

ARETIAN

CITY OF BARCELONA



Masterplan del territori productiu i el teixit industrial del Besòs del municipi de Barcelona

Barcelona - Besòs Innovation District: Conceptual Masterplan

Urban and Economic Regeneration Challenges

How can we envision a Knowledge Economy Hub in the future Barcelona - Besòs Innovation District?

What are the industries presenting a global comparative advantage in the future Besòs Innovation District?

How can a city design vision support the urban and economic regeneration in the future Besòs Innovation District?

Barcelona Innovation Triangle: *Conceptual Map of Prior Conditions*

Bon Pastor i La Sagrera

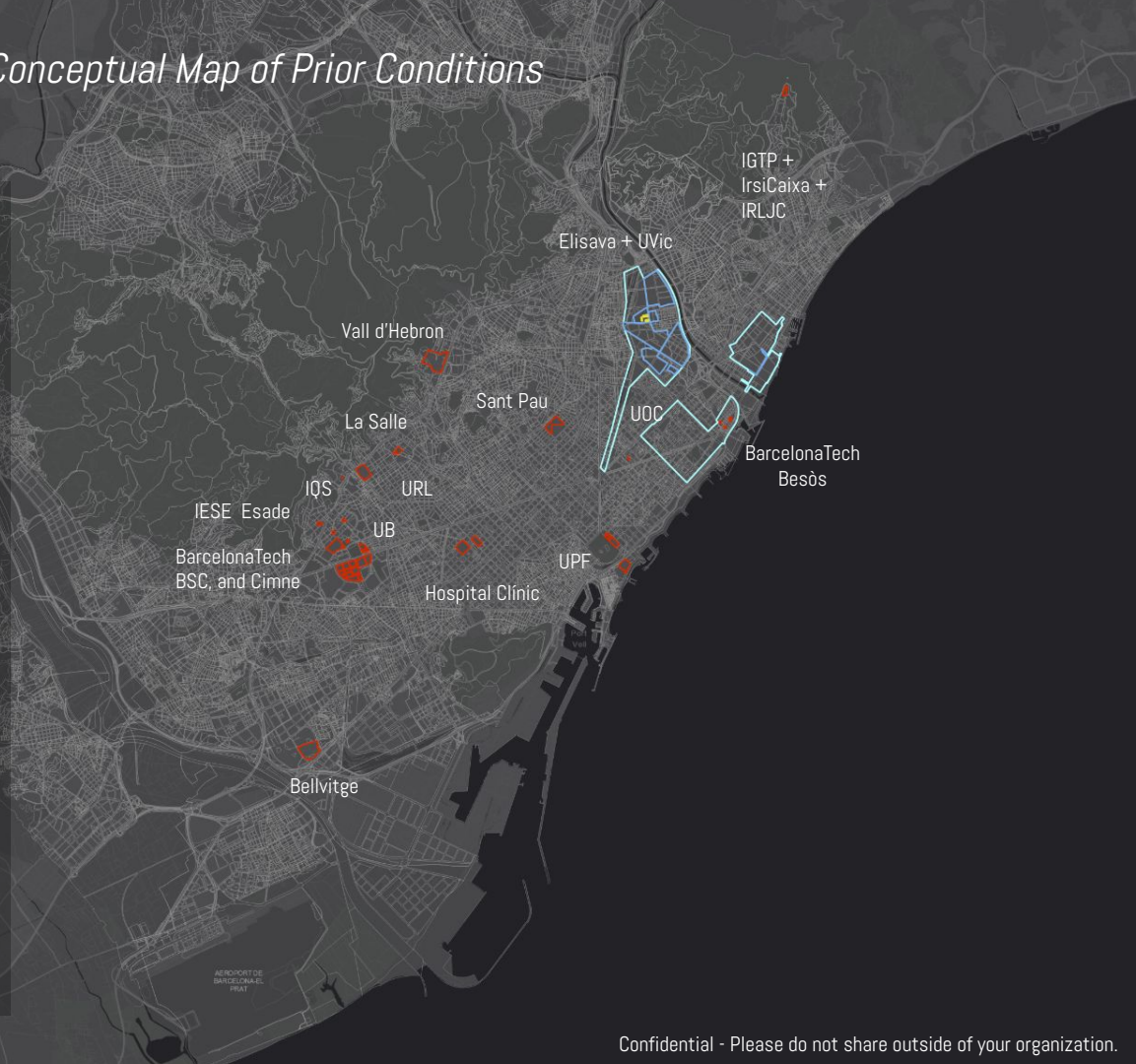
- 748 Companies (8.4k), 96 Innovadores (1,4k)
- Innovation Intensity: **21%**
- Sectors: Pharma, Cosmetics, Bread, Pastry and Food, Automobile, Elevator Manufacturing, Construction, Furniture, Fish and Seafood, Taxi, Printing, Packaging
- Institutions: Elisava, UVic, Leitat, new TMDC and Stage2/Verneda

Diagonal Mar i 22@ Est

- 380 Companies (2.2k), 80 Innovadores (520)
- Innovation Intensity: **25%**
- Sectors: Pharma, Scientific and Technical Services, Furniture, Freight Trucking, Chemicals, Printing
- Institutions: BarcelonaTech Besòs, UOC

Badalona i les Tres Xemeneies

- 367 Companies (6,5k), 71 Innovadores (2,4k)
- Innovation Intensity: **35%**
- Sectors: Pharma, Consulting, AgriTech Machinery, Cranes and Heavy Vehicles, Jewelry, Textile and Apparel, Electronics, Packaging, Glass and Plastic
- Institutions: IGTP, new BarcelonaTech Center
- Badalona Sud, El Sot, Tres Xemeneies



Barcelona - Besòs Innovation District: *Bon Pastor i la Sagrera*
Current conditions



Barcelona - Besòs Innovation District

Current conditions: Bon Pastor, Torrent de l'Estadella, La Verneda, Verneda Industrial, Montsolís

Barcelona - Besòs Innovation District Conditions:

748 companies within Bon Pastor, Torrent de l'Estadella, La Verneda, Verneda Industrial, Montsolís

- 254 firms at Bon Pastor
- 110 firms at La Verneda i la Verneda Industrial
- 122 firms at Montsolís
- 161 firms at Torrent de l'Estadella

A total of 8,643 employees

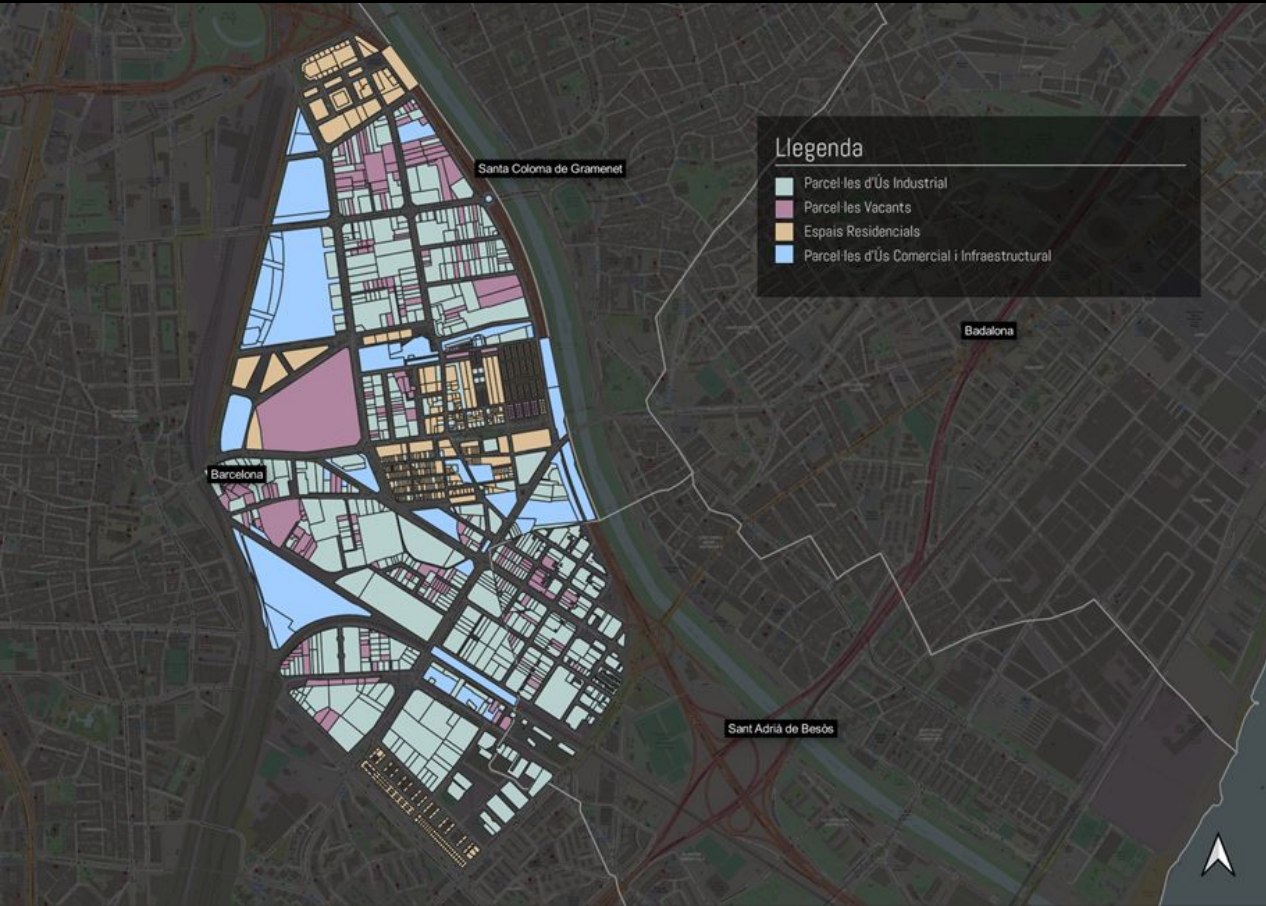
- 100 innovative companies
- 648 regular companies: support and services

Urban and Economic Development Constraints and Challenges

- **Knowledge Economy:** lack of critical mass, negligible research, scarcity of innovative firms
- **Smart Specialization:** industry atomization, short value chains, scarce clustering
- **Urbanization:** low quality informal development, organic/random patterns, low building heights, inefficient urban development, random parcel shapes, scarce access to mobility, negligible amenities and services

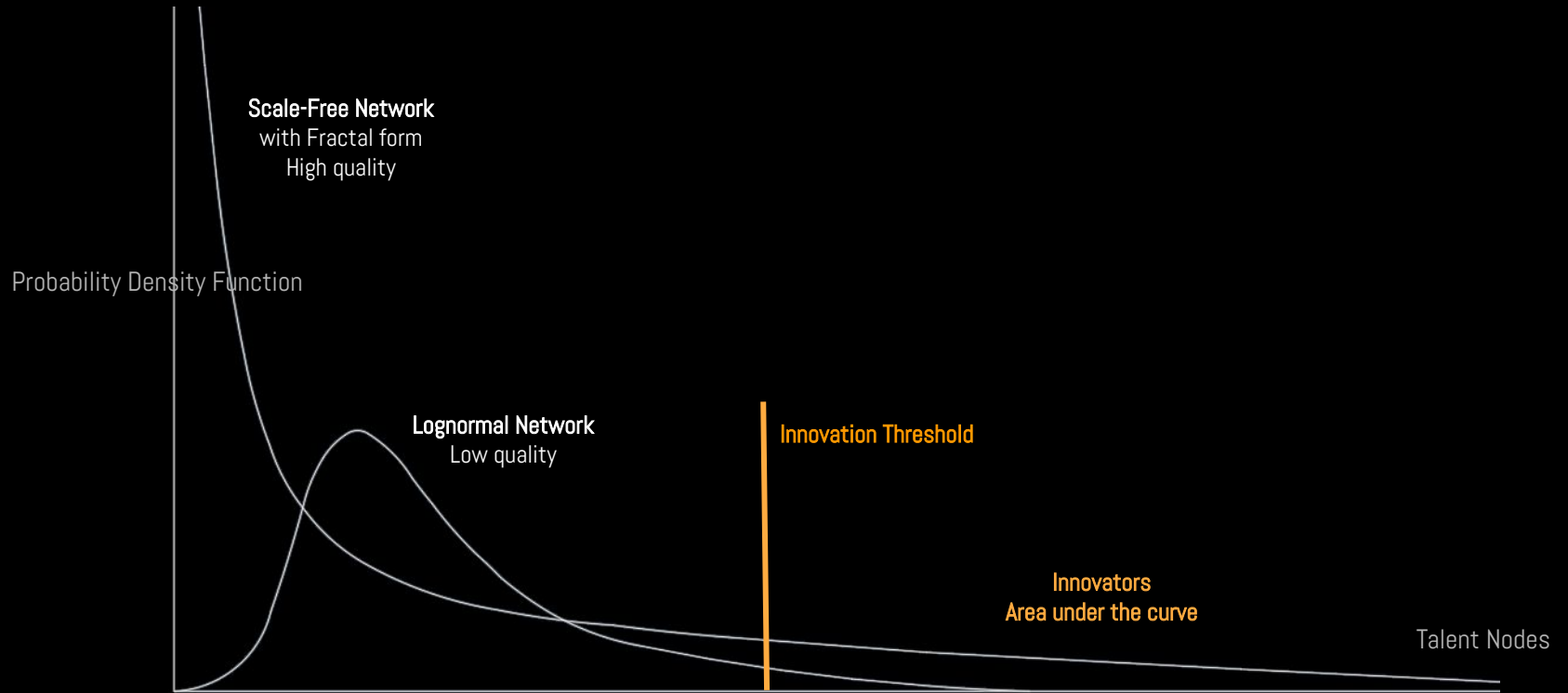
Barcelona - Besòs Innovation District

Current conditions: Bon Pastor, Torrent de l'Estadella, La Verneda, Verneda Industrial, Montsolís

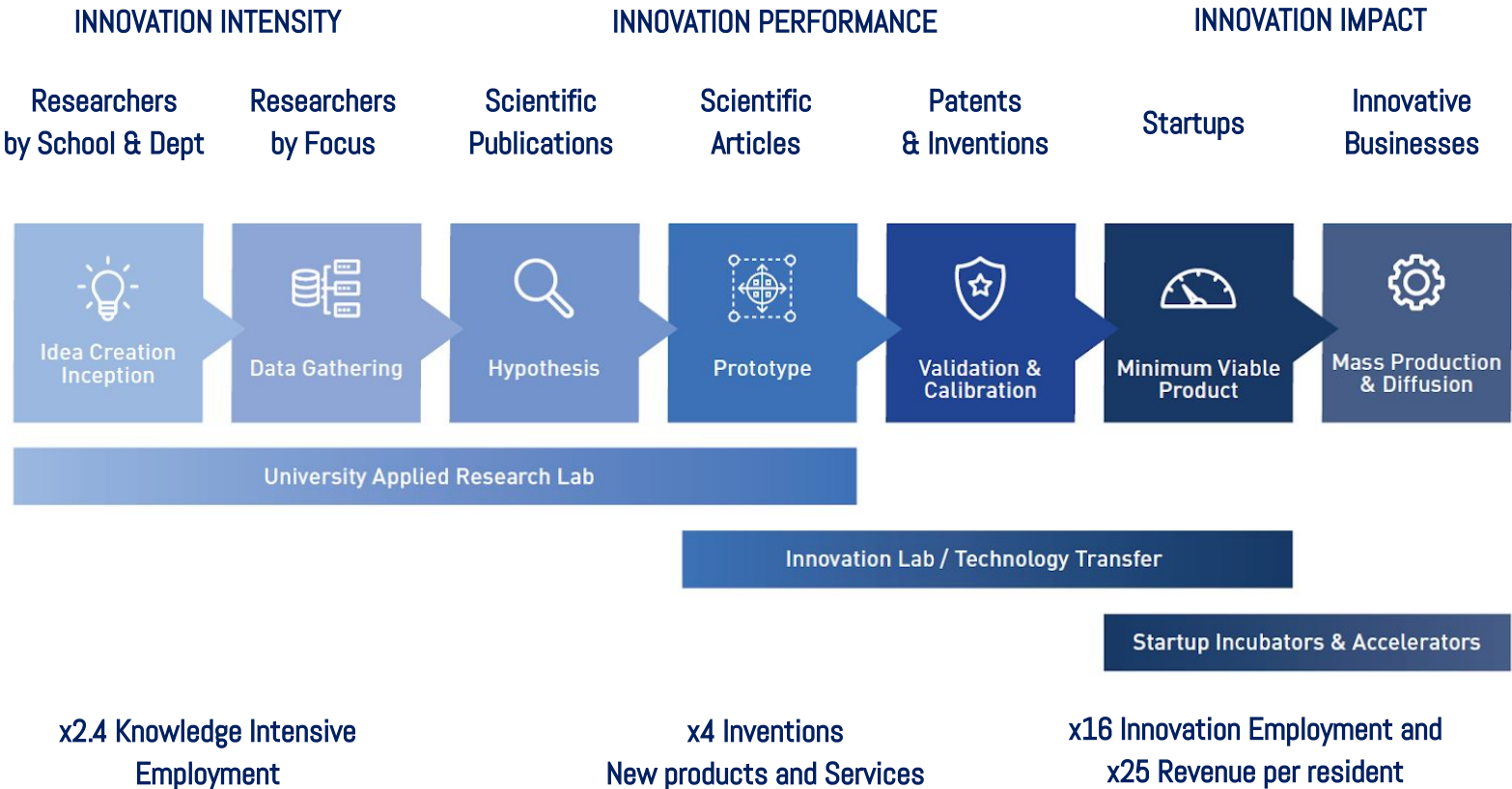


City Science Insights: *Shaping a successful innovation district*

Lognormal versus Scale-Free networks



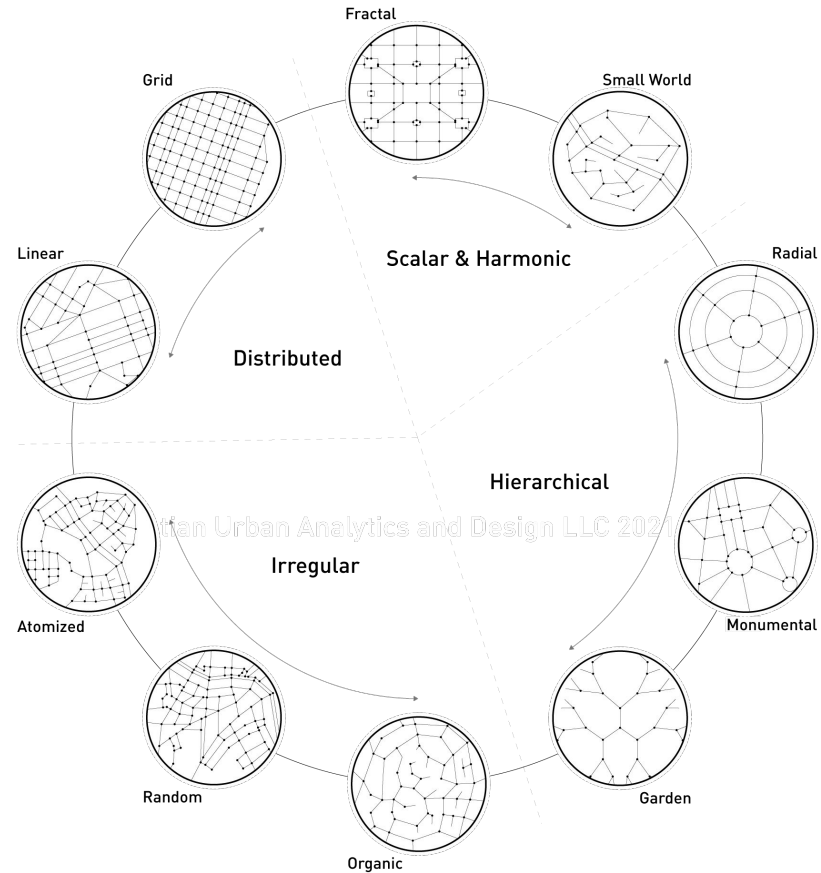
Innovation KPIs: measuring the impact of the knowledge economy



