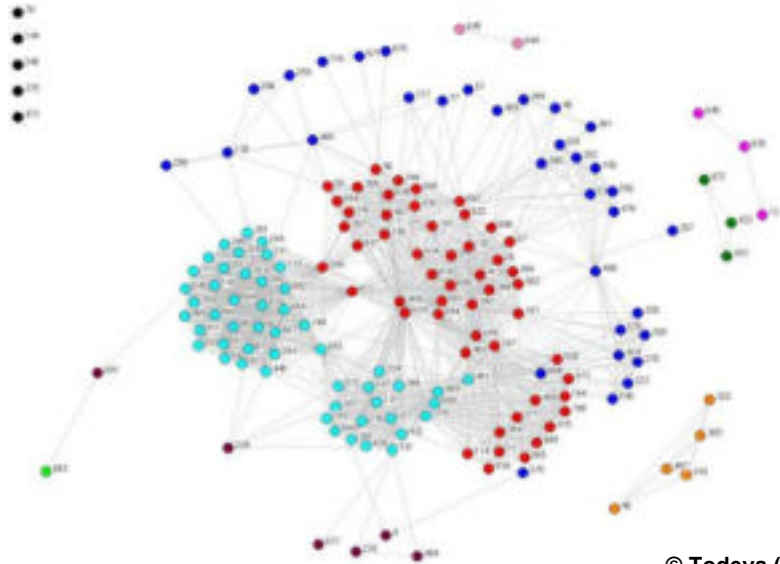# The Scope and Depth of the Health Technology Cluster In the South East of England

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SEHTA International Cluster Developer

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A New Approach to Cluster Analysis of Regional Agglomerations of firms

- Multi-stage methodology for cluster mapping based on formal statistical methods and techniques for cluster and network analysis and multi-level analytical procedures (Todeva, 2006)

- Analysis of cluster membership, cluster boundaries, content of activities, dominant value chain, cluster performance, cluster leadership and cluster dynamics.

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Definition of Clusters

Clusters are agglomerations of firms & institutions, co-located in a geographic area, connected by *value-adding activities,* and with access to benefits from *input/output markets, from infrastructure, and from environmental coordination* via policies (E. Todeva, 2006).

=> horizontal and vertical <u>diversification</u> of firms as evidence of emerging value chains within the cluster

Methodology (Todeva, 2006)

Data source
- Amadeus European Database – full record for each firm with portfolio of activities and performance indicators (records for UK firms are built from Jordans Ltd / in collaboration with Datamonitor and Companies House)

Developing selection criteria
- bio-technology, diagnostics, surgical / medical instruments and devices, pharmaceuticals, medical research (<u>236</u> key words and phrases and selected codes from UK SIC, US SIC, NACE, NAICS

Building the database of firms with their portfolio of commercial activities <u>(5282 firms)</u>

Cluster mapping - Identifying leading cluster activities and framing of sub-cluster groups with clear membership and core specialisation

Decisions on the cluster boundaries

Analysis of cluster demographics

Analysis of the cluster value chains (using network analysis technique)

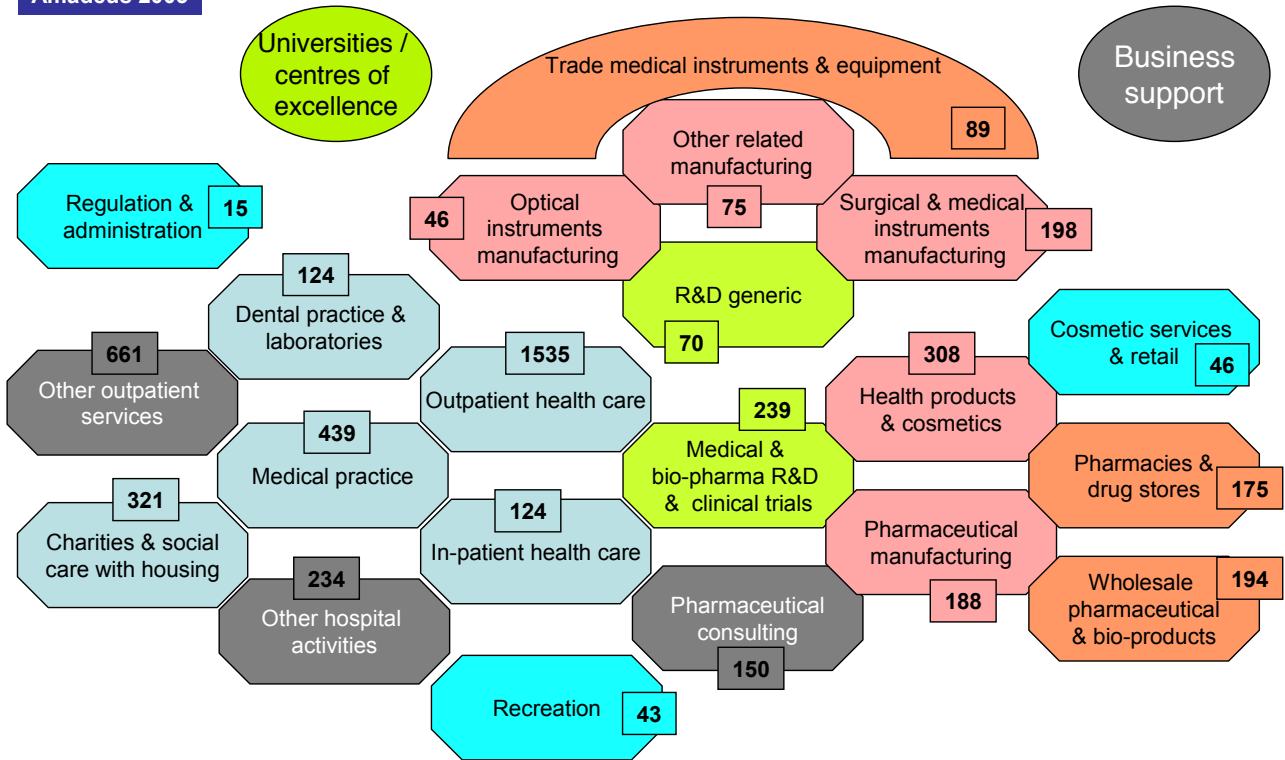Performance analysis of individual sub-clusters

