



IX SUMMER SCHOOL NETVAL
12-15 settembre 2016, Paestum

**Comunicare la ricerca e
l'innovazione per
massimizzare l'impatto**



Patent trends and future impacts

Audrey Dayon

Summary

Global trends

- Overview: 2004-2015
- Specialisation by country: 2012-2014
- Investments trends by technology domains 2012-2014

Focus on the fastest growing techno domains 2012-2014

- R&D location
- Main players
- Emerging actors
- Technological trends
- Netval associates positioning

NETVAL associates overview 2004-2015

- Investment trends & Technological focus
- Degree of specialisation
- Main players and Technological relationship

Technological evolution for main NETVAL players

- Evolution of IPC codes
- Emerging technologies

Data & Tools

- Data extracted from Orbit
- Analysis with Orbit Silver to Platinum Levels



			
LIVE ANALYSIS	100.000	300.000	2.000.000
SAVED ANALYSIS	15.000	20.000	30.000

- Earliest priority year (EPRD)
- Earliest priority country (EPRC)
- Technology domains (35)
- Patent assignees
- Patent assignees by EPRD
- IPC/CPC codes
- IPC/CPC codes by EPRD
- Concepts

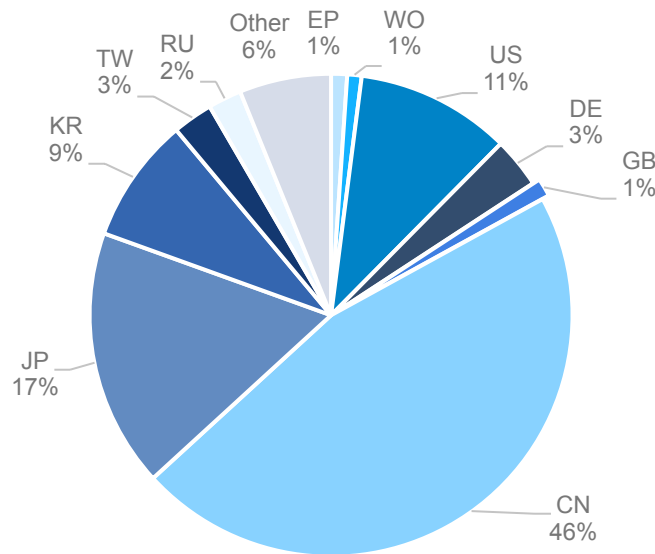
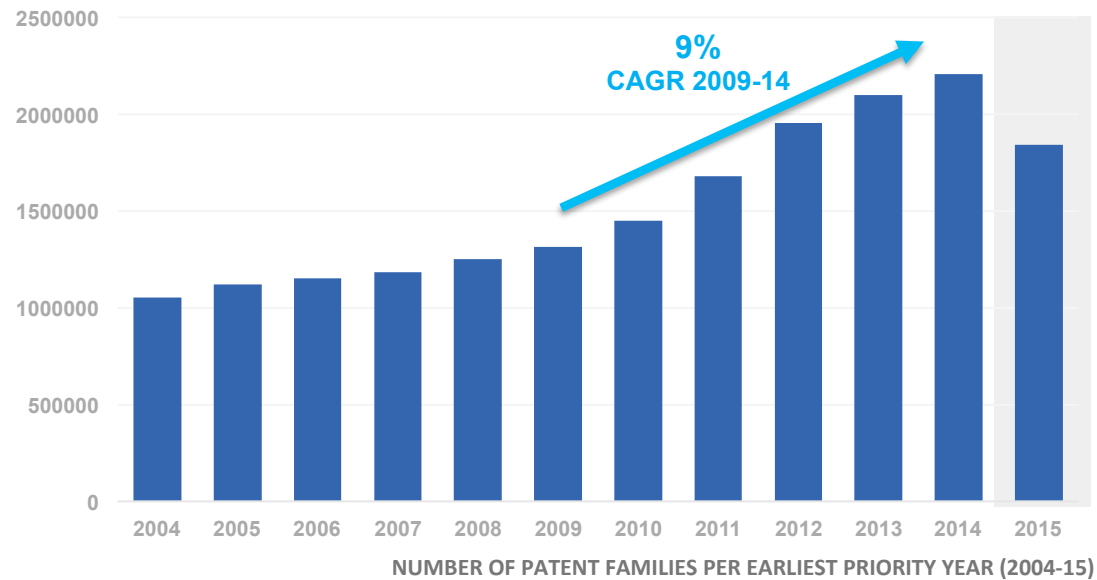
➤ Analysis with Intellixir

