

The Cambridge Phenomenon – Fulfilling the Potential



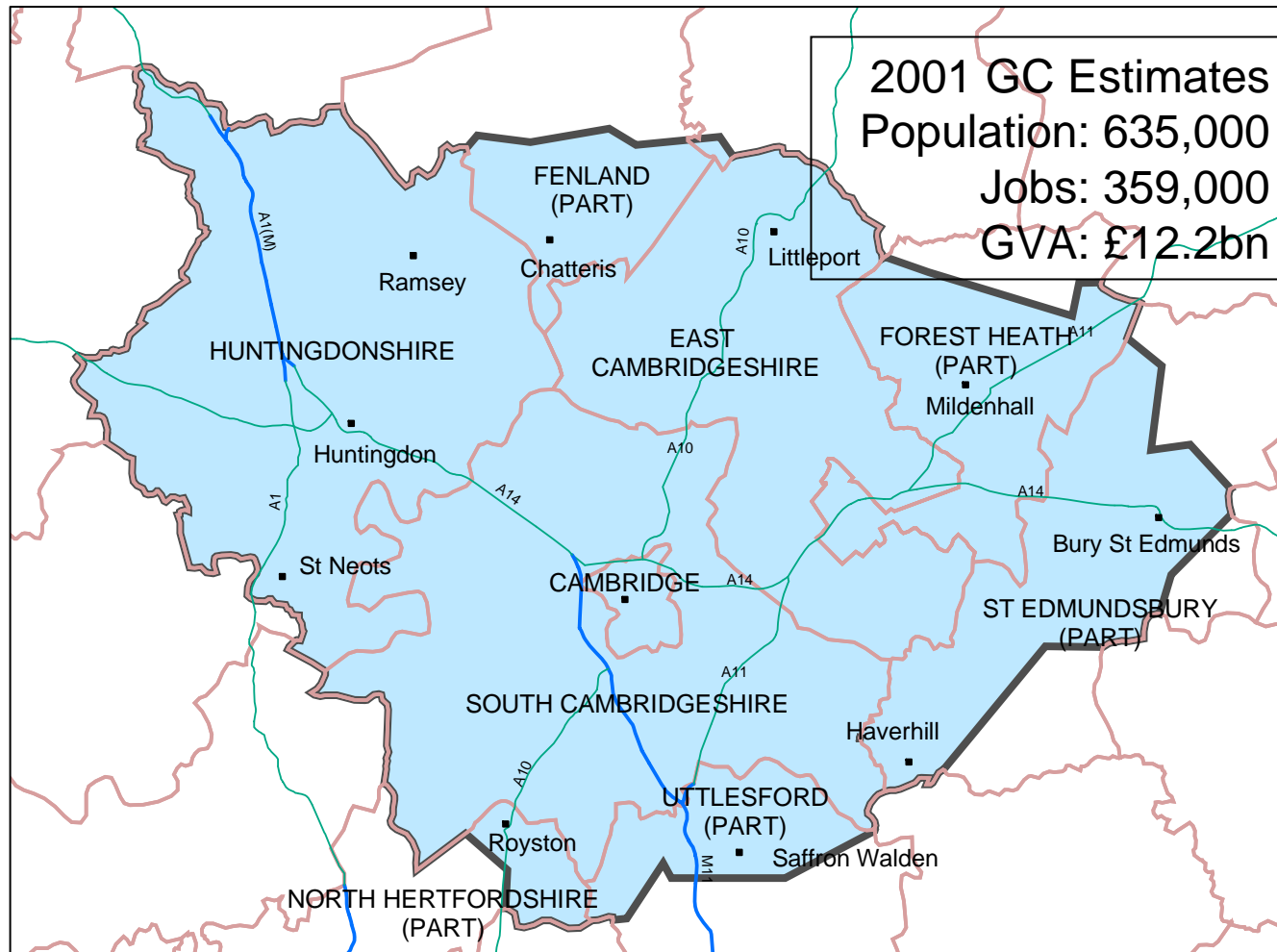
Greater Cambridge Partnership

Research On the Cambridge Cluster – 2003/2004

Beijing Seminar 18th January 2005

Presented by Alan Barrell

Greater Cambridge Partnership Area



Purpose of the Study



- Assess the contribution the Greater Cambridge Economy makes to the National Economy
- Identify key emerging technologies in which Greater Cambridge has a leading edge
- Explore international competitor sub regions in search of best practice
- Develop a range of alternative scenarios of the future evolution of the Greater Cambridge Economy – as a stimulus for debate and to support strategic decision making for the area.

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)

