Funding Technology

Britain Forty Years On

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www.fundingtechnology.org

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Agenda

1. Background to *Britain Forty Years On*
2. Persistence of Funding Gap
3. Universities, Regionalism, R&D
4. General Conclusions, Further Research

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FT4 - Background

- FT4 = Funding Technology, volume 4
  1. *Lessons from America* (2000)
  2. *Israel and the Virtues of Necessity* (2002)
  3. *Germany: Better by Design?* (2003)
  4. *Britain Forty Years On* (2007)
- Research began June 2004, writing finished July 2006
  - Same methodology, more detailed
  - Attempt to synthesize a forest of recent reports
  - Limited original research, stimulus for debate
  - As with *America*, no silver bullet

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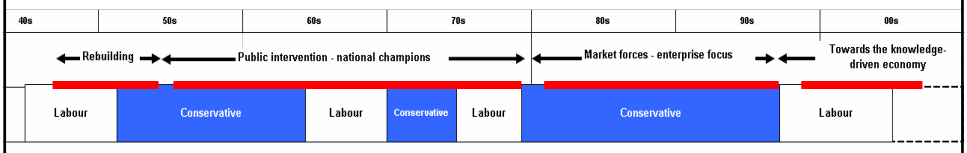

Venture Capital and 'Angel' Investment

Banks and Financial Services

Universities

Government Support for Innovation

Advisers, Tax and Business Incubation

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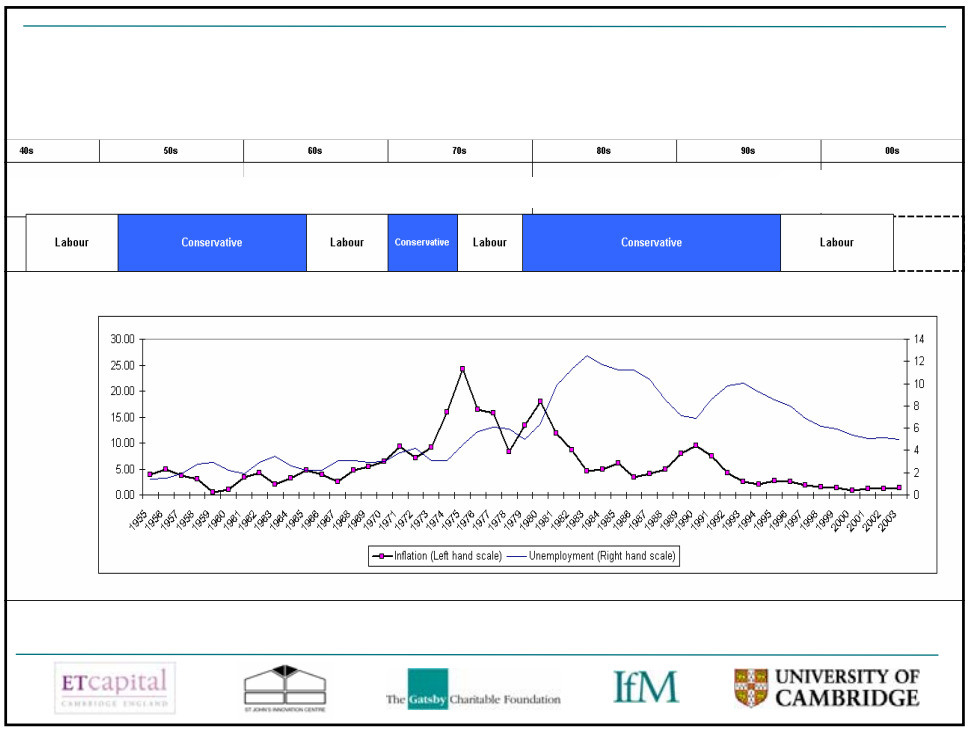

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That was then….

- "White heat of the technological revolution"

Harold Wilson (1963)

- Ministry of Technology, picking winners - Concorde
- Department of Economic Affairs, NEDO, little Neddies
- Central planning (East Kilbride = Palo Alto)
- High taxation = no business angels
- National champions, merger policy = few start-ups
- Unstable macro-economy, IMF crisis
- Limited venture capital; 3i more financial than engineering
- US already identified as main model

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… and this is now

- Stable macro environment, industrial relations
- Lower but rising - and complex! - taxes
- Government not picking winners
  - But persistent regional agenda, mixed goals
  - And mixed agendas for universities
- Improvement in management quality
  - Gaps in (strategic) marketing, international ambition
- Greater acceptance of entrepreneurship
- Significant weaknesses?
  - Early risk capital, banking, private R&D

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Finance Issues

The appearance of progress?

