High Technology Clusters in UK: Science Parks & Incubators for Innovation & Entrepreneurship

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MAR and Jacobs

- Boschma, Frenken, Van Oort et al Utrecht
- MAR ascribed view that sectoral or cluster specialisation furthers innovativeness
- Jacobs ascribed view that diversification of sectors is key to innovativeness
- Research by Cantwell/Iammarino (2003); Utrecht Team; C. Ketels - suggests growth dynamics (including innovation) are more associated with ‘related variety’

Related Variety

- An evolutionary concept
- Variety enhances health of species (cf. Dutch elm disease; or contemporary devastation of *Ponderosa* pine forest in BC, Canada)
- Too much diversity makes ‘lateral absorptive capacity’ difficult = ‘cognitive dissonance’
- Neighbouring and proximate knowledge interaction ‘adds value’ to localised knowledge spillovers
- Clusters have some, but limited, related variety

Incubators for Specialisation

- E.g. Bioincubation
- Specialist infrastructure
- Specific service requirements
- Distinctive ‘screening’ expertise
- Long-term financing model
- Opportunities for IPR & licensing revenue
- Geographical & Relational Proximity

Science Parks as ‘Related Variety’ Proximity Platforms

- Harmonious interaction between entrepreneurship and the innovation system
- Entrepreneurs proximate to innovation system hub
- System hub has interactive policy instruments

The Cambridge & Oxford Science Parks

- Originally, somewhat ‘Jacobian’
- Or, at least, diversified – by 1980s Cambridge Science Park (1969) had very mixed tenants
- Pharmaceutical, electronics, biotechnology, materials, software, consultancies, etc.
- Little networking – so Cambridge Network Ltd. (ICT) set up in 1986 – Californian model
- Later, incubators, e.g. St. John’s & Babraham (C), BioTechNet (O) brought MAR interactions
- By 2000s quite good ‘related variety’ ICT-Bio-Nano interactions and spillovers

The First Cambridge Clusters in ICT : a MAR-type cluster – Wolfson & St. John's Incubator