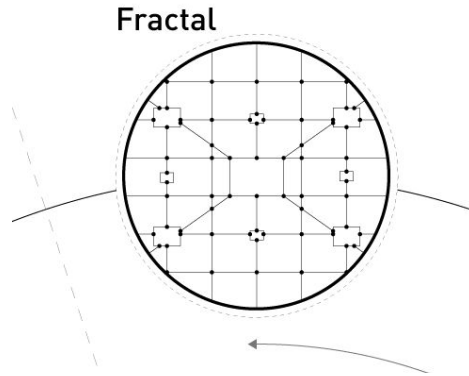
Urban and Economic Development Vision

Conceptual urban design for the future Innovation District
to support the urban regeneration process

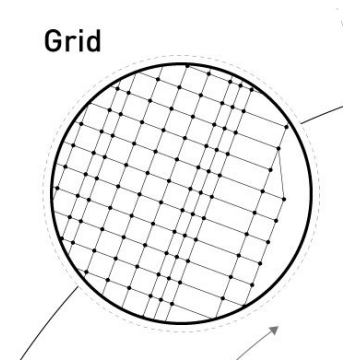
City Science Analysis: *Informing Urban Design Best Practices*



City Science Analysis: *Informing Urban Design Best Practices*



Very high fractality / self-similarity
Intermediate levels of entropy
Harmonic layouts



Intermediate fractality / self-similarity
Very low levels of entropy
Rigid layouts

Barcelona - Besòs Innovation District: *Nodes - Tiers 1 through 5*

Urban Design Space Programming

	Actual (2022)	Escenari Futur (2040)
Nodes Tier 1 - Recerca	Negligible (Φ)	Nous Centres laMercedes: Elisava + UVic BarcelonaTech / UB / Privats ≈1,600 empleats
Nodes Tier 2 - Transferència de Coneixement	Negligible (Φ)	Nous centres de transferència del coneixement ≈1,600 empleats
Nodes Tier 3 - Companyies Innovadores Tractores	Negligible (Φ)	≈250 companyies* ≈7,500-9,000 employees
Nodes Tier 4 - Startups	Negligible (Φ)	≈250 startups ≈2,800 employees
Nodes Tier 5 - Companyies Actuals Innovadores dels 11 sectors	100 companyies 1,824 employees	Integrades a 3 i Espais de Coworking
Nodes Tier 6 - Companyies de serveis i proveïdors	648 companyies 6,819 employees	≈750 companyies ≈12,000 - 15,000 employees

Legenda

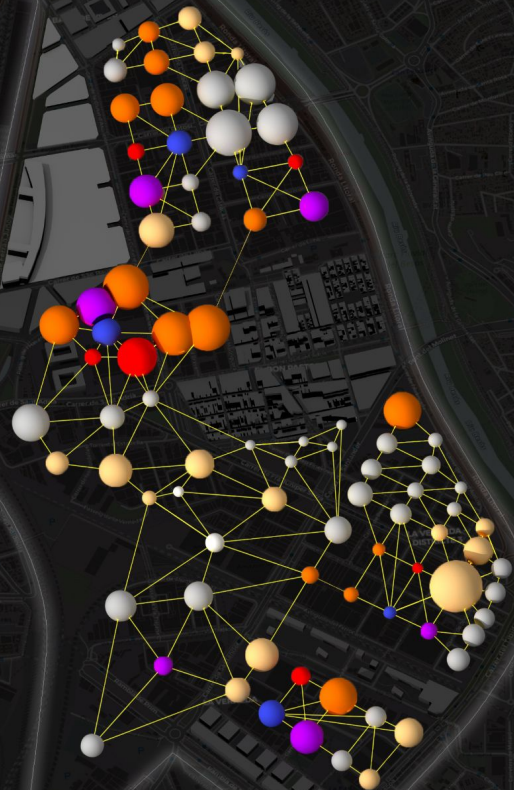
Nanotecnologia i Materials Avançats

UrbanTech

Robòtica i Manufactures Avançades

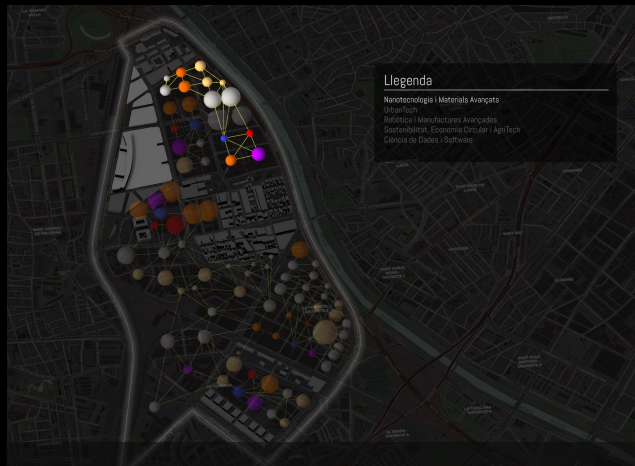
Sostenibilitat, Economia Circular i AgriTech

Ciència de Dades i Software

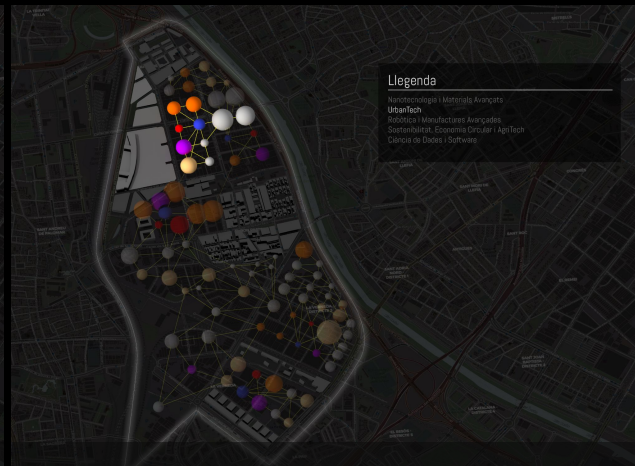




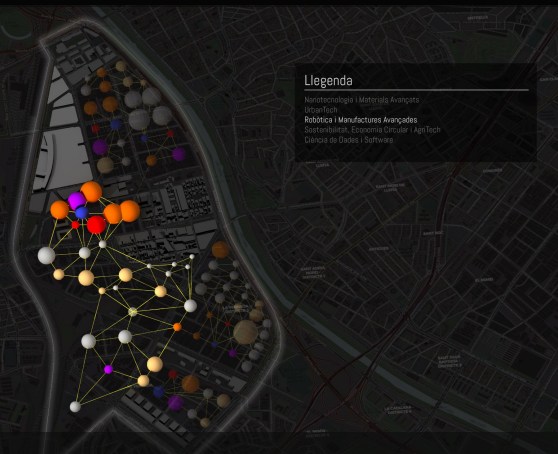
Barcelona Besòs Innovation Ecosystem



Nanotech and Advanced Materials Ecosystem



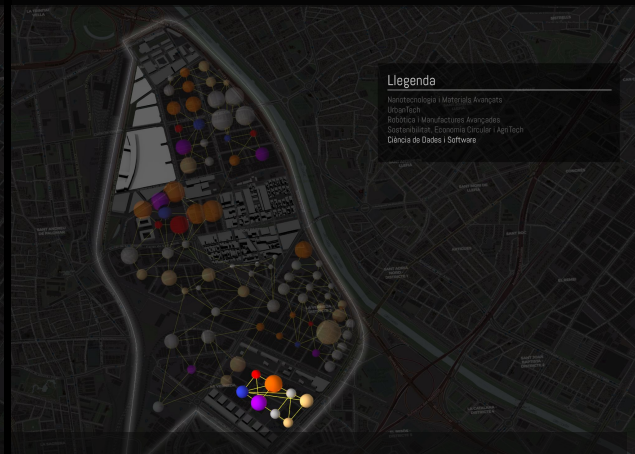
UrbanTech Ecosystem



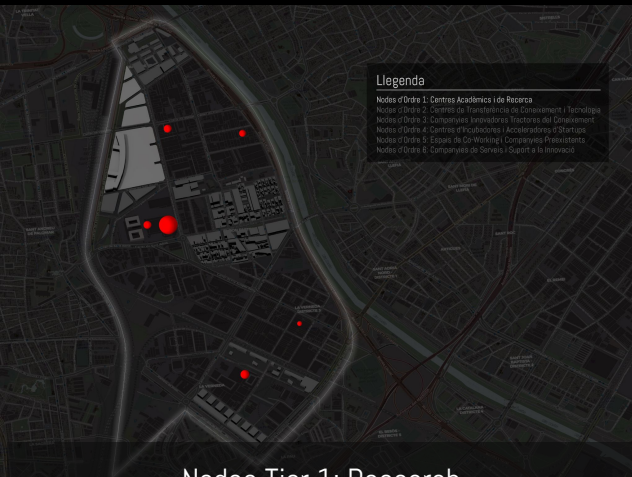
Robotics and Manufacturing Ecosystem



Agritech and Sustainability Ecosystem



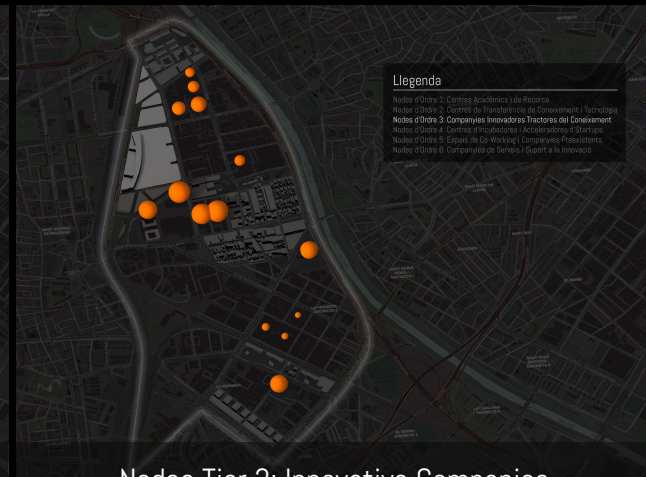
Data Science and Software Ecosystem



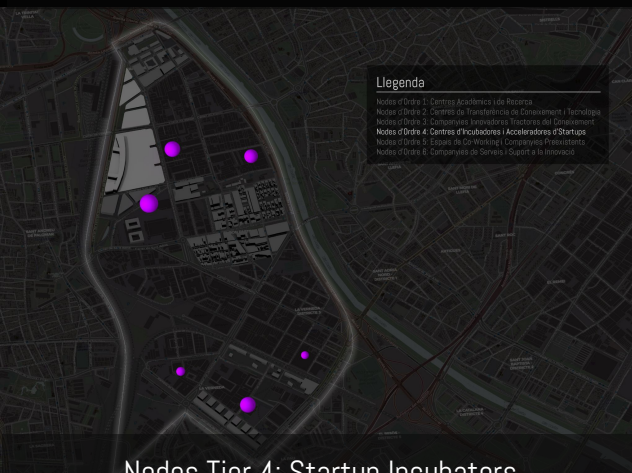
Nodes Tier 1: Research



Nodes Tier 2: Tech Transfer



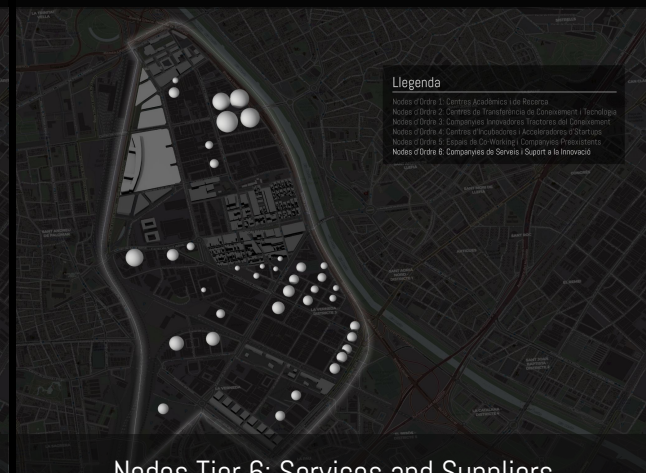
Nodes Tier 3: Innovative Companies



Nodes Tier 4: Startup Incubators



Nodes Tier 5: Coworking Spaces



Nodes Tier 6: Services and Suppliers

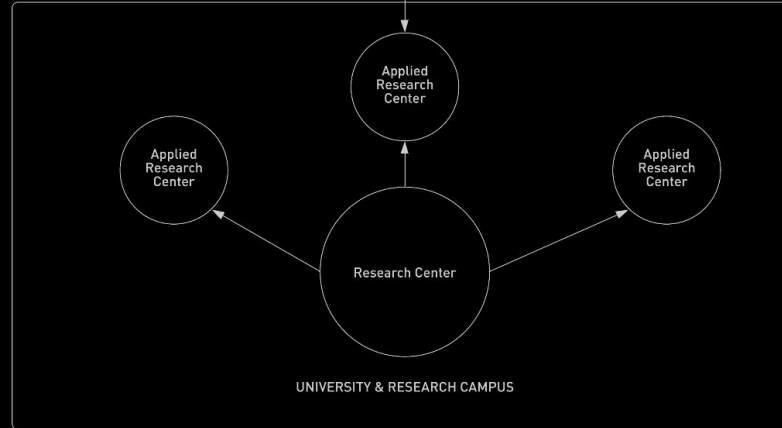
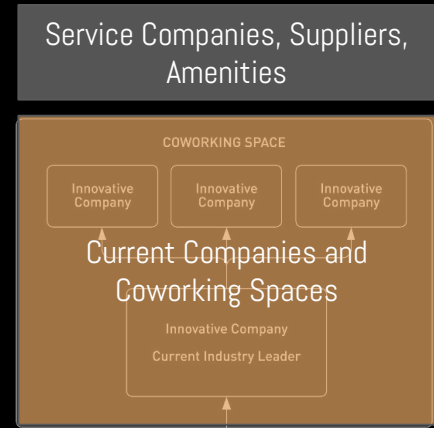
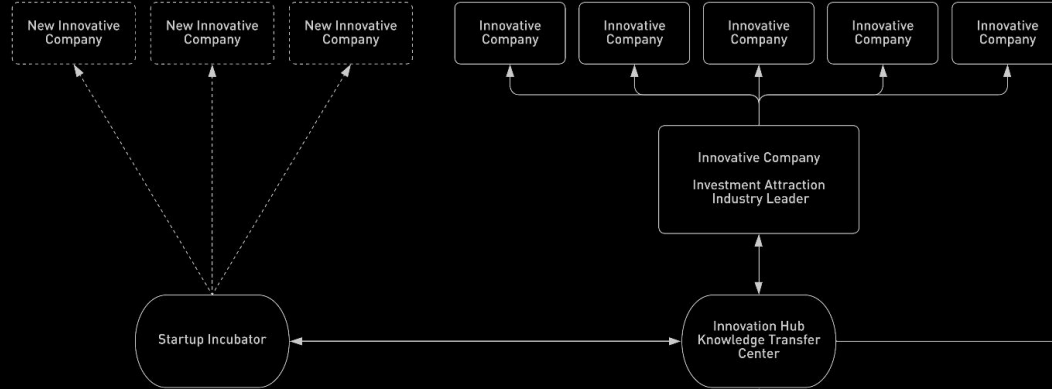
Barcelona - Besòs Innovation District

Fractal Vision: Self-similar Nodes and Edges

Nodes de Centralitat Metropolitana	Eixos Metropolitans
<p>Nodes d'Ordre 1: Centres de Recerca i Acadèmics</p> <ul style="list-style-type: none">• Nanotech, UrbanTech, Robòtica i Manufactures Avançades, Agritech, Data Science i Software <p>Nodes d'Ordre 2: Transferència de Coneixement</p> <ul style="list-style-type: none">• 5 Centres per Àrees de Coneixement, 11 camps tecnològics i del coneixement, 325 disciplines o camps d'innovació <p>Nodes d'Ordre 3: Companyies Innovadores</p> <ul style="list-style-type: none">• Companyies innovadores tractores, per cadascun de les 5 àrees de coneixement <p>Nodes d'Ordre 4: Startups</p> <ul style="list-style-type: none">• Incubadores i Acceleradores d'Startups <p>Nodes d'Ordre 5: Serveis i Suport a la Innovació:</p> <ul style="list-style-type: none">• Centres de Coworking per PIMEs• Proveïdors• Companyies de Serveis	<p>Eixos d'Ordre 1:</p> <ul style="list-style-type: none">• Avingudes Metropolitanes• Accessibilitat global <p>Eixos d'Ordre 2:</p> <ul style="list-style-type: none">• Carrers Metropolitans• Boulevards que reforcen la centralitat dels nodes principals de la xarxa de coneixement <p>Eixos d'Ordre 3:</p> <ul style="list-style-type: none">• Xarxa parcialment reticular d'accés i distribució de serveis essencials <p>Eixos d'Ordre 4:</p> <ul style="list-style-type: none">• Xarxa de carrers a escala de barri / districte <p>Eixos d'Ordre 5:</p> <ul style="list-style-type: none">• Xarxa local del districte de la innovació connectant espais arquitectònics que presenten sinèrgies• Àrees Peatonals