Analysis of sub-regional specialisation

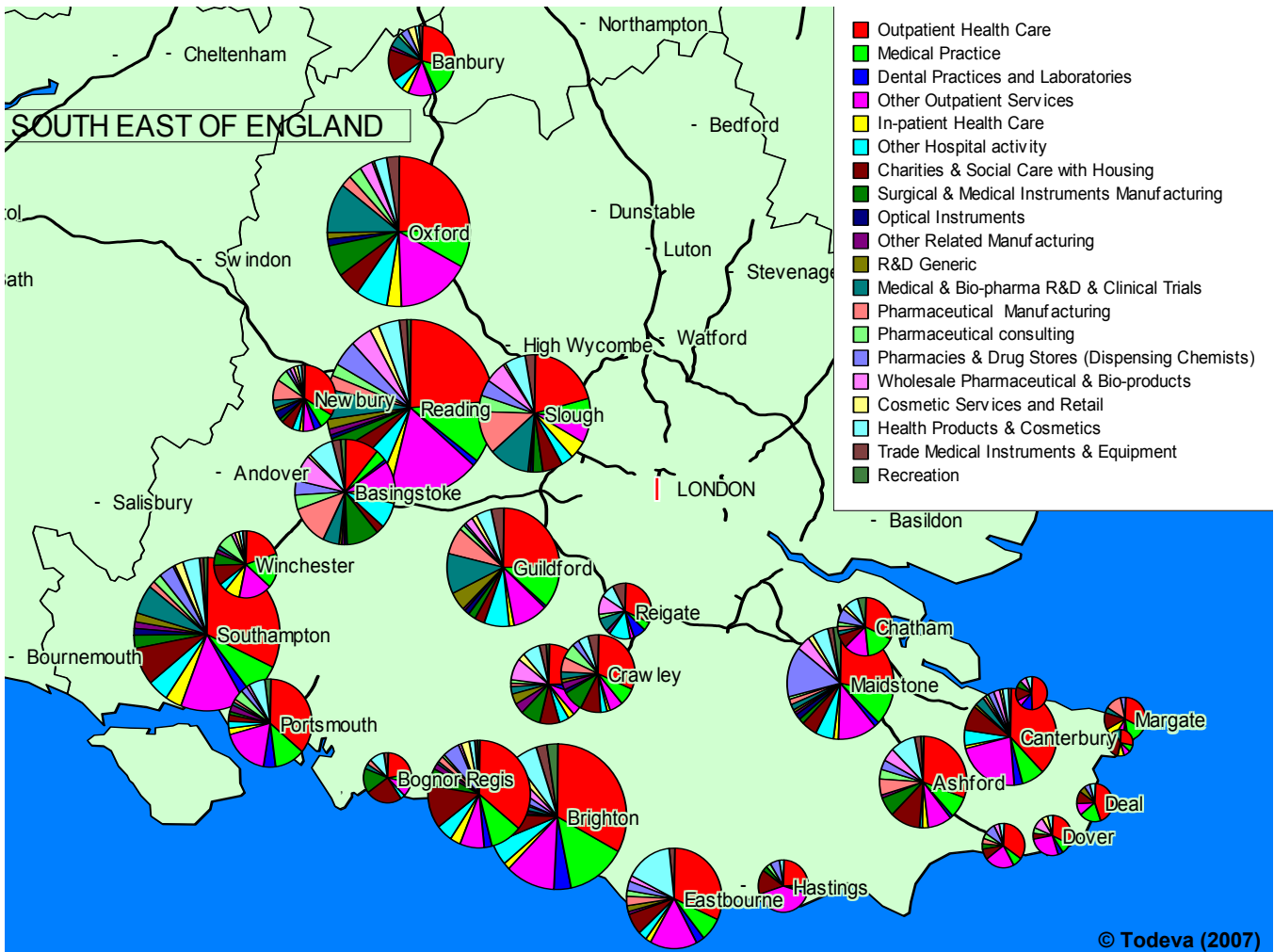Analysis of strategic industry groups

Clusters or Strategic Industry Groups in the Health Technology Sector

Amadeus 2005

Universities / centres of excellence

Business support

Trade medical instruments & equipment | 89

Other related manufacturing | 75

Optical instruments manufacturing | 46

Surgical & medical instruments manufacturing | 198

Regulation & administration | 15

R&D generic | 70

Dental practice & laboratories | 124

Outpatient health care | 1535

Cosmetic services & retail | 46

Other outpatient services | 661

Health products & cosmetics | 308

Medical practice | 439

Medical & bio-pharma R&D & clinical trials | 239

Pharmacies & drug stores | 175

Charities & social care with housing | 321

In-patient health care | 124

Pharmaceutical manufacturing | 188

Wholesale pharmaceutical & bio-products | 194

Other hospital activities | 234

Pharmaceutical consulting | 150

Recreation | 43

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SOUTH EAST OF ENGLAND

Legend:
- Outpatient Health Care
- Medical Practice
- Dental Practices and Laboratories
- Other Outpatient Services
- In-patient Health Care
- Other Hospital activity
- Charities & Social Care with Housing
- Surgical & Medical Instruments Manufacturing
- Optical Instruments
- Other Related Manufacturing
- R&D Generic
- Medical & Bio-pharma R&D & Clinical Trials
- Pharmaceutical Manufacturing
- Pharmaceutical consulting
- Pharmacies & Drug Stores (Dispensing Chemists)
- Wholesale Pharmaceutical & Bio-products
- Cosmetic Services and Retail
- Health Products & Cosmetics
- Trade Medical Instruments & Equipment
- Recreation