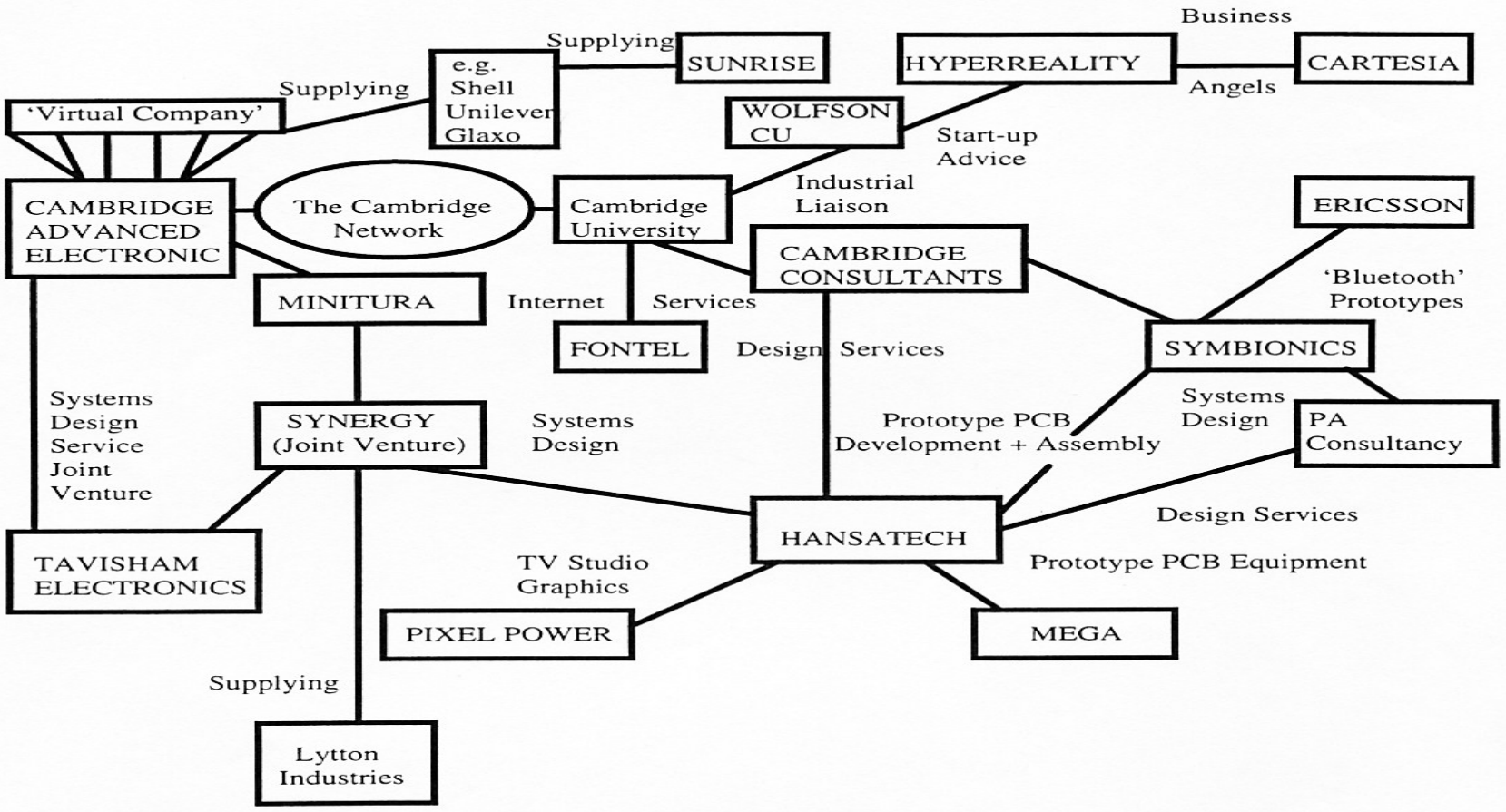
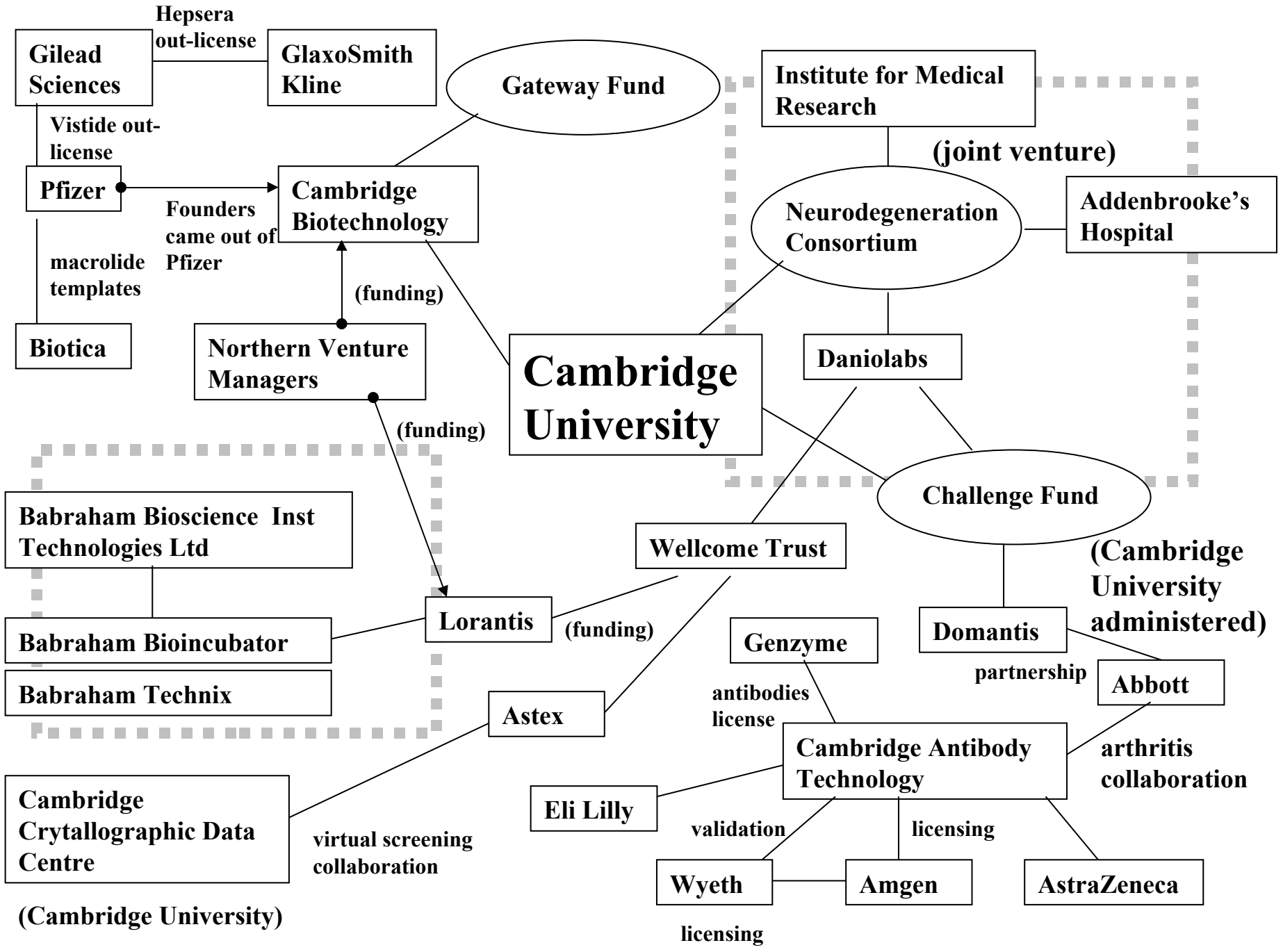