Barcelona - Besòs Area: *Urban Design and Innovation Strategy*

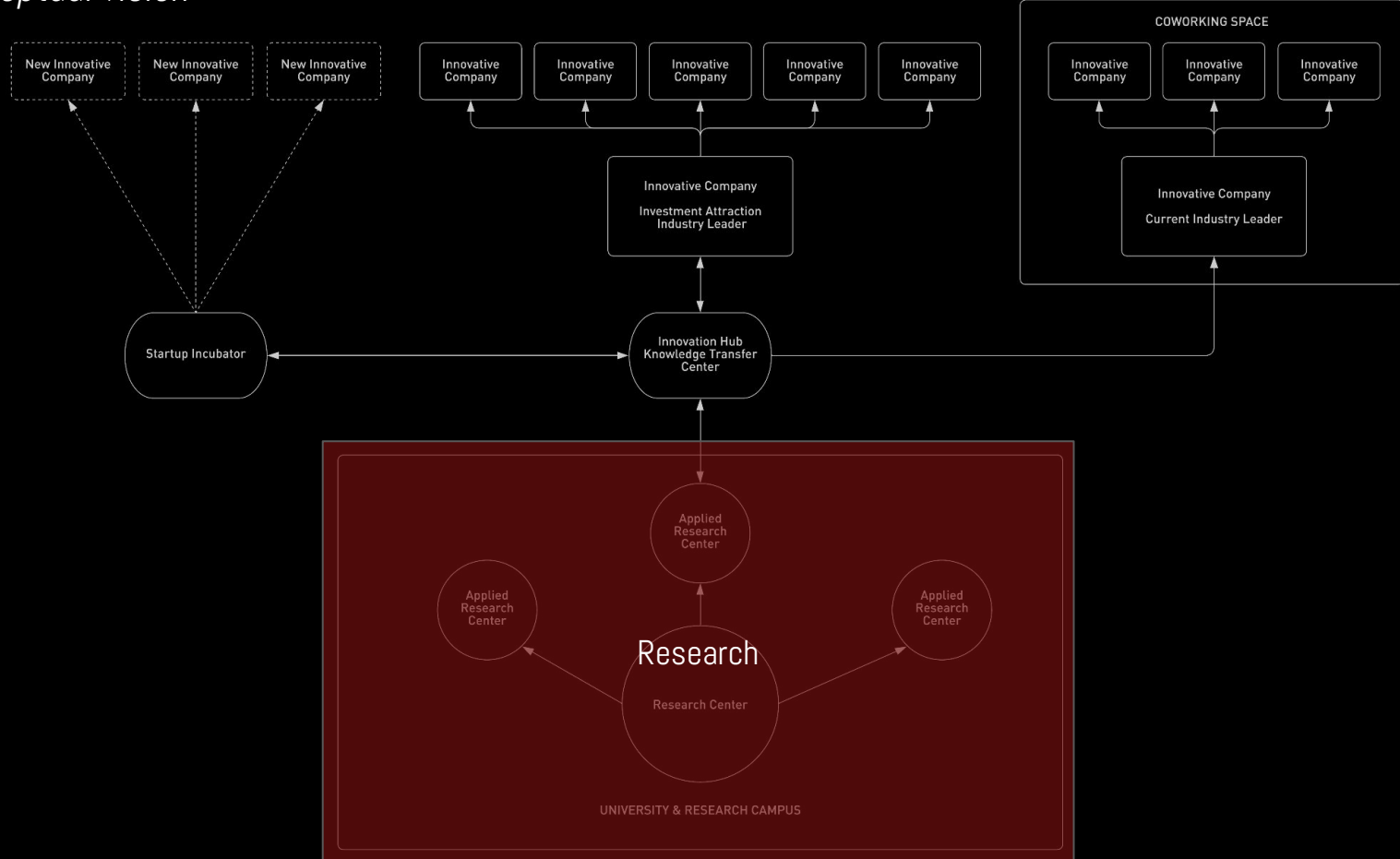
Current conditions: lack of an innovation ecosystem



Current Companies and Coworking Spaces

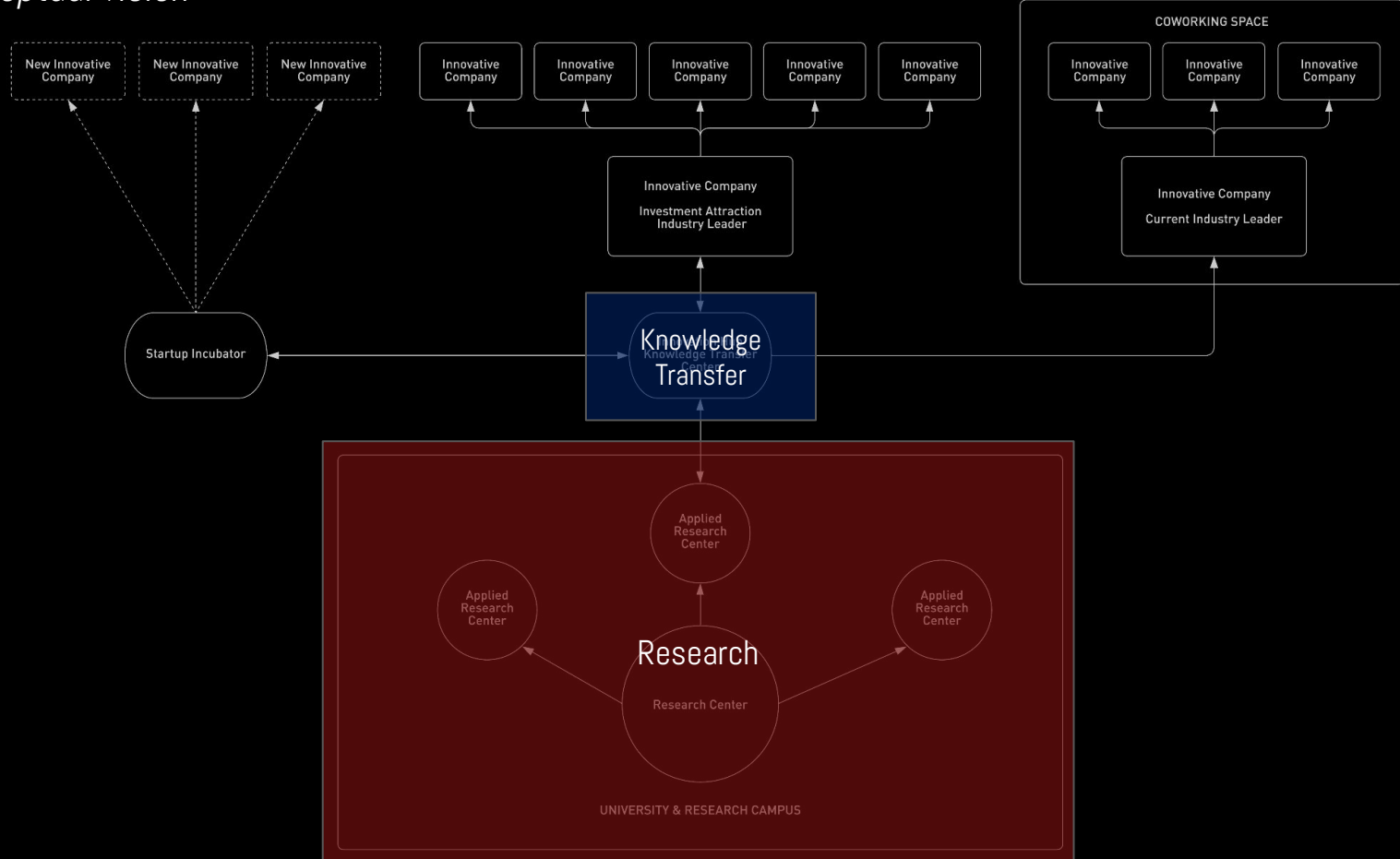
Barcelona - Besòs Area: *Urban Design and Innovation Strategy*

Conceptual vision



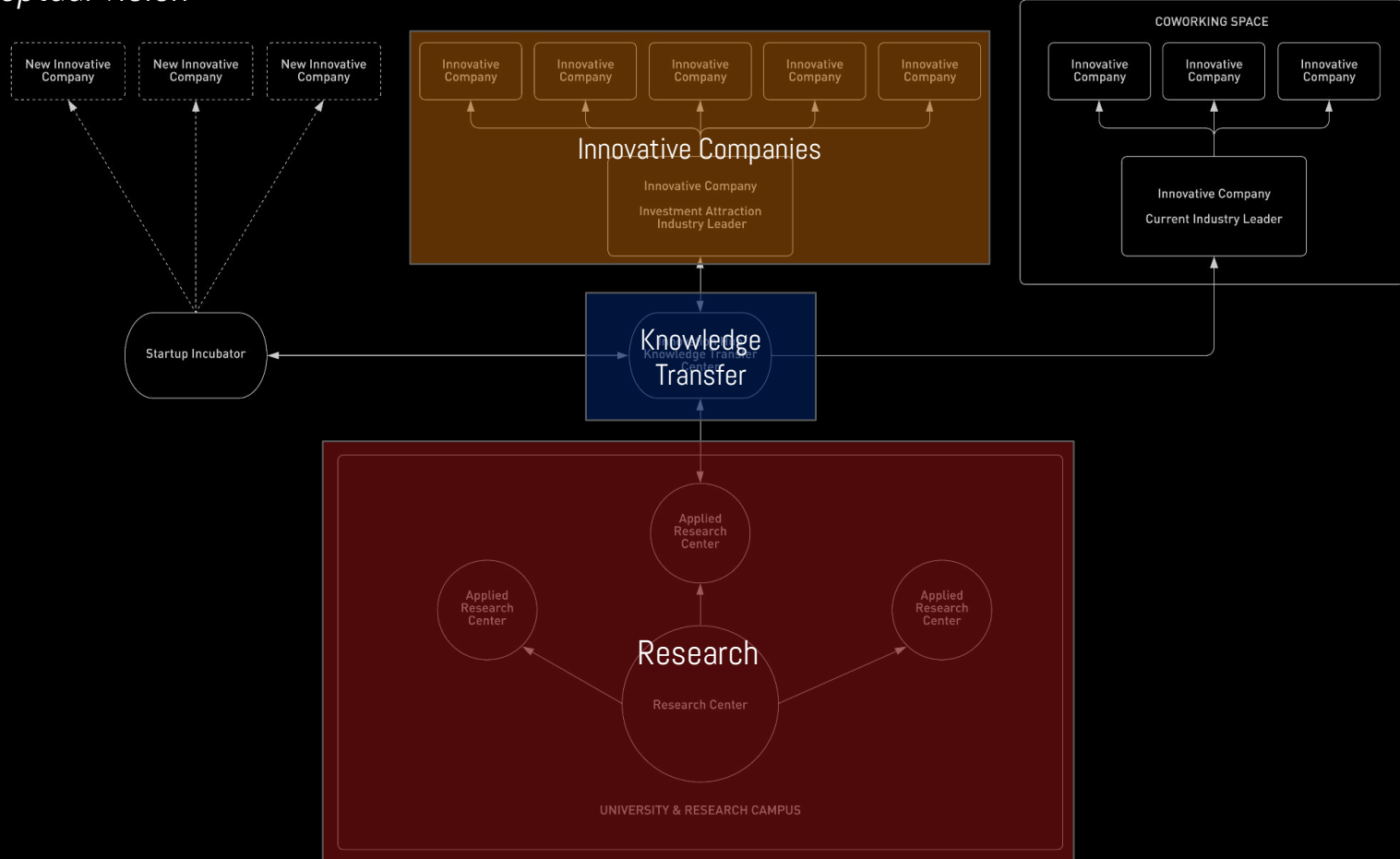
Barcelona - Besòs Area: *Urban Design and Innovation Strategy*

Conceptual vision



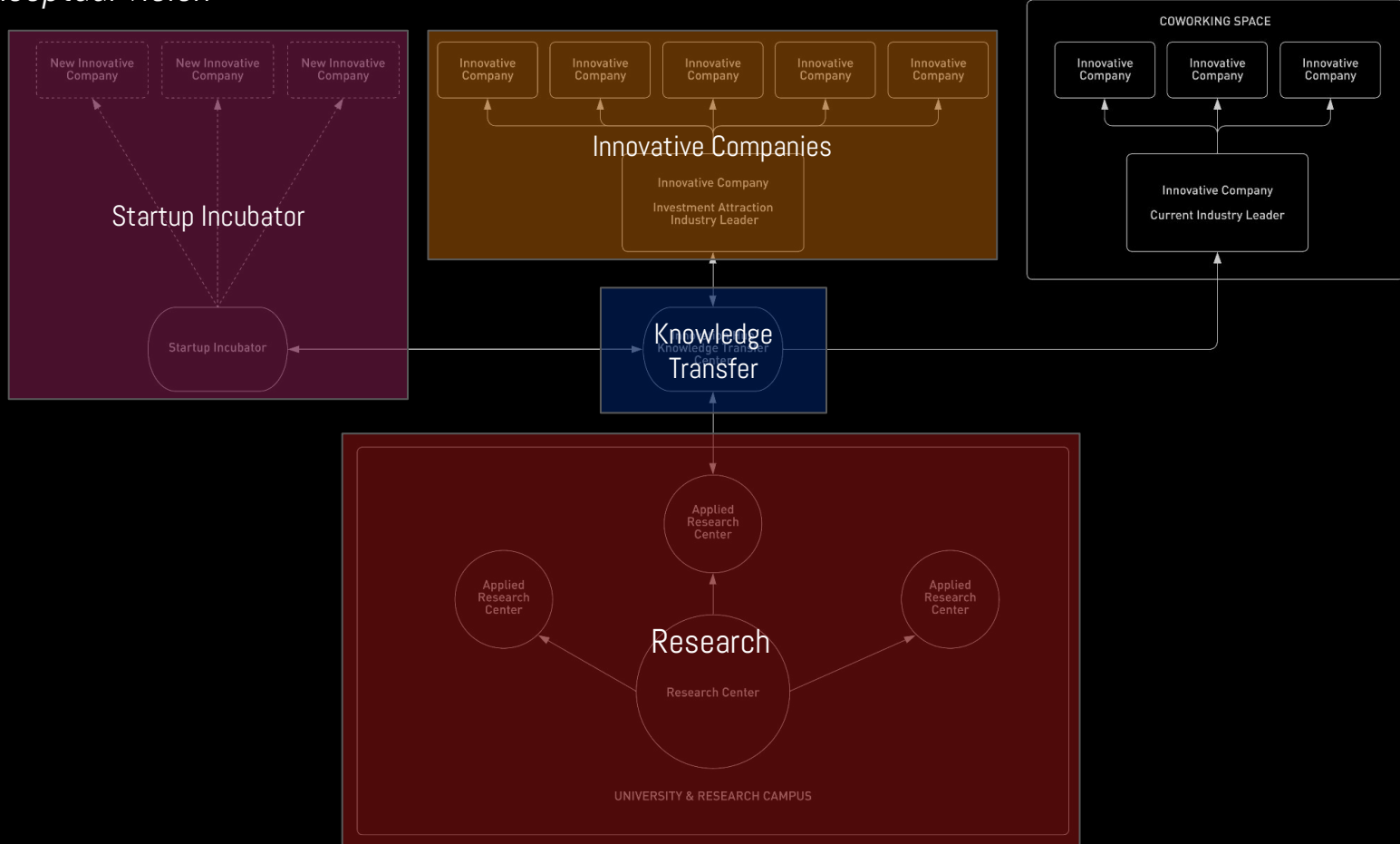
Barcelona - Besòs Area: *Urban Design and Innovation Strategy*

