Science Parks and the Cambridge Phenomenon

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GREATER CAMBRIDGE PARTNERSHIP

Cooperation for Regional Innovation

2nd Annual Conference of the Technopolicy Network

Helsinki 2005

Professor Alan Barrell

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A Short Agenda

- Is there a Cambridge Phenomenon ?
- The latest FACTS and MEASURES
- How did we get here ? A Chronology
- Science Parks and Innovation Centres
- Communities, Culture and Common Purpose
- Some Conclusions

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Phenomenon

"A remarkable or unusual person, thing or appearance"

"A prodigy"

Prodigy

"Any person or thing that causes great wonder: A wonder: A monster: A child of precocious genius or virtuosity"

"Astonishing - more than usually large in size or degree"

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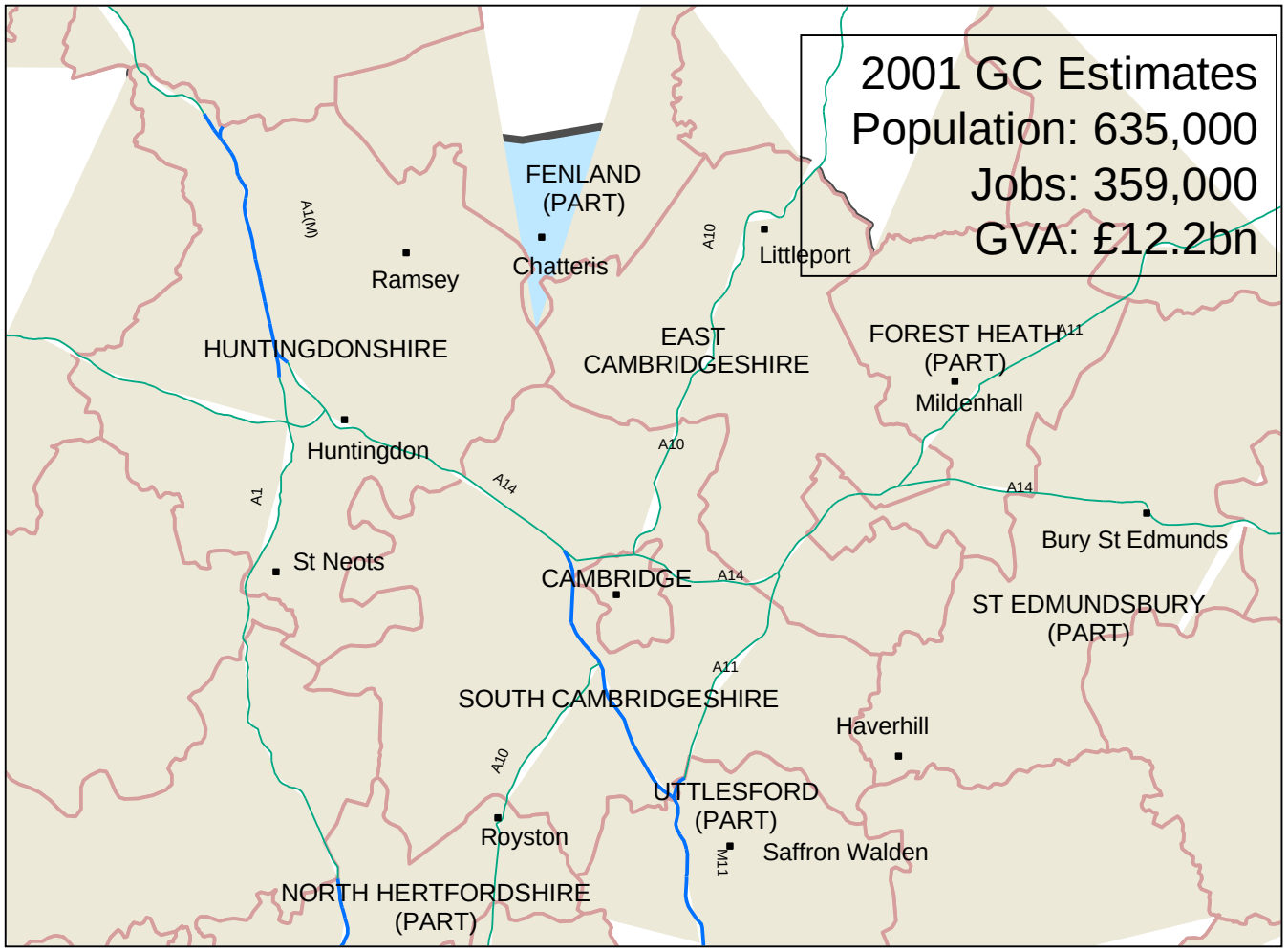
Greater Cambridge Partnership Area



Cambridgeshire County Council

EEDA East of England Development Agency

The Cambridge Phenomenon – Fulfilling the Potential

"Greater Cambridge is one of the most dynamic sub-regions within the UK Economy"

- GDP growth 6.5% p.a. (UK 3.4%, USA 3.8%)
- Employment Growth 5,000 p.a.(160,000 1971 – 2001)
- 3,500 High Technology businesses
- 50,000 High Technology jobs
- 360,000 jobs in total
- UK Exchequer tax take £5.5 billion
- Export value - £2.8 billion
- Gross Value Added - £12.2 billion (2001)

More on Greater Cambridge

- Rapid economic growth
- Near full employment
- 80% job growth in three decades (UK 16%)
- Knowledge-based jobs 1/3 of total jobs (30% higher than national average)
- Relatively high level of well-being
- University Science Base – R and D strength
- Genome Centre and Babraham Complex
- Numerous Institutes, Science Parks and Innovation Centres

Many Sectors of Employment are doing well in Greater Cambridge

"The conventional sector accounts for 2/3 of jobs in G.C. economy."

• Total jobs	360,000
• Retail & Leisure	95,000
• High Technology	46,000
• University R&D	5,000
• Education & Healthcare	25,000
• Other Knowledge-based	69,000
• Manufacturing	35,000 (stable)
• Business Services	45,000
• Utilities	39,000
• Public Services	25,000

And there is impact beyond hard facts and influence beyond Cambridge

- First Microsoft R&D facility outside USA
- Toshiba JV with Dept. of Physics – leading to first Toshiba spin-out – Teraview Ltd.
- Other partnerships/ M&A/ embedded laboratories – examples- Hitachi, Monsanto, Incyte, Globespan-Virata, Convergys
- Worldwide reach, influence and business success of “technology provider cluster”
- Science Parks and Innovation Centres – models and outreach to other sub-regions and regions
- CMI – Research base and Best Practice exchange
- Entrepreneurship Centre – developing educational programs, exporting and migrating to other UK universities
- Cambridge Enterprise – Technology Transfer and Commercialisation
- Networks – most notably Cambridge Network – serving the local community and connecting with networks worldwide