- Number of IPC/CPC codes by year
- IPC codes by affiliations network
- Timeline IPC codes by year
- Descriptors (key words extracted from IPc code definition)
- IPC codes acceleration



Methodology

Global Overview: 2004-2015



REPARTITION PER PRIORITY COUNTRIES (2004-15)

➤ **IN ITALY ?**

TOP 5 MAIN TECHNOLOGY DOMAINS

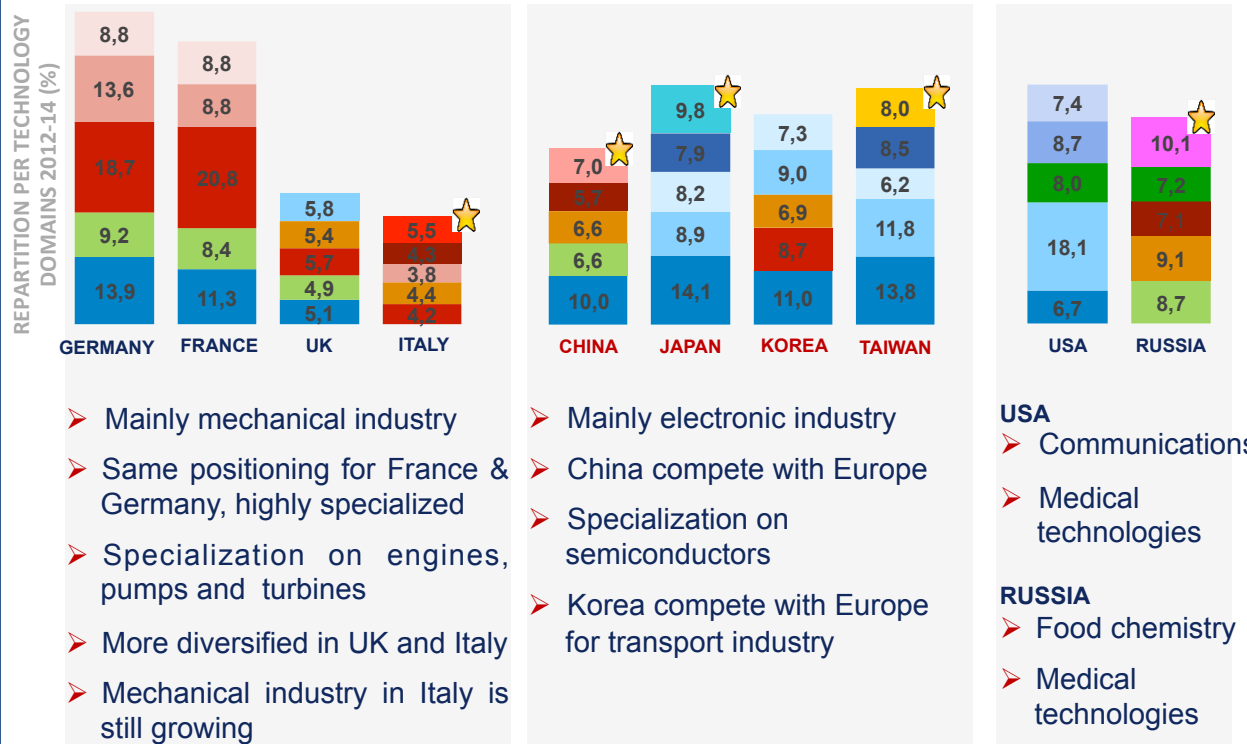
ELECTRICAL MACHINERY	1.798.589
COMPUTER TECHNOLOGY	1.299.009
CIVIL ENGINEERING	1.122.009
MEASUREMENT	1.122.036
TRANSPORT	1.023.280