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

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
- TWI at Granta Park

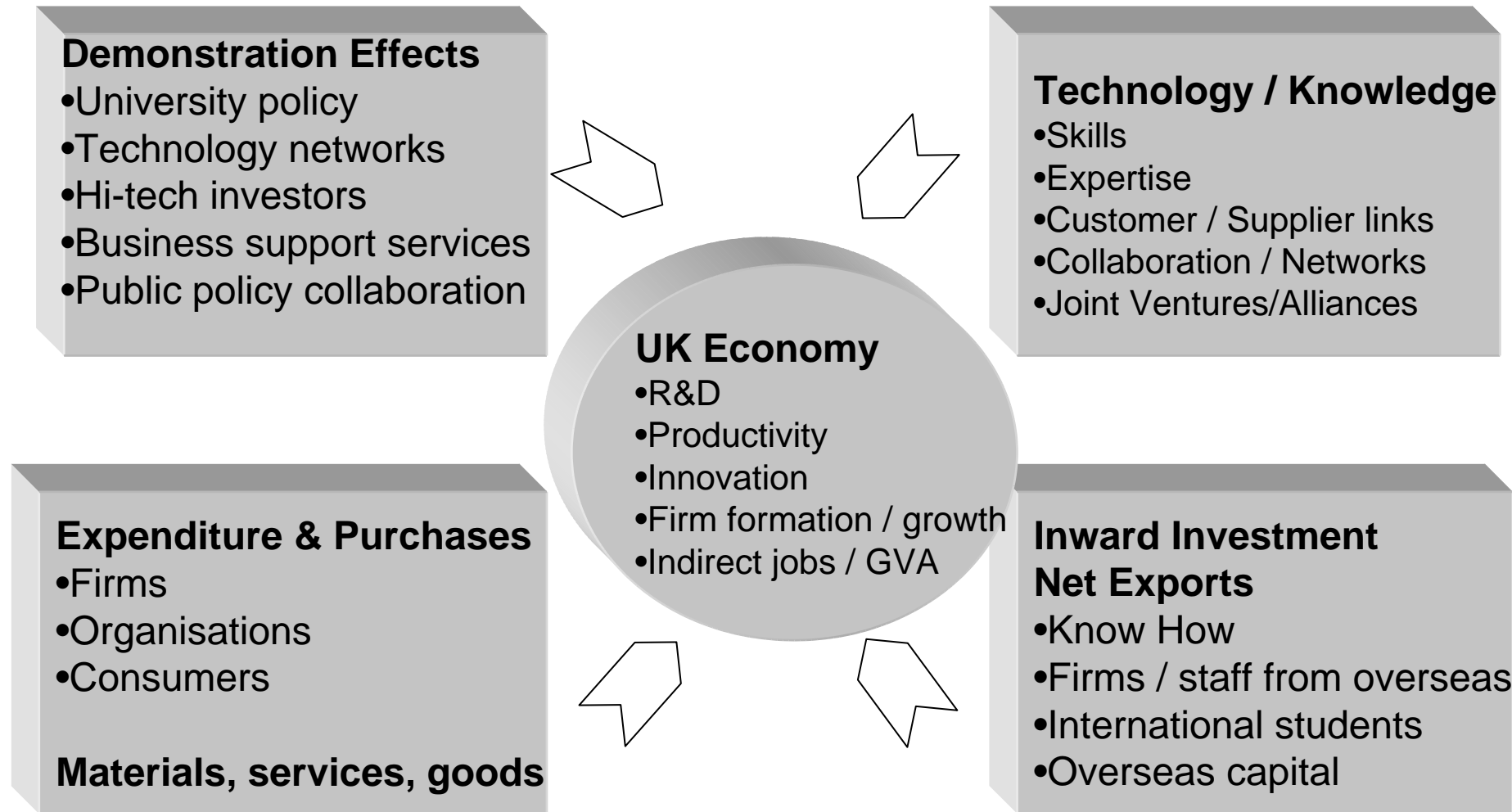
And there is impact beyond hard facts and influence beyond Cambridge



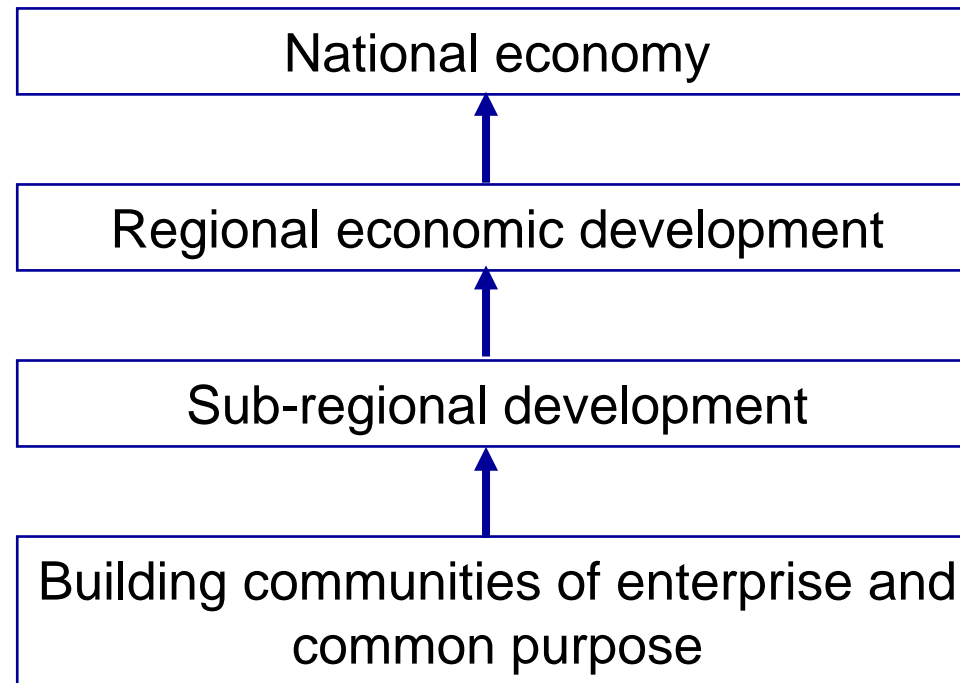
- First Microsoft R&D facility outside USA
- Toshiba JV with Dept. of Physics – leading to first Toshiba spin-out – Teraview Ltd.
- Other partnerships/ M&A/ embedded laboratories – examples- Hitachi, Monsanto, Incyte, Globespan-Virata, Convergys
- Worldwide reach, influence and business success of “technology 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



Wider Benefits to the UK Economy



Building an Enterprise Society



Greater Cambridge.... Fulfilling the Potential



For the UK economy to continue to reap the benefits of the Greater Cambridge success story:

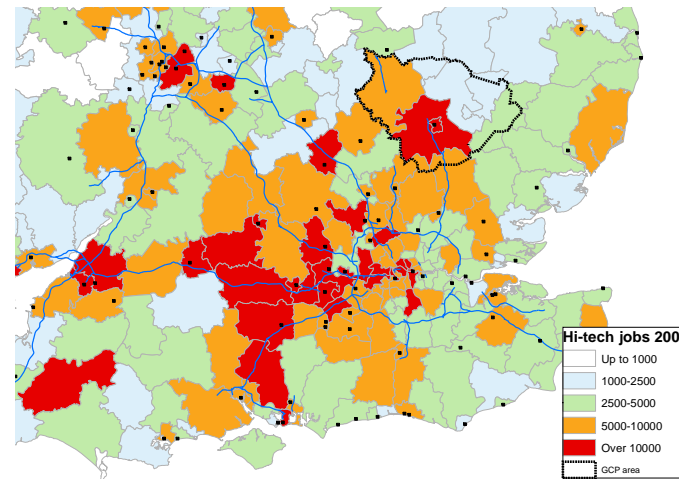
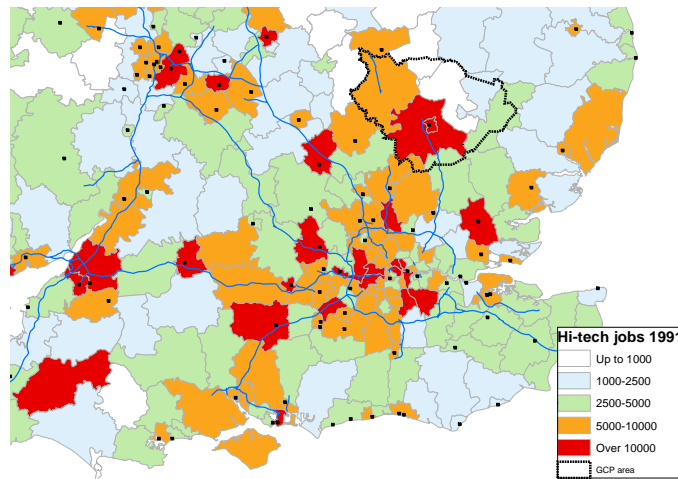
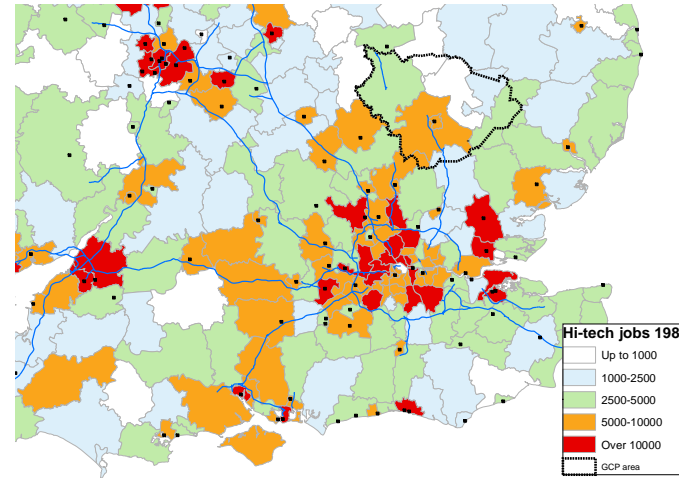
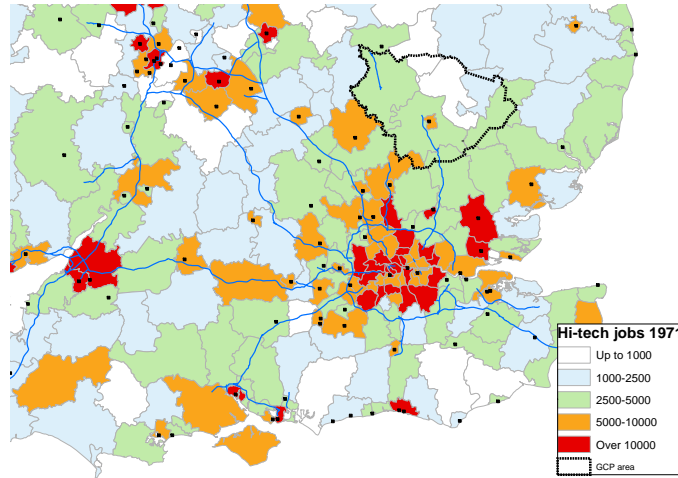
- Direct GDP, export and exchequer growth
- Broader productivity gains
- The physical ripple effect into surrounding towns and along corridors....

Government must join with us to invest in success to overcome the constraints to growth. Lack of investment will stifle growth and lead to private companies investing in leading edge R&D, jobs and wealth creation in other parts of Europe and not in the UK.

- Strong science base
- Entrepreneurial culture
- Growing company base
- Ability to attract key staff
- Availability of finance
- Premises and infrastructure
- Business support services and large companies in related industries
- Skilled workforce
- Effective networks
- Supportive policy environment