Conceptual vision



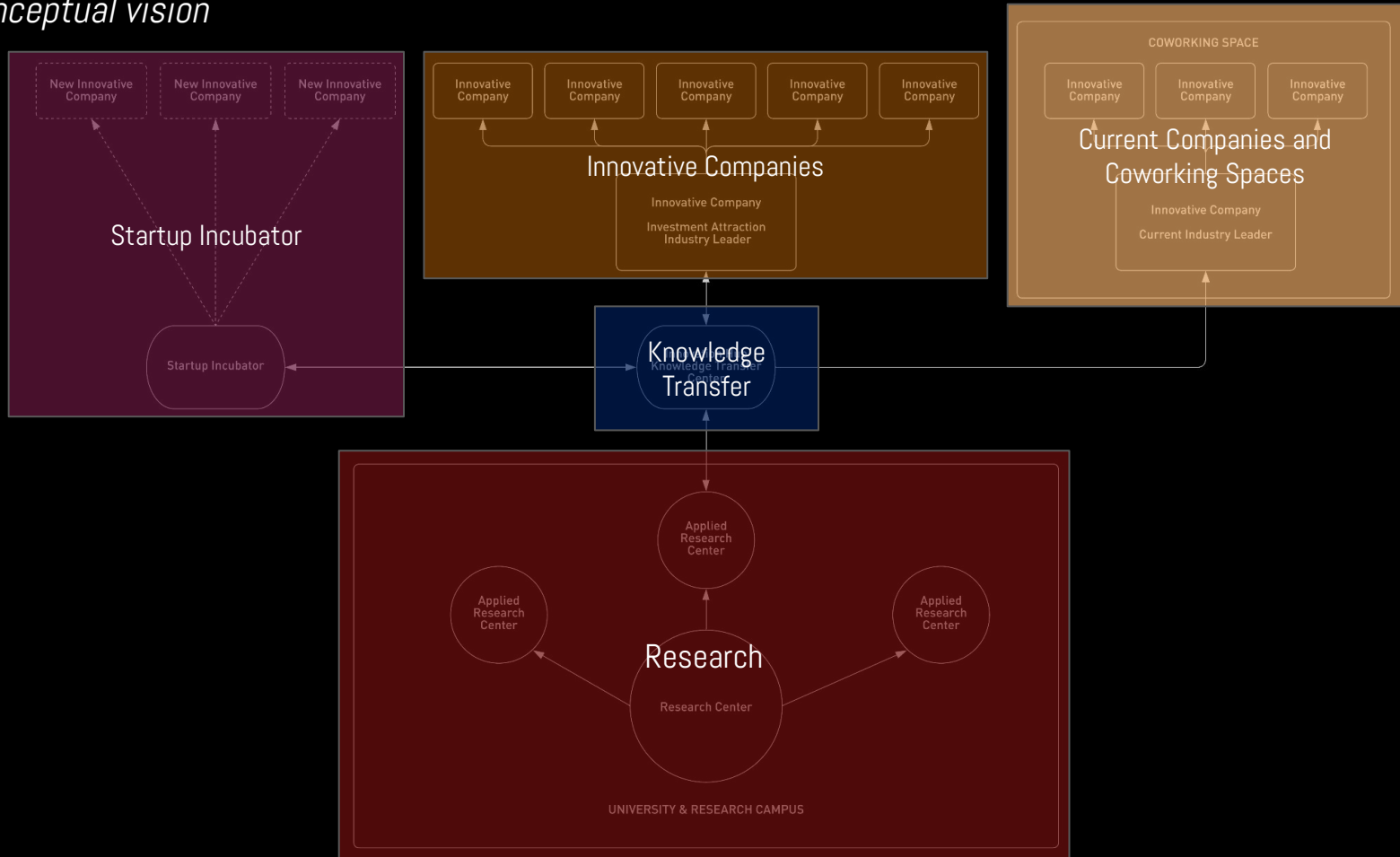
Barcelona - Besòs Area: *Urban Design and Innovation Strategy*

Conceptual vision

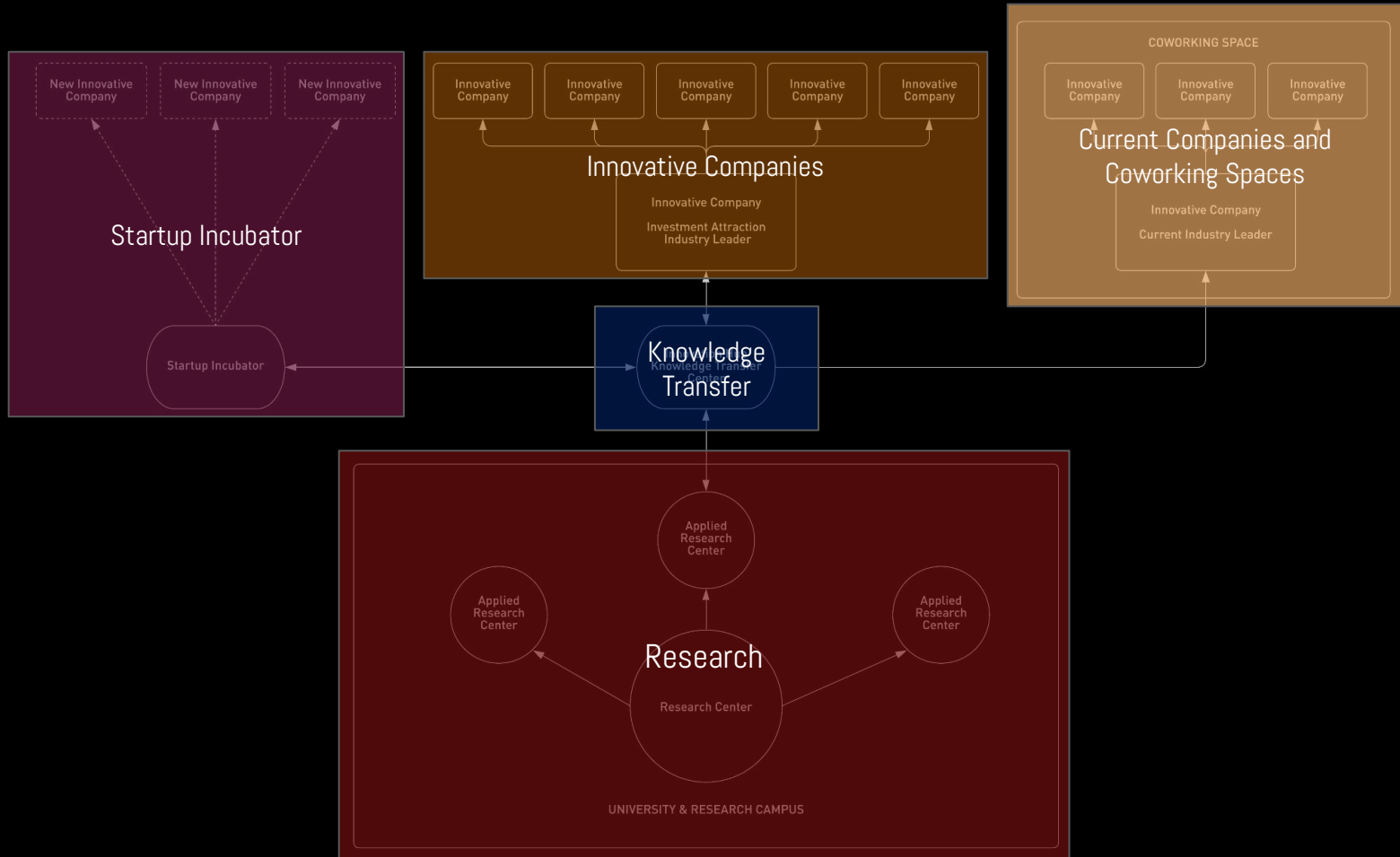


Barcelona - Besòs Area: *Urban Design and Innovation Strategy*

Conceptual vision



Service Companies, Suppliers, Amenities



Innovation Vision

Innovation Strategy *to Strengthen the Knowledge Economy*
Land Use and Placemaking

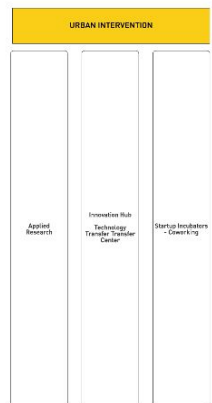
Barcelona - Besòs Innovation District Innovation Pipeline

Knowledge Economy System: Bridging the Gap between Research and Industry

UrbanTech Research

FIELD	UNIVERSITIES	DEPARTMENTS	RESEARCHERS	NUM OF PUBLICATIONS	NUM OF ARTICLES	NUM OF BOOKS	NUM OF CHAPTERS
UrbanTech	Barcelona Tech	[Departament d'Enginyeria Civil i Ambiental]	180	17.898	1.832	342	29679
		[Departament de Sociologia del Habitatge]	73	4.180	11.97	700	1.767
		[Departament de Psicologia Experimental]	69	1.987	740	398	747
		[Departament d'Arquitectura i Disseny del Habitatge]	37	2.048	602	283	1.122
		[Departament de Matemàtiques i Estadística i Informàtica i Governança]	32	7.713	708	152	1.801
		[Departament d'Enginyeria de Proccesos i de Controladors]	28	3.020	603	53	1.882
		[Departament d'Enginyeria de Sistemes i Informàtica]	27	2.027	688	51	1.489
		[Departament de Representació i Informàtica]	21	616	449	19	426
		[Departament de Matemàtica Bàsica]	21	1.031	612	40	840
		[Departament de Resposta a Emergències i Resiliència i d'Enginyeria]	22	1.148	522	71	688
UrbanTech	Multiple Affiliations	[Centre d'Innovació de Mòduls Numèrics i d'Enginyeria, Departament d'Enginyeria]	24	4.577	1.833	189	2.733
		[Centre d'Innovació de Mòduls Numèrics i d'Enginyeria, Departament de Física]	4	222	82	11	128
		[Centre d'Innovació de Mòduls Numèrics i d'Enginyeria, Departament de Física]	2	123	53	9	22
		[Centre d'Innovació de Mòduls Numèrics i d'Enginyeria, Departament d'Enginyeria]	2	84	52	4	8
		[Centre d'Innovació de Mòduls Numèrics i d'Enginyeria, Departament d'Enginyeria]	1	54	22	0	2
		[Departament d'Enginyeria de Proccesos i de Controladors, Departament de Física]	2	75	86	0	188
		[Centre d'Innovació de Mòduls Numèrics i d'Enginyeria, Departament de Física]	1	46	28	1	21
		[Departament d'Enginyeria de Proccesos i de Controladors, Departament de Física]	1	79	32	2	35
		[Departament d'Enginyeria, Departament de Matemàtica Bàsica]	1	181	98	2	81
		[Departament d'Enginyeria, Departament de Física i Matemàtica Bàsica]	1	74	28	11	30
UrbanTech	UB	[Departament d'Enginyeria de Sistemes i Informàtica, Facultat de Ciències de l'Enginyeria]	10	1.206	1.073	27	188
		[Departament de Física Bàsica, Facultat de Ciències de l'Enginyeria]	2	371	208	51	84

UrbanTech Centers



UrbanTech-related Innovative Companies and Support Services

URBANTECH INNOVATIVE COMPANIES																															
EXISTING INDUSTRIES																															
<table border="1"> <thead> <tr> <th>NAICS 2017, core code description</th> <th>Companies</th> <th>Employees</th> <th>Revenue (€M)</th> </tr> </thead> <tbody> <tr> <td>Management of Companies and Enterprises</td> <td>1</td> <td>274</td> <td>650.38</td> </tr> <tr> <td>Chemical Products</td> <td>1</td> <td>244</td> <td>513.06</td> </tr> <tr> <td>Ship and Boat Building</td> <td>2</td> <td>8</td> <td>63.76</td> </tr> <tr> <td>Architectural, Engineering, and Related Services</td> <td>1</td> <td>4</td> <td>62.39</td> </tr> <tr> <td>Other Wood Product Manufacturing</td> <td>1</td> <td>3</td> <td>62.59</td> </tr> <tr> <td>Scientific Research and Development Services</td> <td>1</td> <td>2</td> <td>63.01</td> </tr> </tbody> </table>				NAICS 2017, core code description	Companies	Employees	Revenue (€M)	Management of Companies and Enterprises	1	274	650.38	Chemical Products	1	244	513.06	Ship and Boat Building	2	8	63.76	Architectural, Engineering, and Related Services	1	4	62.39	Other Wood Product Manufacturing	1	3	62.59	Scientific Research and Development Services	1	2	63.01
NAICS 2017, core code description	Companies	Employees	Revenue (€M)																												
Management of Companies and Enterprises	1	274	650.38																												
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Scientific Research and Development Services	1	2	63.01																												
HS Industry	NAICS Description	Companies	Employees	Revenue (€M)																											
		Building Equipment Construction	32	661	97.264																										
		Building Finishing Contractors	9	211	19.917																										
		Installation, Structure, and Building Exterior Contractors	1	14	714																										
		Crown and Glass Product Manufacturing	1	11	3.84																										
STONE PRODUCTS	NAICS Description	Other Special Trade Contractors	7	37	3.98																										
		Operative Building Construction	10	58	6.63																										
		Utility System Construction	1	6	5.13																										
		Management of Companies and Enterprises	1	2	1.11																										
		Direct Selling Establishments	1	77	9.98																										
TRANSPORTATION	NAICS Description	General Freight Trucking	18	262	185.78																										
		Water Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers	2	25	2.87																										
		Support Activities for Rail Transportation	1	3	8																										
		Support Activities for Motor Transportation	12	284	16.44																										
		Urban Transit Systems	3	106	6.93																										
REAL ESTATE	NAICS Description	Activities Related to Real Estate	7	6	1.85																										
		Intermediate Equipment Merchant Retailing	4	44	4.18																										
		Construction and Equipment Merchant Retailing	7	48	2.74																										
		Computer Dealers Retailing	1	18	8.67																										
		Stores of Other Retailers	62	113	16.63																										
Offices of Real Estate Operators and Brokers	3	7	6.52																												

Recerca Teòrica	Recerca Aplicada	Centres de Transferència de Coneixement	Camps del Coneixement	Indústries i Sectors d'Activitat
1089 Camps de Recerca	325 Camps de Recerca Aplicada	5 grans àrees de coneixement	11 Camps del Coneixement	114 sectors estratègics d'especialització

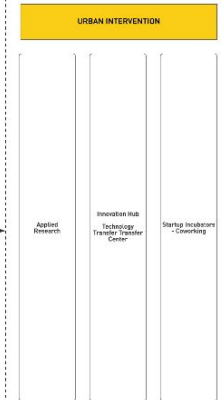
Barcelona - Besòs Innovation District Innovation Pipeline

Knowledge Economy System: Bridging the Gap between Research and Industry

Advanced Manufacturing and Robotics Research

FIELD	UNIVERSITIES	DEPARTMENTS	RESEARCHERS	NUM OF PUBLICATIONS	NUM OF ARTICLES	NUM OF BOOKS	NUM OF CHAPTERS
AM and Robotics	Barcelona Tech	[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial]	50	9.126	1.877	109	
		[Departament d'Enginyeria de Màquines Industrials (EM2)]	18	7.877	870	102	1.885
		[Departament d'Enginyeria Mecànica]	46	2.858	806	179	1.058
		[Departament d'Ingenyeria Tècnica de Sistemes]	26	2.761	686	10	1.088
		[Facultat de Matemàtiques i Informàtica (MII)]	18	1.212	403	28	381
		[Departament de Ciències i Enginyeria Tècnica]	17	869	323	74	397
		[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial - Tècnica de Sistemes Aeroespacials]	12	2.013	574	23	881
		[Departament d'Ingenyeria Mecànica - Tècnica d'Enginyeria - Ciència i Sistemes Aeroespacials]	4	389	276	14	336
		[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial - Tècnica de Sistemes Aeroespacials]	4	613	300	88	338
		[Tècnica d'Enginyeria de Sistemes Aeroespacials]	1	265	143	0	258
	Multiple Affiliations	[Departament d'Enginyeria - Tècnica de Sistemes Aeroespacials (TSA)]	1	12	12	0	0
		[Institució d'Estudis Científics de Catalunya - Institut de Ciències i Tecnologia]	1	23	14	1	17
		[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial - Tècnica de Sistemes Aeroespacials]	1	18	11	0	16
		[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial - Tècnica de Sistemes Aeroespacials]	1	113	93	7	45
		[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial - Departament d'Enginyeria de Sistemes Aeroespacials]	1	12	10	7	11
		[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial - Tècnica de Sistemes Aeroespacials]	1	11	10	0	1
		[Departament d'Enginyeria de Sistemes Aeroespacials i Informàtica Industrial - Tècnica de Sistemes Aeroespacials]	1	144	704	0	31
		[Departament d'Enginyeria Mecànica - Departament de Sistemes Aeroespacials]	1	121	128	0	73
		[Departament d'Enginyeria Mecànica - Departament de Sistemes Aeroespacials]	1	17	7	8	6
		[Departament d'Enginyeria Mecànica - Departament de Sistemes Aeroespacials]	1	16	17	18	19
'UVic-UCC	[Departament d'Enginyeria]	28	108	456	12	191	

AM Centers



Advanced Manufacturing-related Innovative Companies and Support Services

INNOVATIVE COMPANIES			EXISTING INDUSTRIES			
NAICS 2017, 6-digits description	Companies	Employees	Revenue (M€)	Companies	Employees	Revenue (M€)
Other General Purpose Machinery Manufacturing	4	184	€207.9			
Other Miscellaneous Manufacturing	7	98	€19.8			
Other Fabricated Metal Product Manufacturing	8	34	€4.65			
Other Electrical Equipment and Component Manufacturing	3	54	€3.82			
Semiconductor and Other Electronic Component Manufacturing	3	51	€5.37			
Motor Vehicle Parts Manufacturing	3	30	€4.15			
Machine Shops, Turned Product, and Screw, Nut, and Bolt Manufacturing	4	22	€4.73			
Heat Treating, Anodizing, and Commercial Refrigeration Equipment Manufacturing	1	18	€97.7			
Spring and Wire Product Manufacturing	3	10	€1.47			
Other Transportation Equipment Manufacturing	1	10	€1.12			
Electric Lighting Equipment Manufacturing	1	12	€1.12			
Instrument, Measuring, Electromedical, and Control Instruments Manufacturing	1	2	€1.09			
Iron and Steel Mills and Ferroalloy Manufacturing	1	1	€9.17			
HS Industry						
MACHINES						
Design and Drafting; Goodies Merchant Wholesale				90	€5.62	29.87
Electronics and Appliance Stores				31	€5.42	4.34
Hardware, and Plumbing and Heating Equipment and Supplies				21	€1.95	26.30
Machinery, Equipment, and Supplies Merchant Wholesale				7	€0.82	47.09
Wholesale Electronic and Electrical and Electronic Goods				11	€3.25	24.86
Machinery, Equipment, and Supplies Merchant Wholesale				2	€0.82	3.69
Wholesale Electronic and Electrical and Electronic Goods				1	€0.21	4.62
Professional and Commercial Equipment and Supplies Merchant				1		12.22
Wholesale Heating, Air Conditioning, and Commercial Refrigeration				202	€21.85	6.77
Wholesale Electronic and Electrical and Electronic Goods				4	10	2.92
Wholesale Electronic, Electronic, and Related Services				4	20	2.92
Management of Companies and Enterprises				16	4.91	56.34
Management of Companies and Enterprises				2	6	1.82
Motion Picture and Video Industries				7	29	1.87
Other Telecommunications, Scientific, and Technical Services				1		9.95
Blank, Blanks, and News Dealers				1	0	9.9
Other Support Activities for Transportation				1	1	9.9
Printing and Related Support Activities				50	384	94.72
Building Material and Supplies Dealers				3	10	1.52
Furniture and Home Furnishings Merchant Wholesale				4	25	3.82
Furniture Stores				1	7	4.76
Other Motor Vehicle Construction Materials Merchant Wholesale				12	95	11.06
Electronic and Electronic Equipment Manufacturing				16	174	18.76
Batteries, Torque, and Shipping Container Manufacturing				2	10	2.15
Coating, Engraving, Heat Treating, and Allied Activities				13	94	7.98
Custom and Off-Highway Vehicle Manufacturing				4	6	6.06
Printing and Related Support Activities				1	4	5.47
Other Nonmetallic Mineral Product Manufacturing				1	0	1.93
Steel Product Manufacturing from Purchased Steel				7	85	12.06
Nonmetallic Mineral Product Manufacturing				0	35	3.93
Basic Chemicals				4	11	4.76
Metal and Metal (except Precious) Merchant Wholesale				1	6	9.9