➤ **At country level?**

Global trends

Specialisation by country: 2012-2014

TOP 5 Technology domains



EP > Pharmaceuticals and basic material chemistry

WO > Electric engineering +++, same profile than USA

MECHANICAL ENGINEERING

- TRANSPORT
- MECHANICAL ELEMENTS
- ENGINES, PUMPS, TURBINES
- OTHER SPECIAL MACHINE
- HANDLING
- MACHINE TOOLS

ELECTRIC ENGINEERING

- ELECTRICAL MACHINERY
- COMPUTER TECHNOLOGY
- SEMICONDUCTORS
- AUDIO VISUAL
- DIGITAL COMMUNICATION
- TELECOMMUNICATION

INSTRUMENTS

- MEASUREMENT
- OPTICS
- MEDICAL TECHNOLOGY
- CIVIL ENGINEERING
- FURNITURE, GAMES
- FOOD CHEMISTRY

Investments trends by technology domains 2012-2014



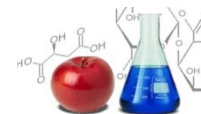
Global trends

FOOD CHEMISTRY	+ 15 %	 - 3 %
PHARMACEUTICALS	+ 11 %	- 7 %
HANDLING	+ 10 %	- 1 %
MACHINE TOOLS	+ 10 %	- 1 %
OTHER SPECIAL MACHINES	+ 10 %	=
BASIC MATERIALS CHEMISTRY	+ 9 %	- 6 %
CHEMICAL ENGINEERING	+ 9 %	- 3 %
ENVIRONMENTAL TECHNOLOGY	+ 9 %	- 2 %
CONTROL	+ 8 %	- 9 %

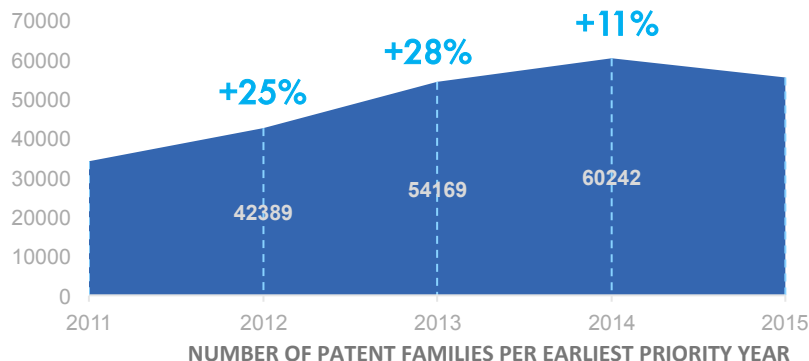
CAGR 2011-14



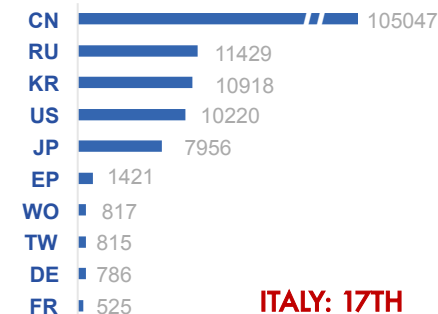
+ 7 % OPTICS
+ 6 % IT METHODS FOR MANAGEMENT