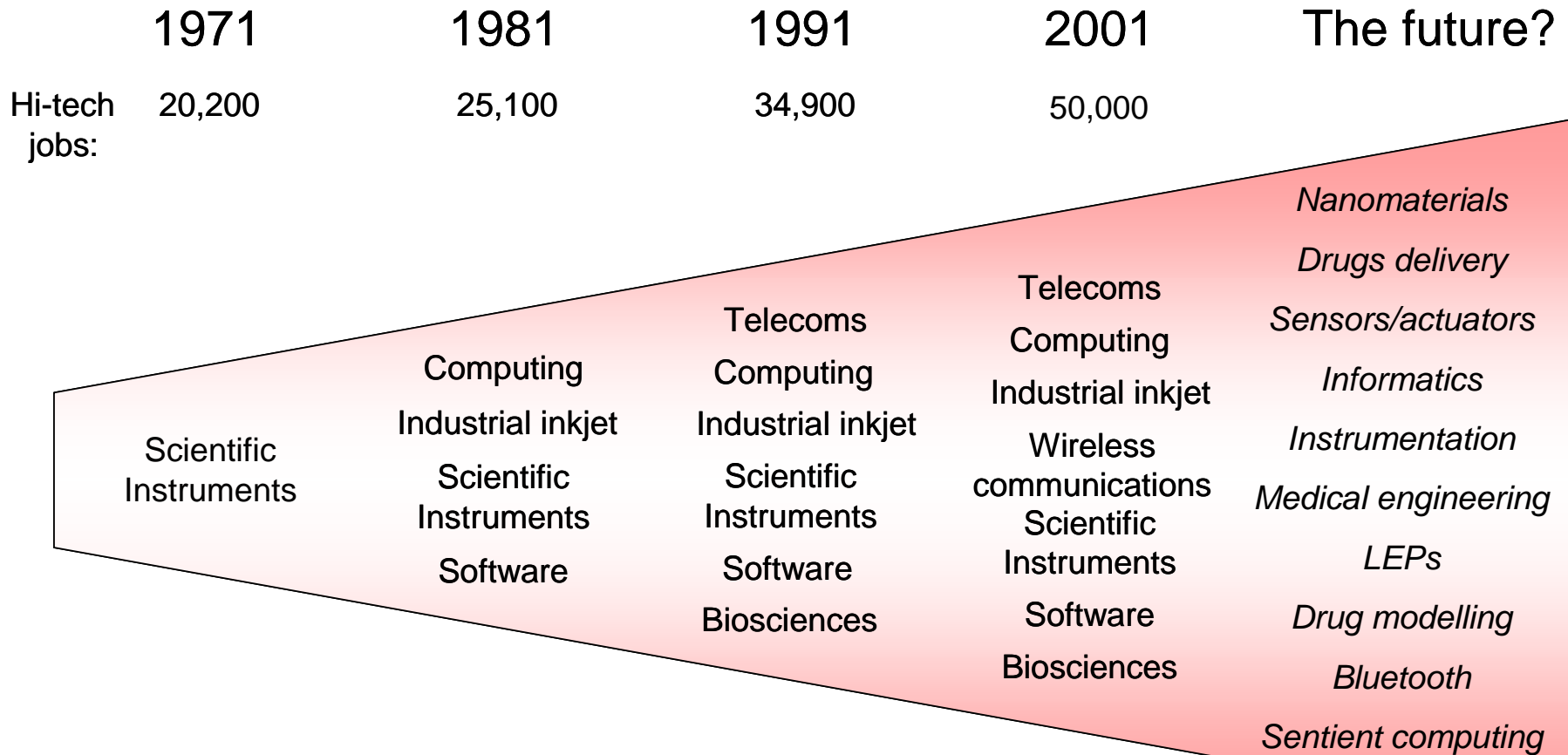
Department of Trade & Industry report 'Biotechnology Clusters' August 1999