Applied Research Centers

Knowledge Transfer

Innovative Companies

Support Industries

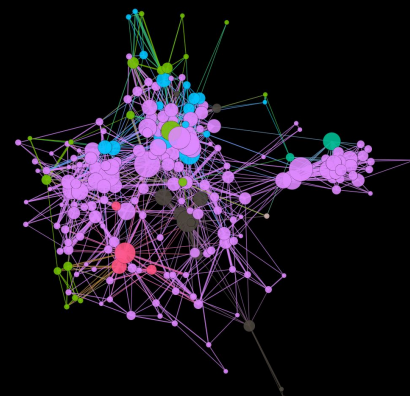
Barcelona Area Research: overview of knowledge networks



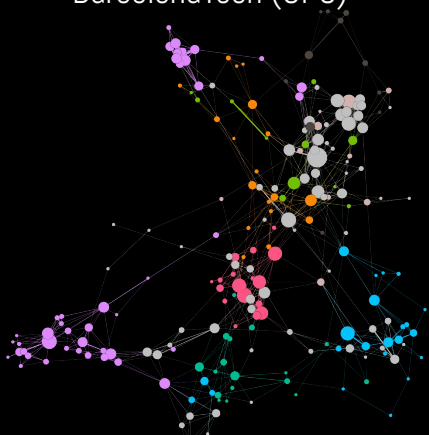
BarcelonaTech (UPC)



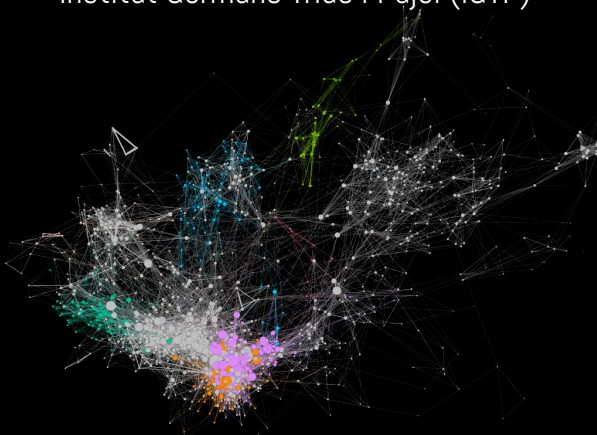
Institut Germans Trias i Pujol (IGTP)



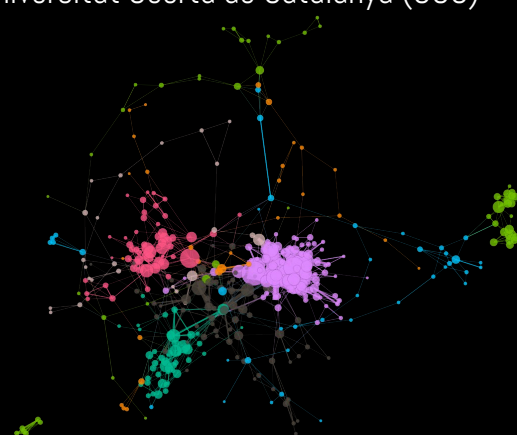
Universitat Oberta de Catalunya (UOC)



Universitat de Vic (UVic)

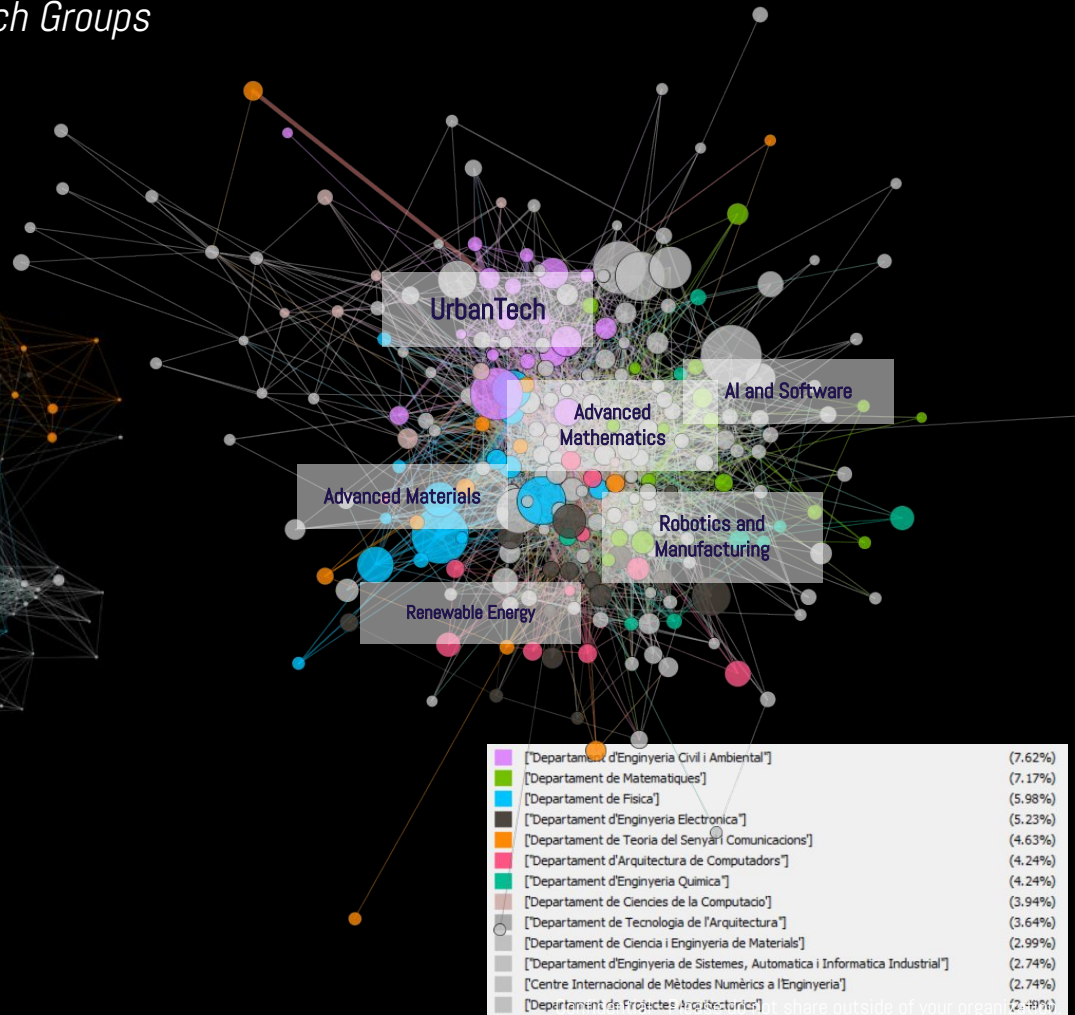
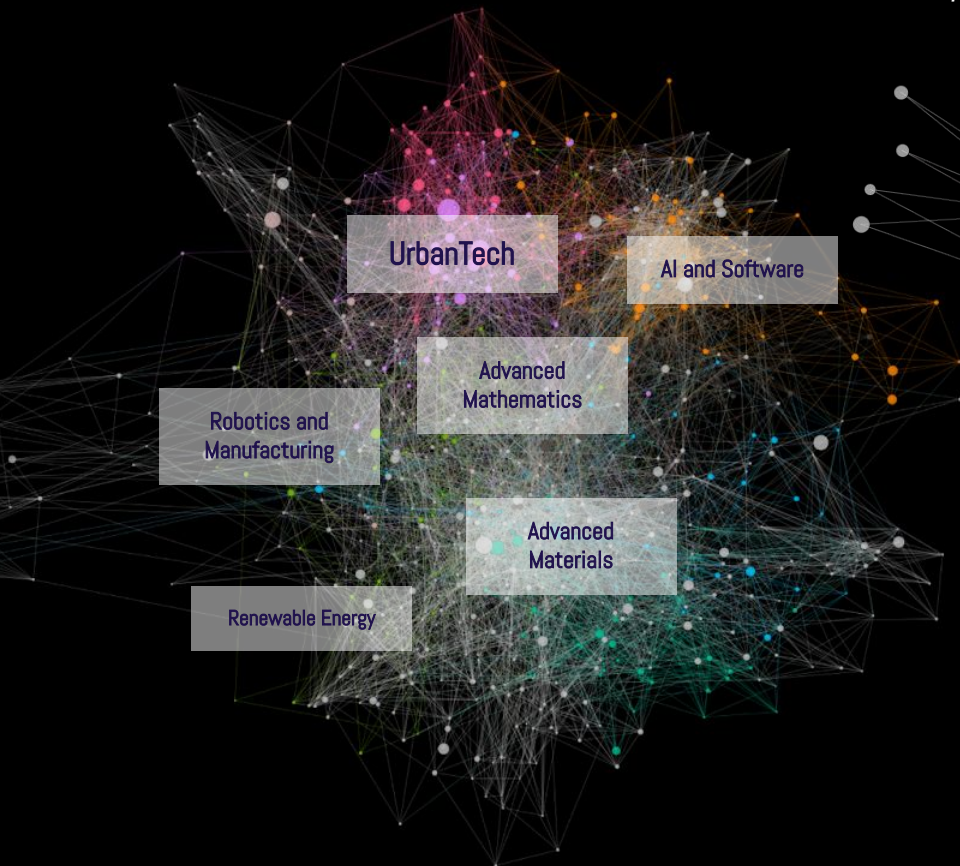


Universitat de Barcelona (UB)

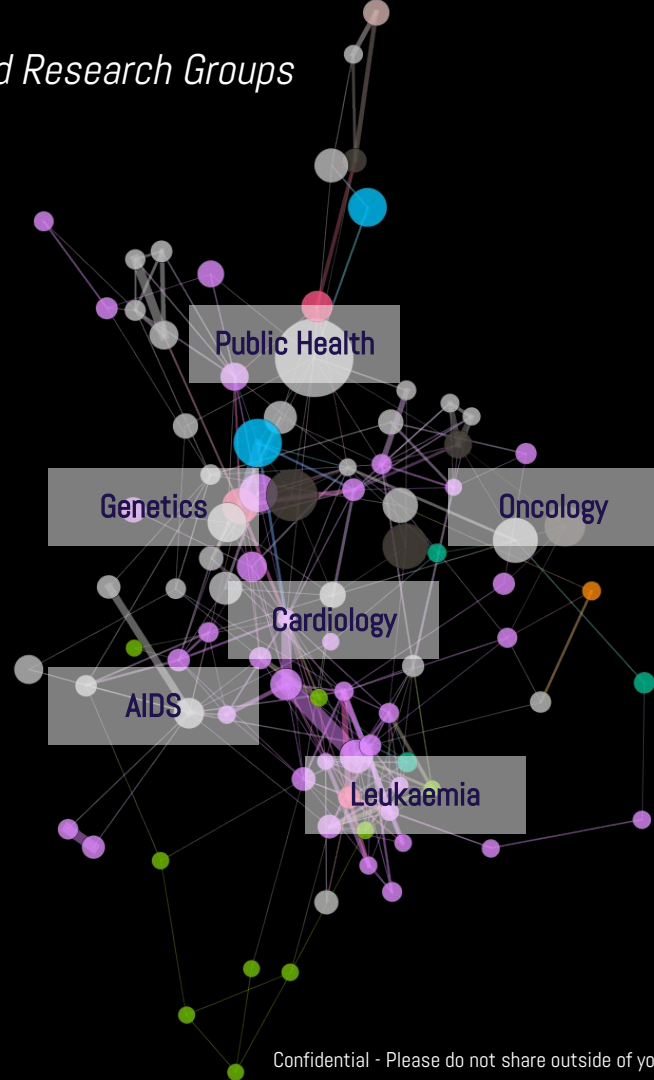


Universitat Pompeu Fabra (UPF)

BarcelonaTech: Researchers and Research Groups

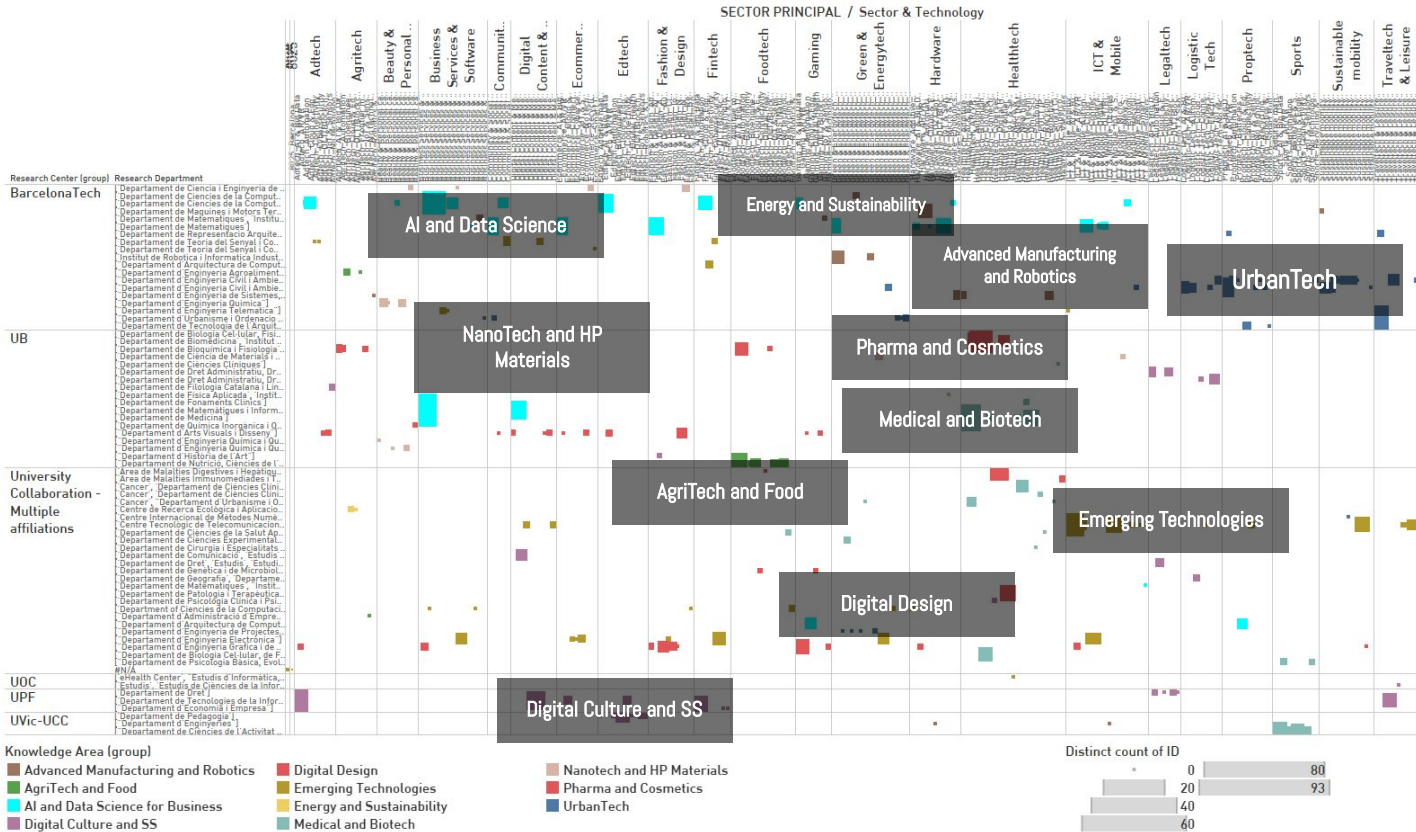


Institut Germans Trias i Pujol (IGTP): *Researchers and Research Groups*



Innovation Pipeline: Applied Research Potential - Knowledge Transfer with Startups

Applied Research Potential with Startups

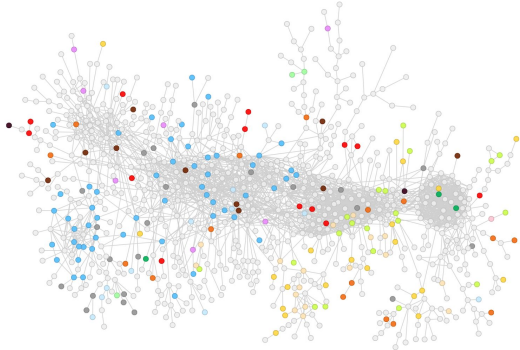


Economic Development Vision

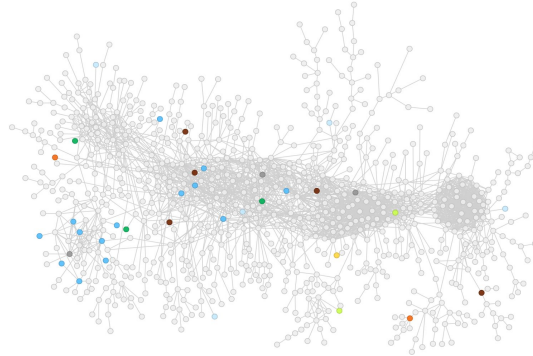
Smart Specialization *to unleash growth in the industries
with global comparative advantage*

Economic Development: *Smart Specialization based on the Strengths of the Network of Industries*