American Research & Development Corporation 1946

- MIT President Karl Compton & HBS Prof General George Doriot
  - First venture FIRM and FUND
  - Much science from wartime available for exploitation
  - USP: combine MIT science and HBS management
  - Sophisticated Boston financial markets assisted
  - Some invested commercially, some *pro bono publico*
  - Target $5M but ARD started with only $3M
  - Technical advisory board to give leads and assessments
  - Experienced staff structure deals, give business advice, organize investees
  - Other funds soon followed, eg J H Whitney (1946; Minute Maid)

US government policy

- 1958 SBA licenses and helps fund first Small Business Investment Companies, institutionalizing the industry
- CGT reduced from 49% to 28% (1979), 20% (1981)
- Incentive Stock Option Act imposes tax only when options are sold, not exercised (by 1986?)
- ERISA 1974: amended to allow VC within prudent man rule (1979, 1980)
- SBIR program 1982: Federal Agency with external R&D > $100M to allocate % of budget to small firms
- Bayh-Dole Act 1980: transfers ownership of IP to University of government-funded research
- Huge investments in military and health R&D

Origins of UK VC

- 20th July 1945: Industrial & Commercial Finance Corporation
  - Outcome of Macmillan Report (1931)
  - Bank of England and UK clearing banks
  - 30 years using preference shares, term loans
  - 1980s: more use of equity, mainstream businesses
  - But little role in development/strategy, only disposal
  - 1980s rebranding as 3i, dominant market share
  - 1988 zenith: 4,789 firms = £1.6bn = 38.5% share, 23 regional offices, 800 staff, 'staff college' of UK VC
  - Mainly employed generalists - graduates, ACAs

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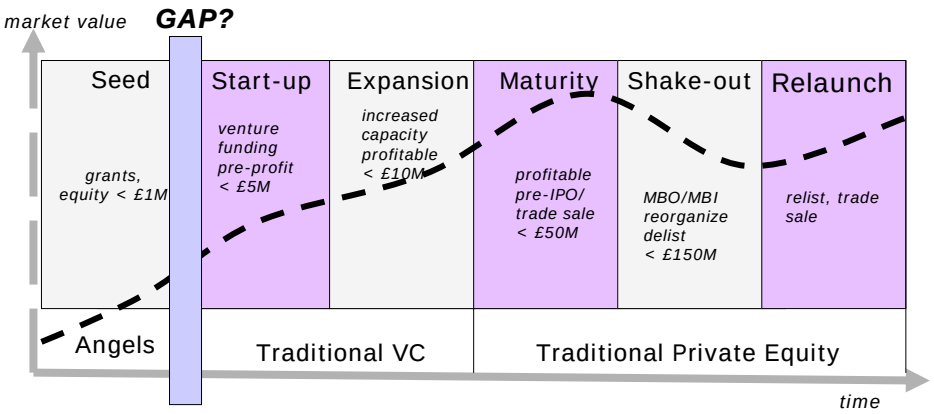
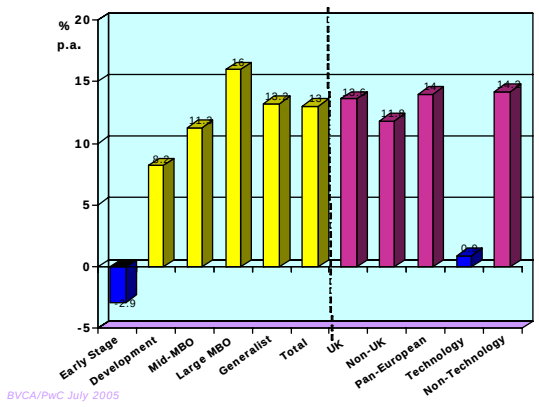
1990s VC growth - path dependency

- 1970s: some entrants (eg Apax, 1972)
- 1990s: new VCs, business-development focus
  - Amadeus (1997), Advent, Abingworth
- UK VC history skewed to financial engineering
  - Current preponderance of Private Equity
  - Defence, pharmaceuticals, aerospace: strong R&D
  - Otherwise fewer major technology corporations
  - So fewer potential purchasers for products/firms
  - Fewer experienced middle managers as entrepreneurs