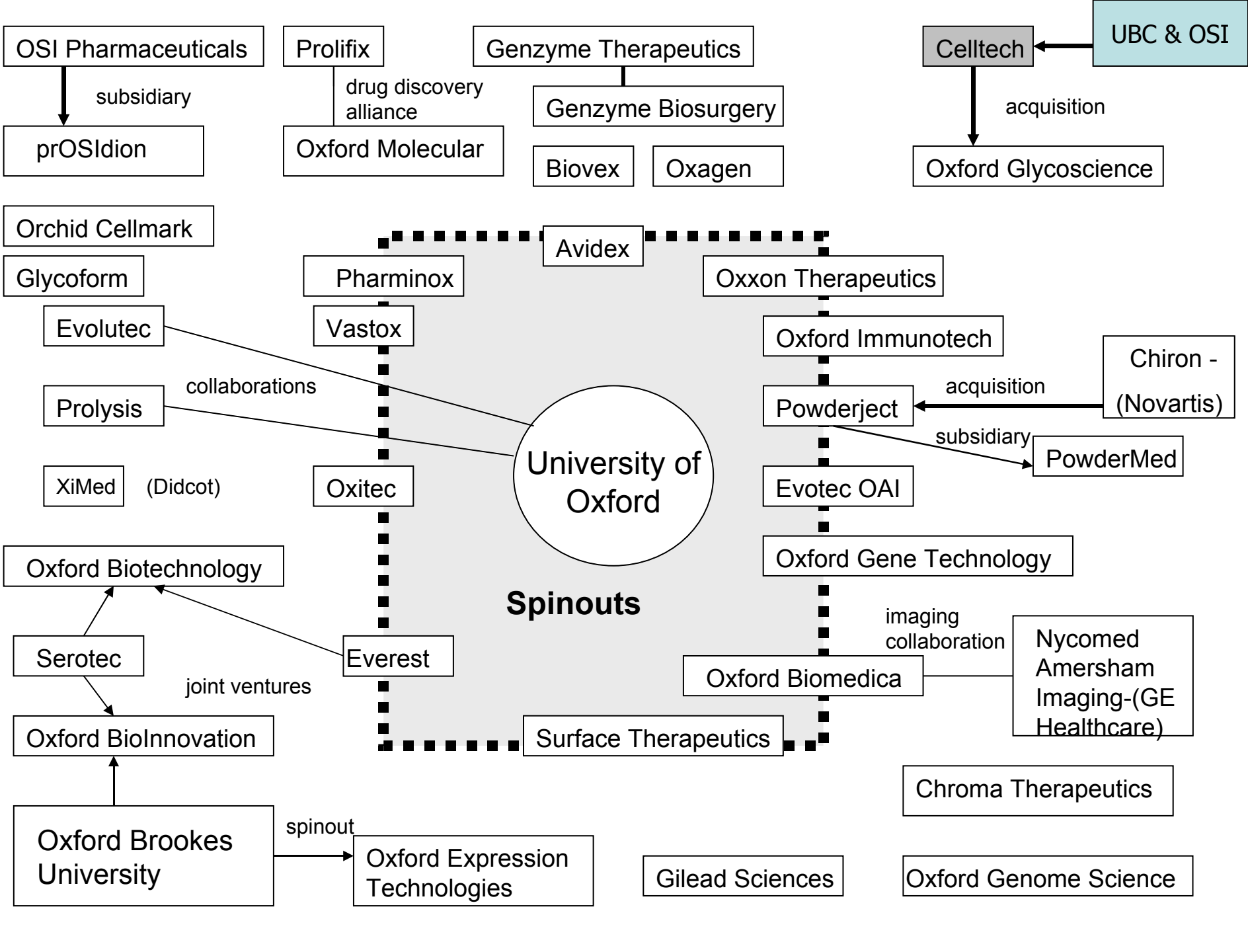
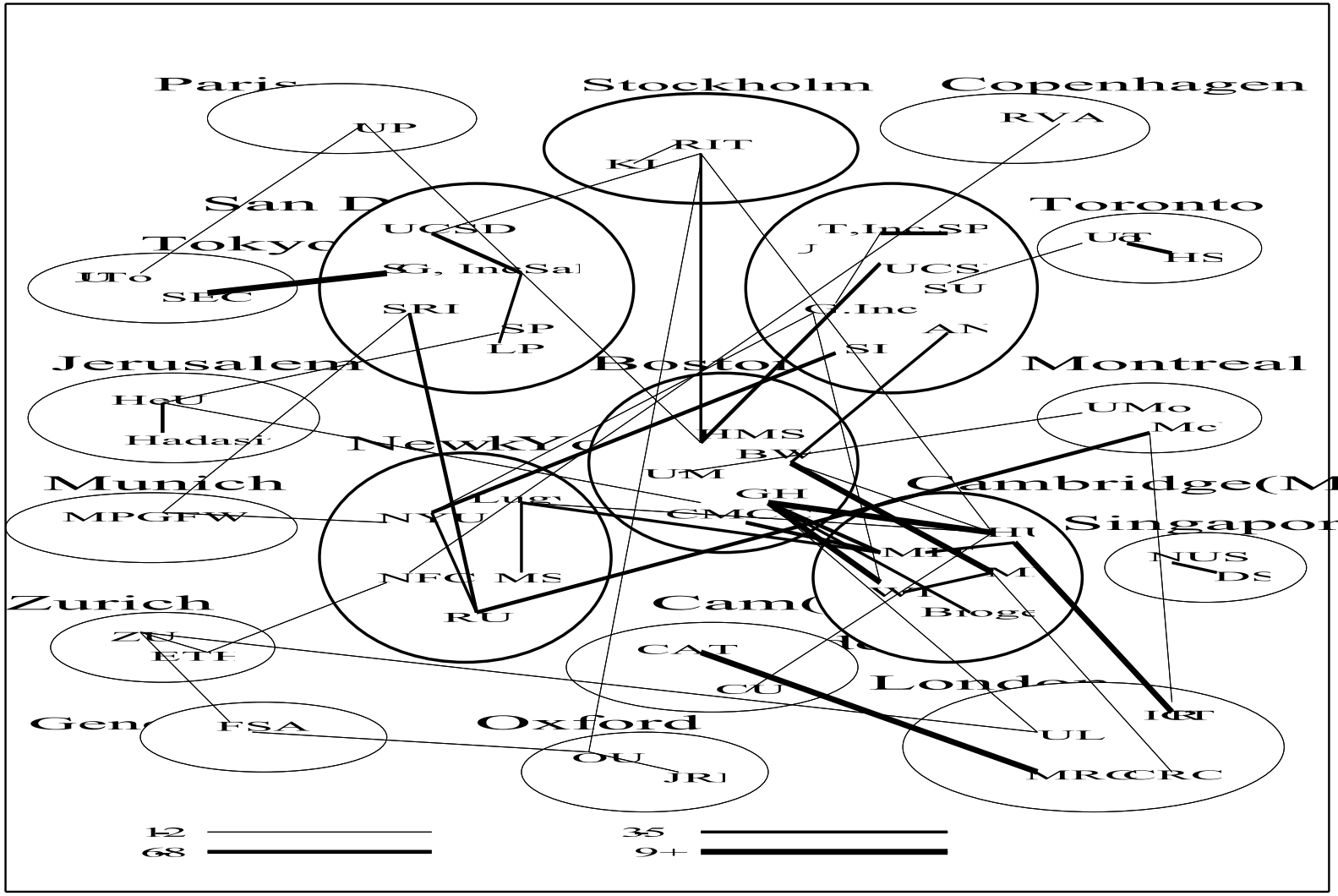