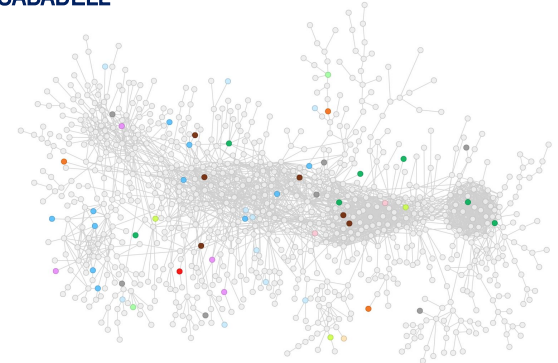
BARCELONA



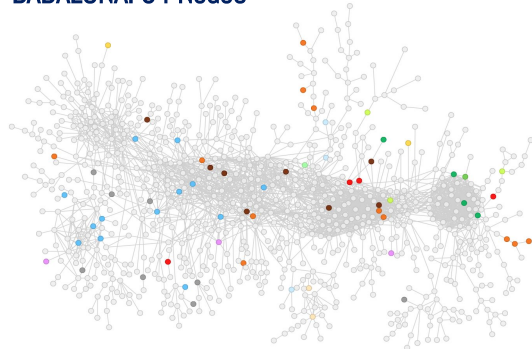
SANT CUGAT



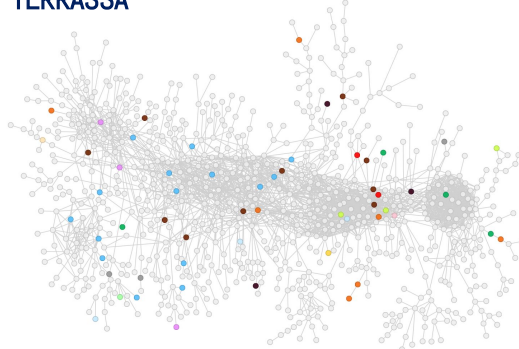
SABADELL



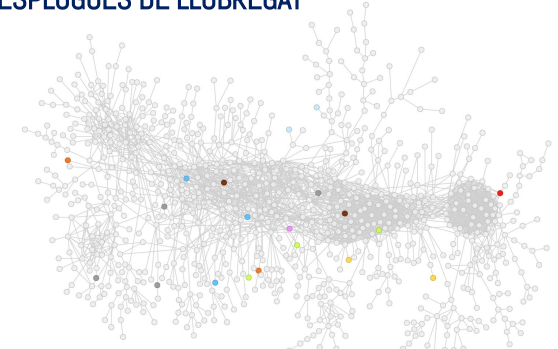
BADALONA: 64 Nodes



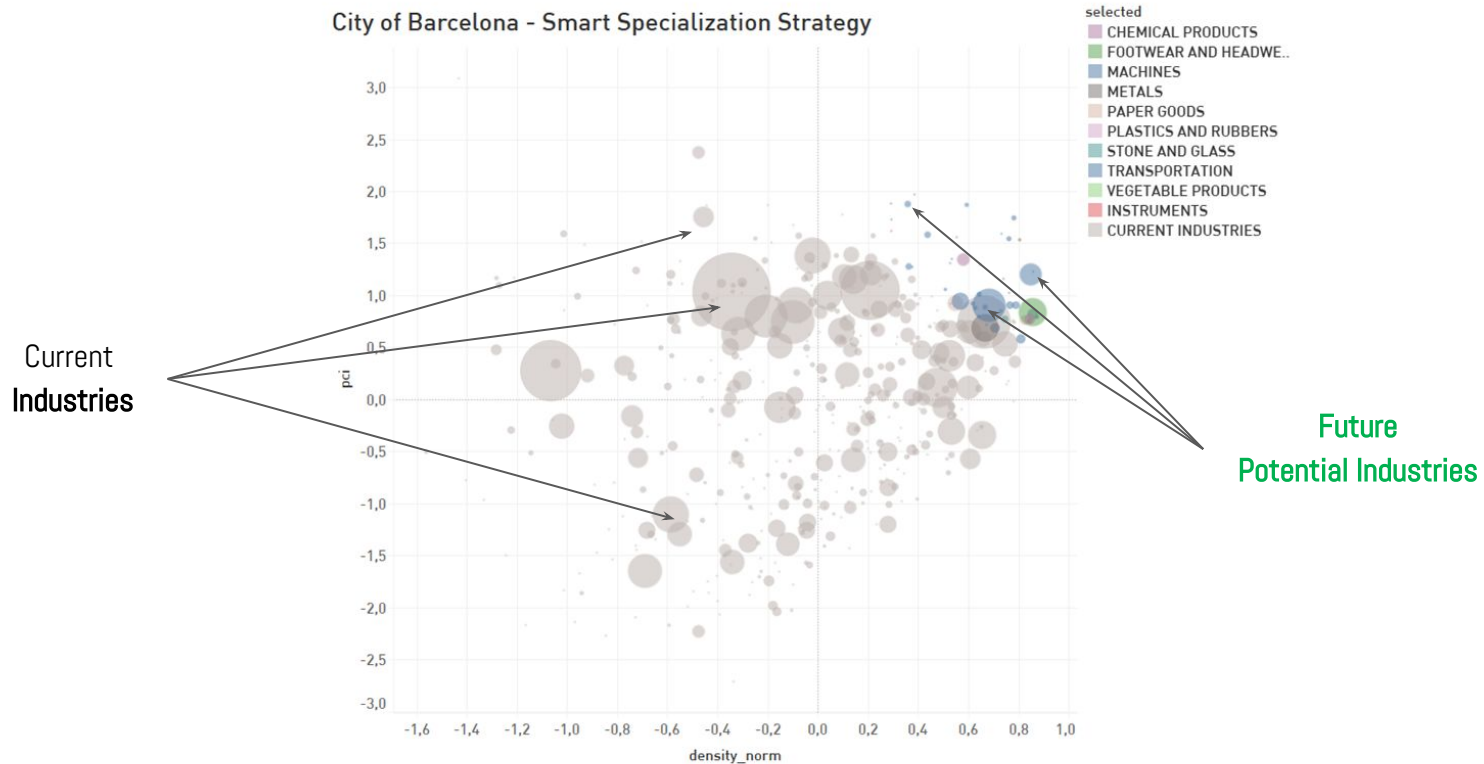
TERRASSA



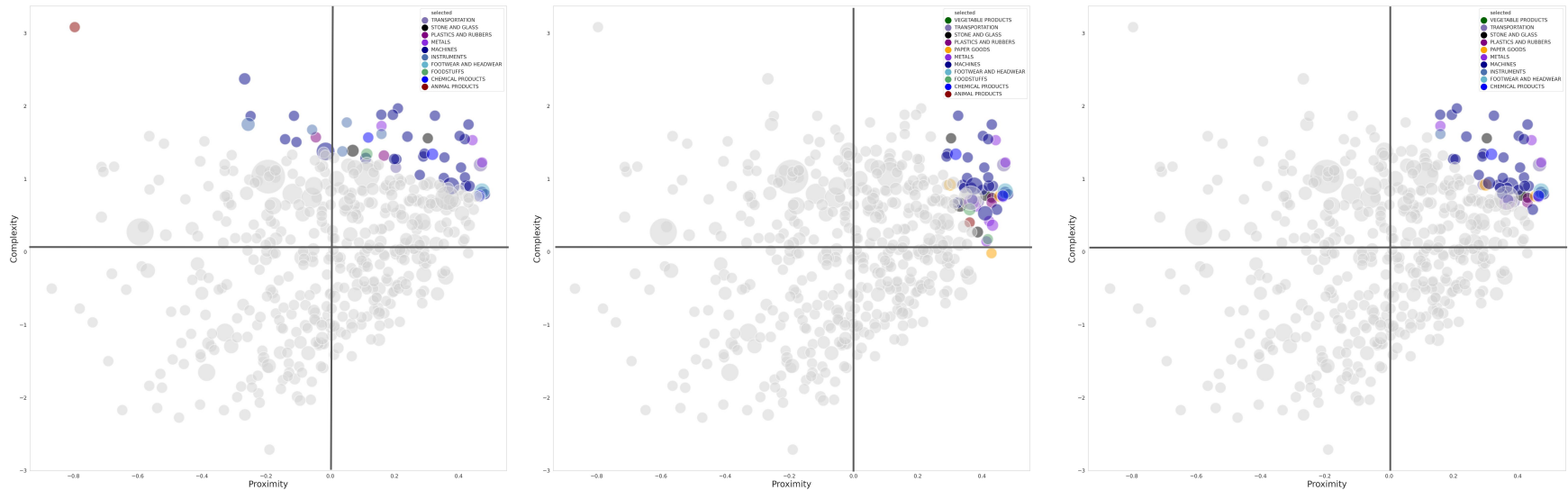
ESPLUGUES DE LLOBREGAT



Economic Development: *Smart Specialization based on the Strengths of the Network of Industries*



Barcelona: *Smart Specialization based on the Strengths of the Network of Industries*

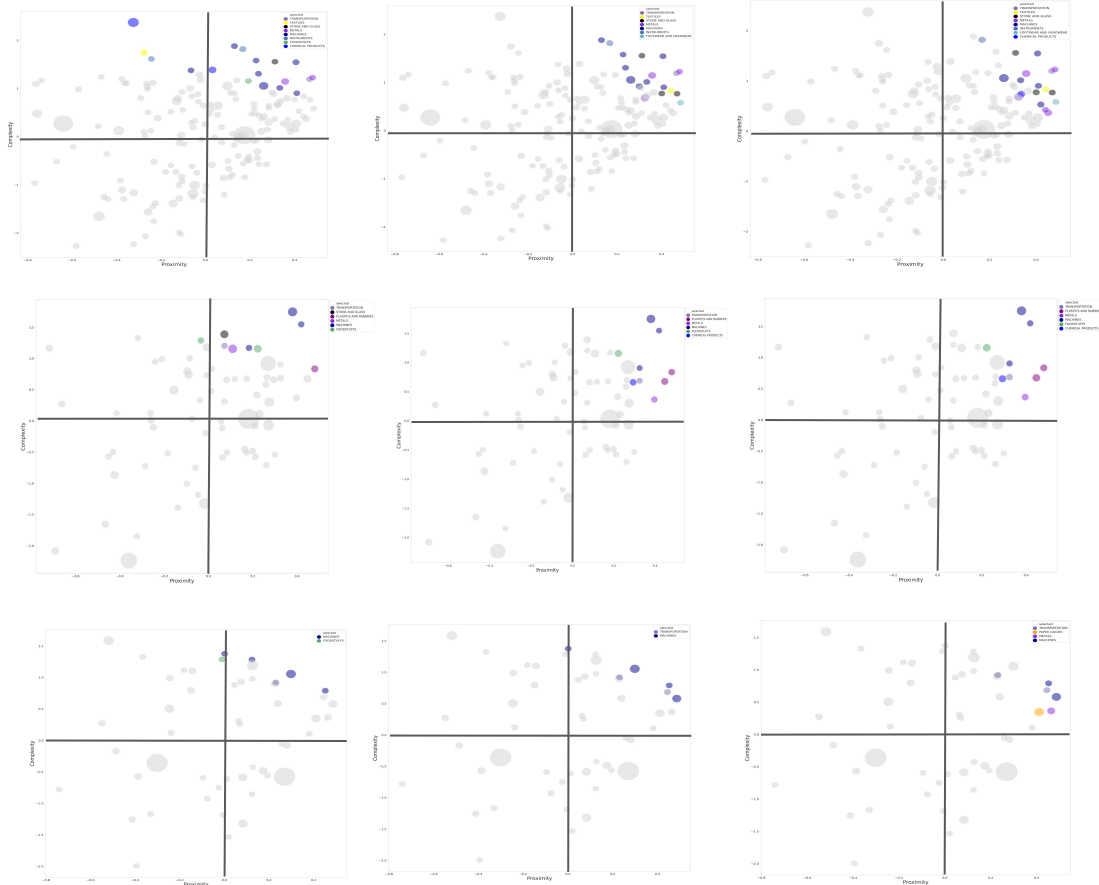


Preliminary Identification of Smart Specialization Target Industries for the City of Barcelona (201 Nodes)

Current strengths: Pharmaceuticals, Medicaments, Automobile, Electronics, Synthetic Rubber, Food, Printing Machinery, etc

Target Industries: Photonics, Robotics, Electric Furnaces, High Precision Instruments, Radar Apparatus, Tractors and Heavy Vehicles, Agritech Processing Machinery, Air or Vacuum Pumps, Electric Motors, Rail Equipment

Besòs Area: Smart Specialization based on the Strengths of the Network of Industries



Badalona: 64 industries

Wadding of Textile Materials, Batteries, Jewelry, Anoraks & Coats, Chemicals for Electronics, Motor Cars, Cranes, TV and Radar Electronics, Precious Metals, Cements, AgriFood, etc
Potential/Target: Liquid Treatment Appliances, Robotics / Metal Instruments, Measuring Instruments, Furniture Hardware, Mechanical Processes, Machinery for HP Materials Treatment

Sant Adrià: 24 industries

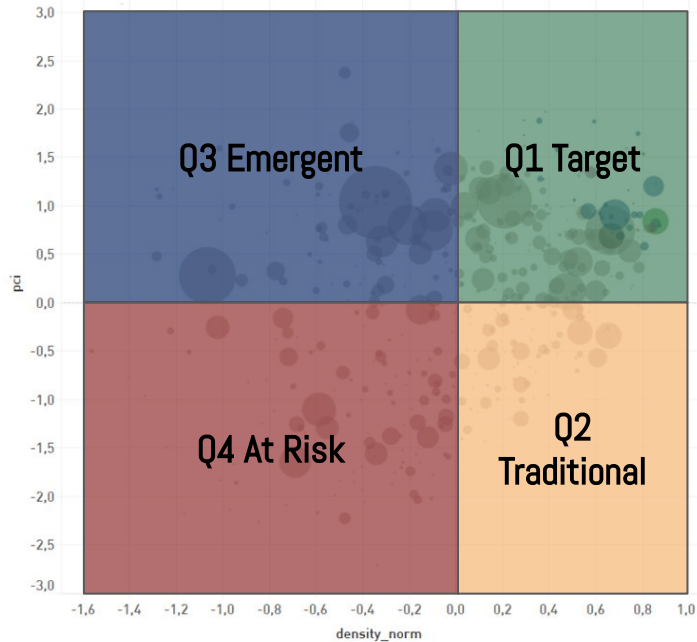
Cranes, Jewelry, Pharma/Cosmetics, Furniture Hardware, Chemicals, Packaging, AgriFood, Construction, TV Electronics
Potential/Target: Machinery for HP Materials Treatment, FoodTech Processing Machinery, Electrical Insulators, Plastics/Polymers, Trailers

Santa Coloma: 19 industries

Animal Feeding Processing, Apparel/Clothing, Human & Animal Blood, Zinc Tubes, Motorcycles, Apparel, Furniture, Trucks, Glass, Pearls
Potential/Target: Heavy Vehicles & Trucks, Liquid Treatment Appliances, Electrical Transformers and Power Supplies, Furniture Hardware, Electric Motors

Barcelona Besòs Innovation District: Smart Specialization

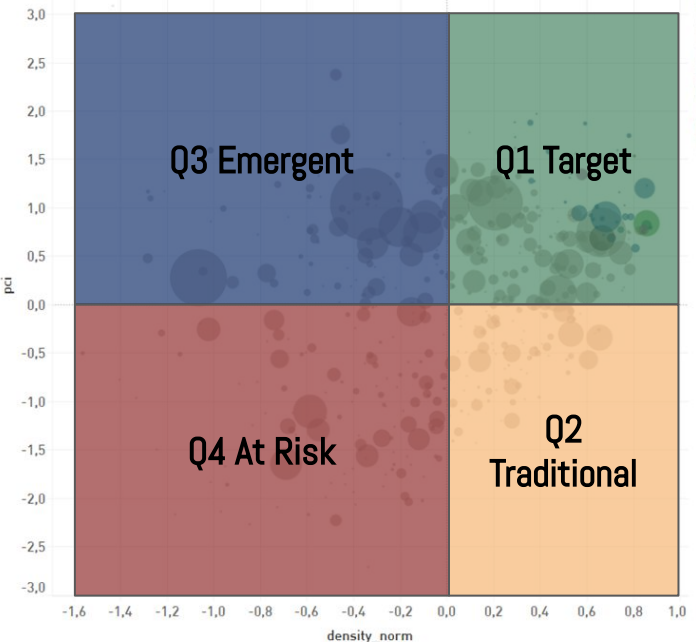
City of Barcelona - Smart Specialization Strategy



Quadrant	Nombre de sectors
1 - Indústries d'Oportunitat Estratègica	114
2 - Indústries Tradicionals Estancades	93
3 - Indústries Innovadores Emergents	98
4 - Indústries Estables	88
5 - Indústries en Risc	42