Venture capital *vs* private equity - traditional view: size/stage

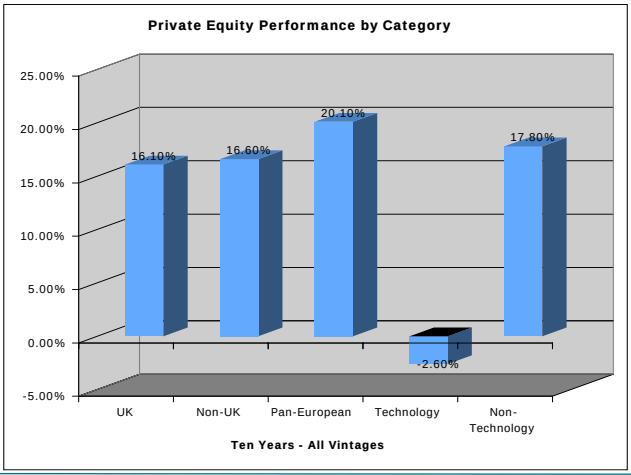


UK all-funds performance since inception to December 2004



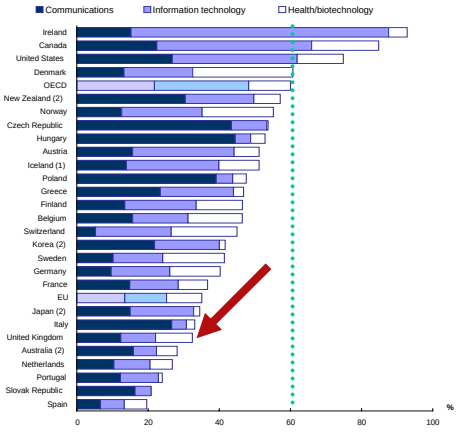
BVCA/PwC July 2005

Ten year performance - 2005



BVCA/PwC Private Equity and Venture Capital Performance Measurement Survey 2005

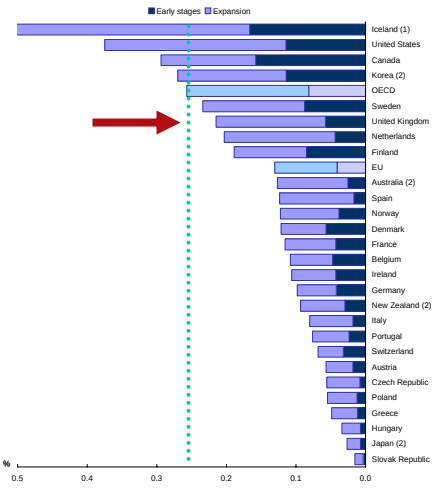
Venture capital by sector



- Tech component of VC investments
- 2003, except (1) 2000-02; (2): 1998-2001
- UK below EU and OECD averages
- Does tech investment matter? European VC not a recognised asset class.
- Can tech VC work in UK?

Source: OECD (2005)

Venture capital by type



- Availability of venture capital as % of GDP
- 2003, except (1): 2002; (2): 2001
- UK close to OECD average for all VC, above all EU except Sweden
- But UK lags in early-stage funding provision, needs to lead to sustain 'knowledge economy'

Source: OECD (2005)

UK banks and tech sectors

- 1970s/1980s: Barclays around Cambridge
  - 1978 on: Matthew Bullock, Walter Herriot
  - Cambridge Computer Group, Jack Lang
  - After Phenomenon (1985), 'leave it to others to carry on'
- 1990s: NatWest; appraisal scheme, training
  - Influential analyses of technology sectors
- 1997-2004: HSBC; Chairs of Innovation, Tech Managers
- 2003-2005: LloydsTSB; targeted local specialist teams
- 2007: retreat from specialist provision to generic SME services
  - Are tech firms more risky … or just more uncertain?
  - No alternative products - mezzanine inefficient, adverse selection

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Universities, R&D, regionalism

Mission creep
and mixed messages

University world rankings 2006

World Rank	Institution	Region	Regional Rank	Country
1	Harvard Univ	Americas	1	USA
2	Univ Cambridge	Europe	1	UK
3	Stanford Univ	Americas	2	USA
4	Univ California - Berkeley	Americas	3	USA
5	Massachusetts Inst Tech (MIT)	Americas	4	USA
6	California Inst Tech	Americas	5	USA
7	Columbia Univ	Americas	6	USA
8	Princeton Univ	Americas	7	USA
8	Univ Chicago	Americas	7	USA
10	Univ Oxford	Europe	2	UK
11	Yale Univ	Americas	9	USA
12	Cornell Univ	Americas	10	USA
13	Univ California - San Diego	Americas	11	USA
14	Univ California - Los Angeles	Americas	12	USA
15	Univ Pennsylvania	Americas	13	USA
16	Univ Wisconsin - Madison	Americas	14	USA
17	Univ Washington - Seattle	Americas	15	USA
18	Univ California - San Francisco	Americas	16	USA
19	Tokyo Univ	Asia/Pac	1	Japan
20	Johns Hopkins Univ	Americas	17	USA

