

The Limits of a Market-Based Approach to Science

Presentation to 29th Annual AAAS Policy Forum
Washington DC

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Outline

- Trends in research performing sectors
- Convergence
- Limitations of a market model in a research system
- Policy implications

Trends in research performing sectors

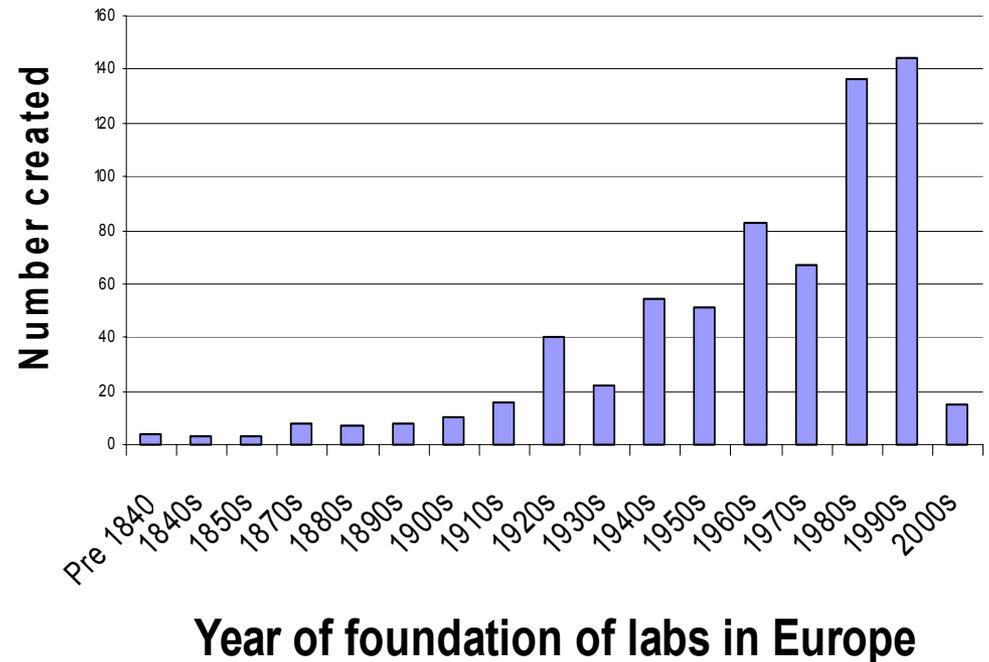
- Corporate R&D: decentralisation and outsourcing
- Institutional reform and commercialisation of public laboratories
- Growth of contract research in universities

Corporate R&D: decentralisation and outsourcing

- Globalisation, mergers & acquisitions add to pressure for shareholder value
- Decline of corporate laboratories
 - budgets held by operating divisions
 - research focused on current business problems
 - laboratories seeking external work
- Growth of outsourcing as substitute or strategic reach for research
- Examples
 - Btexact Technologies
 - Roke Manor Research

Public laboratories: Institutional reform and commercialisation

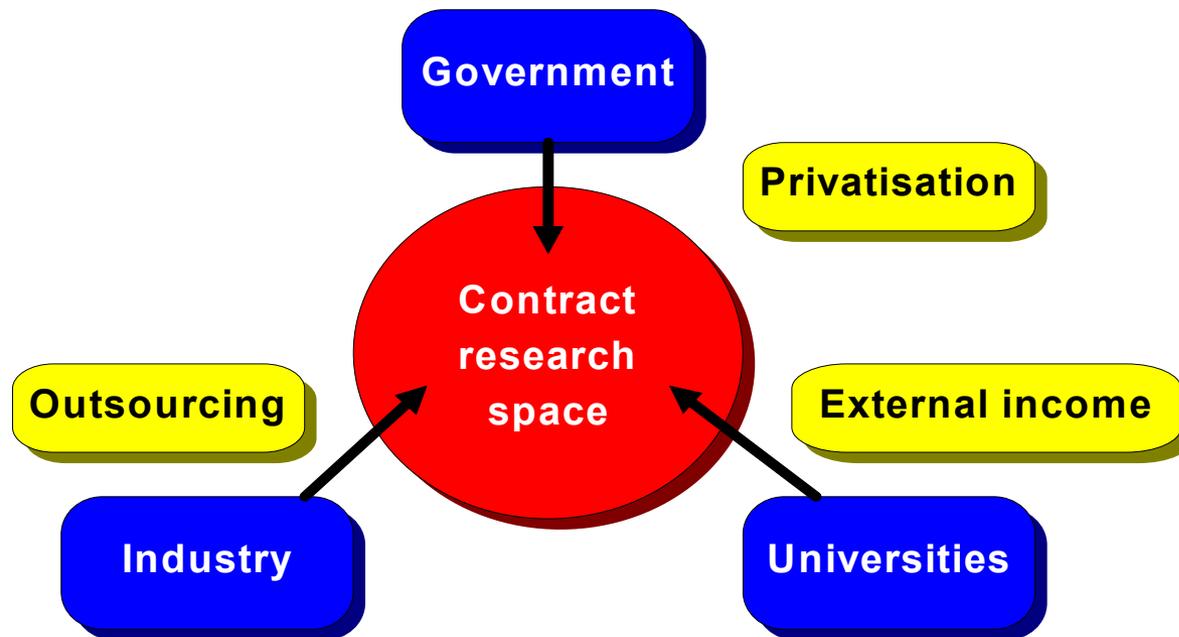
- Expiry of missions
- “New public management”
- Commercialisation, agencification & privatisation creates turbulence
- Examples
 - Building Research Establishment
 - AEA Technology