Barcelona Besòs Innovation District: Smart Specialization

City of Barcelona - Smart Specialization Strategy



STRATEGIC SECTOR	INDUSTRIES	PCI (Complexity Index)	Product Density Normalized	Total Exports (€)
CHEMICAL PRODUCTS	CHAIN AND PARTS THEREOF OF IRON OR STEEL	1.34	3.18	50,259,191 €
CHEMICAL PRODUCTS	MULTIPLE-WALLED INSULATING UNITS OF GLASS	0.77	4.65	32,040,493 €
FOOTWEAR AND HEADWEAR	ARTICLES OF PLASTICS AND ARTICLES OF POLYMERS AND RESINS	0.83	0.47	240,812,835 €
INSTRUMENTS	INSTRUMENTS AND APPARATUS FOR PHYSICAL OR CHEMICAL ANALYSIS	1.62	0.16	19,857 €
MACHINES	AIR OR VACUUM PUMPS, AIR OR OTHER GAS COMPRESSORS AND	0.85	4.01	2,079,409 €
MACHINES	BALL OR ROLLER BEARINGS, AND PARTS THEREOF	1.58	2.41	9,979,411 €
MACHINES	CALENDERING OR OTHER ROLLING MACHINES, OTHER THAN FOR	1.97	0.21	716,231 €
MACHINES	CENTRAL HEATING BOILERS NESOI, INCLUDING CENTRAL HEATING	1.02	0.42	317,162 €
MACHINES	CENTRIFUGES, INCLUDING CENTRIFUGAL DRYERS; FILTERING OR	1.01	3.54	6,022,549 €
MACHINES	COMPRESSION-IGNITION INTERNAL COMBUSTION PISTON ENGINE	1.30	0.36	45,576 €
MACHINES	ELECTRIC LASER, OTHER LIGHT OR PHOTON BEAM, ETC. APPARAT	1.88	0.20	9,052,473 €
MACHINES	ELECTRIC MOTORS AND GENERATORS (EXCLUDING GENERATING	0.92	0.34	3,497,021 €
MACHINES	ELECTRICAL APPARATUS FOR SWITCHING OR PROTECTING ELECT	0.72	0.37	1,117,050 €
MACHINES	ELECTRICAL INSULATORS OF ANY MATERIAL	0.90	3.78	331,005,780 €
MACHINES	ELECTRICAL LIGHTING OR SIGNALING EQUIPMENT NESOI, WINDSH	0.90	4.34	18,419,513 €
MACHINES	ELECTRICAL SIGNALING, SAFETY OR TRAFFIC CONTROL EQUIPME	0.90	4.22	19,258,986 €
MACHINES	ELECTRICAL TRANSFORMERS, STATIC CONVERTERS OR INDUCTOR	0.06	4.46	21,224,141 €
MACHINES	ENGINES AND MOTORS NESOI, AND PARTS THEREOF	1.27	2.06	817,543 €
MACHINES	GASKETS AND LIKE JOINTS OF METAL SHEET COMBINED WITH OT	1.35	2.93	84,450 €
MACHINES	HARVESTING OR THRESHING MACHINES; GRASS OR HAY MOWERS	0.88	0.37	5,597,261 €
MACHINES	INDUSTRIAL OR LABORATORY ELECTRIC FURNACES AND OVENS; O	1.87	3.26	4,250,173 €
MACHINES	INDUSTRIAL OR LABORATORY FURNACES AND OVENS, INCLUDING	0.80	0.35	1,843,174 €
MACHINES	MACHINERY OR EQUIPMENT FOR THE TREATMENT OF MATERIALS	1.55	4.19	7,386,180 €
MACHINES	MACHINES AND MECHANICAL APPLIANCES HAVING INDIVIDUAL FU	1.88	1.59	45,576 €
MACHINES	MECHANICAL APPLIANCES FOR DISPERSING LIQUID OR POWDER;	0.11	2.79	1,719,885 €
MACHINES	PARTS FOR ELECTRICAL APPARATUS FOR SWITCHING ETC, ELECT	0.82	0.47	32,201,346 €
MACHINES	PARTS FOR SPARK-IGNITION RECIPROCATING OR ROTARY INTERN	1.16	0.41	18,686 €
MACHINES	PARTS OF ELECTRIC MOTORS, GENERATORS, GENERATING SETS A	0.79	4.82	3,450,313 €
MACHINES	PARTS OF MACHINERY OF HEADINGS 8425 TO 8430 COVERING DI	0.88	0.34	3,246,093 €
MACHINES	PUMPS FOR LIQUIDS, WITH OR WITHOUT A MEASURING DEVICE; L	1.31	2.90	155,679 €
MACHINES	RADAR APPARATUS, RADIO NAVIGATIONAL AID APPARATUS AND RA	1.27	1.99	841,658 €
MACHINES	TAPS, COCKS, VALVES AND SIMILAR APPLIANCES FOR PIPES, BOIL	1.75	4.31	7,897,488 €
MACHINES	TRANSMISSION SHAFTS AND CRANKS, BEARING HOUSINGS, HOUS	1.59	0.40	84,792 €
METALS	ARTICLES OF ALUMINUM, NESOI	0.75	0.47	6,030,555 €
METALS	HANDTOOLS NESOI; BLOW TORCHES ETC.; VISES, CLAMPS AND TH	0.68	3.67	231,964,661 €
METALS	INTERCHANGEABLE TOOLS FOR HANDTOOLS (POWER-OPERATED)	1.73	1.60	1,053,116 €
METALS	SCREWS, BOLTS, NUTS, COACH SCREWS, SCREW HOOKS, RIVETS	1.53	0.44	2,268,085 €
METALS	SPRINGS AND LEAVES FOR SPRINGS, OF IRON OR STEEL	1.23	0.47	607,114 €
PAPER GOODS	MOUNTINGS AND OTHER HARDWARE FOR FURNITURE, DOORS, WI	0.92	3.00	69,283,272 €
PAPER GOODS	NEWSPAPERS, JOURNALS AND PERIODICALS, WHETHER OR NOT	0.76	4.55	30,014,261 €
PLASTICS AND RUBBERS	ARTICLES NESOI OF UNHARDENED VULCANIZED RUBBER	0.67	0.43	153,619 €
PLASTICS AND RUBBERS	PLATES, SHEETS, FILM, FOIL AND STRIP NESOI, OF PLASTICS	0.74	0.43	1,635,317 €
STONE AND GLASS	MILLSTONES, GRINDING WHEELS AND THE LIKE (NO FRAMEWORK	1.56	3.04	339,607 €
STONE AND GLASS	SAFETY GLASS, CONSISTING OF TOUGHENED (TEMPERED) OR LAM	0.77	4.12	13,098,270 €
TRANSPORTATION	MACHINERY AND APPARATUS FOR SOLDERING, BRAZING OR WELD	0.92	2.91	397,120 €
TRANSPORTATION	PARTS AND ACCESSORIES FOR TRACTORS, PUBLIC-TRANSPORT P	1.20	0.47	134,284,901 €
TRANSPORTATION	TRAILERS AND SEMI-TRAILERS; OTHER VEHICLES, NOT MECHAN	0.69	0.39	28,794,731 €
VEGETABLE PRODUCTS	PIG FAT (INCLUDING LARD) AND POULTRY FAT, OTHER THAN OF HE	0.73	0.43	1,837,261 €

Urban Design Vision

Conceptual urban design for the future Innovation District
to support the urban regeneration process

Legenda

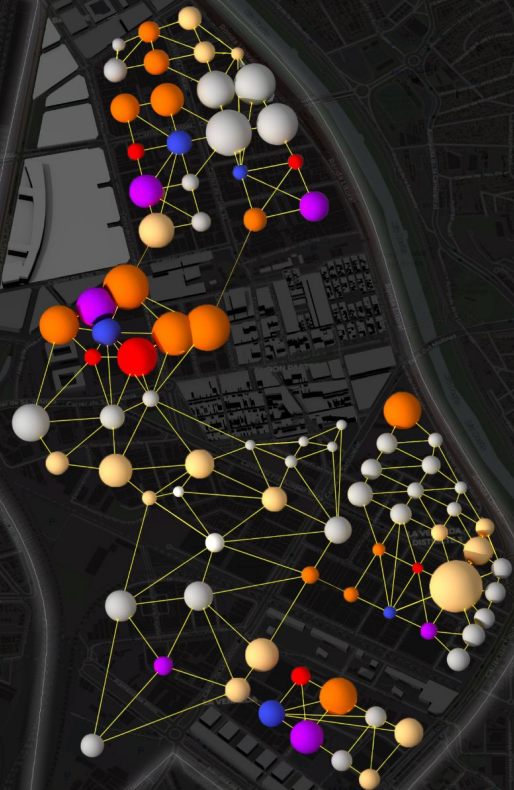
Nanotecnologia i Materials Avançats

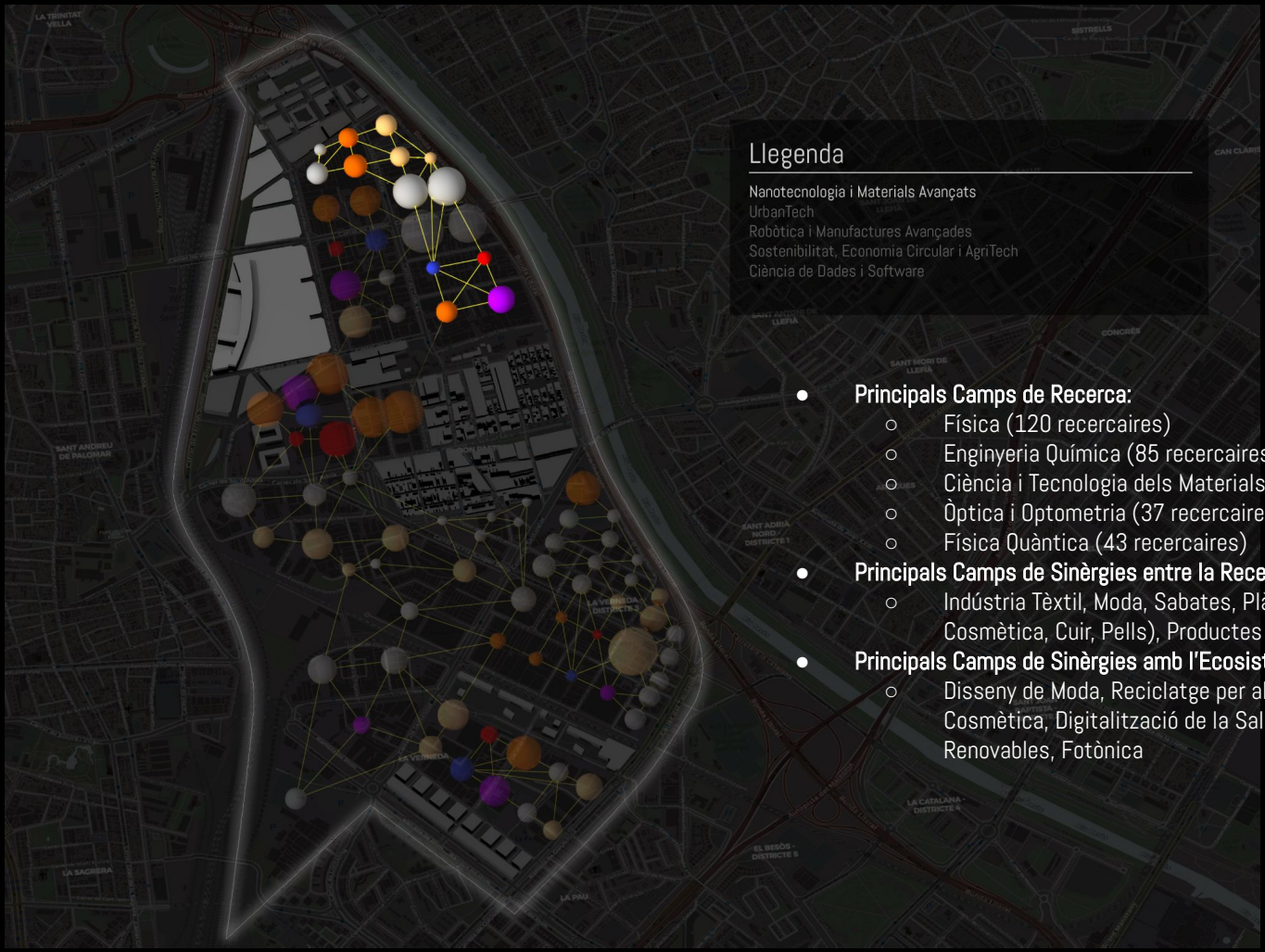
UrbanTech

Robòtica i Manufactures Avançades

Sostenibilitat, Economia Circular i AgriTech

Ciència de Dades i Software






Llegenda

- Nanotecnologia i Materials Avançats
- UrbanTech
- Robòtica i Manufactures Avançades
- Sostenibilitat, Economia Circular i AgriTech
- Ciència de Dades i Software

- **Principals Camps de Recerca:**
 - Física (120 recercaires)
 - Enginyeria Química (85 recercaires)
 - Ciència i Tecnologia dels Materials (60 recercaires)
 - Òptica i Optometria (37 recercaires)
 - Física Quàntica (43 recercaires)
- **Principals Camps de Sinèrgies entre la Recerca i la Indústria Local:**
 - Indústria Tèxtil, Moda, Sabates, Plàstics i Resines, Productes Químics (Moda, Cosmètica, Cuir, Pells), Productes Mèdics i Farmacèutics
- **Principals Camps de Sinèrgies amb l'Ecosistema d'Startups:**
 - Disseny de Moda, Reciclatge per al Sector Tèxtil, Productes de Bellesa i Cosmètica, Digitalització de la Salut, Materials de Frontera per a les Energies Renovables, Fotònica



Llegenda

Nanotecnologia i Materials Avançats


UrbanTech

Robòtica i Manufactures Avançades

Sostenibilitat, Economia Circular i AgriTech

Ciència de Dades i Software

- **Principals Camps de Recerca:**
 - Enginyeria de Camins (153 recercaires)
 - Arquitectura (123 recercaires)
 - Urbanisme (37 recercaires)
 - Informàtica i Computació (79 recercaires)
 - Matemàtiques (144 recercaires)
 - Enginyeria Gràfica i Disseny (26 recercaires)
- **Principals Camps de Sinèrgies entre la Recerca i la Indústria Local:**
 - Construcció: empreses constructores, estructures, fusteria, disseny d'interiors, vidre i cristall)
 - Mobilitat: disseny i fabricació d'automòbils, motocicletes, vehicles pesats, logística, solucions tecnològiques de mobilitat urbana
 - Immobiliari: disseny d'enginyeria civil/arquitectura, urbanisme, GIS, consultoria
- **Principals Camps de Sinèrgies amb l'Ecosistema d'Startups:**
 - PropTech, Mobilitat Sostenible (automatització, AI i Mobilitat), TravelTech & Leisure, Disseny per enginyeria civil i arquitectura, GIS / models de ciència de les ciutats, Tecnologies per Energia Verda, Ciència de Dades i Logística, Construcció Avançada



Llegenda

Nanotecnologia i Materials Avançats

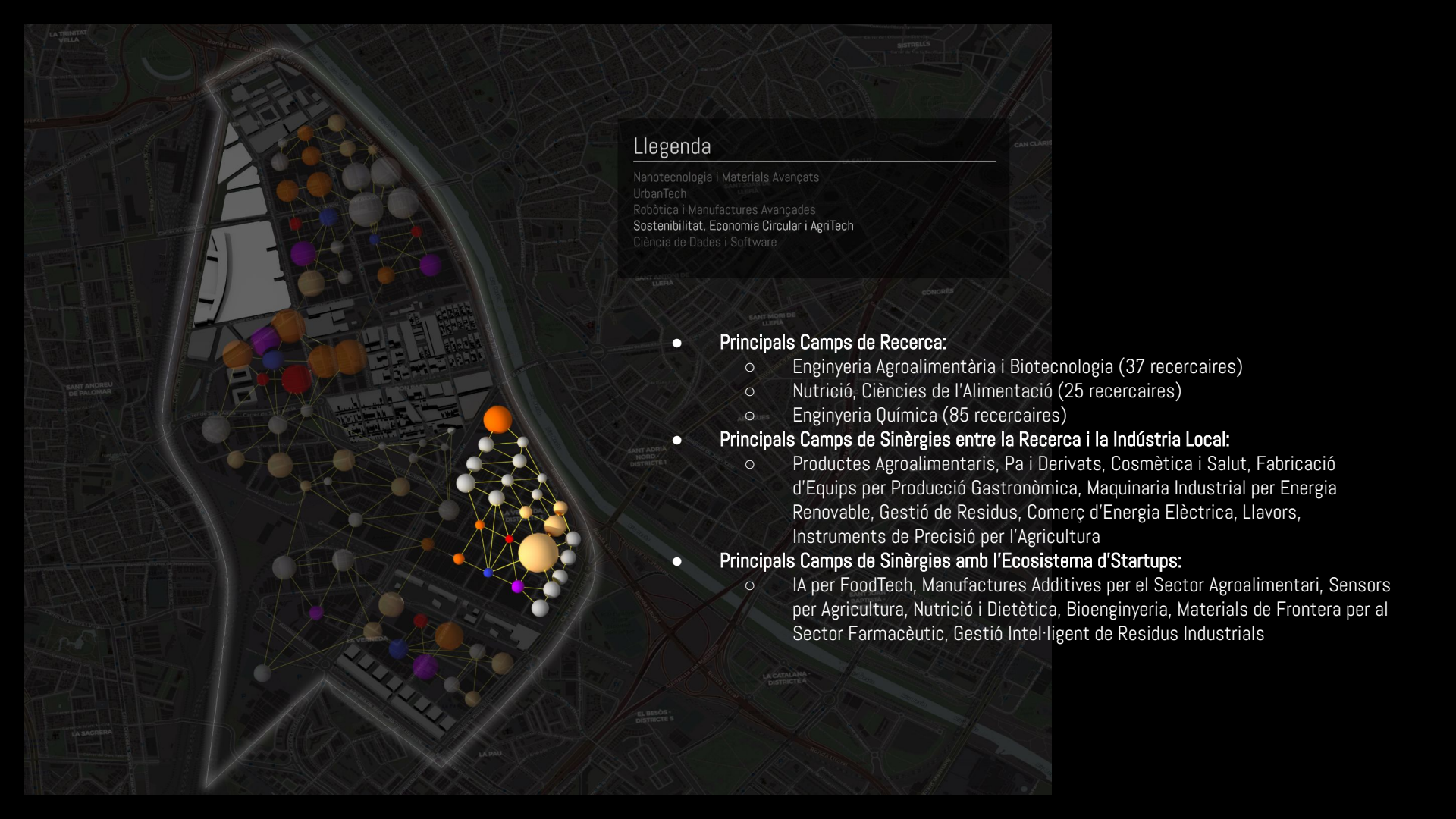
UrbanTech

Robòtica i Manufactures Avançades

Sostenibilitat, Economia Circular i AgriTech

Ciència de Dades i Software


- **Principals Camps de Recerca:**
 - Enginyeria de Sistemes, Automàtica i Informàtica Industrial (55 recercaires)
 - Enginyeria Industrial i TIC (48 recercaires)
 - Enginyeria de Màquines i Motors Tèrmics (25 recercaires)
 - Enginyeria Electrònica i Teoria del Senyal (160 recercaires)
 - Enginyeries (29 recercaires)
 - Computació (79 recercaires)
- **Principals Camps de Sinèrgies entre la Recerca i la Indústria Local:**
 - Dispositius tecnològics per Medicina/Farmàcia/Odontologia, Instruments de Precisió, Fotònica, Fabricació de Peces per Automoció i Vehicles de Motor, Components Electrònics, Productes Metàl·lics per la Indústria de Guerra, Fabricació de Pintures i Vernissos, Productes de Robòtica, Fabricació de Roba i Calçat, Distribució d'Energia Elèctrica, Electrodomèstics
- **Principals Camps de Sinèrgies amb l'Ecosistema d'Startups:**
 - Automatització de Hardware, Automatització de Processos per Energies Renovables, Cosmètica, Centres de Dades, Maquinària per la Mobilitat Sostenible