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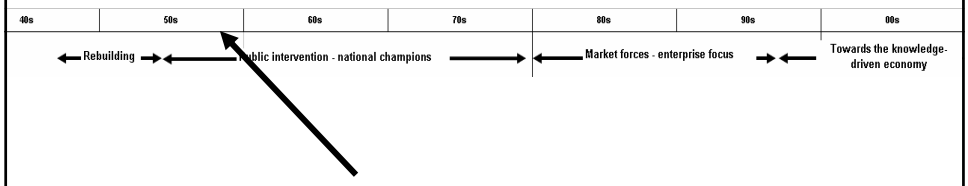
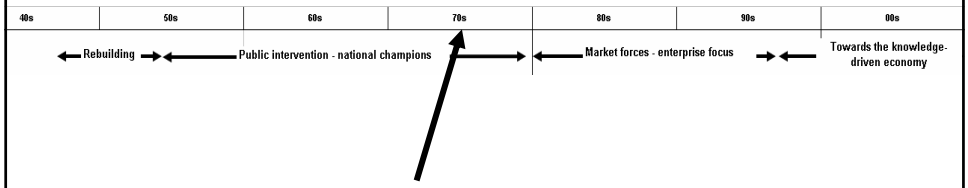


- "The crude engineer, the mere technologist are tolerated in universities because the State and industry are willing to finance them. Tolerated, but not assimilated", University V-C



- "Many of our best trained students have no desire to join industry" James Callaghan
- "It is almost unknown for interest to be expressed in a career in manufacturing"

Universities (1)

- Mixed policy agendas, rethinking is required of the role of universities:
  - what are they for, how should they be funded, who benefits, etc.
- Government views universities as supporting innovation as providers of:
  - world-class research that feeds IP into the innovation system;
  - people with the skills to bring ideas to market;
  - but also as active generators of commercial value from their IP.
- Not all universities are able to operate in all three areas, and that knowledge transfer is increasingly a people-centric activity.

Universities (2)

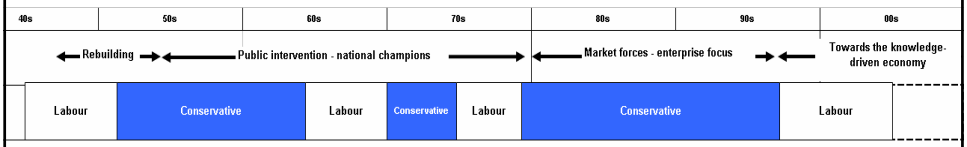
- Following years of neglect, significant investment is needed to ensure that the UK's science base remains world-class.
  - But what is impact of full economic costing models?
- Blurring of the boundaries between research and commercialisation may present challenges in the future
  - royalty-free use of patented IP by universities.
  - over-emphasis on short term returns may drive companies away from universities.
- There would be benefit in more detailed analysis of the real impact of HEIF funding streams and the various precursor schemes.

Impact of education

- “Further education in the UK is now larger than agriculture”. - *Stephen Allott*
- “The British suffer because they have little idea what universities are for. They are confused about the difference between excellence and elitism, and between equality of opportunity and equality of outcome.” - *Robert Stevens*
- “Universities can [transform students’ lives] by reviving one of the oldest models of university structure in existence: the decentralized residential colleges of Oxford and Cambridge in Great Britain.” - *collegiateway.org*

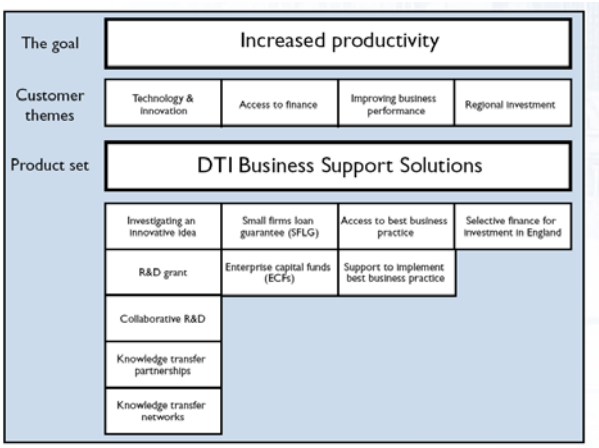
CRAIG – govt support for innovation, plus policy for incubation

Government support for innovation



- 1960s & 70s
  - Public intervention, national champions
- 1980s & 90s
  - Market forces, enterprise focus
- Late 90s and 00s
  - Towards the knowledge economy

Structure of support



But innovation is changing …

- The nature of the innovation process is changing, and Government support for innovation must reflect this change.
  - open model of innovation, government can play a role in supporting collaborative innovation and ensuring a 'level playing field' for small and large firms.
- Developing ideas (invention) not the same as bringing them to market (innovation).
  - Support is needed for both, and focusing much of the effort onto invention through support for R&D may not be sufficient to increase our innovative capacity and hence improved productivity.