Fig. 1 Aspects of the Cambridge IT Cluster


Hepsera out-license
Gilead Sciences
GlaxoSmith Kline
Gateway Fund
Institute for Medical Research
(joint venture)
Vistide out-license
Pfizer
Cambridge Biotechnology
Founders came out of Pfizer
Neurodegeneration Consortium
Addenbrooke's Hospital
macrolide templates
(funding)
Biotica
Northern Venture Managers
Cambridge University
Daniolabs
(funding)
Challenge Fund
Babraham Bioscience Inst Technologies Ltd
Wellcome Trust
(Cambridge University administered)
Lorantis
(funding)
Babraham Bioincubator
Genzyme
Domantis
partnership
Abbott
Babraham Technix
Astex
antibodies license
Cambridge Antibody Technology
arthritis collaboration
Eli Lilly
Cambridge Crytallographic Data Centre
validation
licensing
virtual screening collaboration
Wyeth
Amgen
AstraZeneca
(Cambridge University)
licensing


OSI Pharmaceuticals
subsidiary
prOSIdion
Prolifix
drug discovery alliance
Oxford Molecular
Genzyme Therapeutics
Genzyme Biosurgery
Biovex
Oxagen
Celltech
UBC & OSI
acquisition
Oxford Glycoscience
Orchid Cellmark
Glycoform
Evolutec
Prolysis
collaborations
XiMed
(Didcot)
Avidex
Pharminox
Vastox
Oxitec
University of Oxford
Spinouts
Oxxon Therapeutics
Oxford Immunotech
Powderject
acquisition
Chiron - (Novartis)
subsidiary
PowderMed
Evotec OAI
Oxford Gene Technology
Oxford Biotechnology
Serotec
Everest
joint ventures
Oxford BioInnovation
Oxford Biomedica
imaging collaboration
Nycomed Amersham Imaging-(GE Healthcare)
Surface Therapeutics
Chroma Therapeutics
Oxford Brookes University
spinout
Oxford Expression Technologies
Gilead Sciences
Oxford Genome Science

Global Biotechnology Co-Patenting: 1998-2004



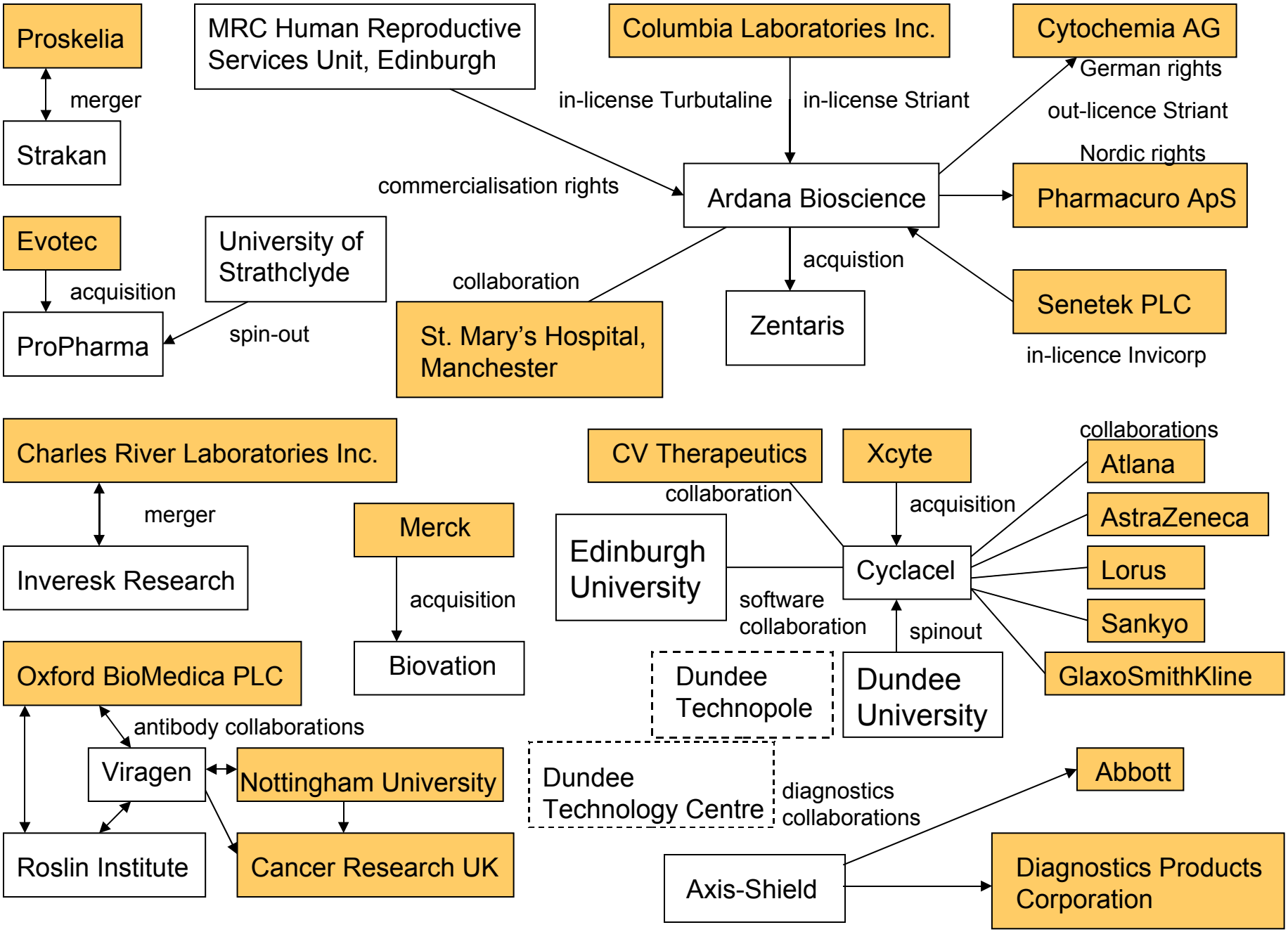
Scotland's 'Knowledge Economy' Approach

- Global Knowledge Flows
- Cosmopolitanism
- Retaining 'Talent'
- FDI conversion to R&D
- Intermediary Technology Institutes
- Clusters/'Proof of Concept Fund'
- Scotland's Science Strategy
- Edinburgh Science Triangle -