Hi-Tech Jobs, 1971-2001



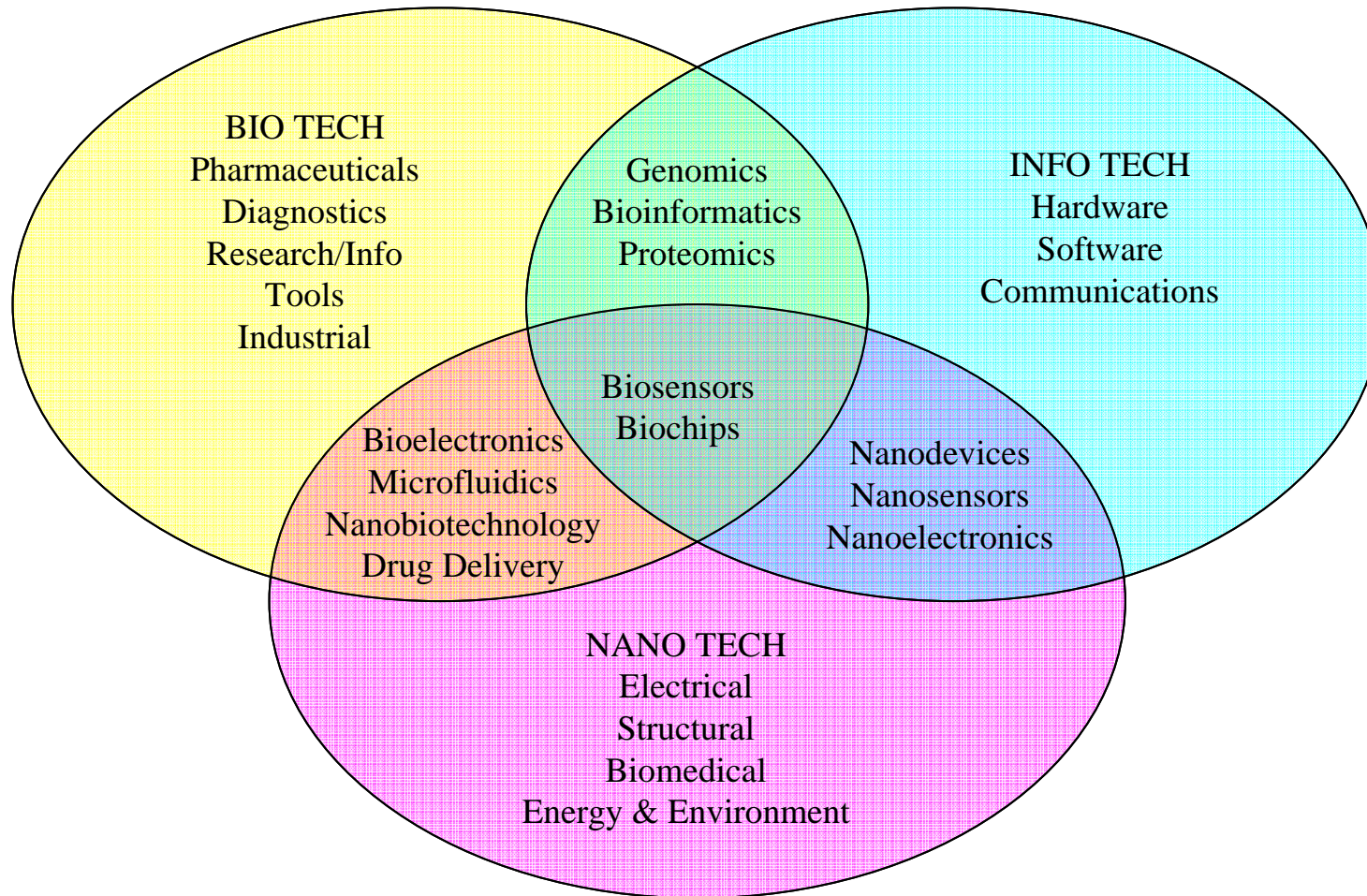
Source: ABI, LFS, PACEC

The emergence of high-technology clusters in Greater Cambridge

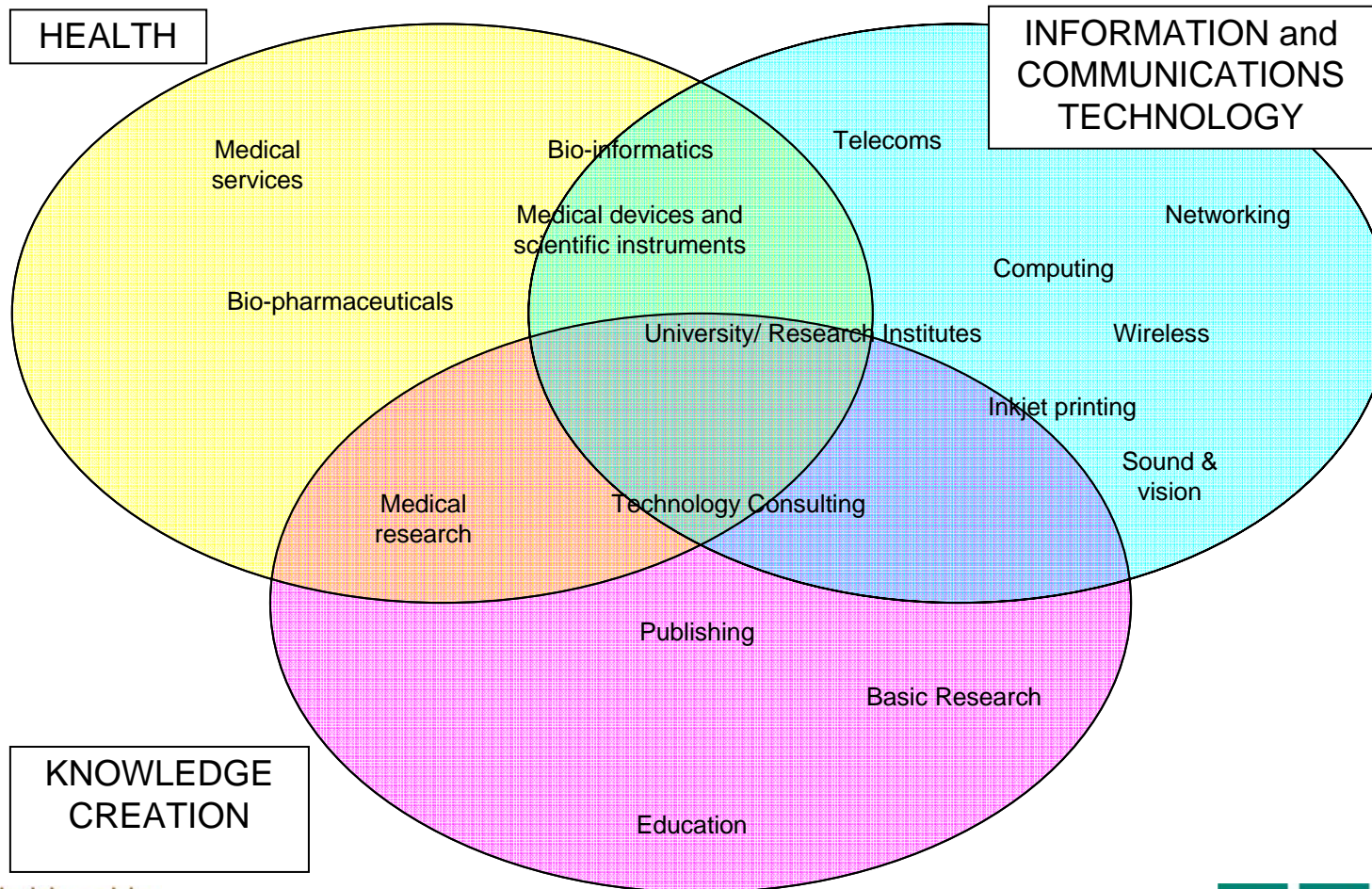


Three Converging Revolutions

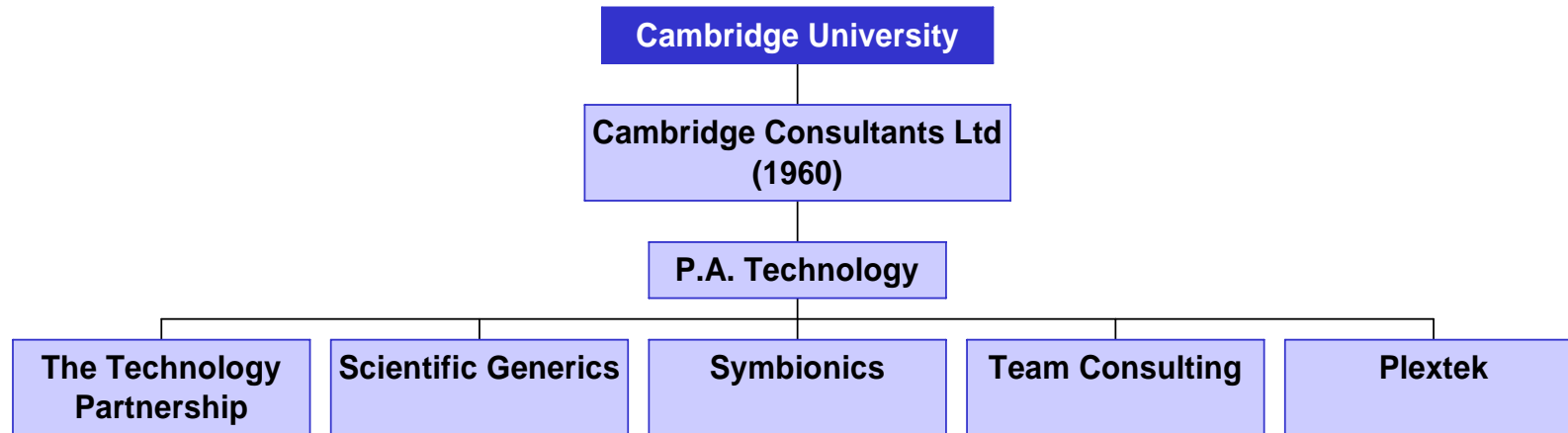
Three Pervasive Technology Platforms



Overlapping clusters in Greater Cambridge

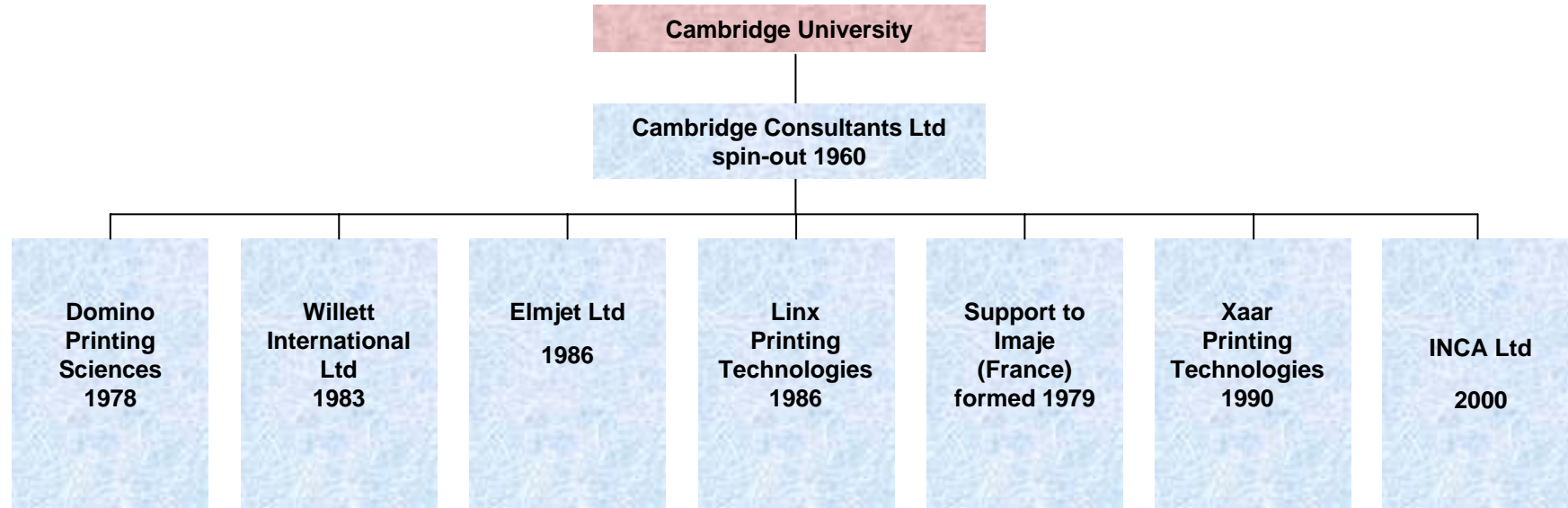


Birth of a cluster of world-class technology providers



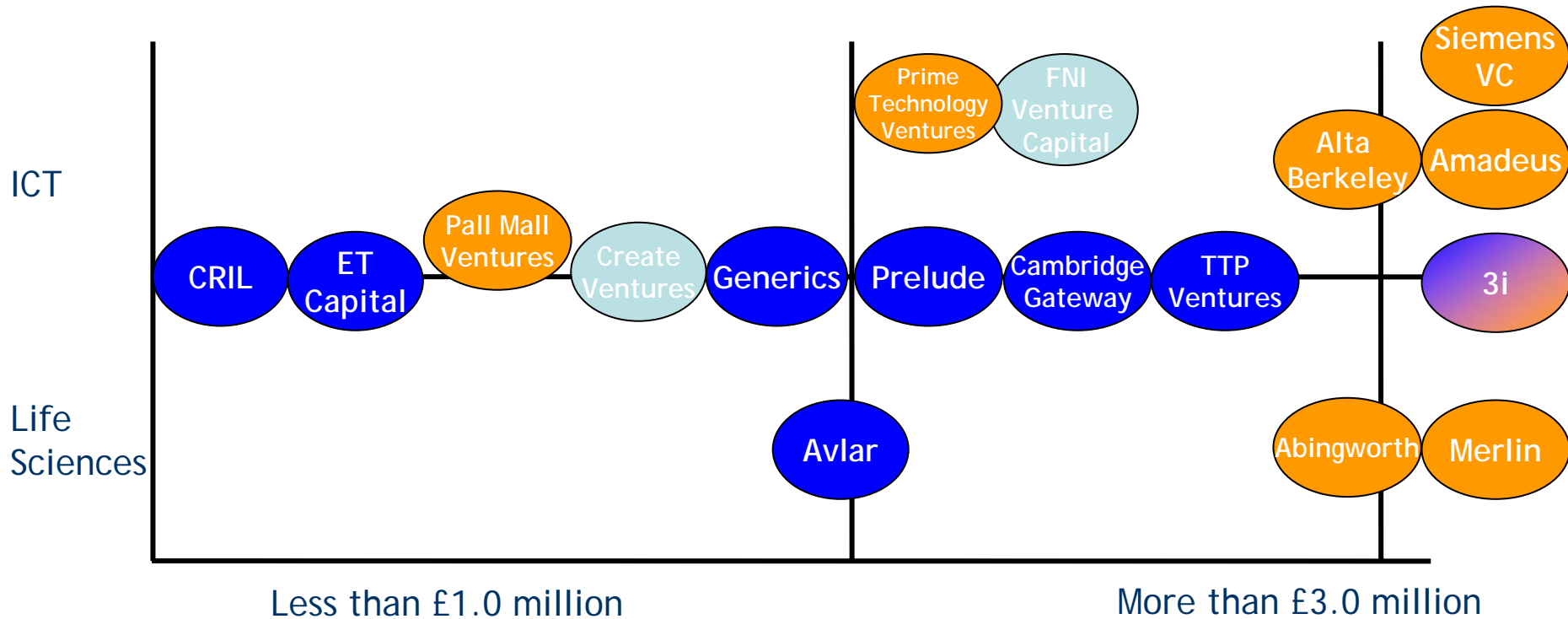
- Combined headcount of technology providers currently exceeds 1,200 in UK
- PA Technology employs 3,500 Worldwide
- Combined revenues estimated at £120 millions – UK
- PA technology – Revenues \$750millions
- Some players have seed funds
- 60 identified spin-outs - highly successful incubator models