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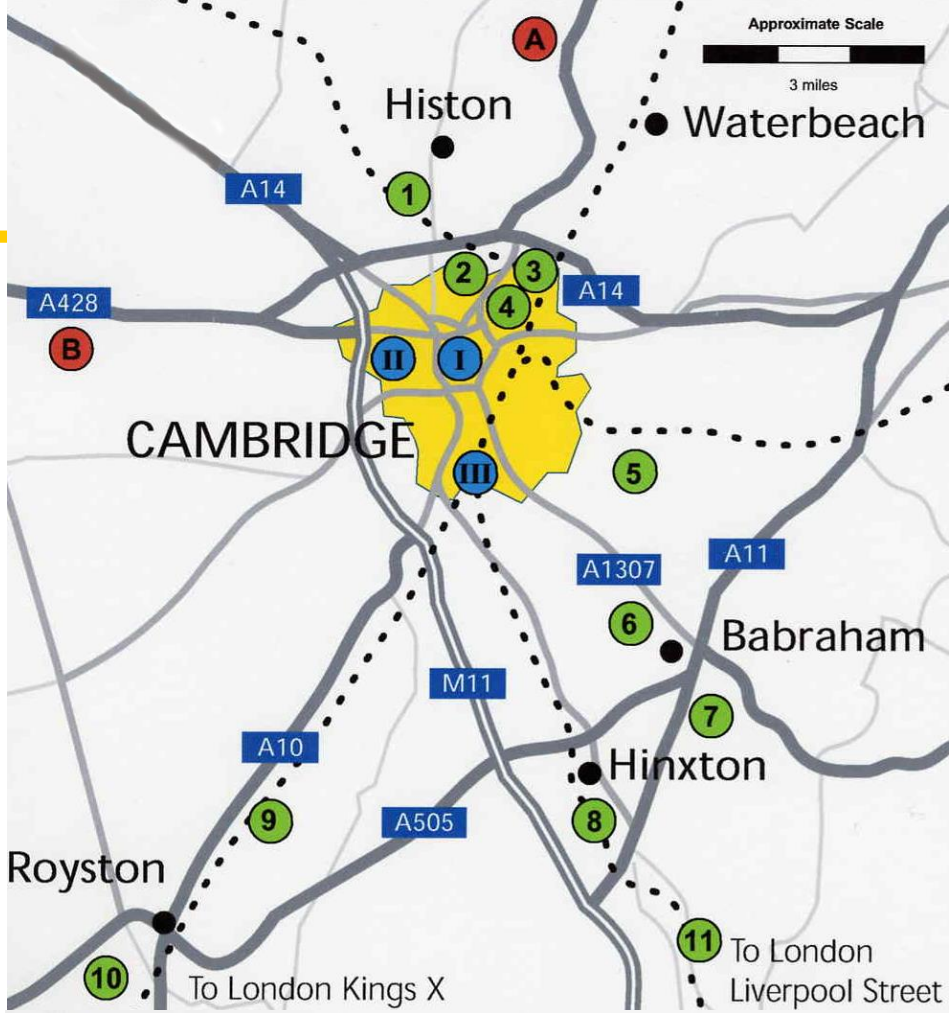
Research Establishments and Science Parks within 15 miles of Cambridge



Science/Business Parks and Incubators

1 Vision Park
2 Cambridge Science Park (CSP)
3 St John's Innovation Centre (SJIC)
4 Biotech Innovation Centre(BIC)
5 Peterhouse Technology Park
6 Babraham Bio-Incubator (and future business park)
7 Granta Park
8 Hinxton Genome Campus
9 Melbourn Science Park
10 Royston estate
11 Chesterford Park

University and Hospital Research/ Incubator Sites

I Central University site
II West University site
III Addenbrookes and University / MRC site

New Business Parks (can take Biotech)

A Cambridge Research Park
B Cambourne Business Park

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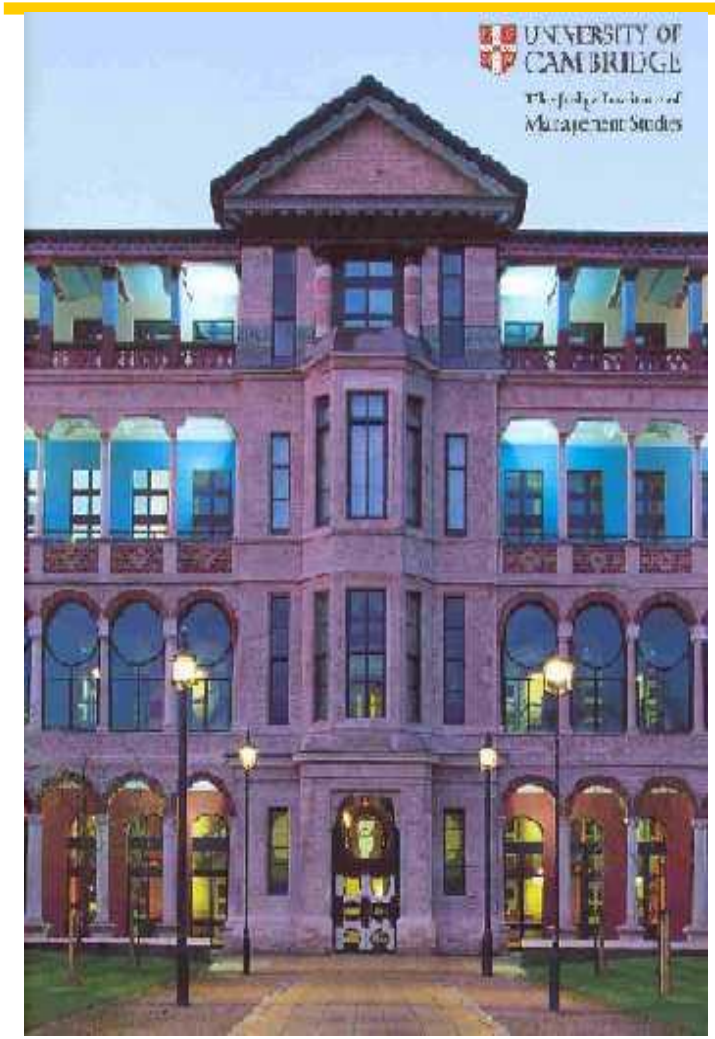
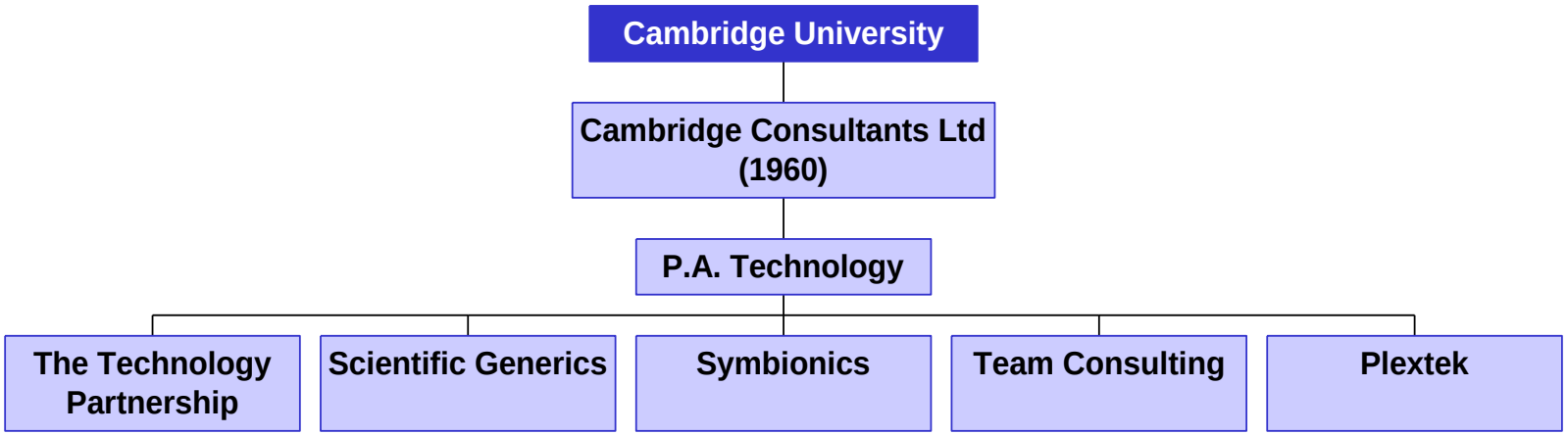
Characteristics for high technology regions - Gibbon's Top 10



- Universities and centres of academic excellence
- Entrepreneurs with marketable ideas and product
- Business angels and established seed funds
- Sources of early stage venture capital
- Core of successful large companies
- Quality management teams and talent
- Supportive infrastructure
- Affordable space for growing businesses
- Access to capital markets
- Attractive living environment and accommodatio

