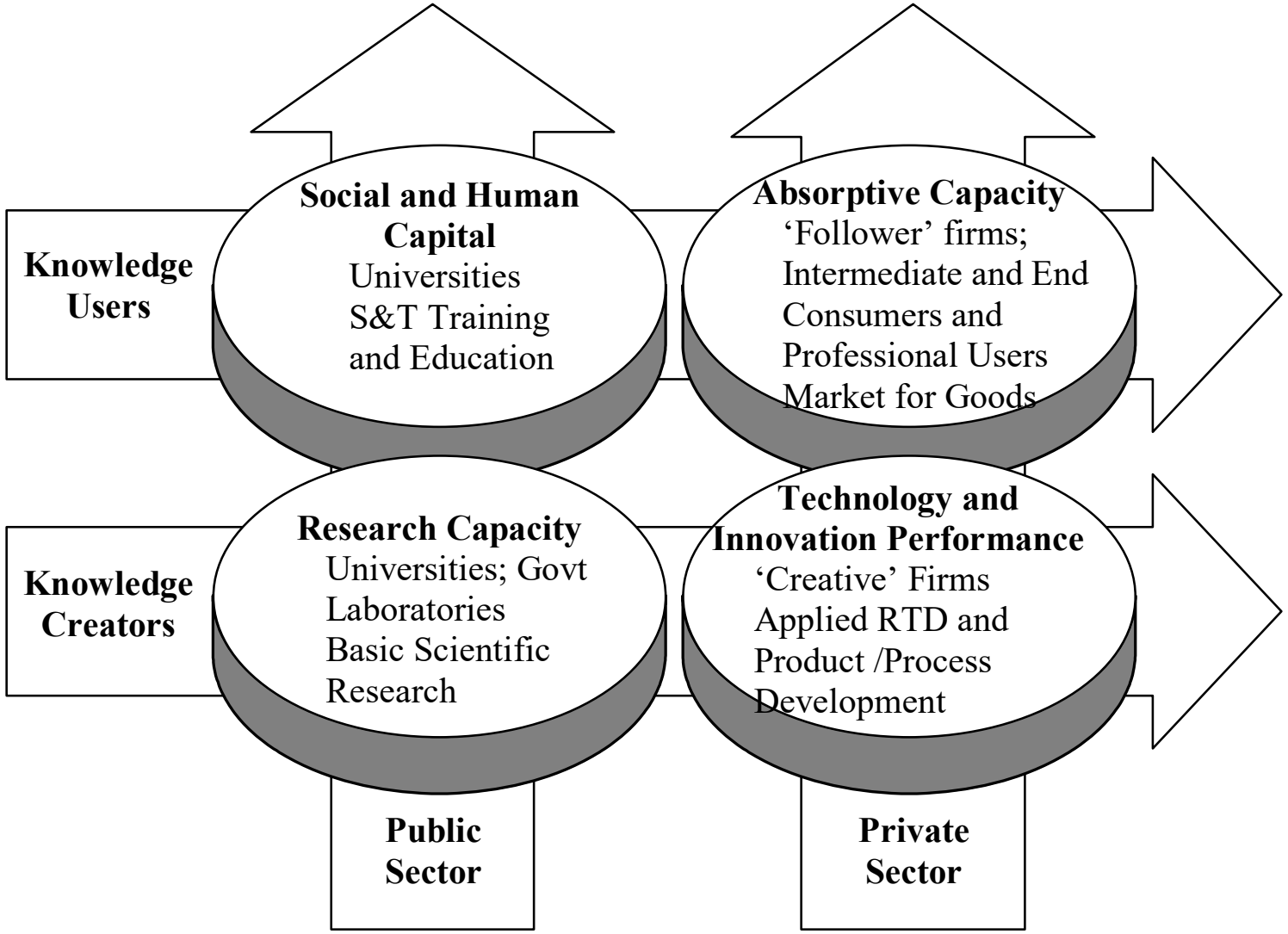
Key areas of innovation policy:

- IPRs - the enforcement of IPRs can be influenced by national policy, as is legislation to some extent
- Tax policy - corporate tax policy can affect innovation in various ways; key areas include R&D tax concessions, rules surrounding IP, and venture capital
- Competition policy - the stance of competition policy matters, especially when decisions involve innovation (e.g. a firm has a dominant market position but also leads the industry in terms of innovation)

