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The Entrepreneurial University

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The State of Knowledge Exchange

“...RELATIONS BETWEEN UNIVERSITIES AND CORPORATIONS HAVE RARELY BEEN WORSE.”

STAN WILLIAMS, HEWLETT-PACKARD

“THE PROCESS OF TECHNOLOGY TRANSFER FROM ACADEMIA TO INDUSTRY IS “IMPOSSIBLE AT WORST, ARDUOUS AT BEST.”

MARK MODZELEWSKI, NANOBUSINESS ALLIANCE

Remarks during Congressional Testimony on S. 2945, to expand the the national technology Initiative, 17 September 2002, cited by David Roessner at 'Best Practice in University-Industry Collaborative Research: Experiences from the US and UK ,Cambridge-MIT Institute Center for Competitiveness and Innovation , 8 July 2004

Three Perspectives

- Christian Zellner: 'Exploring the impact of science'
- John Douglass: 'The Entrepreneurial State – state based initiatives in the US and a second stage in university-industry collaborations'
- Allison Bramwell and David Wolfe: 'Universities and regional economic development: the entrepreneurial University of Waterloo'

Christian Zellner: 'Exploring the impact of science'

- Background: 'In Switzerland, there has been an ongoing concern that excellence in science and engineering has largely failed to translate into overall economic growth'
- Focus on technology transfer from EPFL in Lausanne
- Specifically start ups from the Engineering School

Christian Zellner: 'Exploring the impact of science'

- Purpose: to examine the growth experience of start ups and how it is influenced by attitudes and organisation of technology transfer
- Analysis – suggest that policies, attitudes and local conditions are important

Christian Zellner: 'Exploring the impact of science'

- Key point 1 – 'spin-outs' are only one part of the knowledge exchange process
- Key point 2 – the importance of human capital – 'entrepreneurially inclined PhDs/post-docs'
- Key point 3 – the difficulty of measuring the economic impact of knowledge exchange

John Douglass: 'The Entrepreneurial State'

- Background – importance of science and technology as a driver of economic growth
- Purpose – evaluate new state based initiatives to improve university industry relations to promote innovation
- Focus on California
 - The California Institutes for Science and Innovation (CISI)
 - The California Stem Research Initiative

John Douglass: 'The Entrepreneurial State'

- The spread of initiatives – 'most states have initiated a range of other efforts to bolster the business climate for the HT sector. This includes an increasingly complex range of tax credits and state- established venture capital funds'
- But ' the role of policy in the development of cluster advantages can only be marginalResults are measured in decades, if measurable at all' (Maskell and Kebir)

John Douglass: 'The Entrepreneurial State'

- Key point 1 – policy devolution
- Key point 2 – potential for 'place competition'
- Key point 3 – the problem of declining state funding (fiscal short-termism?)
- Key point 4 – the problem of sustainability
- Key point 5 – the shortage of human capital

Allison Bramwell and David Wolfe: 'Universities and regional economic development'

- Background – universities 'as central actors in the knowledge – based economy'
- Focus on the University of Waterloo – 'a strong example of an 'entrepreneurial research university' that is actively engaged with the process of economic development in the local community'

Allison Bramwell and David Wolfe: 'Universities and regional economic development'

- Waterloo region –
 - 468 HT companies
 - Diverse economy: wide range of sectors
- Waterloo University Initiatives
 - Intellectual Property Policy
 - Co-op program
- Stress on innovation as social and interactive process

Allison Bramwell and David Wolfe: 'Universities and regional economic development'

- Key point 1 – presence of research based University (almost) necessary but not sufficient
- Key point 2 – the range of KE mechanisms and 'boundary spanning systems'
- Key point 3 – the importance of people – human capital
- Key point 4 – many HT businesses had no links with the universities