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



- Total current revenues £500m+
- 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

Silicon Valley and the Eastern Region



source: Cambridge
2020 report - 1998

Microsoft
 WindRiver
 symbian
 integrated systems
 KADAK
 EPOC
 Sun
 Axe Inc
 JAVA
 ETNOTEAM
 eL
 GEOWORKS
 Acorn
 Tao Systems
 FIRMWARE SYSTEMS
 Eonic
 microware
 Mentor graphics
 ACCESS
 U S SOFTWARE
 CMX COMPACT

CoWare
 Tektronix
 cadence
 TEXAS INSTRUMENTS
 hp HEWLETT PACKARD
 OKOGAWA
 Mentor graphics
 Aliant Communications
 MetaWare
 EPI
 Green Hills SOFTWARE
 ADS
 SYNOPSYS
 COGENT
 cygnus
 LAUTERBACH



Acorn
 TEKNOA
 SYMBIONICS
 SSL
 Sirius communications
 N1
 ORIGIN
 neXus
 WIPRO
 Acapella
 PANTEC
 Virata
 OXONS SEMICONDUCTOR

ORACLE
 VOCAIS
 ENSIGMA
 JAVA
 POLYHEDRA
 MOTOROLA
 Lexicus Division
 AltoCom
 RONTIER
 DNT Limited

10 Emerging Technologies with Global Market Potential



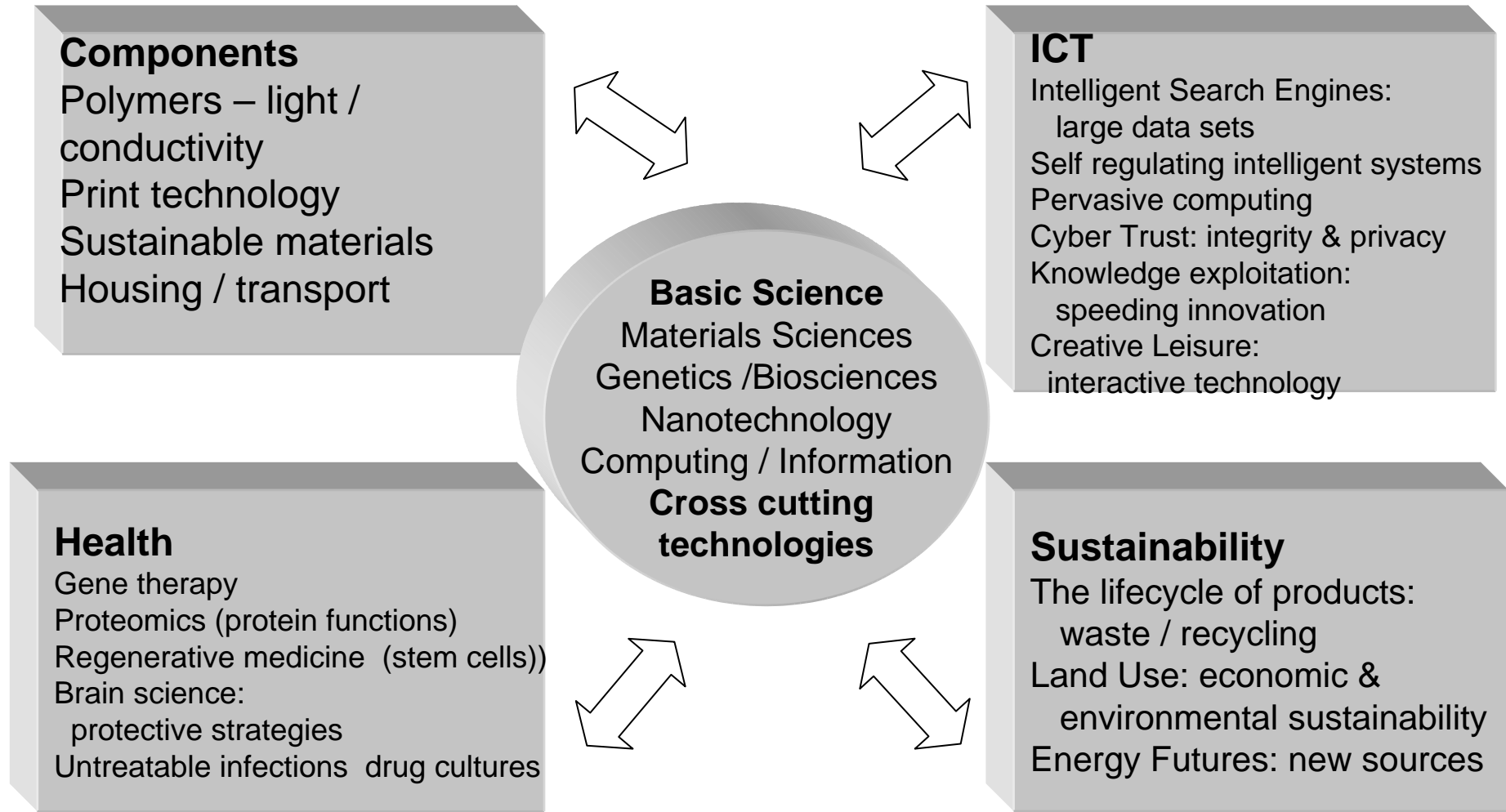
- New materials developed at a nano level including stronger, lighter plastics. Multiple applications – e.g. countertops, auto parts, toys
- Drug and gene delivery systems – numerous applications – targeting tumours and incorrect proteins
- Sensors and actuators – variety of applications e.g. electronics, cars, medical devices, pollution monitoring
- Electronic communications and informatics for data transmission
- Instrumentation, tooling and metrology for manipulation and assembly of the nanoscale
- Tissue engineering – artificial organs, medical implants, replacements for bones and teeth