Investments 2012-2014



MAIN PRIORITY COUNTRIES



Food chemistry



1 MONSANTO

2 DUPONT

5 NESTEC

9 FUJI OIL

SYNGENTA



5 NATIONAL UNIV FOOD TECHNOLOGIES (UA)

NATIONAL RESEARCH UNIVERSITY - MPEI

KHARKIV UNIV FOR NUTRITION

US DEPARTMENT OF AGRICULTURE

INRA

Asia

3 JIANGNAN UNIV

4 ZHEJIANG UNIV

6 CHINA AGRICULTURAL UNIV

7 KOREA RURAL DEV ADM

8 QINGDAO XIUXIAN FOODS

10 KOREA FOOD RESEARCH INSTITUTE



CARPIGANI

PERFETTI VAN MELLE

FOUNDATION MINOPRIO

SEVECOM

UNIV. BOLOGNA

BARILLA

≥ 4 patent families

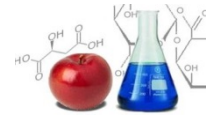
Emerging actor (from Top 50)

- Dummen
- National Research Univ MPEI
- Nunhems
- Roquette

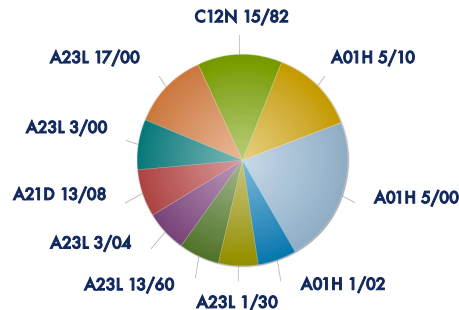
Emerging actors (Top 30)

- Biochemtex
- Foundation Minoprio
- Inst. genomica applicata
- Univ. Udine
- Univ. Bologna

Technological trends 2012-2014*



[Distribution by IPC CODES]



FLOWERS, SEEDS SEA PRODUCTS

GENETIC MODIFICATIONS OF PLANT CELLS
INSECT, PATHOGEN, HERBICIDE RESISTANCE
METABOLISM MODIFICATION
MODULATION OF PROTEIN CONTENT

PRESERVATION OF FOOD, PACKAGING

...Emerging technologies...

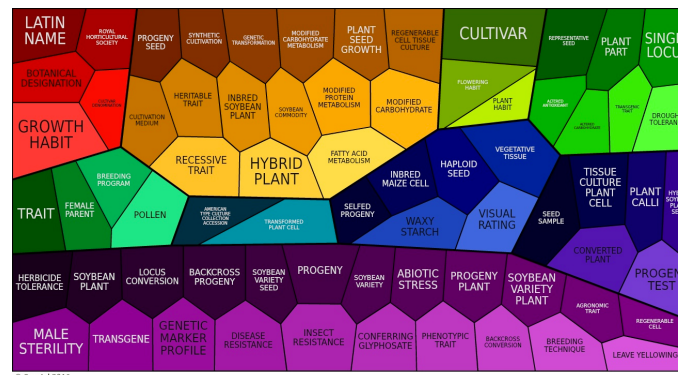
Non-alcoholic beverages, Alcoholic beverages other than wine and beer, **Glyphosate resistance**

Food chemistry

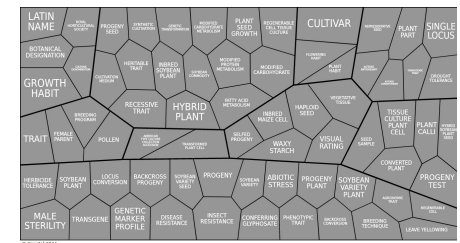
IN ASIA

Modifying **nutritive qualities** of food, Animal **feeding stuff**, Re-use of **by-products** from vegetal origin, **Tea** substitutes, Preparation of **other alcoholic beverages**, **Non alcoholic beverages**, **Other non alcoholic beverages**, **Meat** products, **Cereal** derived products, Progestives **drugs**