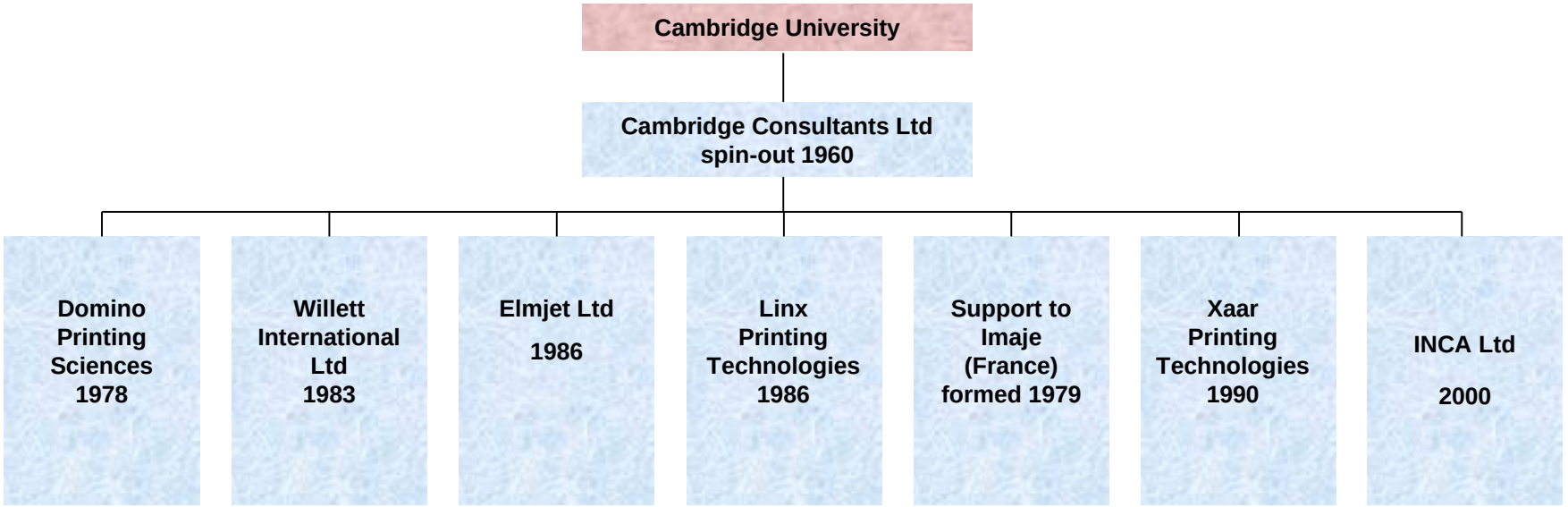
source :- Gibbons - Stanford University 1998

Birth of a cluster of world-class technology providers



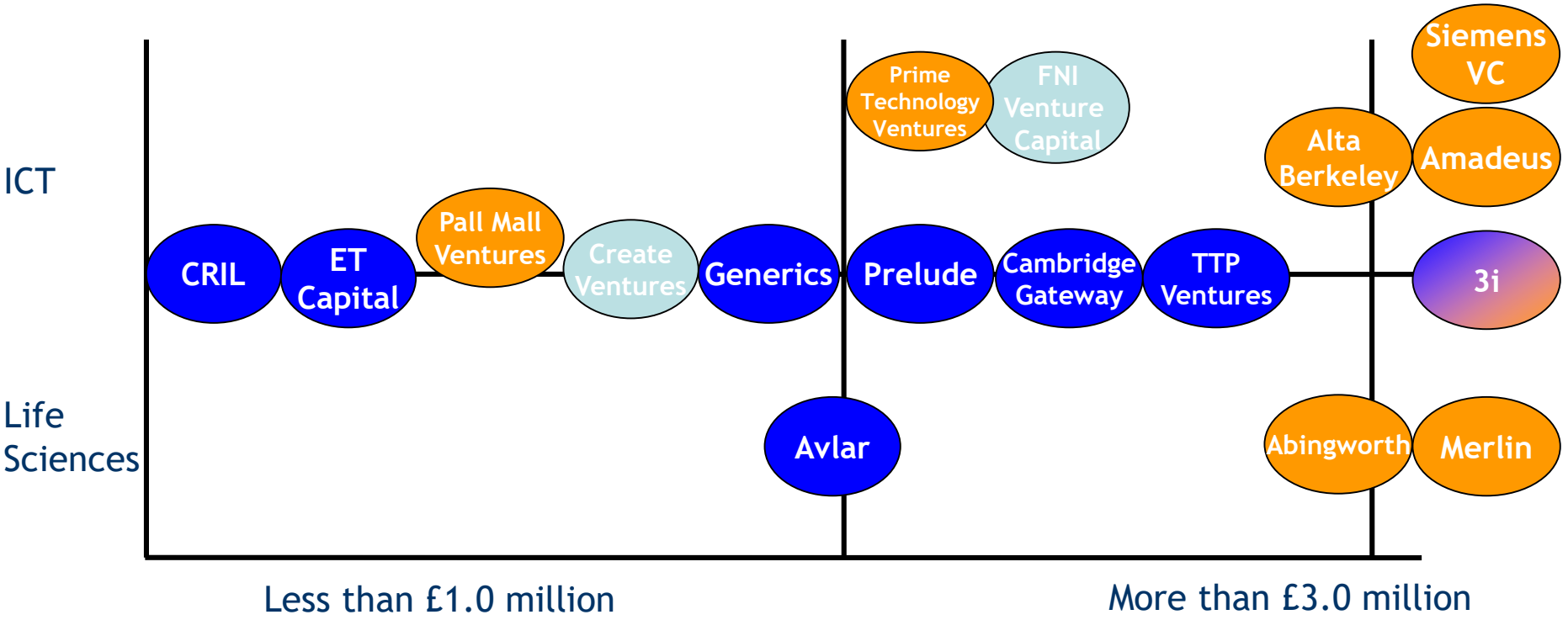
- Combined headcount of technology providers currently exceeds 1,200 in UK
- PA Technology employs 3,500 Worldwide
- Combined revenues estimated at £120 millions – UK
- PA technology – Revenues $750millions
- Some players have seed funds
- 60 identified spin-outs - highly successful incubator models

Birth of a world-class cluster - Industrial Ink Jet, Cambridge



- Total current revenues £1 billion +
- Total headcount 3,000+
- Major market share participation worldwide
- Diaspora populates Ink Jet Industries in international locations
- Ink Jet Cluster is enabling “Plastronics” Cluster

A Financial Cluster follows The Technology Cluster



- Cambridge Region only
- UK only
- UK and Europe

Cambridge Venture Capital Scene – Estimated total value of funds: in excess of £1.5 billions