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Cluster Demographics

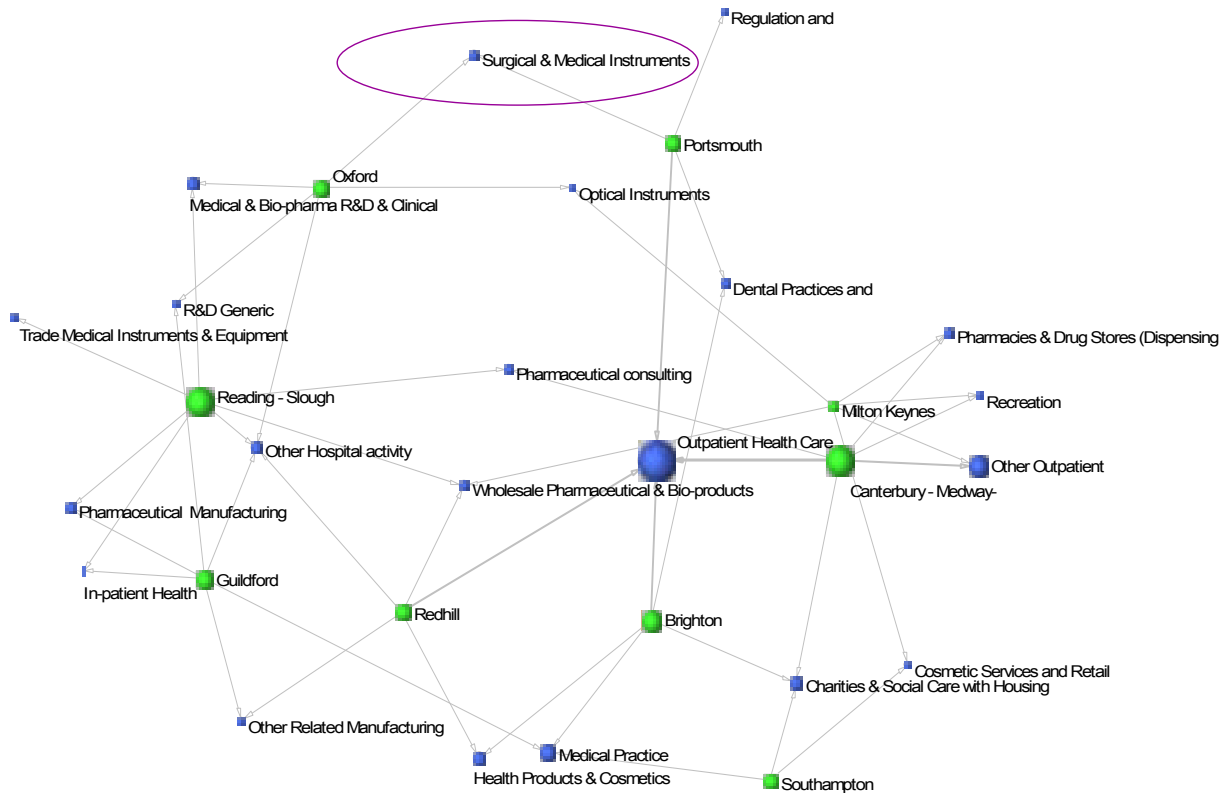| CLUSTER	Number of firms in cluster	% from total population	Total revenue per cluster	% of total population revenue	Number of replied revenue data	% of replied revenue data	Mean revenue (average per replied firm)	Total employment per cluster	% of total population employment	Number of replied employment data	% of replied employment data	Mean employment (average per replied firm)
Outpatient Health Care	1535	29,1%	1350330	2,3%	409	26,6%	3302	19109	5,9%	174	11,3%	110
Medical Practice	439	8,3%	79690	0,1%	120	27,3%	664	1336	0,4%	24	5,5%	56
Dental Practices and Laboratories	124	2,3%	25457	0,0%	34	27,4%	749	448	0,1%	5	4,0%	90
Other Outpatient Services	661	12,5%	95918	0,2%	95	14,4%	1010	21142	6,5%	261	39,5%	81
In-patient Health Care	124	2,3%	325966	0,6%	31	25,0%	10515	16747	5,1%	22	17,7%	761
Other Hospital activity	234	4,4%	201815	0,3%	99	42,3%	2039	692	0,2%	30	12,8%	23
Charities & Social Care with Housing	321	6,1%	54847	0,1%	69	21,5%	795	9415	2,9%	118	36,8%	80
Surgical & Medical Instruments Manufacturing	198	3,7%	2135175	3,7%	94	47,5%	22715	16985	5,2%	62	31,3%	274
Optical Instruments	46	0,9%	86444	0,1%	15	32,6%	5763	751	0,2%	10	21,7%	75
Other Related Manufacturing	75	1,4%	229028	0,4%	29	38,7%	7898	1768	0,5%	17	22,7%	104
R&D Generic	70	1,3%	821900	1,4%	28	40,0%	29354	7241	2,2%	21	30,0%	345
Medical & Bio-pharma R&D & Clinical Trials	239	4,5%	3484234	6,0%	99	41,4%	35194	17908	5,5%	66	27,6%	271
Pharmaceutical Manufacturing	196	3,7%	32128969	55,4%	101	51,5%	318109	133710	41,0%	81	41,3%	1651
Pharmaceutical consulting	150	2,8%	3419767	5,9%	58	38,7%	58962	26793	8,2%	28	18,7%	957
Pharmacies & Drug Stores (Dispensing Chemists)	175	3,3%	221606	0,4%	44	25,1%	5037	1524	0,5%	12	6,9%	127
Wholesale Pharmaceutical & Bio-products	194	3,7%	6859649	11,8%	71	36,6%	96615	11618	3,6%	56	28,9%	207
Cosmetic Services and Retail	46	0,9%	7668	0,0%	19	41,3%	404	255	0,1%	4	8,7%	64
Health Products & Cosmetics	308	5,8%	5873843	10,1%	91	29,5%	64548	32237	9,9%	35	11,4%	921
Trade Medical Instruments & Equipment	89	1,7%	416433	0,7%	43	48,3%	9684	2426	0,7%	22	24,7%	110
Regulation and Administration	15	0,3%	214	0,0%	1	6,7%	214	0	0,0%		0,0%	
Recreation	43	0,8%	177920	0,3%	20	46,5%	8896	4227	1,3%	8	18,6%	528
Total	5282	100%	57996873	100%	1570	29,7%	36941	326332	100%	1056	20,0%	309