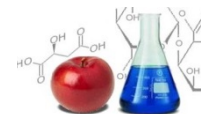
[CONCEPTS ANALYSIS]



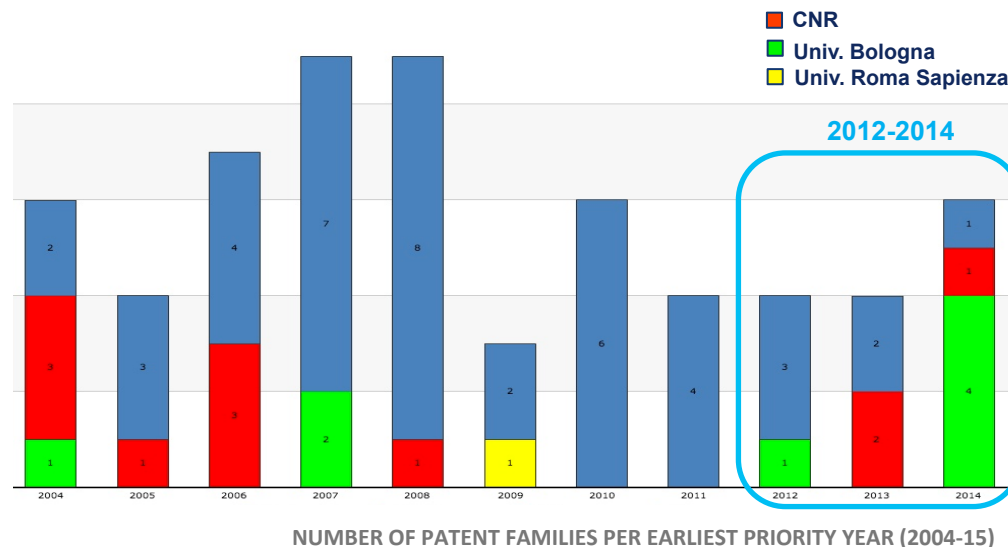
Color by Netval's
associates portfolio



NETVAL positioning



Food chemistry



MAIN CONCEPTS

Milk⁽³⁾ Protein⁽²⁾ Accessory⁽²⁾ Alcoholic fermentation⁽²⁾ Atmospheric pressure⁽²⁾ Bitter taste⁽²⁾ Centrifugation⁽²⁾ Consumer⁽²⁾ Cow⁽²⁾ Cow milk⁽²⁾ Enzymatic activity⁽²⁾ Extra virgin⁽²⁾ Fermentation⁽²⁾ Food industry⁽²⁾ Grain⁽²⁾ Heated fluid⁽²⁾ Hmw⁽²⁾ Human consumption⁽²⁾ Human milk⁽²⁾ Incidence⁽²⁾ Interface science⁽²⁾ Microwave⁽²⁾ Molecular weight⁽²⁾ Nutrient⁽²⁾ Oil production⁽²⁾ Olive⁽²⁾ Olive oil⁽²⁾ Organoleptic property⁽²⁾ Producer⁽²⁾ Proteolytic activity⁽²⁾ Room temperature⁽²⁾ Taste⁽²⁾ Yeast⁽²⁾ 2d binarization⁽¹⁾ 2d projection⁽¹⁾ 2d quality⁽¹⁾ 2d radiographic image quality⁽¹⁾ 2d reconstructed image⁽¹⁾ 2d reconstructed slice image⁽¹⁾ 2d xray image⁽¹⁾ 3d model⁽¹⁾ 3d reconstruction⁽¹⁾ 3d resolution⁽¹⁾ 3d volume⁽¹⁾ 3d xray⁽¹⁾ 50th day⁽¹⁾ Abdominal bloating⁽¹⁾ Abnormal fermentation⁽¹⁾ Abo ut⁽¹⁾ Absorbent product⁽¹⁾