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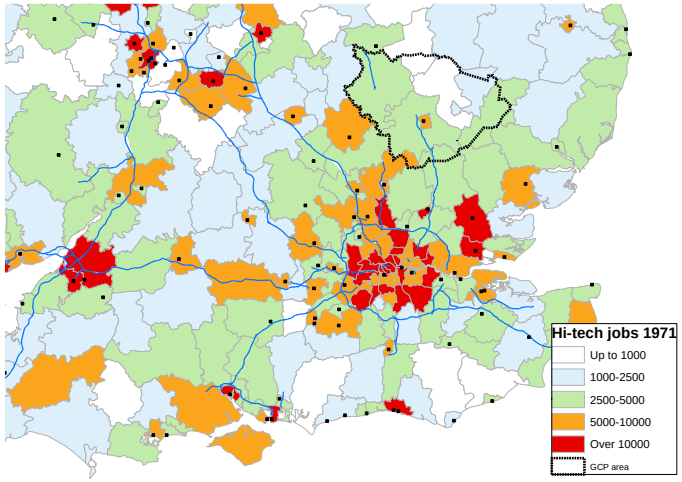
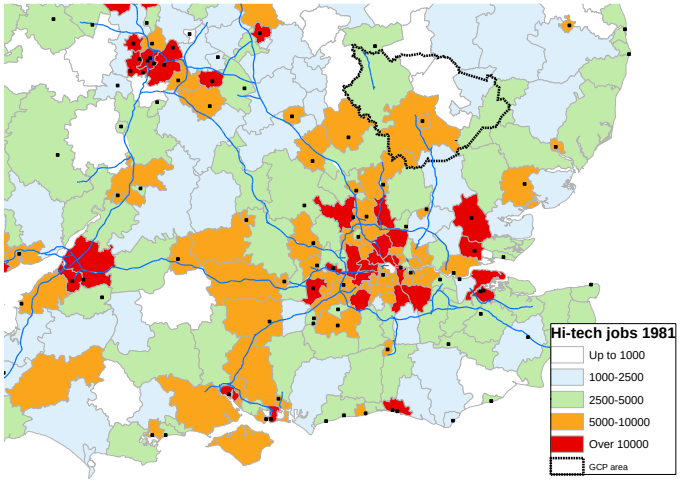
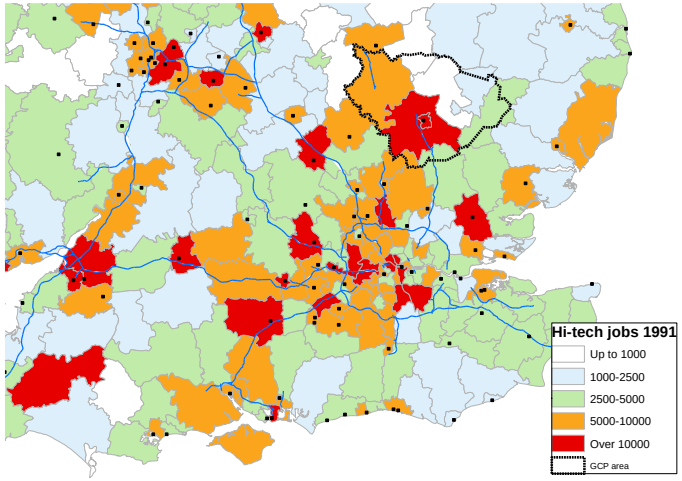
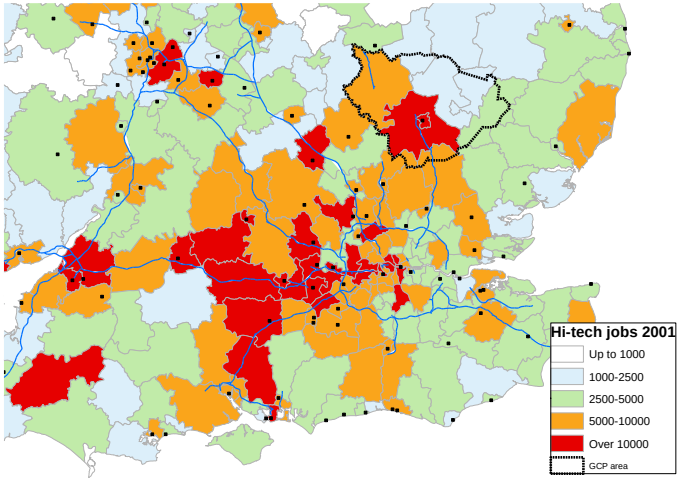
Hi-Tech Jobs, 1971-2001









Source: ABI, LFS, PACEC

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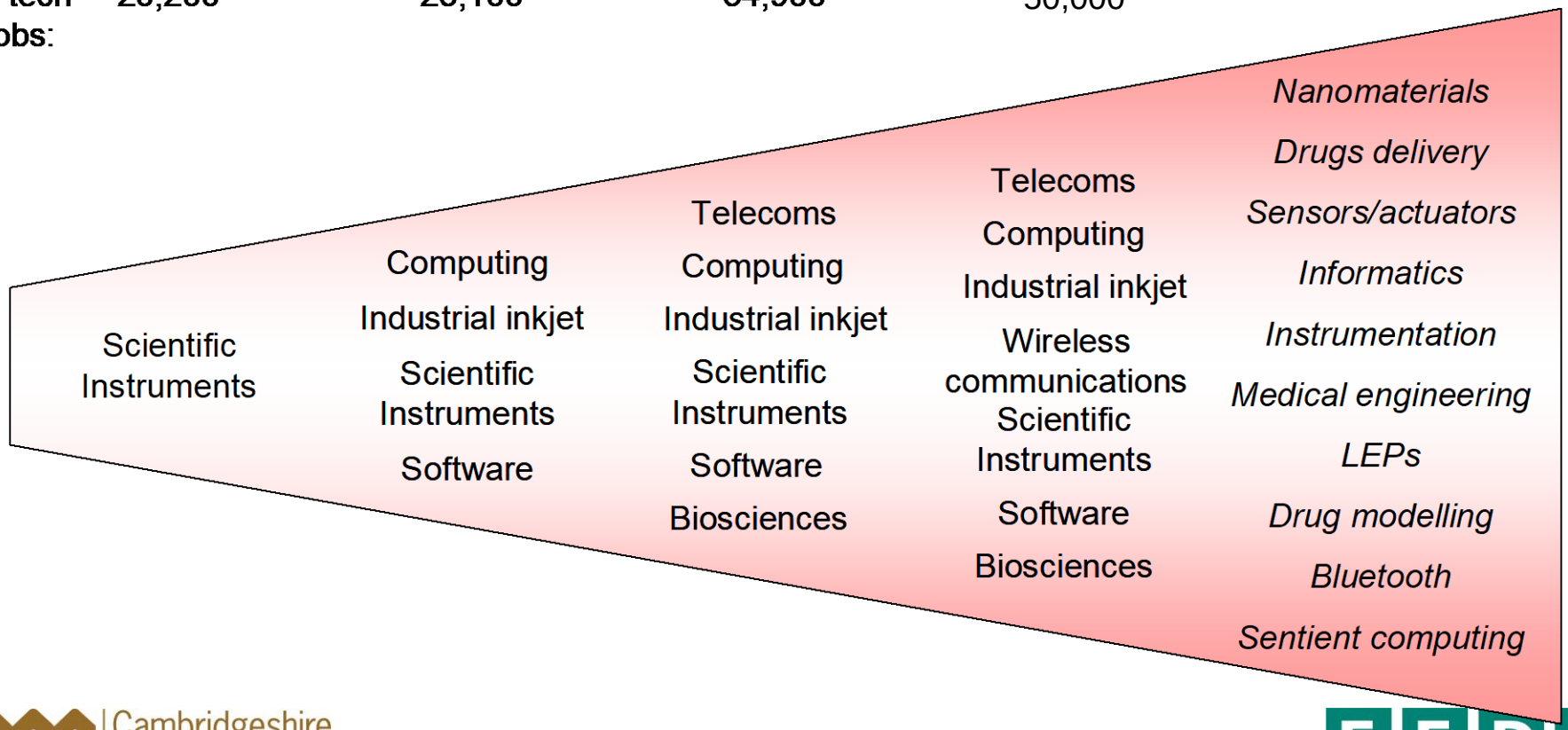
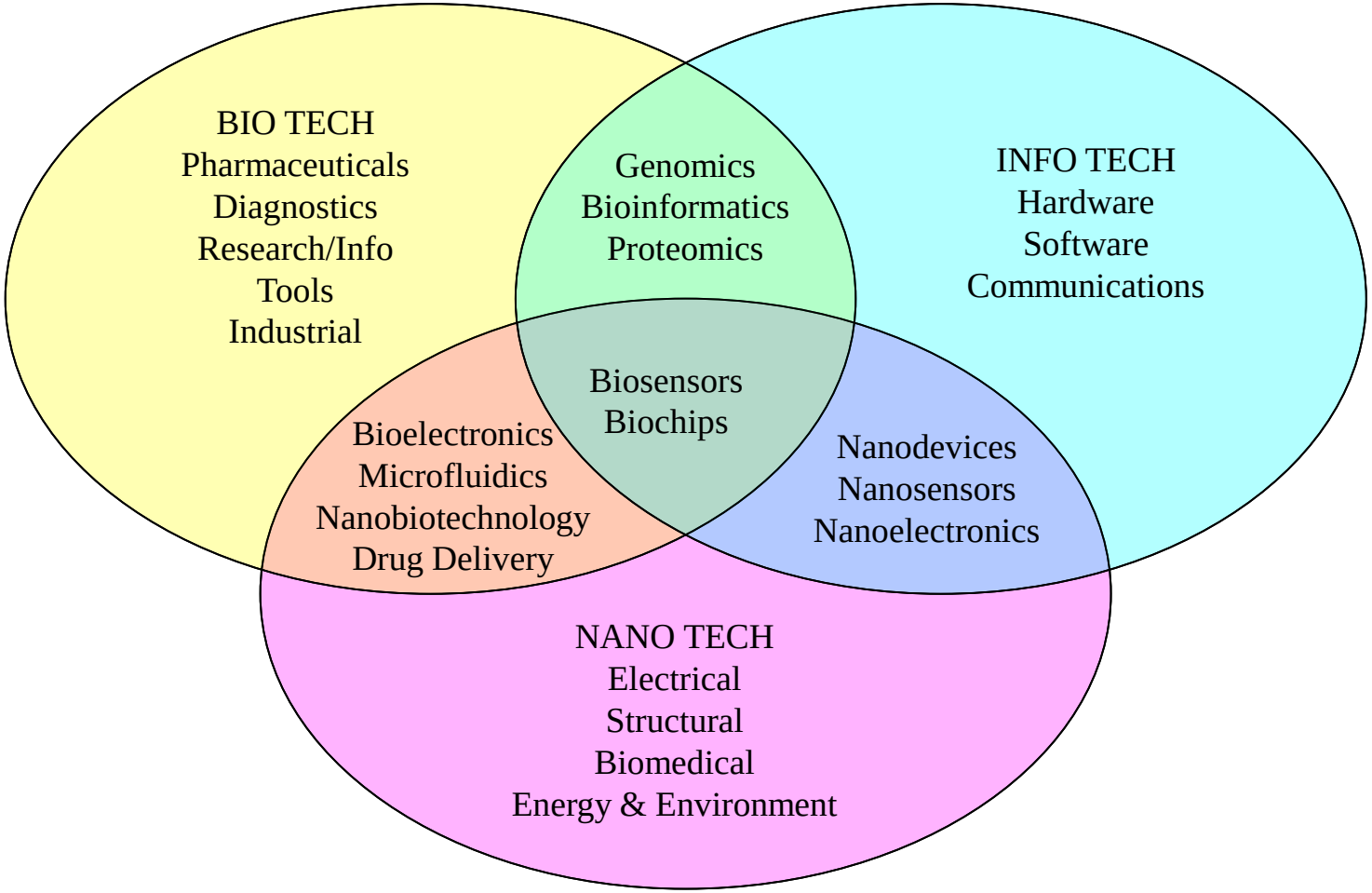
The emergence of high-technology clusters in Greater Cambridge