* Revenue - In thousands GBP

Regional Distribution of Cluster Activities

CLUSTER	Brighton	Canterbury - Medway-Tonbridge	Guildford	Milton Keynes	Oxford	Portsmouth	Reading - Slough	Redhill	Southampton	Total
Outpatient Health Care	31,9%	31,8%	27,4%	20,9%	25,8%	34,7%	23,7%	32,9%	30,5%	29,1%
Medical Practice	10,9%	7,8%	11,2%	4,6%	6,8%	8,4%	7,3%	5,7%	10,3%	8,3%
Dental Practices and Laboratories	3,0%	1,9%	1,6%	,5%	1,6%	4,7%	2,6%	3,0%	1,6%	2,3%
Other Outpatient Services	13,3%	15,1%	12,6%	18,9%	12,7%	13,3%	8,4%	9,4%	13,5%	12,5%
In-patient Health Care	1,9%	2,0%	3,2%	3,1%	1,6%	3,1%	3,1%	,9%	2,4%	2,3%
Other Hospital activity	3,7%	2,0%	6,1%	5,6%	6,4%	2,2%	5,7%	6,6%	3,7%	4,4%
Charities & Social Care with Housing	7,5%	8,1%	3,1%	4,6%	3,9%	5,8%	5,7%	5,3%	8,5%	6,1%
Surgical & Medical Instruments Manufacturing	3,0%	2,3%	2,9%	2,6%	7,6%	5,3%	3,9%	4,6%	2,7%	3,7%
Optical Instruments	,7%	,8%	1,1%	2,0%	1,4%	,7%	,8%	,2%	,8%	,9%
Other Related Manufacturing	1,3%	1,2%	2,0%	1,5%	1,4%	,4%	1,4%	2,1%	1,9%	1,4%
R&D Generic	,3%	1,3%	2,3%	,5%	2,0%	,4%	1,4%	1,6%	1,9%	1,3%
Medical & Bio-pharma R&D & Clinical Trials	1,3%	2,0%	5,2%	3,6%	12,5%	2,2%	6,5%	3,4%	4,8%	4,5%
Pharmaceutical Manufacturing	2,1%	3,3%	5,1%	3,1%	3,3%	2,4%	6,6%	2,7%	1,3%	3,7%
Pharmaceutical consulting	,6%	4,2%	2,5%	1,0%	3,3%	,9%	4,5%	2,3%	2,4%	2,8%
Pharmacies & Drug Stores (Dispensing Chemists)	3,3%	4,9%	1,6%	5,6%	1,0%	4,0%	3,7%	2,1%	2,9%	3,3%
Wholesale Pharmaceutical & Bio-products	2,5%	3,7%	2,7%	9,2%	2,3%	2,0%	4,9%	5,5%	2,7%	3,7%
Cosmetic Services and Retail	,9%	,7%	1,1%	2,0%	,8%	,2%	,8%	,7%	1,9%	,9%
Health Products & Cosmetics	9,4%	4,8%	5,2%	7,1%	2,5%	6,7%	5,9%	7,8%	3,7%	5,8%
Trade Medical Instruments & Equipment	1,5%	,7%	2,2%	2,0%	1,8%	1,3%	2,3%	2,3%	1,9%	1,7%
Regulation and Administration	,3%	,3%	,2%		,2%	,7%	,2%	,2%	,5%	,3%
Recreation	,6%	1,1%	,5%	1,5%	1,2%	,4%	,8%	,9%	,3%	,8%
Number of firms	671	1076	554	196	512	450	1008	438	377	5282

Interconnected Clusters and Regions
(25% strength of ties)

Surgical & Medical Instruments
Regulation and
Portsmouth
Oxford
Medical & Bio-pharma R&D & Clinical
Optical Instruments
Dental Practices and
R&D Generic
Trade Medical Instruments & Equipment
Pharmacies & Drug Stores (Dispensing
Pharmaceutical consulting
Reading - Slough
Milton Keynes
Recreation
Other Hospital activity
Outpatient Health Care
Other Outpatient
Wholesale Pharmaceutical & Bio-products
Canterbury - Medway-
Pharmaceutical Manufacturing
In-patient Health
Guildford
Redhill
Brighton
Cosmetic Services and Retail
Charities & Social Care with Housing
Other Related Manufacturing
Medical Practice
Health Products & Cosmetics
Southampton