MAIN PLAYERS

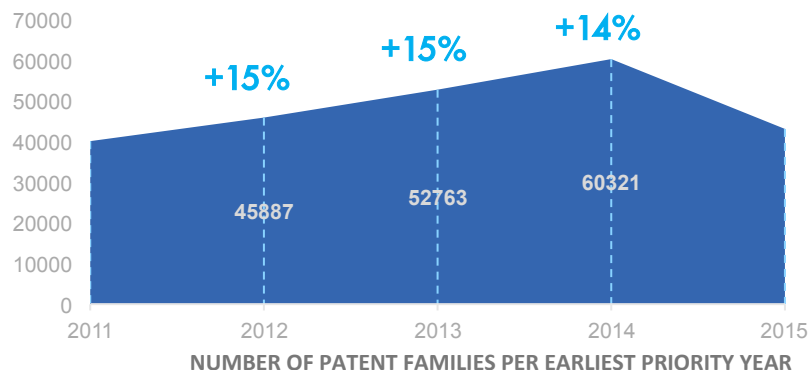
Univ. Bologna
CNR
Univ. Torino

MAIN IPC CODES

A01H 5/08: Fruits
A23L 5/30: Physical treatment
e.g. electrical or magnetic means, wave energy or irradiation (preservation; cooking) of foods



Investments 2012-2014



MAIN PRIORITY COUNTRIES



Pharmaceuticals



Asia

1 HOFFMANN LA ROCHE

2 NOVARTIS

5 MERCK

9 BMS

BAYER

3 UNIV CALIFORNIA

7 INSERM

8 CNRS

UNIV TEXAS

JOHN HOPKINS UNIV

4 CHINA PHARM UNIV

6 ZHEJIANG UNIV

10 NANJING UNIV

FUDAN UNIV

QINGDAO MUNICIPAL HOSPITAL

Emerging actor (from Top 50)

➤ Bayer Healthcare



CHIESI FARMA

I.I.T

ABOCCA società agricola

C.N.R

BRACCO IMAGING

NERVIANO MED. SCIENCES

FOUNDATION TELETHON

FIDIA ADV. BIOPOLYMERS

OSPEDALE SAN RAFFAELE

INDENA

≥ 12 patent families

Emerging actors (Top 30)

➤ Abocca società agricola

➤ Univ Bologna

➤ Epitech

➤ Foundation telethon

➤ Ospedale San raffaele

➤ IIT

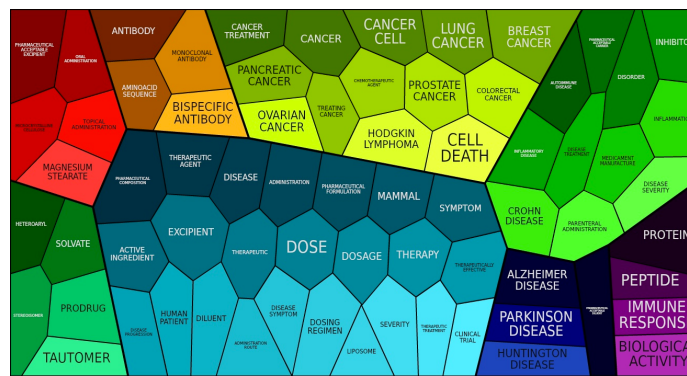
**BIOLOGICS
DRUG CONJUGATES**

...No emerging new technologies...

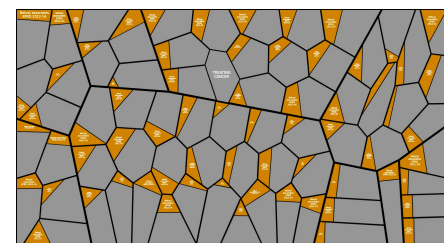
IN ASIA

Cancer, Inflammation, Infection, Dermatological diseases, Atherosclerosis, Disorders of the alimentary tract or the digestive system
Drugs from insects, Drug compositions containing plants
 (curcuma, ginseng, citrus)
 Modifying **nutritive quality** of food