10 Emerging Technologies with Global Market Potential



- New polymers – “plastronics” – light emitting polymers in screen and display technology, conductive polymers as potential silicon replacements
- Bioinformatics – computer based methods for a variety of applications to support bioscience developments, e.g. identification of drug candidates, genomics and proteomics
- “Bluetooth” – short-range wireless device-to-device communication – applications – entertainment, security, telecommunications, many more
- Sentient computing – computers and sensors responding and interfacing with the external environment

Basic Science+Technology Applications



A Partnership Pilot to Exploit our Competitive Advantage



As an early future action, it is recommended that one of the ten sectors should be taken forward as a pilot to see how through a partnership of research institutes, business support providers and private business the sector can be developed to exploit the science and technology base.

What can we learn from Competition?



- Much more study and work needed
- Future realities bound to involve international territorial competition. Competing sub-regions can also be collaborators on cluster development
- Seven overseas technology clusters studied through known and published data – examples:
 - Taiwan – planned, integrated infrastructure to support hi-tech activities along 60 mile corridor linking Taipei with Hsinchu Science Park
 - Sweden – Stockholm-Uppsala collaboration to support Kista Science Park development, connecting inner “hot spots” with growth into remote areas
 - USA – San Diego Connect – already being adopted successfully
 - Germany – Bavaria “Offensive Zukunft Bayern” – targeting enhanced economic performance through infrastructural development

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(E.g. Centre for Entrepreneurial Learning)
- 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

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.

The “Library House” Cluster Report 2004



- Cambridge – the “most invested” sub-region in Europe 2004 !
- 25% of ALL UK related early stage VC
- 13% of TOTAL European early stage VC
- Stability in number of technology companies in cluster
- Very strong in IT, Life Sciences, Software,
- Telcomms.
- Growing Strength in other sectors – eg Materials

- Creative Catalyst
- Maturing Sub-region
- Global Player

Creative Catalyst



- Focus on Greater Cambridge research capacity and capability
- Proliferation of University Research and Corporate spin-offs, R&D and technology driven
- Many may remain small
- Acting as knowledge channels for commercial applications of innovations for science and technology base
- Collaboration with larger companies in UK or overseas
- Few will move to production activities down-stream
- Numbers of companies may be acquired early in the life-cycle by multinationals

Maturing Sub-region



- Innovative companies seeking to capture more down-stream value added
- Proliferation of new business models such as ARM, CSR, Chirosciences – making transition from R&D local base to “niche global” – and highly innovative
- Attracting more large MNCs to sub-region to invest in R&D, product development, early stage prototyping and manufacturing
 - Microsoft UK Limited – Research Centre
 - Toshiba – Dept of Physics JV – leading to Teraview spin-out
- Evolving benefits of scale and internationalisation of cluster development

Maturing Sub-region



- “Thickening” of the skilled workforce. Emergence of increasing numbers of entrepreneurs with both scientific knowledge and business development skills
- Enhanced effectiveness of research institutes and universities to commercialise science and ongoing mutual benefits of improving interface between industry and academia
- Strengthening and stability of local and regional innovation networks

Global Player



- Greater integration into the global economy
- More active participation in cross-border innovation systems
- Reconfiguring of supply networks – greater collaboration with strategic partners overseas
- Providers of inputs, inc design and development tools for overseas MNC system integrators – participating in mass markets – e.g. telecommunications, aerospace
- Greater Cambridge as a global location for R&D of MNCs
- Greater scale and diversity than other two scenarios
 - More downstream activity including manufacturing
 - Greater presence of overseas MNCs in R&D and prototype production

Greater Cambridge – Poised for further growth

- ✓ Potential for continued positive impact on Regional and National Economies
- ✓ Need for coherent forward Strategy and Plans – involving ALL ! – PARTNERSHIP !
- ✓ Need for upgraded business environment
- ✓ Transport and Communications Infrastructure deficits need correcting
- ✓ Social amenities provision to match planned growth (e.g.housing and schools)
- ✓ Continued investment in worldclass science base and research infrastructure essential
- ✓ Need to sustain high quality of life
- ✓ Maintain attractiveness for investment – physical, financial and human capital

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For more information.....

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