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Map 8. Cluster "SURGICAL & MEDICAL INSTRUMENTS MANUFACTURING" – 198 firms
(ties between firms based on 5 or more shared industry codes)
(87% of firms have the core industry codes: 334510 Electro-medical and Electrotherapeutic Apparatus Manufacturing; 334517 Irradiation Apparatus Manufacturing; 39112 Surgical and Medical Instrument Manufacturing; 339113 Surgical Appliance and Supplies Manufacturing)
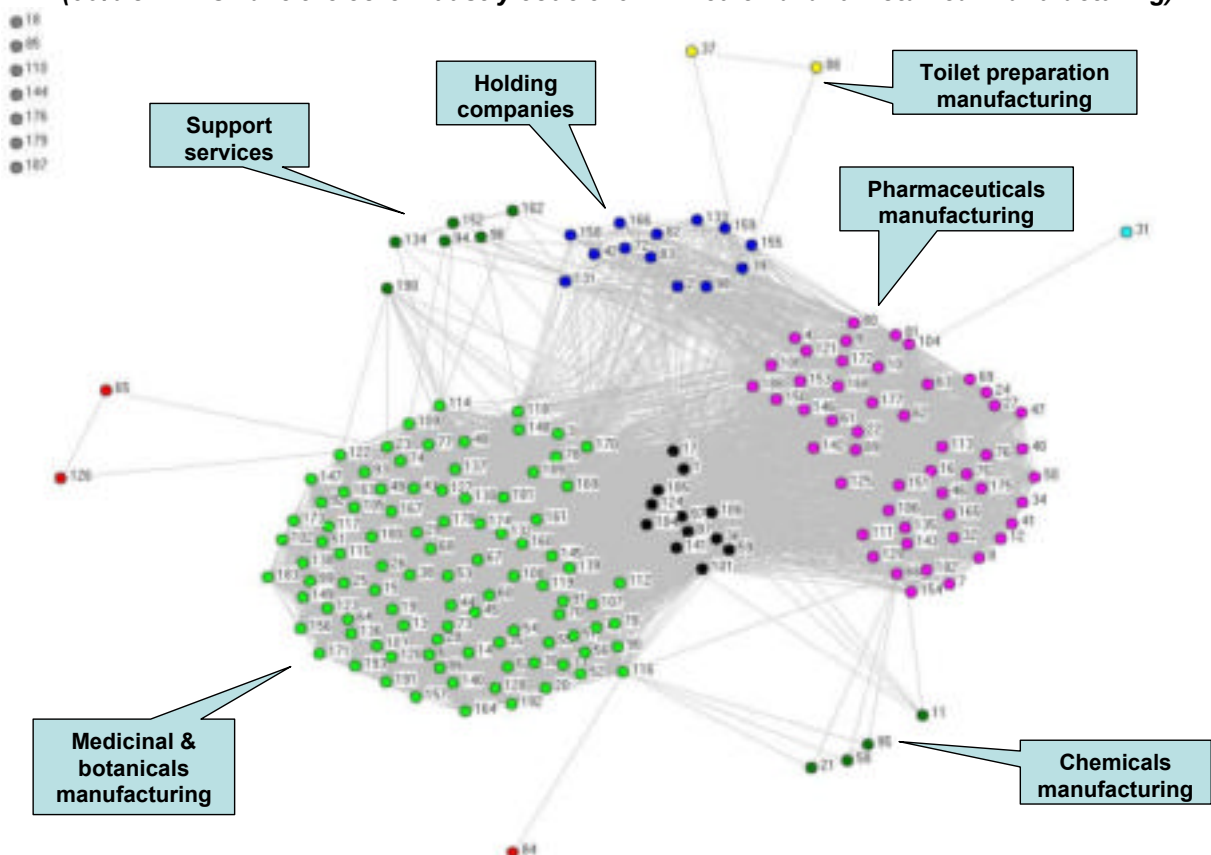

R&D

Plastic products

All other personal care stores

Misc electrical equip & component manuf.

Holding companies

198 firms
87% in 4 core industries

Misc. metal products

Electro-medical, electro-therapeutic, irradiation apparatus; surgical & medical instruments; surgical supplies manufacturing

Wholesale

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Map 12. Cluster "MEDICAL & BIO-PHARMA R&D & CLINICAL TRIALS " – 239 firms
(all ties between firms)
(77% of firms have the core industry code 541710 Research and Development in the Physical, Engineering and Life Sciences)

Testing laboratories

R&D social sciences

R&D life science

Holding companies

Support services

Holding companies

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Map 13. Cluster "PHARMACEUTICAL MANUFACTURING" – 196 firms
(all ties between firms)
(56% of firms have the core industry code 325411 Medicinal and Botanical Manufacturing)

Support services

Holding companies

Toilet preparation manufacturing

Pharmaceuticals manufacturing

Medicinal & botanicals manufacturing

Chemicals manufacturing

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Distribution of Performance for the Pharmaceutical Manufacturing Cluster Holding Companies vs. Non-Holding Companies

Although holding companies exhibited median profit margins that were lower than non-holding companies (+7.6% vs. 9%), within our sample, they were able to achieve lower variability in their profitability. => On a risk-adjusted basis, holding companies do well due to a significant reduction in performance variability.
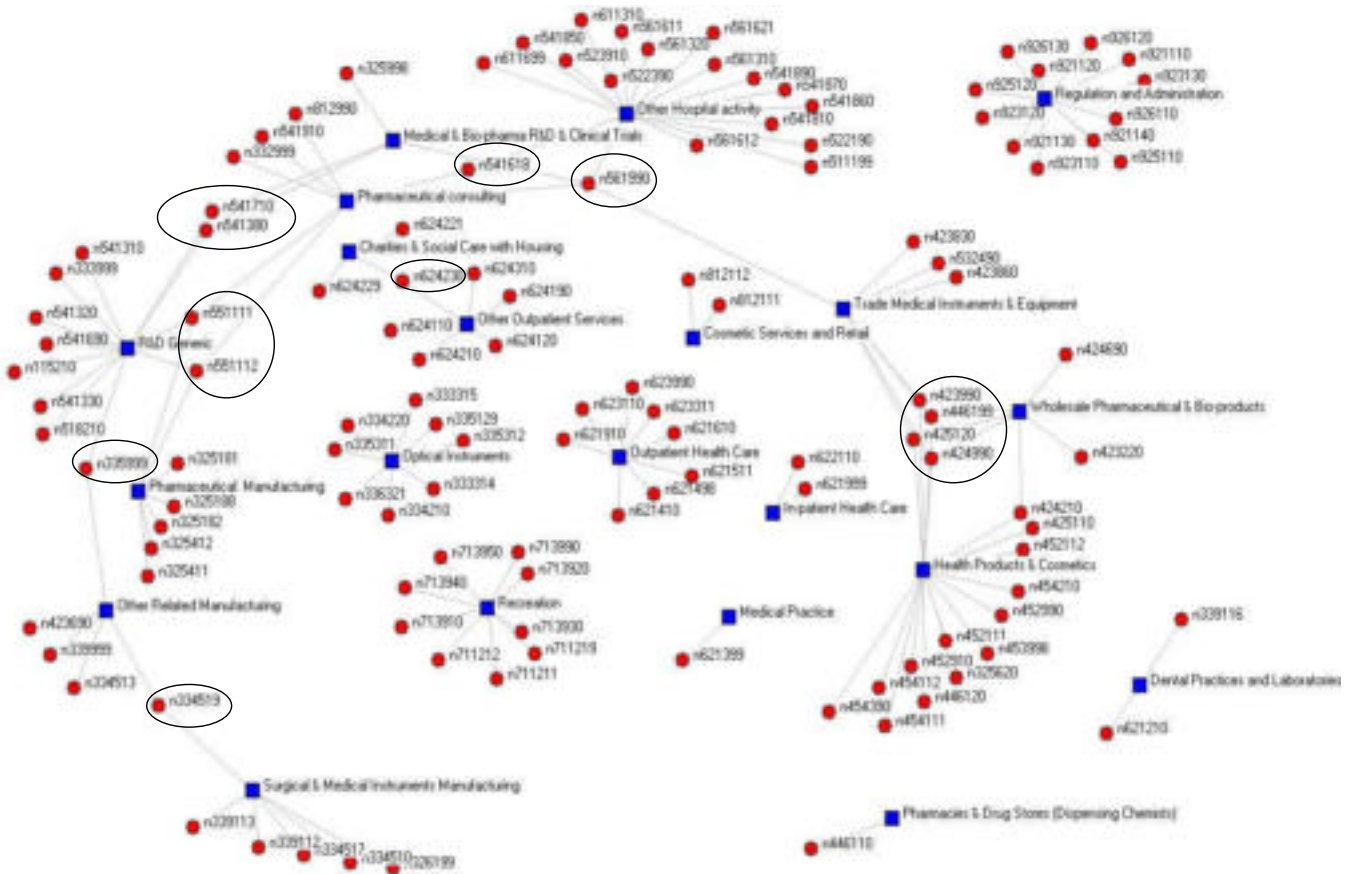
Comparative Cluster Performance