[CONCEPTS ANALYSIS]



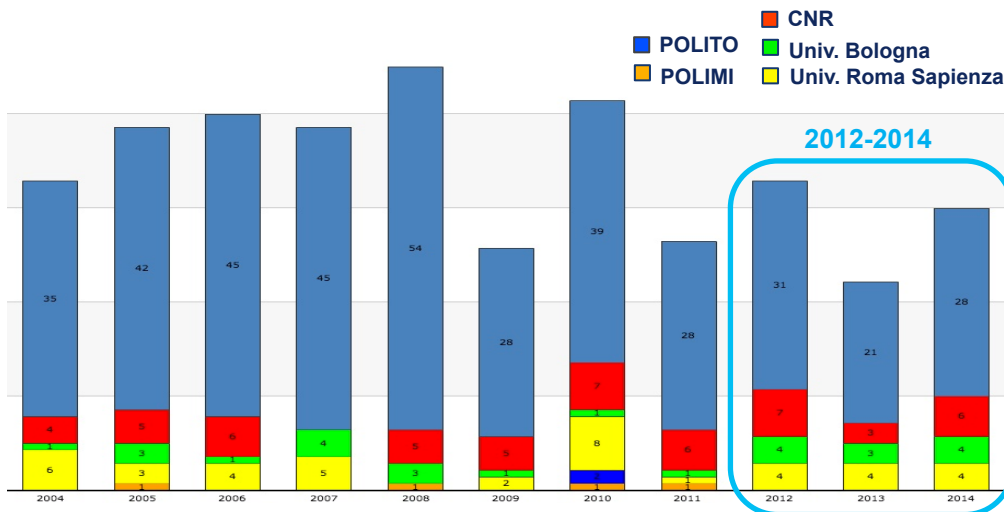
 Color by Netval's associates portfolio



NETVAL positioning



Pharmaceuticals



NUMBER OF PATENT FAMILIES PER EARLIEST PRIORITY YEAR (2004-15)



MAIN CONCEPTS

Inhibitor⁽⁴⁰⁾Protein⁽⁴⁰⁾Cancer⁽³⁶⁾Prevention⁽³⁰⁾Administration⁽²⁹⁾Pharmaceutical acceptable⁽²⁹⁾carrier⁽²⁶⁾Antibody⁽²⁴⁾Peptide⁽²⁴⁾Dose⁽²²⁾Tumor⁽²²⁾Inhibition⁽²¹⁾Breast cancer⁽²⁰⁾Infection⁽²⁰⁾Ligand⁽²⁰⁾Therapeutic⁽²⁰⁾Western blot⁽²⁰⁾Animal⁽¹⁹⁾Disease treatment⁽¹⁹⁾Inflammation⁽¹⁹⁾Monoclonal antibody⁽¹⁹⁾Pharmaceutical acceptable excipient⁽¹⁹⁾Therapeutic agent⁽¹⁹⁾Amino acid⁽¹⁸⁾Aryl⁽¹⁸⁾Cancer treatment⁽¹⁸⁾Parenteral administration⁽¹⁸⁾Mammal⁽¹⁷⁾Oral administration⁽¹⁷⁾Cancer cell⁽¹⁶⁾Clinical trial⁽¹⁶⁾Heteroaryl⁽¹⁶⁾Assay⁽¹⁵⁾Cell proliferation⁽¹⁵⁾Compound synthesis⁽¹⁵⁾Efficacy⁽¹⁵⁾Inflammatory disease⁽¹⁵⁾Receptor⁽¹⁵⁾Symptom⁽¹⁵⁾Amino acid sequence⁽¹⁴⁾Brain⁽¹⁴⁾Cell viability⁽¹⁴⁾Chemotherapy⁽¹⁴⁾Diabetes⁽¹⁴⁾Dosage⁽¹⁴⁾Independent experiment⁽¹⁴⁾Inhibitory activity⁽¹⁴⁾Sigma aldrich⁽¹⁴⁾Statistical analysis⁽¹⁴⁾Tablet⁽¹⁴⁾Biological activity⁽¹³⁾