Further key areas of innovation policy:

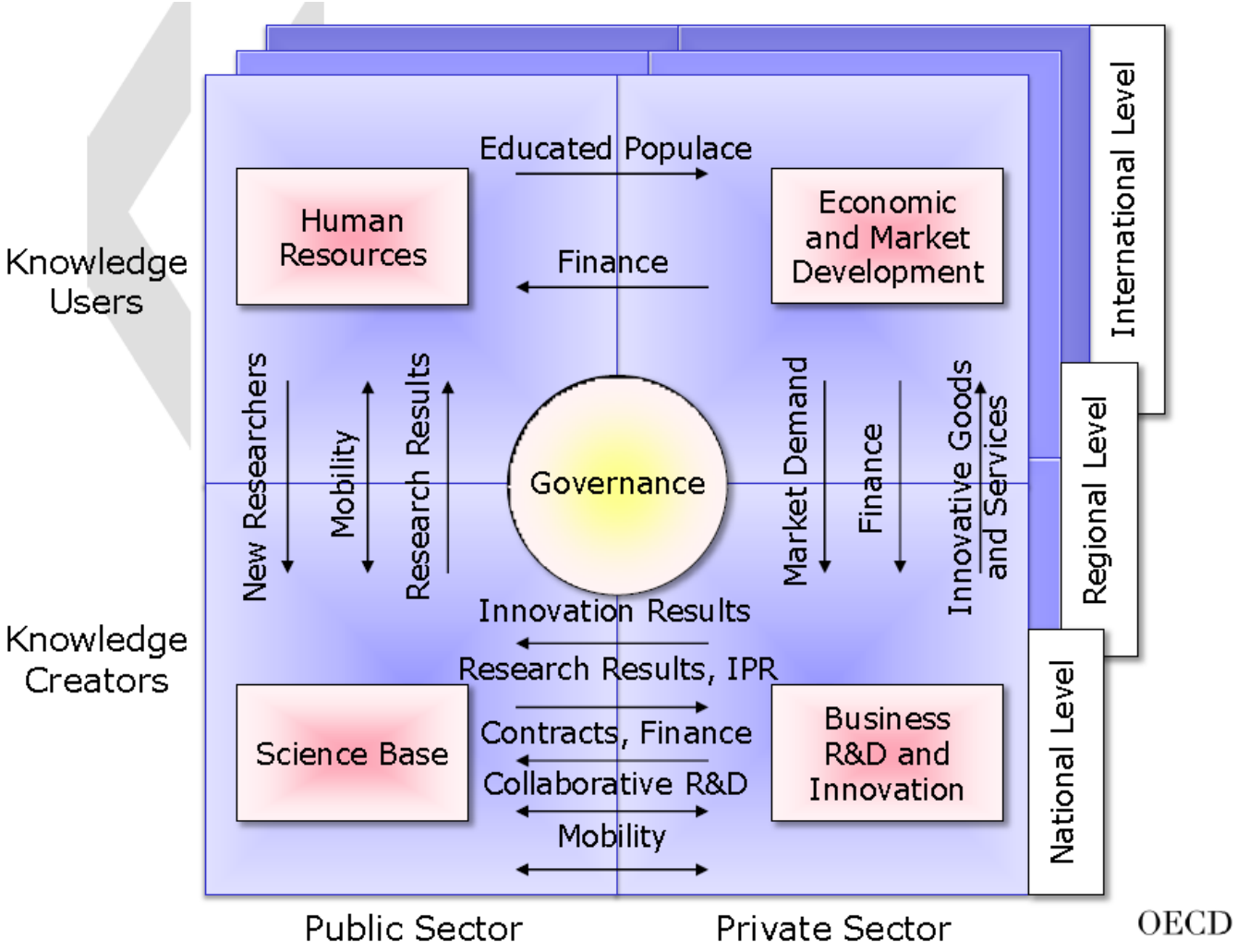
- Government-business targeted funding – can be of specific research areas, technology development and small business
- Standard setting - government is involved in setting various standards for measurement, performance, safety, testing and interoperability
- Procurement policies - as a large purchaser of goods and services, the government can influence business activity (e.g. its decisions about purchasing computers)

A Simple Science, Technology and Innovation System



Source: OECD, 1999, Managing National Innovation System

The OECD policy model (OECD)



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References

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