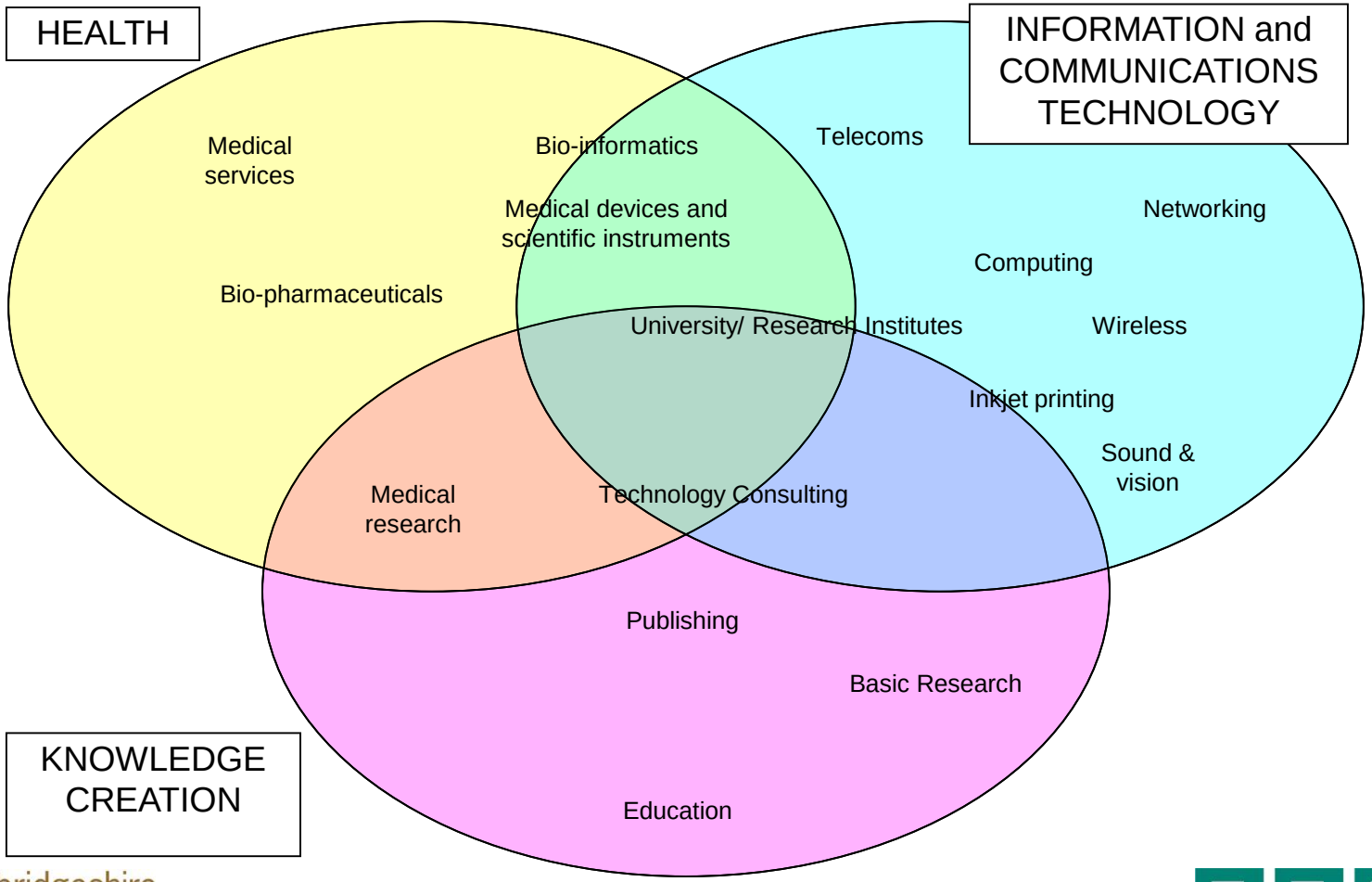
	1971	1981	1991	2001	The future?
Hi-tech jobs:	20,200	25,100	34,900	50,000	