Median Profitability Over the Last 3 Years			
	Profit Margin (t)	Profit Margin (t-1)	Profit Margin (t-2)
outpatient health care	13.1%	16.2%	14.8%
medical practice	23.3%	17.4%	23.9%
dental practice & labs	26.9%	32.9%	25.8%
in-patient health care	13.3%	12.0%	14.6%
charities & social care	7.0%	6.6%	9.5%
other outpatient services	3.6%	6.8%	5.2%
other hospital activity	15.2%	15.9%	15.0%
Optical	1.8%	6.7%	5.0%
Surgical/Medical	7.2%	5.9%	3.7%
Other Related Manufacturing	-0.3%	2.1%	0.5%
R&D generic	0.6%	1.0%	5.9%
medical & bio-pharma R&D	7.9%	6.1%	5.7%
pharma manufacturing	9.1%	9.9%	8.1%
health products	7.3%	4.2%	3.7%
pharma consulting	6.3%	9.7%	10.4%
wholesale pharma	4.6%	3.6%	4.7%
trade medical instr/equip	5.1%	5.0%	3.4%
pharmacies & drug stores	8.7%	7.1%	5.0%
cosmetic services & retail	6.5%	4.4%	8.4%

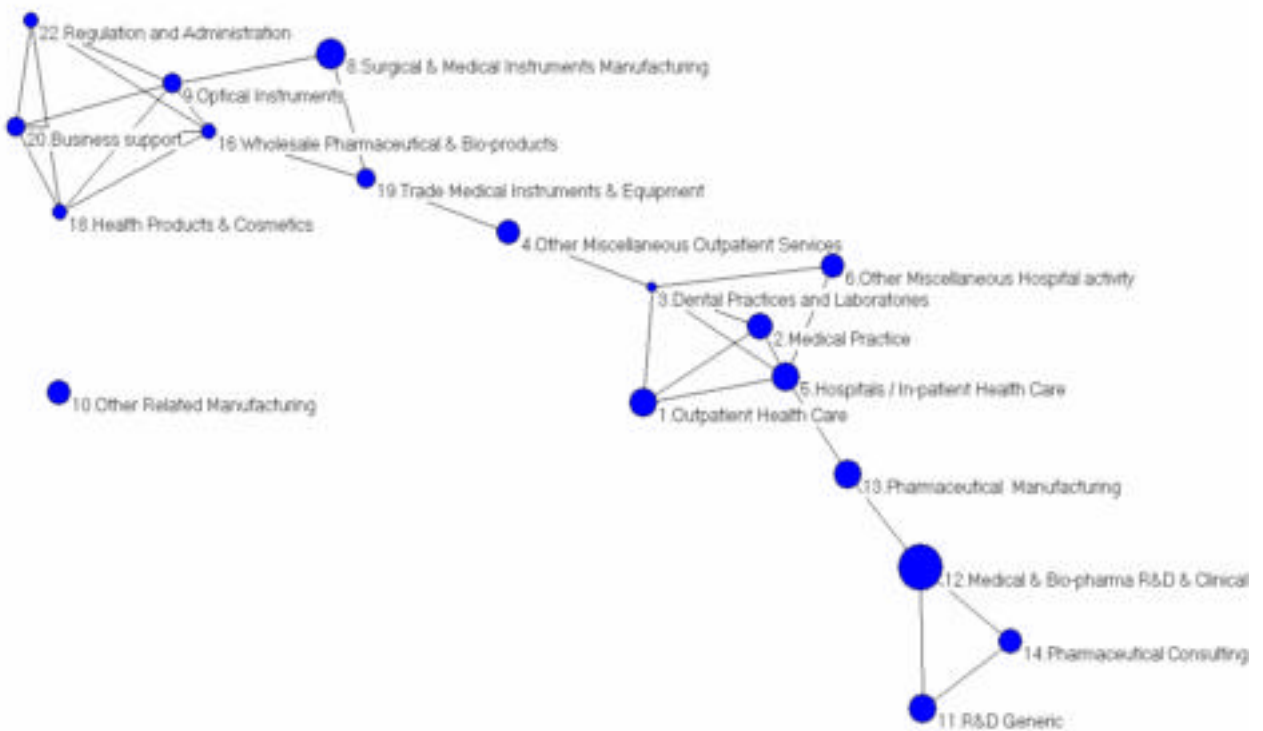| Coefficient of Variance			
	Profit Margin (t)	Profit Margin (t-1)	Profit Margin (t-2)
outpatient health care	1.6	1.5	1.4
medical practice	1.1	1.3	1.2
dental practice & labs	1.1	1.1	1.2
in-patient hlth care	3.8	1.5	1.7
charities & social care	2.3	3.8	1.7
other outpatient services	2.1	2.0	3.2
other hospital activity	1.6	1.6	1.7
Optical	-2.4	3.9	-6.1
Surgical/Medical	2.7	3.8	10.7
Other Related Manufacturing	17.5	284.1	17.1
R&D generic	-4.4	-6.8	2.0
medical & bio-pharma R&D	5.1	14.0	4.1
pharma manufacturing	2.5	3.5	2.5
health products	2.8	6.3	10.0
pharma consulting	2.6	1.8	1.6
wholesale pharma	3.2	6.8	3.8
trade med instr/equip	8.2	2.6	33.1
pharmacies & drug stores	1.3	2.0	1.6
cosmetic services & retail	3.0	-12.5	2.6