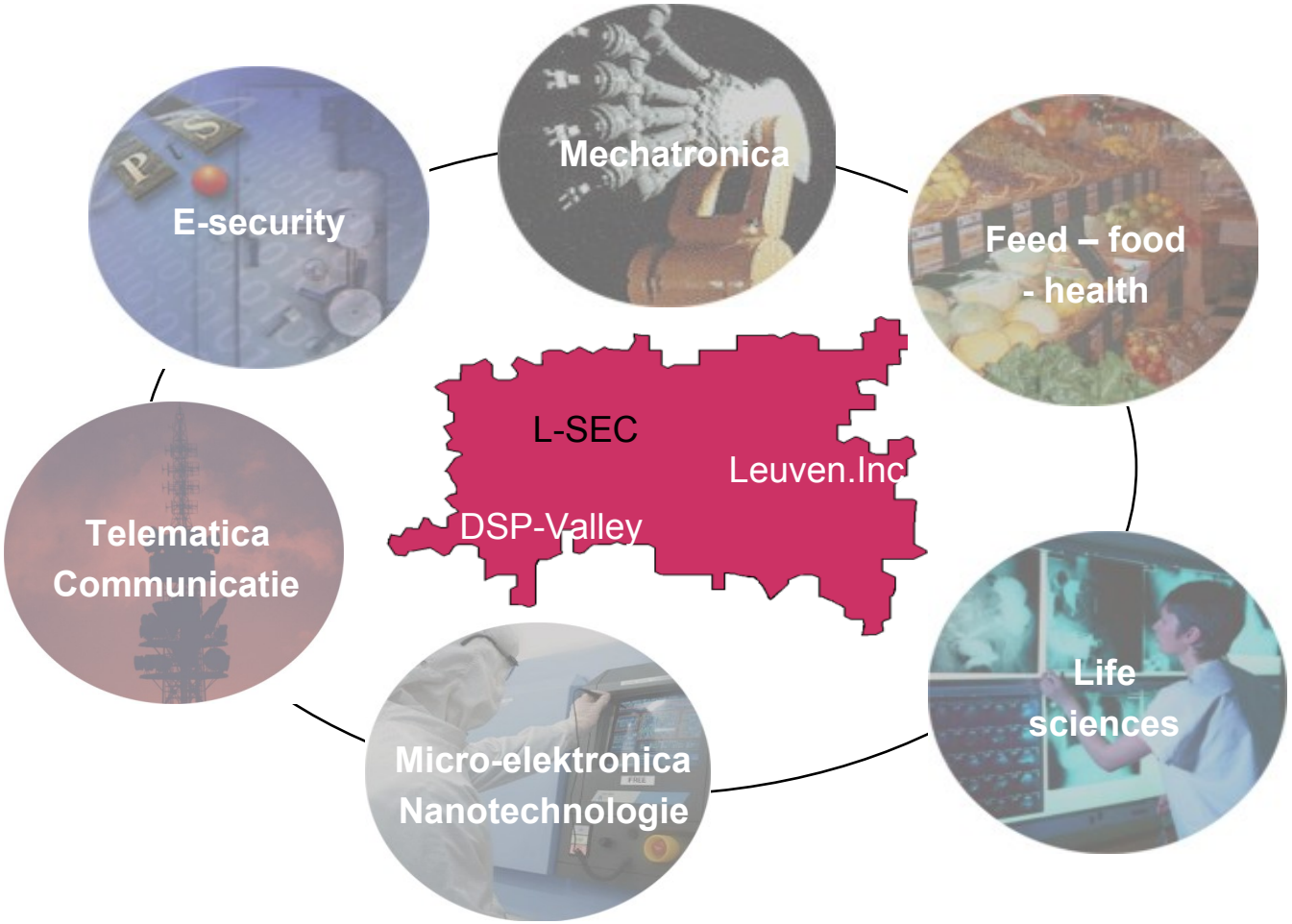
Edinburgh Science Triangle: Towards 'Related Variety' Platform-Building?

- Alba Campus – advanced IT software design
- Edinburgh Technopole – 62 hec. S&T Park
- BioCampus – 12 hec. Biomanufacturing GMP centre
- Heriot Watt Research Park – est.1971
- Centre for BioMedical Research – medical bioincubator
- Pentlands Science Park – veterinary & environmental
- Roslin BioCentre – transgenics R&D commercialisation institute

Scotland's Life Sciences Infrastructure


Proskelia
merger
Strakan
MRC Human Reproductive Services Unit, Edinburgh
Columbia Laboratories Inc.
Cytochemia AG
German rights
in-license Turbutaline
in-license Striant
out-licence Striant
Nordic rights
commercialisation rights
Ardana Bioscience
Pharmacuro ApS
Evotec
acquisition
ProPharma
University of Strathclyde
spin-out
collaboration
St. Mary's Hospital, Manchester
acquistion
Zentaris
Senetek PLC
in-licence Invicorp
Charles River Laboratories Inc.
merger
Inveresk Research
Merck
acquisition
Biovation
CV Therapeutics
collaboration
Xcyte
acquisition
collaborations
Atlana
AstraZeneca
Lorus
Sankyo
GlaxoSmithKline
Edinburgh University
software collaboration
Cyclacel
spinout
Dundee Technopole
Dundee University
Oxford BioMedica PLC
antibody collaborations
Viragen
Nottingham University
Roslin Institute
Cancer Research UK
Dundee Technology Centre
diagnostics collaborations
Abbott
Axis-Shield
Diagnostics Products Corporation

Jacobian Cluster Platform Policy



Lateral System Support

- Knowledge centres
- Entrepreneurs
- Seed Money
- Capital markets
- Infrastructure
- Role Models
- Cluster Policy
- Presence of international companies
- Networks
- Government
- Quality of Life