Three Converging Revolutions
Three Pervasive Technology Platforms



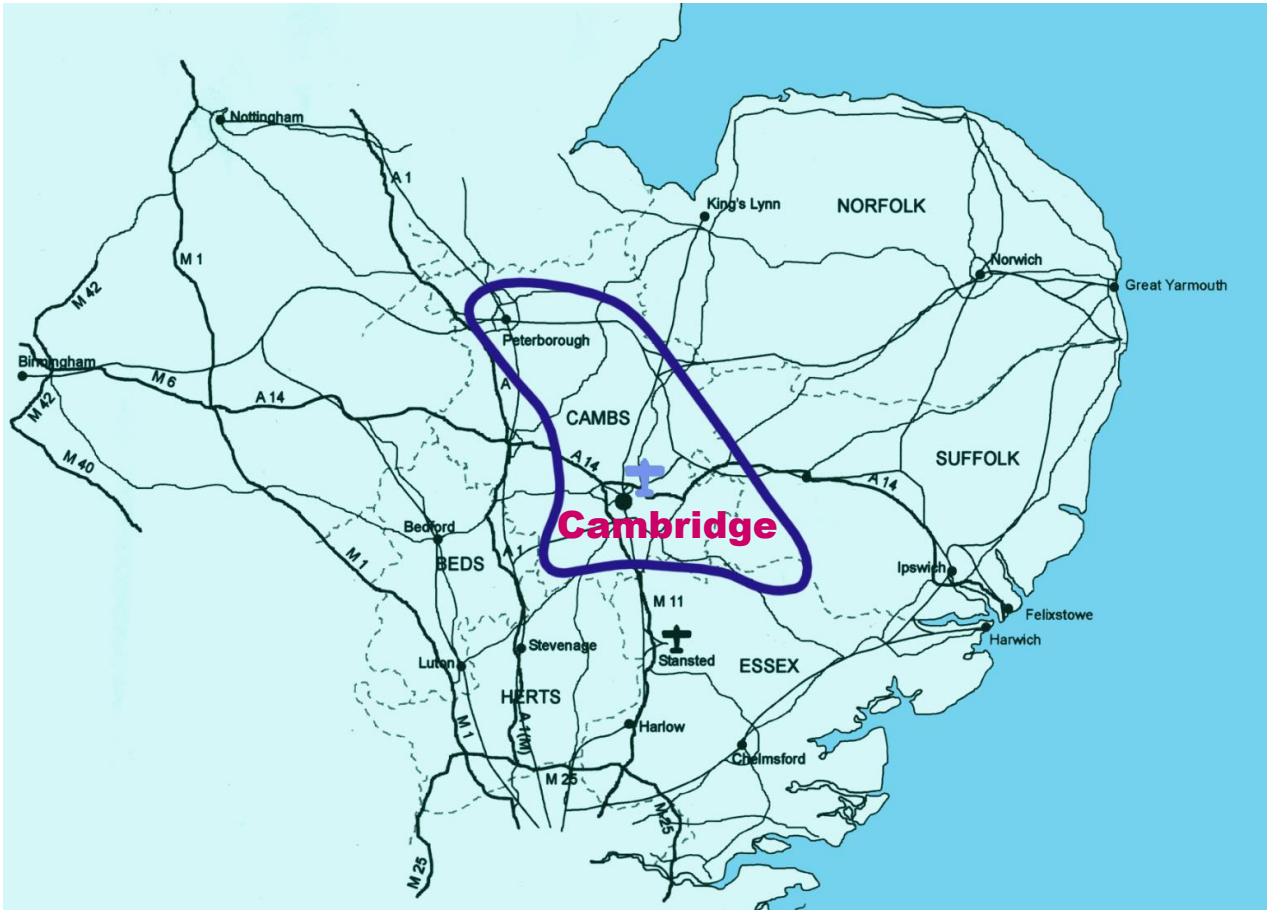
Overlapping clusters in Greater Cambridge



Sources of Competitive Advantage for Greater Cambridge

- Capacity for innovation
- Diverse science base and research infrastructure
- Capability to diffuse knowledge and experience through collective learning and networking systems
- Leading to a functioning knowledge-based cluster
- Entrepreneurial business community – enthusiastic to participate in local, regional, national and international programmes of innovation, change and new business creation
- Established Science Parks and Innovation Centres

Silicon Valley and the Eastern Region



source: Cambridge 2020 report - 1998

BUT – there are constraints on growth and development…….

- Issues of commercialisation of science and diffusion of knowledge
- Still no large revenue and profit earning “local giants”
- Inefficiencies and deficits in funding early stage businesses
- Rising traffic congestion
- Inadequate transportation links to other regions
- Limited air transport connections to international destinations
- Insufficient housing – quality and price issues
- Tym Report 2001 – indicated £ 2 billion infrastructure deficit.

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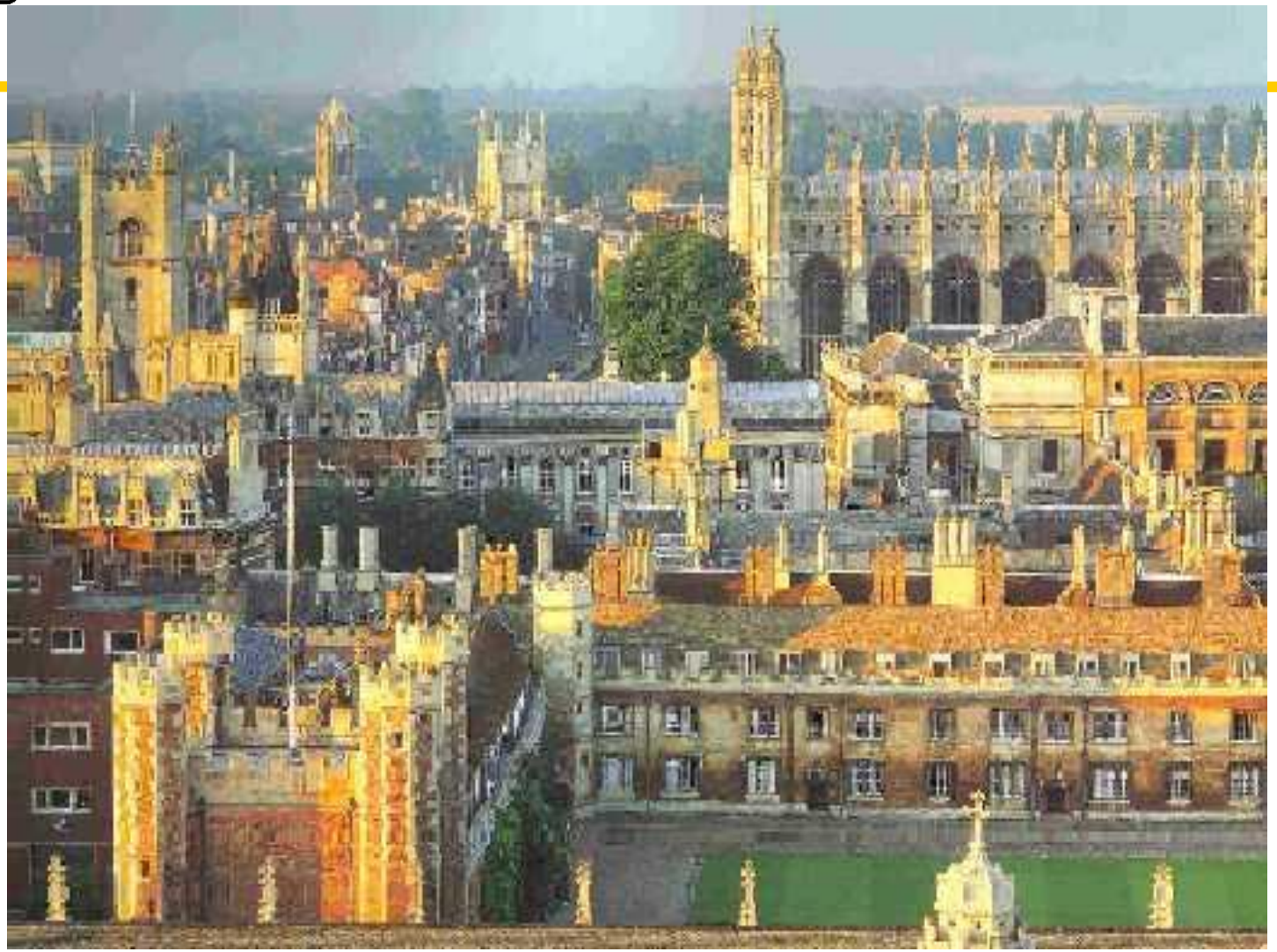