Ties clusters by codes 20%_108+

Survey 2007

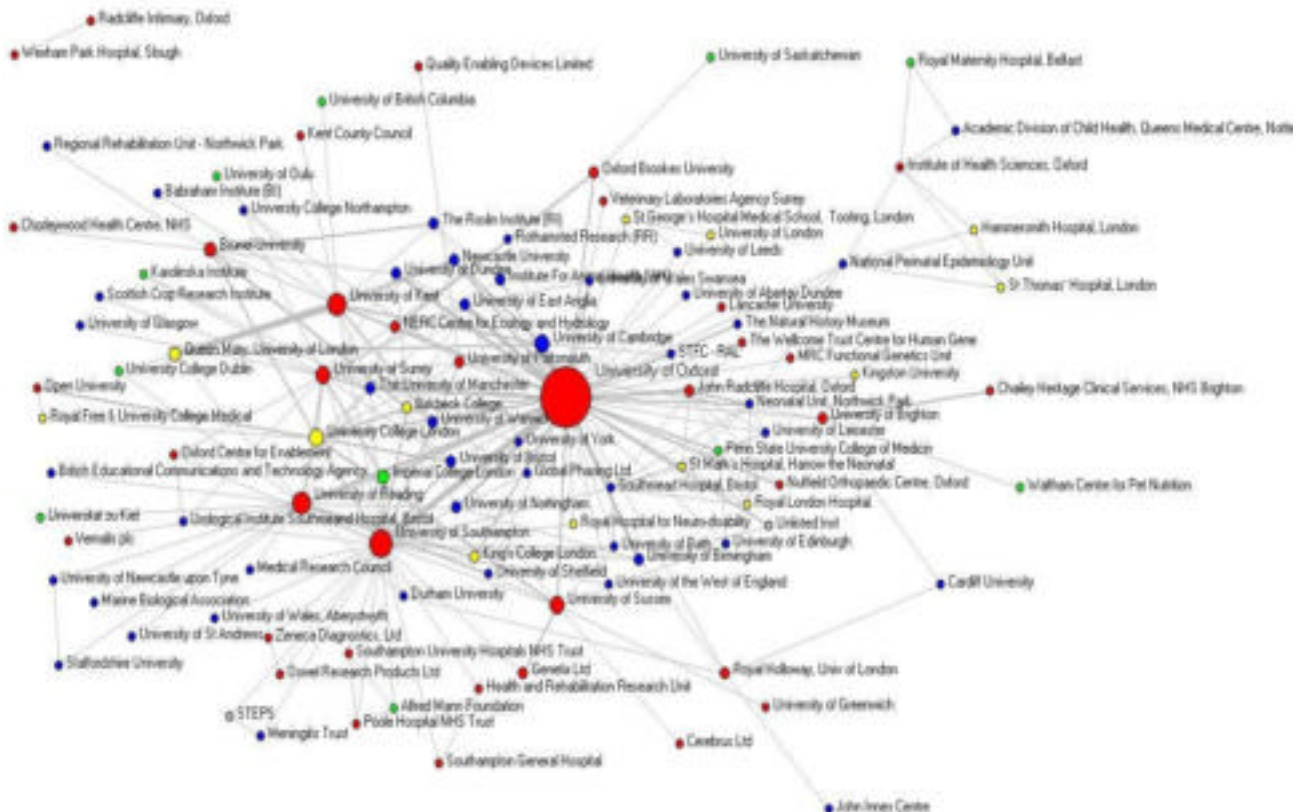# Ties Between Areas of Specialisation for the Companies in the Sample
(normalised value > 0,5)