University research: Growth of contract research

- Massification of higher education
- Sophistication of equipment raising cost of keeping up with research front
- Increasing belief in economic significance of research driving policy and incentive structures
- 53% growth of contract research for industry 95/96 to 2000/01 to around 11.7% of external research income
 - But down to 10.3% in 2001/2
- Licensing income 1.4% of external research income
 - half of US figure but double previous UK year

Convergence into “Contract Research Space”



Consequences of convergence

- **Positive**

- efficiency through competition
- closure of uncompetitive performers
- cross-subsidy to original mission
- contestable scientific advice

- **Negative**

- overcrowding in the contract sector
- loss of coverage & variety
- cross-subsidy or movement from original mission
- compromised scientific advice
- loss of externalities
- purchasers no intrinsic interest to secure supply
- investment difficult in face of uncertainty & large capital requirement

Efficiency gains not proven

- Presumption that greater number of players able to compete for research contracts achieves greater efficiency through competition
 - No evidence to date of cost reduction though difficult to calculate because of generally increased research productivity and proven underpricing of research
- Can research be a contestable market when some players are not motivated by profit
 - Risk of cream-skimming strategies and
 - Freedom of entry and exit is crucial determinant

Closure of uncompetitive performers

- Standard competitive model has threat of closure as powerful stimulus to raise efficiency
- Public or mixed ownership a strong limitation because of regional or local pressures
- Apparently competitive structures for UK universities has to date been underwritten by bail-outs of financially failing institutions (though individual departments frequently close)
- Guaranteed Government contracts maintain presence of privatised labs

Cross-subsidy

- Core of internal university argument for contract research and commercialisation is generation of revenue to spend on core activities
 - Skewed returns mean majority lose money or get low return on costs of IPR protection
- Ignores financial needs of commercialisation which can be weakened by inadequate investment and exposed to competitive pressure from those not engaged in cross-subsidy

Contestable scientific advice

- Market model can be presented as route to plural advice in the public domain and escape from capture of advice within single ministry acting as regulator and promoter
- However, building long term commercial relationships limits ability of supplier to give unpalatable advice
- Suppliers may have independent interests through business relationships with a regulated sector

Overcrowding and loss of variety

- Processes driving universities, government labs and industrial labs to contract research space are largely distinct and do not take account of systemic effect
- Suppliers of information likely to converge in terms of underlying capabilities such that short term gains in performance are at expense of long term ability to adapt to new and unforeseen problems

Loss of variety (2)

- Customer contractor-relationship may inhibit internalisation of externalities as value-for-money contracting may not allow sufficient price to maintain long term capabilities
- Some evidence of shift to technical services and consultancy at expense of research
- Operation of market in information requires degree of stability in supply arrangements but a too narrow commercial attitude of customers may prevent development of stable market relationships

Uncertainty and capital investment

- Development of supply capability depends upon substantial investments in the generation of knowledge.
- Lack of collateral for ideas makes raising capital difficult in face of R&D uncertainty
- Very competitive research market will make it difficult to raise funds for investment in equipment and intangibles when legacy of public sector is exhausted
- Customers will absorb specific costs but not generic or overhead items

Consequences for collaboration

- **Collaboration in research and innovation empirically shown to depend mainly upon *complementarity***
- **Convergence means similar organisations find it more difficult to co-operate**
 - industry/university problems with IPR
 - government lab/industry problems with mixture of commissioning, contracting and commercialisation
 - university/government lab competition

But also new opportunities for collaboration

- Increasing role for former public labs as intermediaries between academia and industry
 - Translating and applying knowledge in problem-solving mode for small and medium sized firms
- Emergence of hybrid organisations
 - Company-sponsored labs on campus

Conclusions

- Health of a research system should be judged by its total capabilities not simply the capabilities of its components
- Need policies that create conditions in which all parts of system are fully networked but preserve specialised functions
- Ensure that incentive structures are aligned with the above objective
- Funders needs long term strategies that take account of the capability of supply institutions
- Expect emergence of market to be starting point for system design and never a solution in itself