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Cambridge University - Great Scientific and Technological Advances

- 1600: Dr William Gilbert - Science of navigation, map making
- 1687: Isaac Newton - ‘Principa Mathematica’ - fundamentals of nuclear physics, laws of gravity
- 1704: First chair of astronomy - leading to first public observatory
- 1812: Charles Babbage - first ‘calculating machine’ - heralded invention of modern computers
- 1873: James Clark Maxwell - ‘Treatise on Electricity and Magnetism’
- 1887: JJ Thomson - Cavendish Labs - discovered the electron - hence telephones, radio, television and computers
- 1915: Lawrence and WH Bragg - X-ray diffraction
- 1929: Frederick Gowland Hopkins - vitamins
- 1932: Cockcroft, Walton and Rutherford - Atom first split

Cambridge University - Great Scientific and Technological Advances

- 1933: Paul Dirac - Quantum Theory and Position Emission Topography
- 1934: Frank Whittle - work on jet propulsion
- 1941: First jet flight
- 1949: Maurice Wilkes - EDSAC (Electronic Delay Storage Automatic Calculator - first stored programme digital computer)
- 1953: Crick and Watson - discovered structure of DNA
- 1958: Frederick Sanger - insulin construction
- 1960: Charles Oatley - first Scanning Electron Microscope
- 1962: Max Peratz & John Kendrew - 3 dimensional structure of proteins
- 1968: Anthony Hewish and Jocelyn Bell - discovery of 'pulsars' in astrophysics
- 1982: Aaron Klug - molecular biology - viruses and RNA
- 1985: Cesar Milstein - monoclonal antibodies

History of the First Cambridge Science Park

- 1960s: First Science Park: Stanford University
- 1964: Labour Government urged closer links between universities and industry
- Cambridge sets up Mott Committee
- 1969: Mott Committee report

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TRINITY COLLEGE

An ancient seat of learning….stepping out into the unknown – and into Hi-Tech

A significant act of faith by Dr John Bradfield

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Trinity College's Response

- Trinity had a strong scientific tradition*
- First use of the word "scientist" 1835 (Whewell)
- Spare land available in a suitable location
- Funds to enable it to carry out the development.

*Alumni include Newton, Clerk-Maxwell, Rayleigh,Thomson, Walton, Rutherford, Aston, Lyle, both Braggs, Bohr, Hopkins, Klug, Kendrew

First Decade: a slow start

- 1970 IBM turned down
- 1971 Planning permission
- 1973 Laserscan moves in
- Other companies follow –

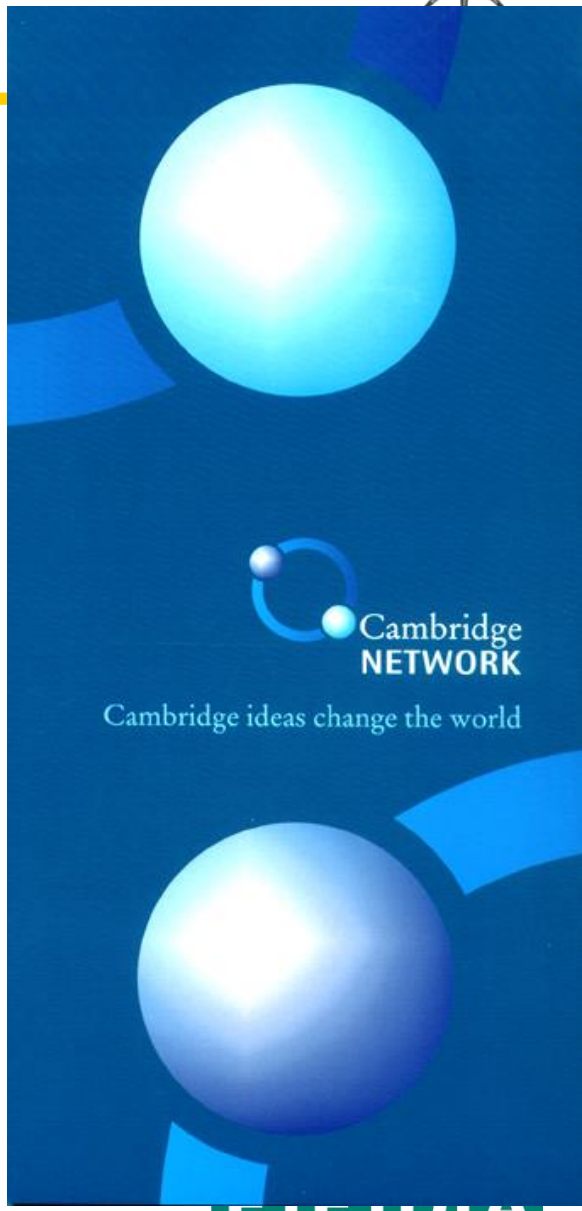
  including some UK subsidiaries of multinationals
- By the end of the 70's, 25 companies installed

Second Decade: Clustering

- Cluster developing - critical mass reached
- 1984: The Trinity Centre
- 3i, Venture Capital company & Prelude VC Trust
- Labour unions, BTG monopoly broken
- Academics start companies (IPR relaxation)
- Spin-outs & collaborative ventures from existing companies (e.g. Cambridge Consultants)

Third Decade

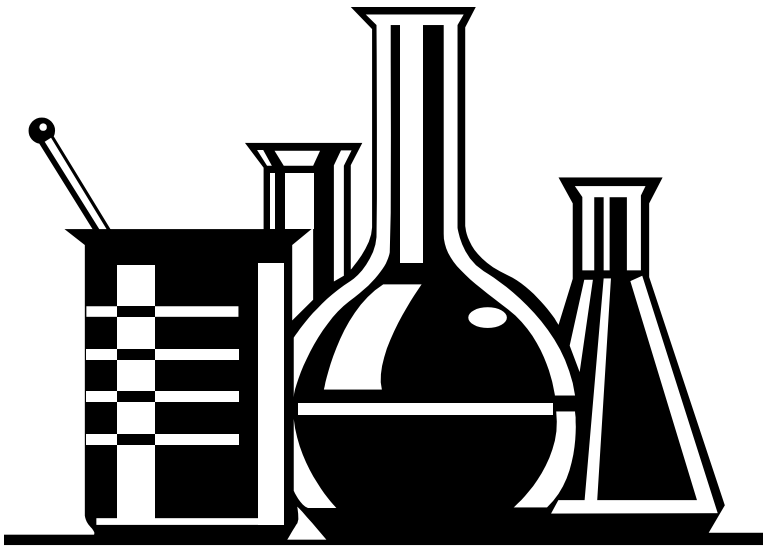
- Greater Cambridge cluster 3,500 cos, (most with <10 staff) 50,000 employees
- More venture funds available
- Strong sectors: Life Sciences, ICT
- Fewer but larger companies, more Stock Exchange launches
- Same mix of spin-outs, new ventures, & UK subsidiaries of multinationals



Present

- 67 companies employing 4,800 people, average age 30
- 61.5 hectares, 144,000 sq m.
- Premises: 45 to 4,000 sq m.
- Development by occupiers on long ground leases
- Purpose-built units on 25 year leases
- Starter units, multi-occupancy or 'listening posts' on 3 to 9 year leases

What type of tenants?