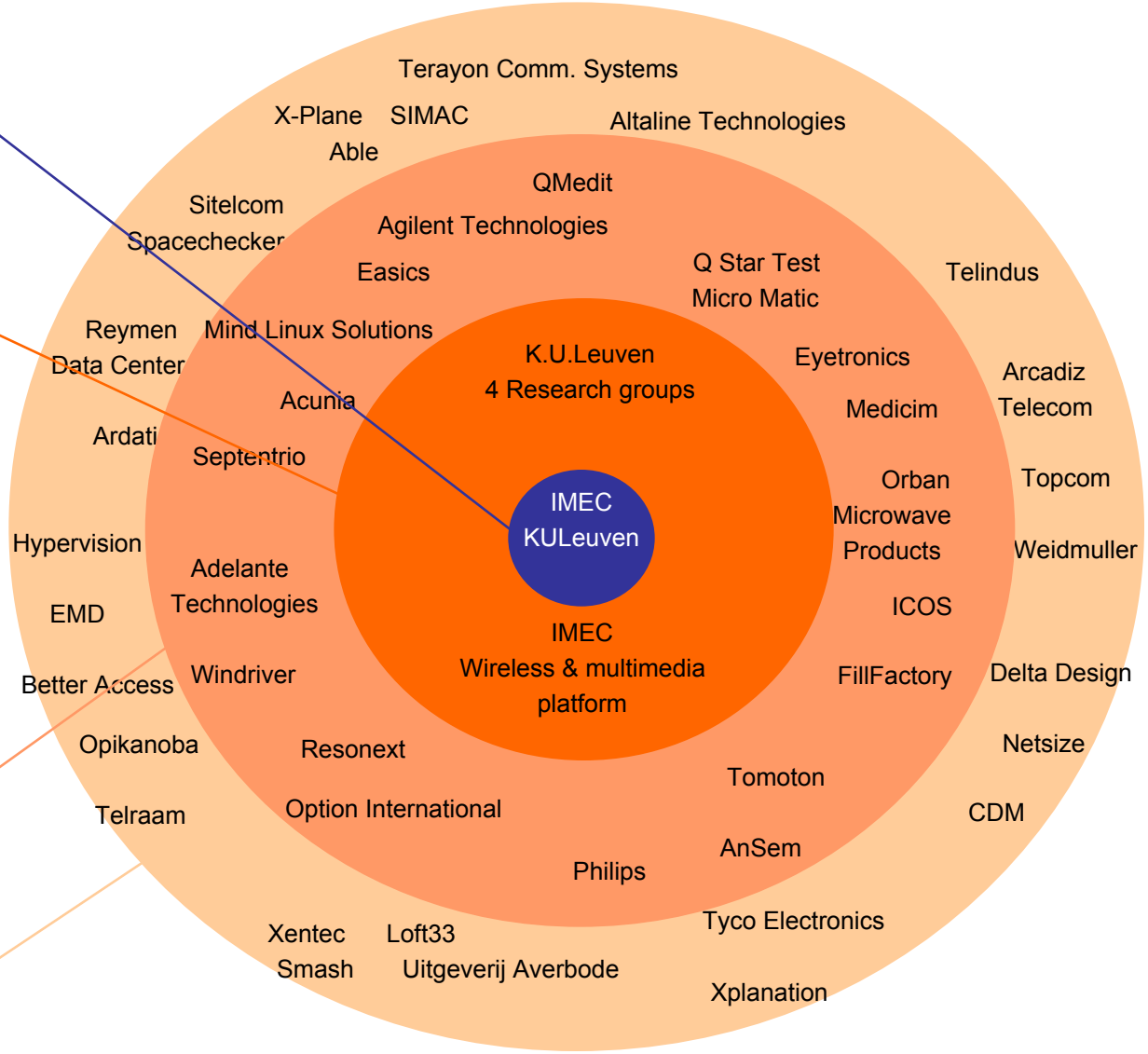
Telecommunications

Kenniscentra

Centres of excellence

Pure innovatieve driven

Mixed innovative driven



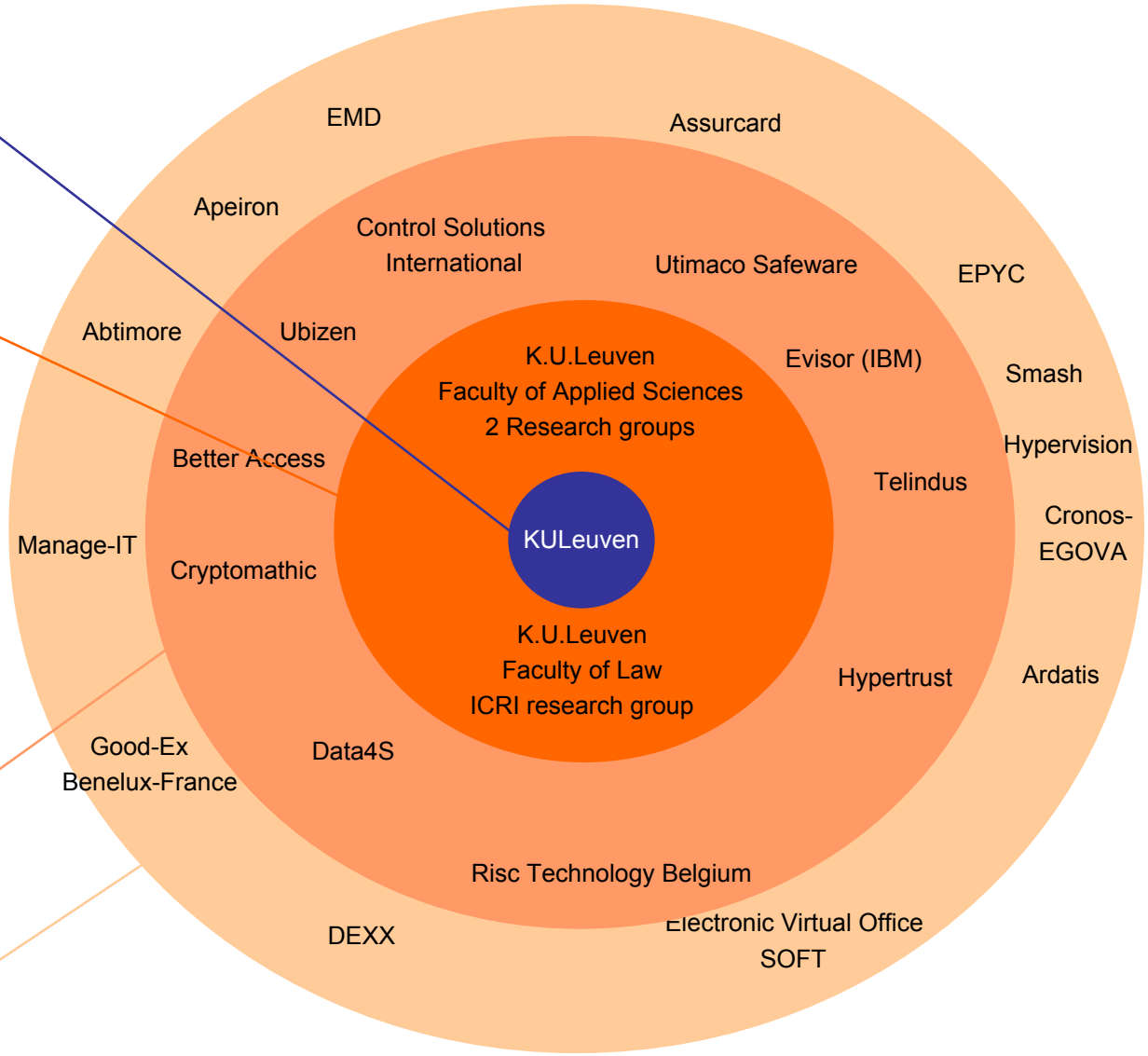
E-security

Kenniscentra

Centres of excellence

Pure innovation driven

Mixed innovation driven



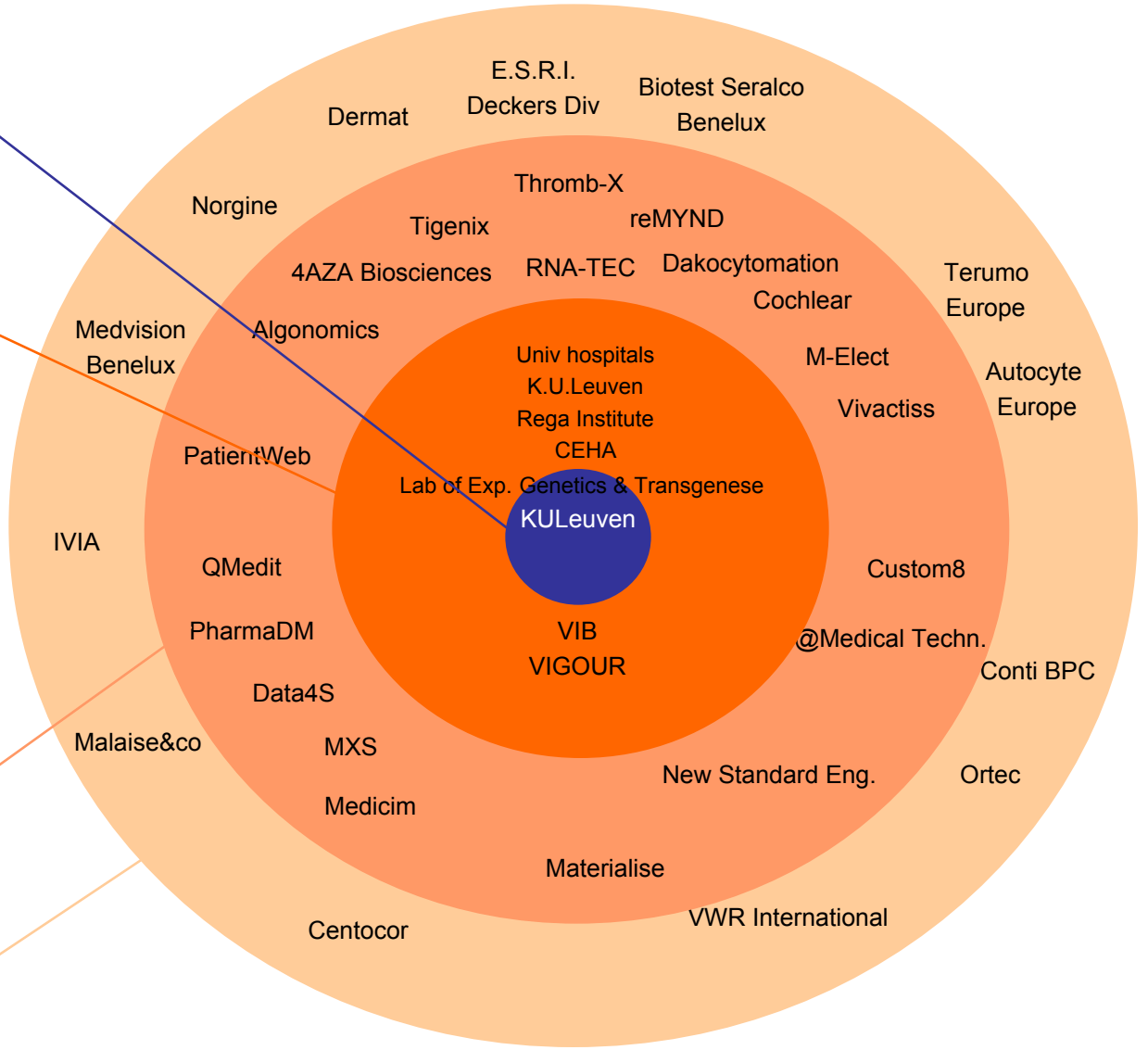
Life sciences

Kenniscentra

Centers of excellence

Pure innovatieve bedrijven

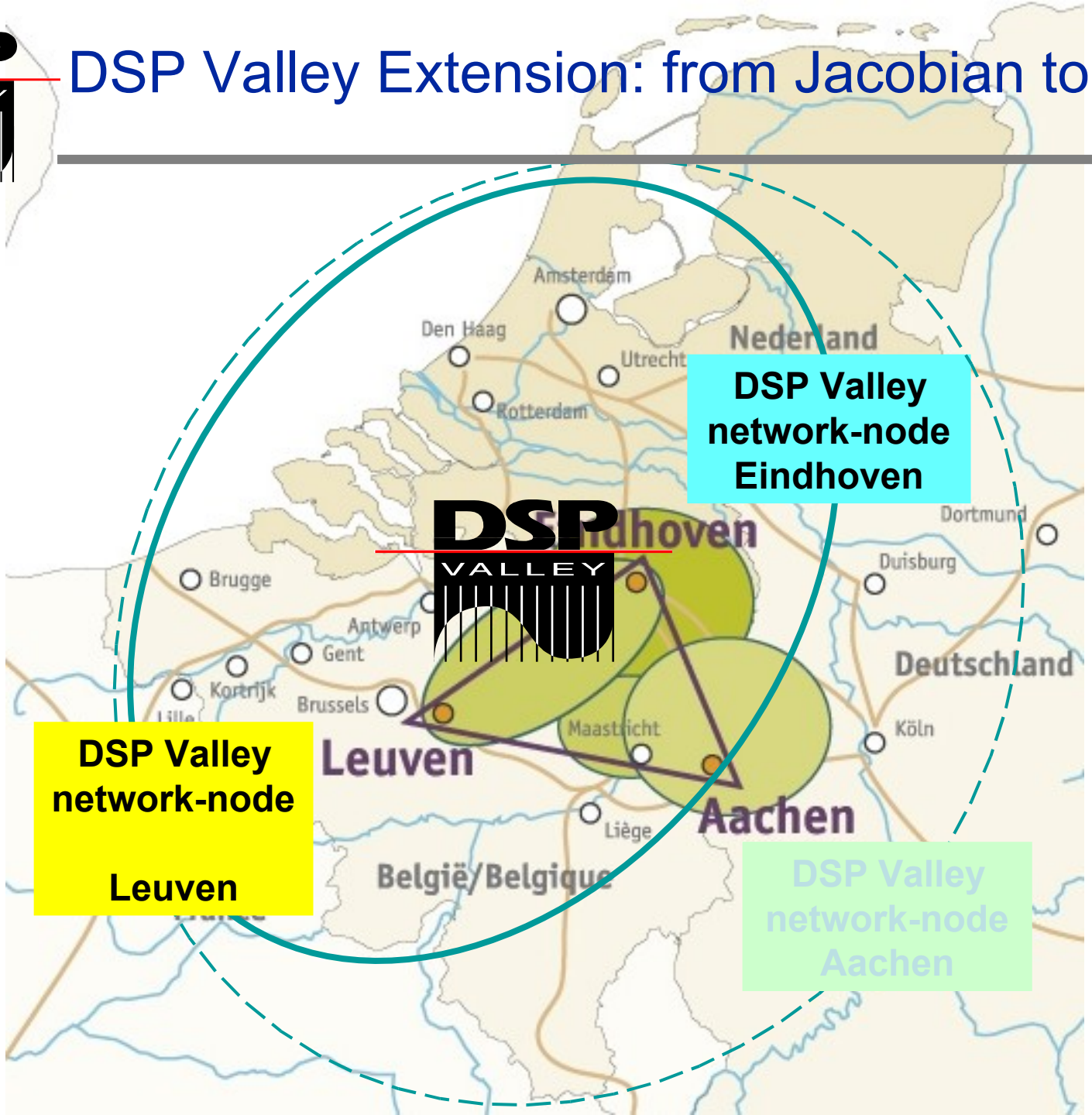
Mixed innovatieve bedrijven



Performance Indicators

	2004	**2010** (est.)
N° of companies	>300	400
Turnover	4.5 bn. €	8 bn. €* * Growth 10 %
Jobs	15,500	20,000