Incubation

- High growth rate since the first major study carried out on the subject by the Enterprise Panel in the 1990s
  - in some geographical areas there may soon be too many incubators for the current size of the market
- Incubation in the UK as in Israel has been a critical component in enabling new ideas to come to market and in selecting and training entrepreneurs.
- Given this success, it is now reasonable for government to cut back on its tangible support
  - but maintaining strong moral support and continuing to provide signposting to and information on incubation.

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Cambridge: reasons to be cheerful?

- *The Cambridge Phenomenon*, SQW (1985):
  - 350 high-tech firms, emerging cluster
- *The Cambridge Phenomenon Revisited* (2000):
  - 1998: 1,350 high-tech firms employing 32,500
- *Cambridge Technopole Report* (2006):
  - Number of high-tech firms: 1,500, employing 45,000
- But limited brawn by West Coast standards?
  - ARM 1375 employees; Autonomy 318; CSR 688; CDT 119
  - Microsoft 61,500; Apple 14,800; Cisco 38,400; Oracle 49,800, Intel 99,900; SUN 31,000; Genentech 9,500

Global imperatives

France or UK
~ California

R&D: less than meets the eye

- "The results also point to a marked positive effect of business-sector R&D, while the analysis could find no clear cut relationship between public R&D activities and growth. [However] the generation of basic knowledge […] provides technology spillovers in the long run." - *OECD 2003*
- "The economic indicators show a positive correlation with R&D spend, but only up to just below 1.5% […] as a proportion of GDP. Above that level there is no further improvement in economic performance." - *Alex Smeets 2006*
- UK R&D heavily skewed to defence, pharma
  - Defence is a proxy for government
  - Pharma is gravitating to New Jersey

Bringing it all together

Conclusions, further research

Funding gap revisited

- *Beyond the Chasm – the Venture-Backed Report UK*
  - 'Of the 1,511 institutional (excluding public sector backed funds) deals with disclosed value, more than half (899) are £2m or below. Moreover, the vast majority (706) of the sub-£2m deals are between £250k and £2m, **squarely in the area traditionally seen as the equity gap**.' Library House 08/06
- *Beyond the Chasm, "Secrets" of the World's Largest Seed Capital Fund:*
  - 'The **lack of other sources of funding for early stage companies is recognised as one of the underlying reasons for poor UK and European early stage technology VC performance** […] If we continue in the UK to expect VC firms to bear the brunt of financing early stage science and technology companies which are **not "venture ready",** we will only help them deliver returns which turn off their own investors and reduce the level of genuine private sector venture capital which is available in the UK.' David Connell 08/06

Crossing the chasm - again

"[T]he **willingness and ability of individuals to acquire and use new products and technologies is as important as** – and in small countries more important than – **the development of such products and technologies**. Moreover nations – unlike many individuals and organizations – don't have to outperform 'competitors' in order to prosper ...

"In fact, because **venturesome production requires venturesome consumption**, excessive thrift can injure rather than help modern capitalism. As it happens, modern consumers have been more inclined to keep up with the recently acquired baubles of their neighbors (if not stay ahead) than towards excessive thrift."

Amar Bhide 2006

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Areas for further analysis

- Can SBIRs be made to work in the UK?
- Another look at the funding gap
- Room for a specialist bank?
- Is the knowledge economy more dependent on comparative than competitive advantage?
- Rethinking what universities are for: excellence not social or regional engineering
- Recognising the need to go global early
- Reviewing the role of manufacturing
- Distinction between inputs, outputs and outcomes.

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Questions

- “To let. A valuable site at the cross-roads of the world. At present on offer to European clients. Outlying portions of the estate already disposed of to sitting tenants. Of some historical and period interest. Some alterations and improvements necessary.” - *Alan Bennett 1969*
- “My companion [a future governor of the Bank of England] recalled the parallel with Wimbledon: held in Britain, staffed by locals, dominated by foreigners but still generating bags of prestige and money for the UK. The City would be the same. I disagreed, preferring the example of manufacturing, where the failure of British firms has left the UK without control of strategic industries or employment.” - *Philip Augur 2000*

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