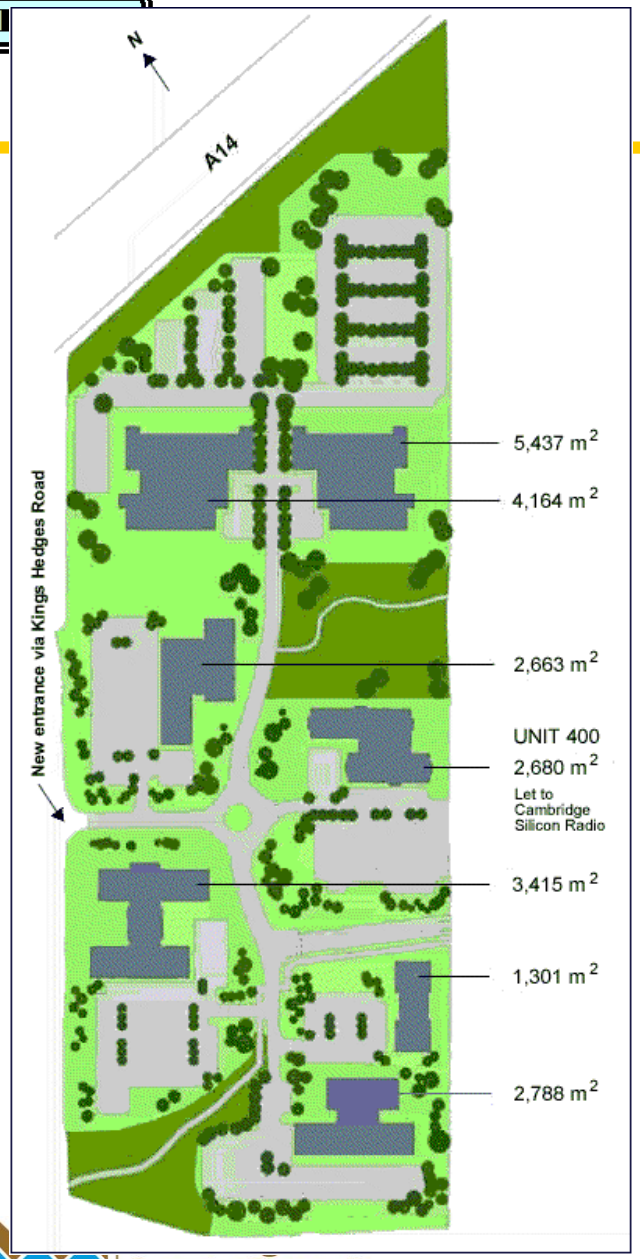
- Scientific research linked to industrial production
- Light industrial production closely associated with on-site or university research
- Ancillary activities (e.g. Venture Capital companies, Patent & IPR law firms etc)
- Not much manufacturing, except Napp, Heraeus, Polatis

Trinity maintained these criteria during economic recession

Occupancy

Type	Number	Sq ft
Agricultural/Biotech	18	290,310
Electronics & IT - Electronics	15	236,037
Software	13	264,254
Divisions of Multinationals	4	325,927
Consultancy & Publishing	6	165,809
Scientific Instruments & Materials	3	61,104
Telecomms	2	85,642
Legal & Business Services	3	34,675
Medical Devices & Products	2	48,663
Venture Capital	1	12,732
TOTAL	**67**	**1,535,123**

Future



- New Conference Centre
- Health & Fitness club
- Nursery facilities (130 places)
- 8.9 Hectares being developed (23,000 sq m, mostly biotech)
- Incubator development
- Continued landscaping

  (site density 1:5 – 18,000sq ft per acre)

Trinity's role

- Promoting contacts & interchange, website
- Advertising university functions & seminars
- Research sponsorship
- CSP Newsletter ("Catalyst") biannually
- Provision of Conference Centre etc
- Landscaping
- But: Rents at normal commercial rates, minimal bureaucracy, no central management company.
- Management by Bidwells, local property specialists

St John's Innovation Park

A commercial operation
established by St John's College in 1987
to provide flexible accommodation
and business support services
to early-stage, knowledge-based companies.

Managed by St John's Innovation Centre Ltd.

www.stjohns.co.uk

ST JOHN'S INNOVATION CENTRE

St John's Innovation Park offers:

- "Virtual incubator" services
- Unit-based accommodation for small businesses, on flexible terms
- Larger-scale accommodation
- Meeting, conference and restaurant facilities
- Business advice
- Regional, national and European networking

Virtual incubator Services (1)

The “Star Service”

- 3 Star: Business address, postal & parcel handling, use of all support services
- 5 Star: All the above plus a communal telephone line with message-taking facilities
- 7-Star: All the above plus a dedicated telephone number and calls answered in the client company name

Virtual incubator services (2)

Enterprise Link

A “business club” for small high-tech companies in Cambridgeshire, offering Business advice and Networking opportunities

www.enterprise-link.co.uk

Buildings

- Innovation Centre + Dirac House (90 units, 5100 m^2)
- Jeffreys Building (8 units, 3100 m^2)
- Zeus Building (3600 m^2)
- Bioscience Innovation Centre (12 units, 2500 m^2, owned and managed by MMI)
- Platinum Building (4500 m^2, owned by Tality UK Ltd)
- Vitrum Building (2800 m^2, owned by Bridehall)

Typical tenants

- Start-up companies researching and developing products
- Technology based companies of 1-5 years' standing that bring some maturity to the Park and may produce spin-out companies.
- Service companies that can provide support such as training, marketing, networking, public relations.

Facilities

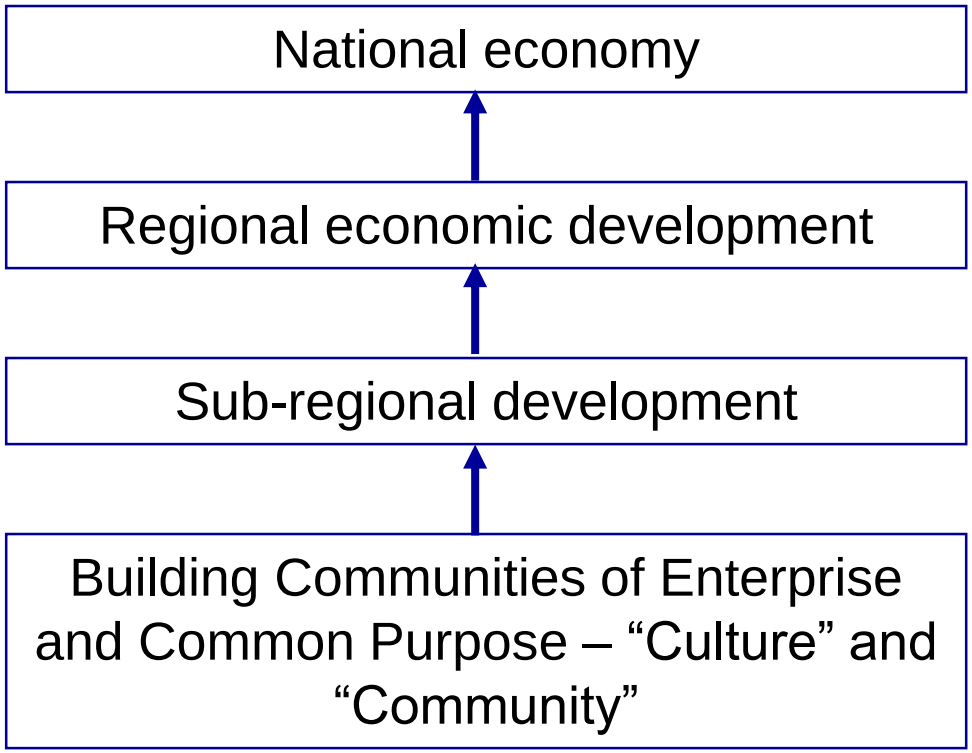
- 4 small meeting rooms plus a boardroom
- 4 conference rooms
- Restaurant, open all day, also provides catering service for meetings and conferences
- Lunchtime trolley service
- Shared reception, postal handling, faxing
- Telephone and broadband internet (100 Mb/s)
- Community !! – Common Purpose !!

Business support services

Usually provided free

- Business plan development
- Fundraising (private and public)
- Company management and development
- Networking contacts
- Technology transfer support

Building an Enterprise Society-Science Parks have been KEY !



Many Sources of additional Information

- www.alanbarrell.com
- www.librrayhouse.net
- www.gcp.uk.net
- Contact me at alan@alanbarrell.com