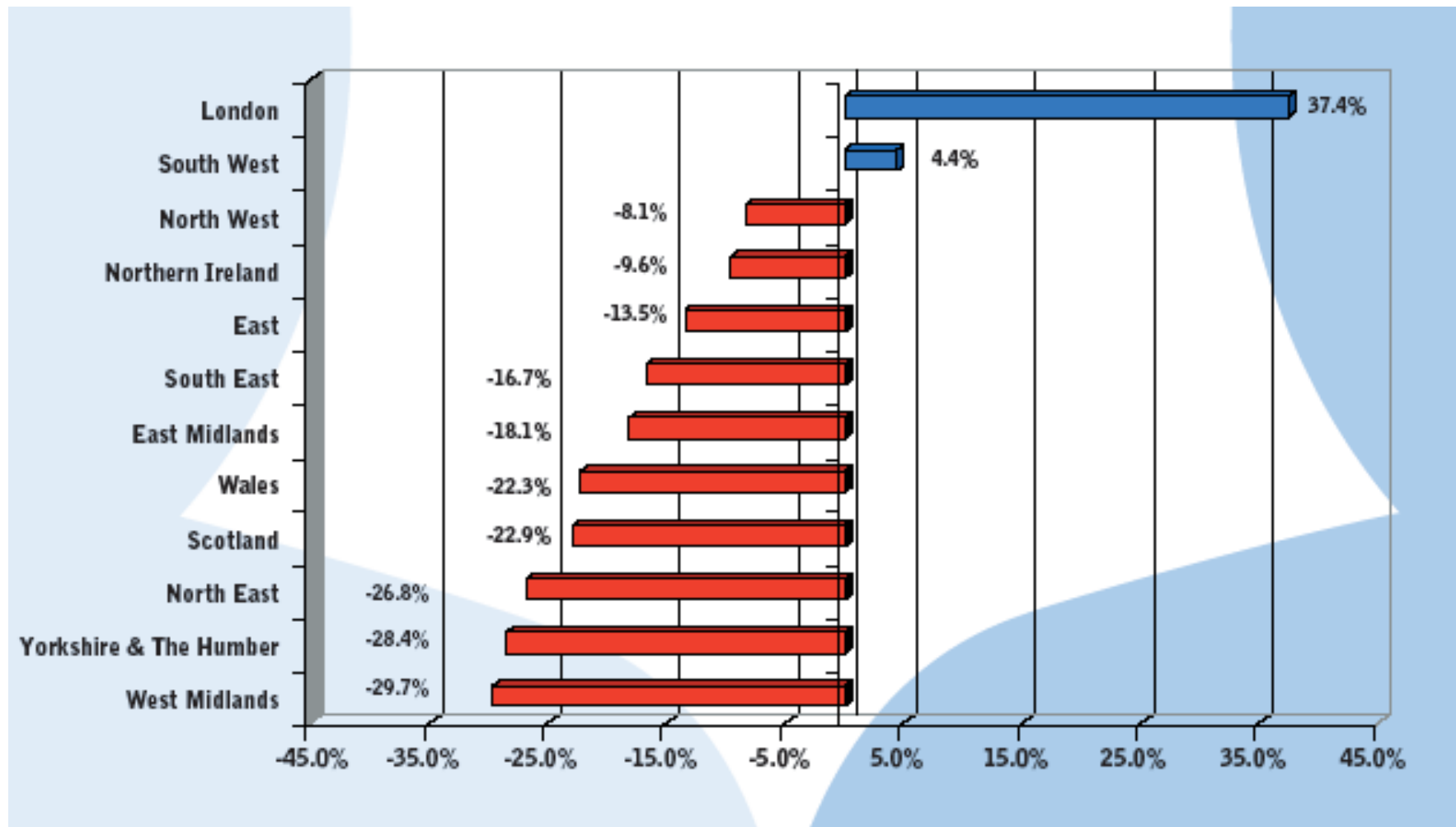
Knowledge Exchange: What space?

Quest for Fundamental Understanding	Yes	BOHR	PASTEUR
	No	?	EDISON
		No	Yes
Consideration of Use			

Knowledge Exchange: Which Mechanisms?

- Importance of multiple KE mechanisms
 - Spin-outs
 - Patents and licenses
 - Joint projects
 - Access to faculty
 - Access to students
 - Access to networks

Net flows of UK domiciled PhD graduates in employment by UK region.



Source: the UK Grad Programme

Knowledge Exchange: What impact?

- Difficult to quantify
- Not a source of significant revenues for Universities
BUT
- Significant potential impact for the economy
 - Social rate of return exceeds the private rate of return
 - The biggest impact will be for those industries that **use** not those that **generate** technology

Knowledge Exchange: What impact?

Paradox

- “You can see the computer age everywhere these days, except in the productivity statistics”. Robert Solow, 1987, (MIT, Nobel Laureate)
- “Answer? Innovation takes time to have a major impact on economic growth.
- Generalizable rule:
 - steam
 - railways
 - electricity
 - internal combustion engine
 - ICT
 - biotechnology?

Knowledge Exchange: What impact?

- Industries that **use** technology contribute more to growth than industries that **generate** technology
- “If a very small industry experiences a big jump in its rate of productivity growth, that may be intrinsically interesting, and one would want to know why, but it will contribute little to the acceleration of productivity on a national scale.” Solow, CMI Summit 2001
- US productivity growth 1995-2000: the three largest contributors to the productivity surge were, in order:
 - wholesale trade
 - retail trade
 - security and commodity brokers

Knowledge Exchange: which model?

- There are many examples of good practice – but there is no one ideal model
- Depends on local circumstances including history and organisational structure
- Importance of local strengths

The Cambridge example:

- The current state of play
 - A centre for high technology businesses
 - University engagement with businesses
 - Cambridge Enterprise
 - Cambridge- MIT Institute (CMI)
 - Cambridge Programme for Industry (CPI)
 - Centre for Business Research (CBR)
 - Corporate Liaison Office
 - Development Office
 - Institute for Manufacturing (IfM)
 - Judge Business School
 - Research Services Division

The Cambridge Phenomenon: The 'Laissez-Faire University'

- The 'Cambridge Phenomenon' developed when the University took little active interest in business engagement
- The past:
 - University largely ignored IP issues
 - A liberal attitude to what academics did
 - Industrial liaison merely acted as 'window' on what the university did – no systematic dialogue

The Cambridge Phenomenon Now

- Most HT businesses are disconnected from the University
- Why are they here?
- The HT sector has reached critical mass
 - Labour market
 - Finance
 - Supply chain

Knowledge Exchange: some Challenges

- The importance of the use of technology when the policy focus is on the generation of technology
- The difficulties of establishing a systematic dialogue when business and universities:
 - speak different ‘languages’
 - have different incentives and constraints
 - have different time frames