Centres of Excellence in the South East

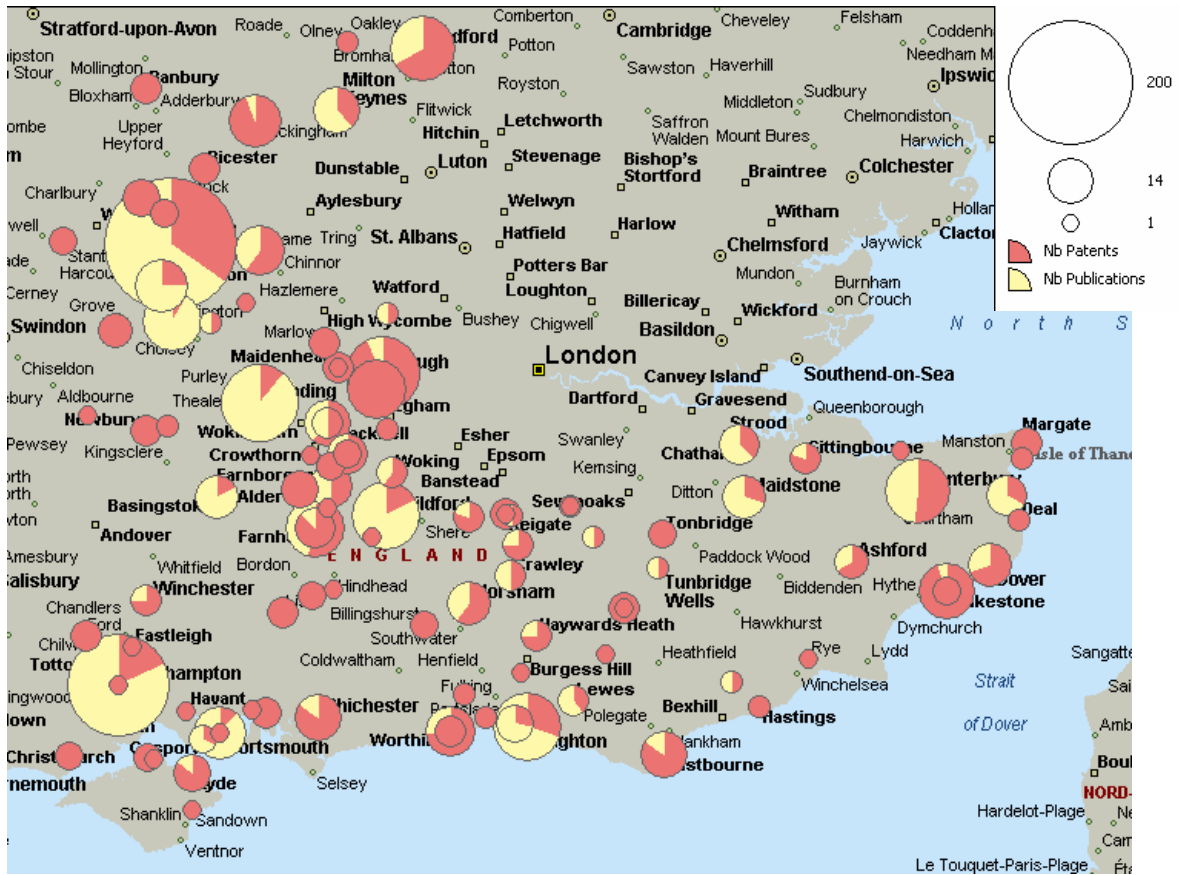# Location of Collaborative Partners - *absolute value*
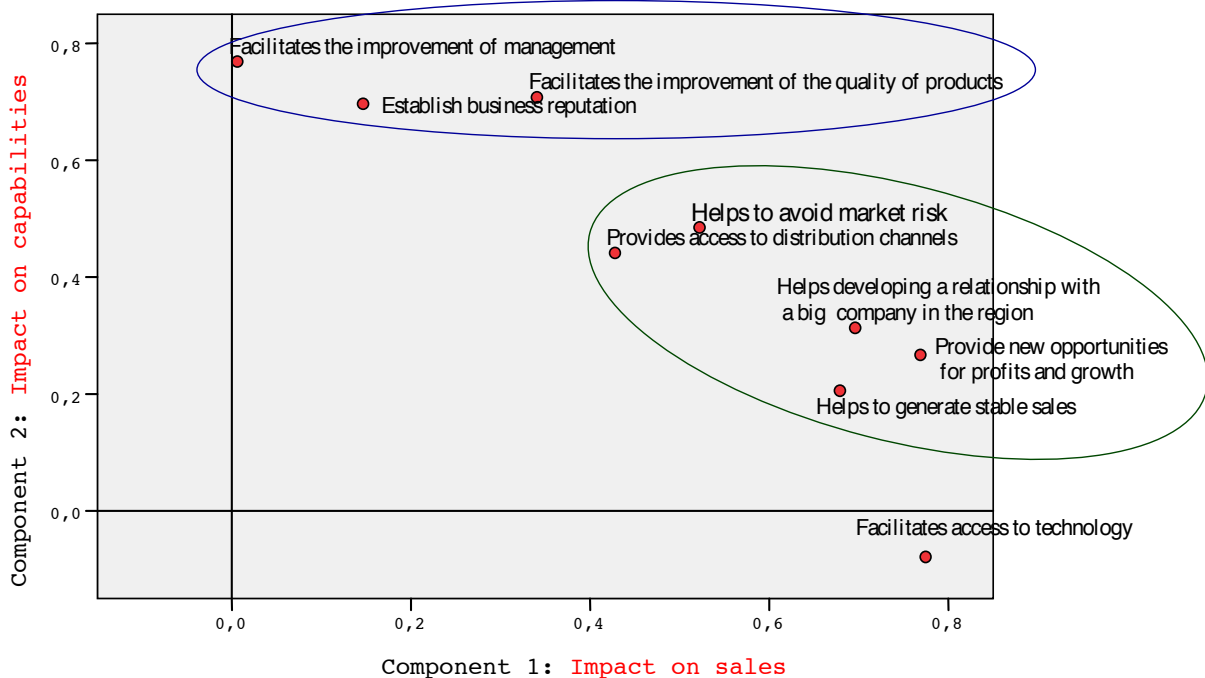### (*Red – in the SE region; blue – in the UK; yellow – London; green – worldwide*)

Nb of Patents & Publications by City

Motivations to Locate in the Region

If your company is an independent business in the region, how significant is the effect of the regional bio- and medical technology cluster for the development of your company?

The Value of our Approach

- **Building <u>a comprehensive database</u> with firms that operate in this sector and using supplementary databases**
- **Revealing the <u>unique cluster blend of activities</u> in a particular region**
- **Assessment of <u>cluster performance</u> for a specific point in time**
- **<u>Comparisons</u> with other regions and benchmarking**
- **Identifying areas of strengths and weaknesses and areas for <u>targeted intervention</u>**
- **Providing <u>business intelligence to firms</u> in the sector**

Extensions of the Method and its Application for Economic / Industry Development

- **Analysis of cluster performance**

- **Analysis of the economic impact of clusters**

- **Analysis of the value-added structure of cluster activities**

- **Comparisons of peer groups and regions**

- **Analysis of intra-cluster and inter-cluster dynamics**

- **Mapping linkages with other regional and global clusters**

- **Mapping firm-institution-centre of excellence linkages**

Other Potential Extensions

- **Mapping <u>changes over time</u> in cluster membership**
  - **Measuring <u>cluster growth</u>**
  - **Analysis of <u>cluster depth</u> in the region**
  - **<u>Longitudinal analysis</u> of cluster performance allowing forecasts**
  - **Current and future trends of <u>cluster dynamics</u>**
- **Mapping the <u>globalisation</u> of the cluster**
- **Mapping <u>collaborative relationships</u> within the cluster and assisting collaborations**
- **Mapping <u>relationships with Universities and Centres of Excellence</u>**
- **Mapping of the innovative capacity in the sector and in the region**
- **Support to collaboration at regional / sector / and firm level**