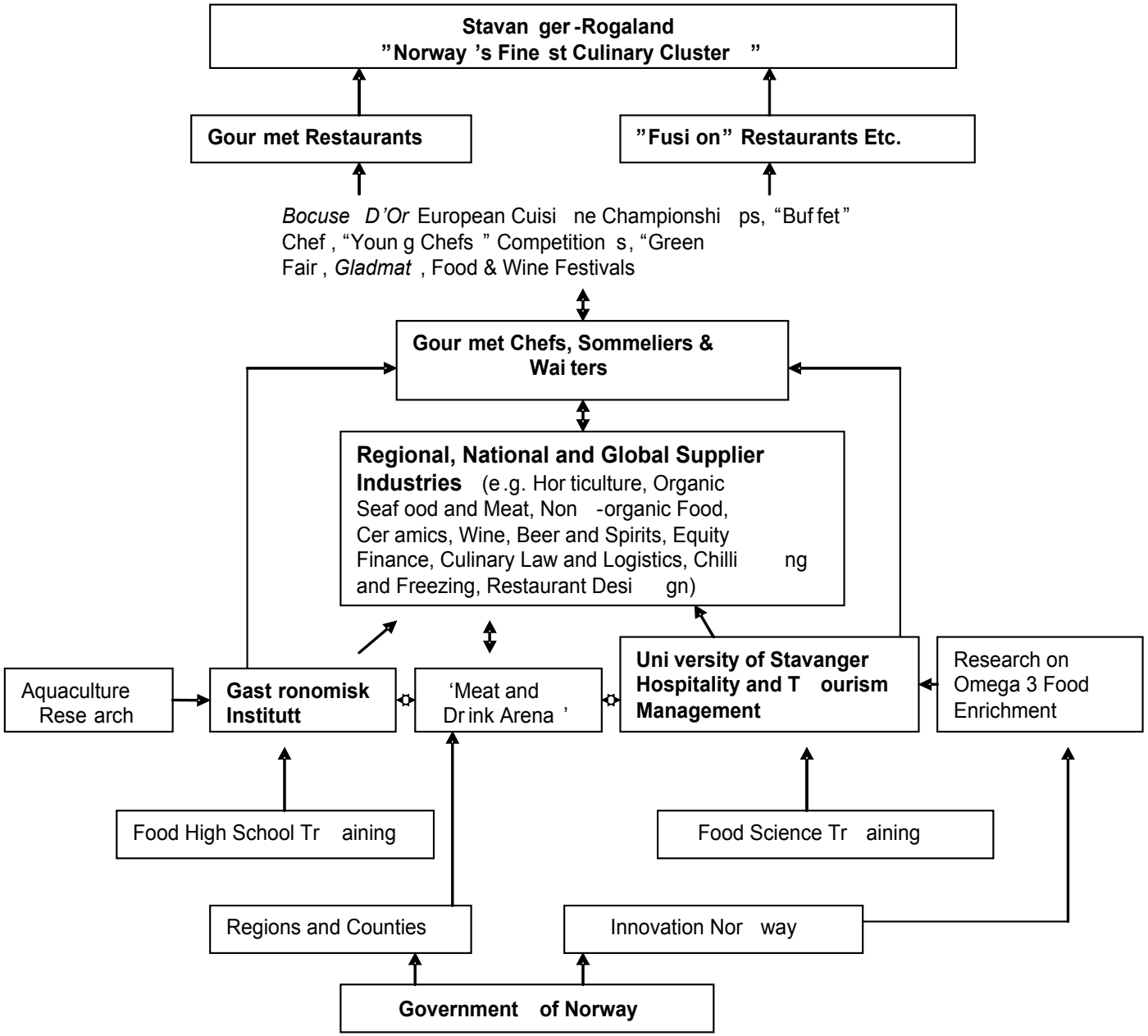
DSP Valley Extension: from Jacobian to MAR



Digital Signal Processing

- Is central to products like high-density hard-disk drives
- Desktop video-conferencing
- Audio/video compression by rapidly processing large amounts of digital information
- Used in conjunction with mixed-signal devices and embedded software, it is referred to as a DSP Solution
- It collects, processes, compresses, transmits and displays analogue and digital data

Norway: Rogaland-Stavanger 'Related Variety' Culinary Platform



Conclusions

- UK high-tech clusters begin specialised (MAR) but evolve towards limited Jacobian character
- Incubation more ‘hands-on’ and can be best when specialised
- Science Parks, once seemed too diversified, but potentially new ‘platform’ functions emerge
- KU Leuven ‘learns’ from Cambridge – moves swiftly from rather weak MAR origins (IMEC) to powerful Jacobian ‘related variety’
- Platform assists local, inter-sectoral ‘horizontal’ ‘related variety’ innovation, relational proximity to firms in other nodes helps ‘pipeline’ innovation
- Entrepreneurship benefits from horizontal ‘absorptive capacity’ proximities and vertical absorptive capacity customer networks