Llegenda

Nanotecnologia i Materials Avançats
UrbanTech
Robòtica i Manufactures Avançades
Sostenibilitat, Economia Circular i AgriTech
Ciència de Dades i Software

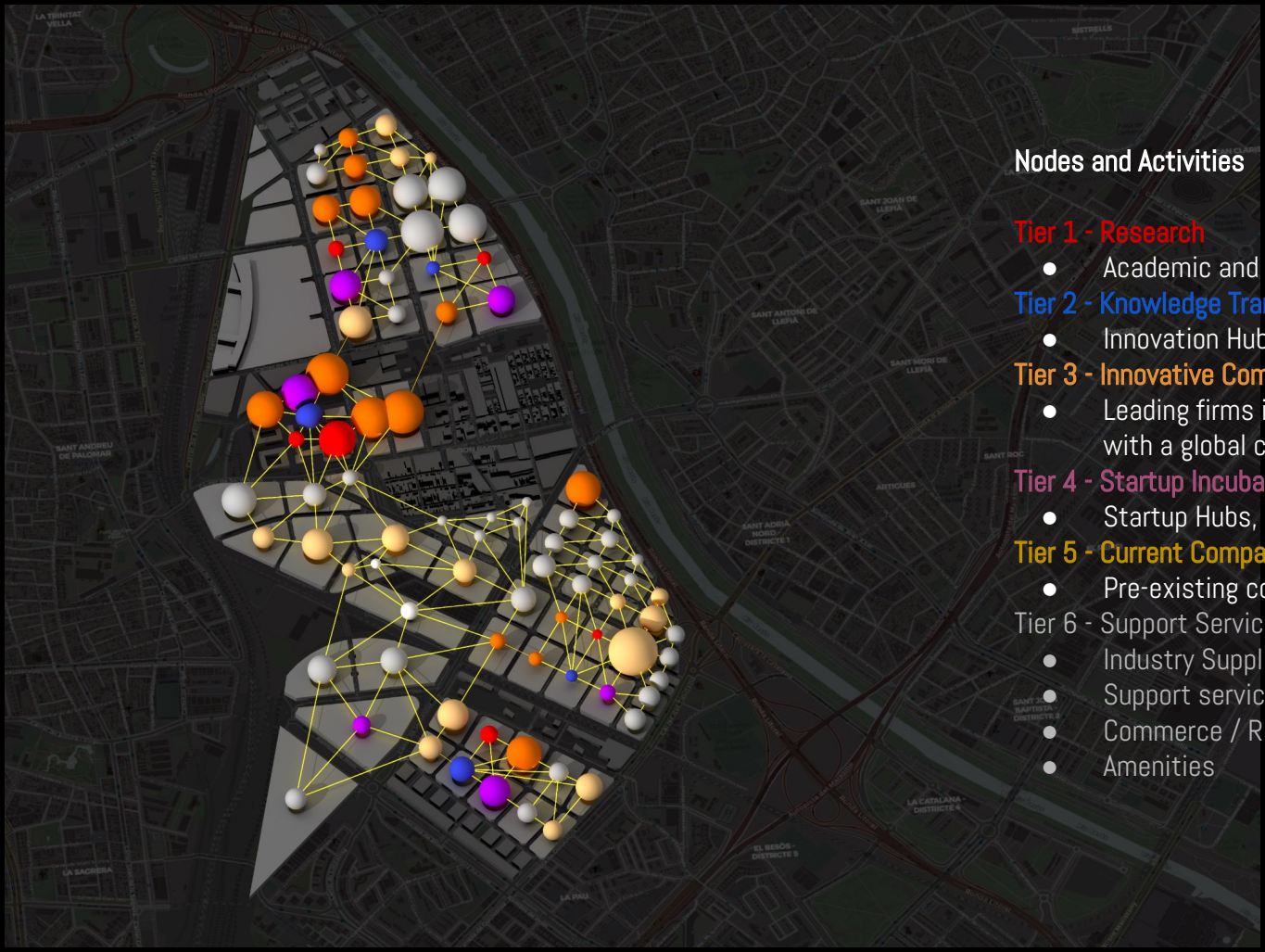
- **Principals Camps de Recerca:**
 - Enginyeria Agroalimentària i Biotecnologia (37 recercaires)
 - Nutrició, Ciències de l'Alimentació (25 recercaires)
 - Enginyeria Química (85 recercaires)
- **Principals Camps de Sinèrgies entre la Recerca i la Indústria Local:**
 - Productes Agroalimentaris, Pa i Derivats, Cosmètica i Salut, Fabricació d'Equips per Producció Gastronòmica, Maquinaria Industrial per Energia Renovable, Gestió de Residus, Comerç d'Energia Elèctrica, Llavors, Instruments de Precisió per l'Agricultura
- **Principals Camps de Sinèrgies amb l'Ecosistema d'Startups:**
 - IA per FoodTech, Manufactures Additives per el Sector Agroalimentari, Sensors per Agricultura, Nutrició i Dietètica, Bioenginyeria, Materials de Frontera per al Sector Farmacèutic, Gestió Intel·ligent de Residus Industrials



Llegenda

Nanotecnologia i Materials Avançats
UrbanTech
Robòtica i Manufactures Avançades
Sostenibilitat, Economia Circular i AgriTech
Ciència de Dades i Software

- **Principals Camps de Recerca:**
 - Computació (79 recercaires)
 - Matemàtiques (144 recercaires)
 - Enginyeria Civil i Mètodes Numèrics (70 recercaires)
 - Enginyeria Industrial, Organització d'Empreses (48 recercaires)
 - Telecomunicacions (160 recercaires)
- **Principals Camps de Sinèrgies entre la Recerca i la Indústria Local:**
 - IA i Ciència de Dades per Consultoria de Gestió Empresarial, IA per Processos Industrials, Programació Informàtica, Estudis de Mercat i Enquestes, Cinema i Audiovisual, Mitjà i Mercadotècnic
- **Principals Camps de Sinèrgies amb l'Ecosistema d'Startups:**
 - ICT i Telefonia Mòbil, IoT i Sensors, IA per Gestió d'Empreses, IA per eCommerce, IA per Disseny i Gaming, IA per Genètica i Medicina, IA per Moda, Cloud Computing, AdTech (Marketing i Anuncis), Hardware



Nodes and Activities

Tier 1 - Research

- Academic and Research Centers

Tier 2 - Knowledge Transfer

- Innovation Hubs and Tech Transfer

Tier 3 - Innovative Companies

- Leading firms in knowledge-intensive industries with a global comparative advantage

Tier 4 - Startup Incubator

- Startup Hubs, Incubators and Accelerators

Tier 5 - Current Companies and Coworking

- Pre-existing companies by domain

Tier 6 - Support Services and Suppliers

- Industry Suppliers
- Support services
- Commerce / Retail
- Amenities

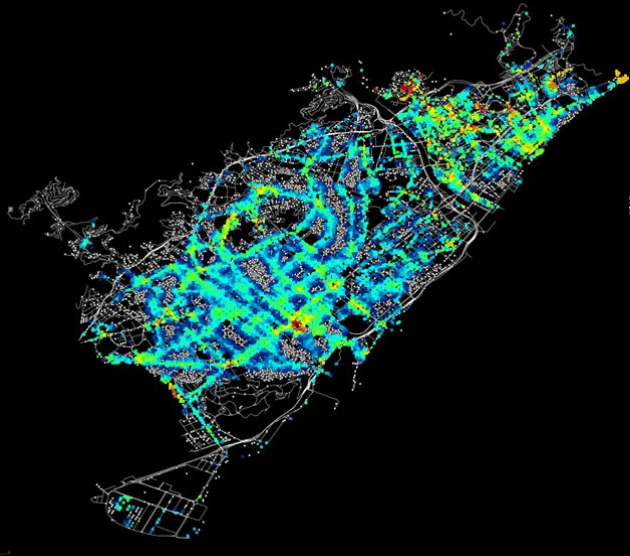
Barcelona Besòs Innovation District: *Urban Development and Architecture Capacity*

Bon Pastor i La Sagrera Parcels: Urban Design and Space Programming Benchmarks



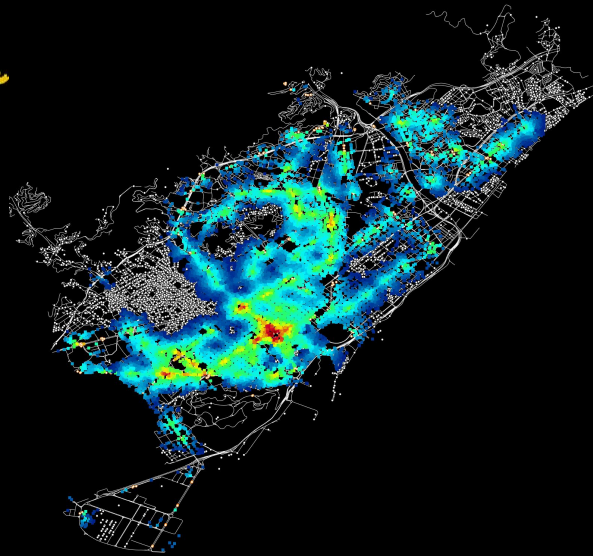
City Form - Urban Performance: *Access to Urban Mobility Systems*

Identifying the needs of the future innovation district in the Besòs Area



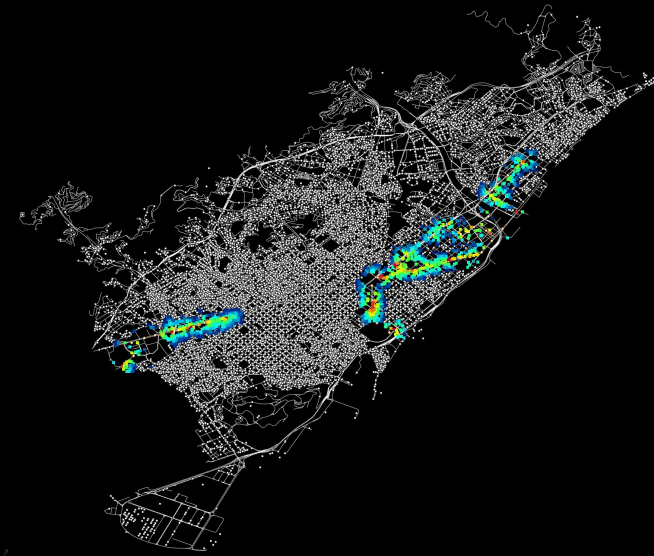
MOBILITY

Access to public transit
Bus Network



MOBILITY

Access to public transit
Metro / Underground Network

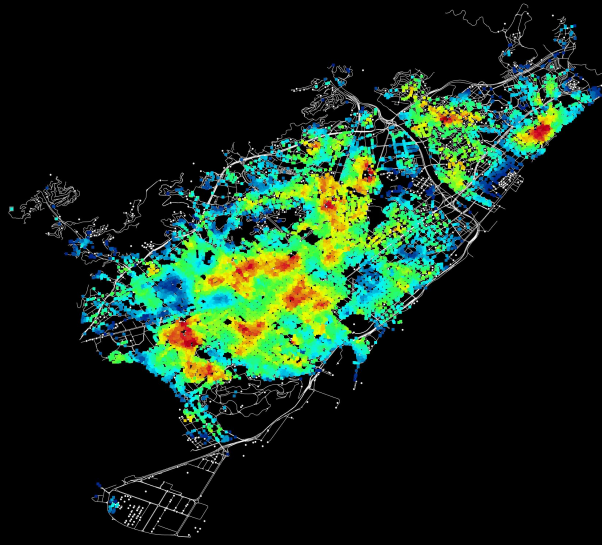


MOBILITY

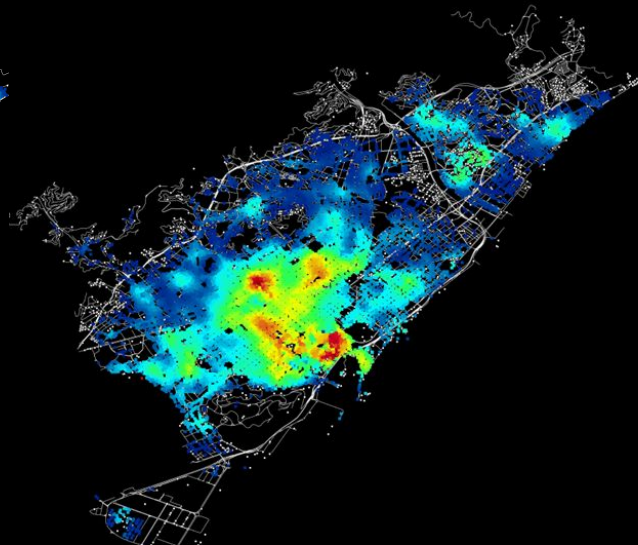
Access to public transit
Tramway Network

City Form - Urban Performance: *Access to Urban Services and Amenities*

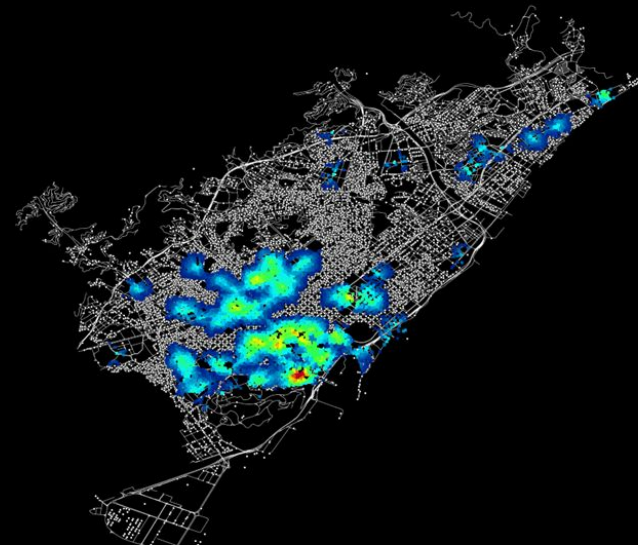
Identifying the needs of the future innovation district in the Besòs Area



URBAN SERVICES
Access to education
Academic training



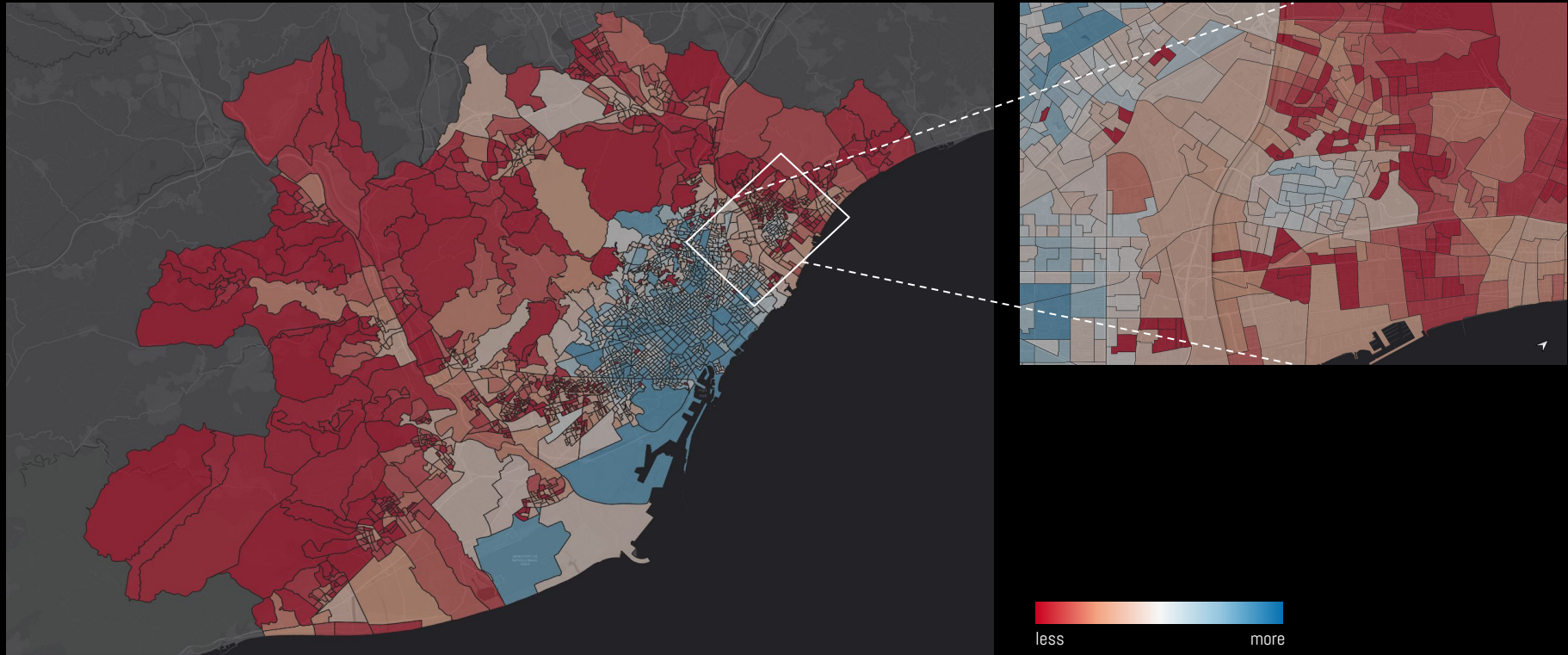
URBAN AMENITIES
Access to sustenance
Restaurants and Cafes



URBAN EXPERIENCE
Access to entertainment
Culture and leisure

City Form - Urban Performance: Access to Urban Services and Amenities

Identifying the needs of the future innovation district in the Besòs Area



Barcelona Besòs Innovation District - Urban Design and Placemaking

City Form and Urban Performance Best Practices for a Successful Urban Regeneration

Llegenda

Nanotecnologia i Materials Avançats
UrbanTech
Robòtica i Manufactures Avançades
Sostenibilitat, Economia Circular i AgriTech
Ciència de Dades i Software

Urban Design Harmony: **City Form Fractality** enables a higher quality of life

Urban Design Liberty/Order: **Intermediate levels of Entropy** are the optimal for social interaction

Knowledge Economy: the higher the **Complexity**, the more strategic the **Physical Concentration**

ARETIAN

CITY OF BARCELONA



Masterplan del territori productiu i el teixit industrial del Besòs del municipi de Barcelona