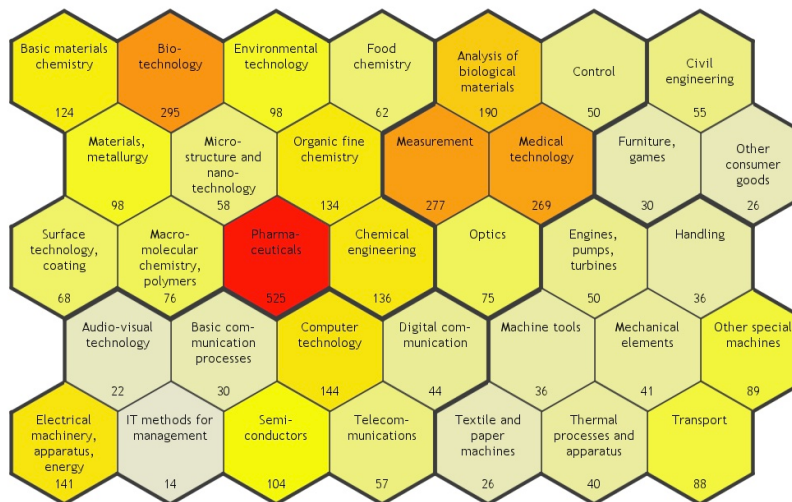
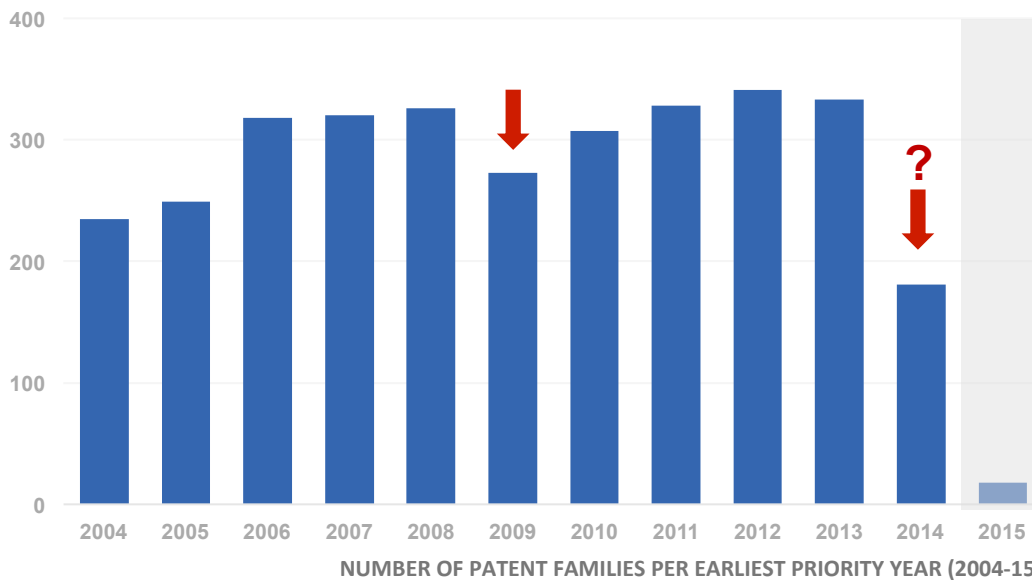
MAIN PLAYERS

CNR
Univ. Roma Sapienza
Univ. Bologna
Univ. Milano

MAIN IPC CODES

A61P 35/00: Antineoplastic agents
A61K 45/06: Mixtures of active ingredients without chemical characterisation
A61P 29/00: Non-central analgesic, antipyretic or antiinflammatory agents

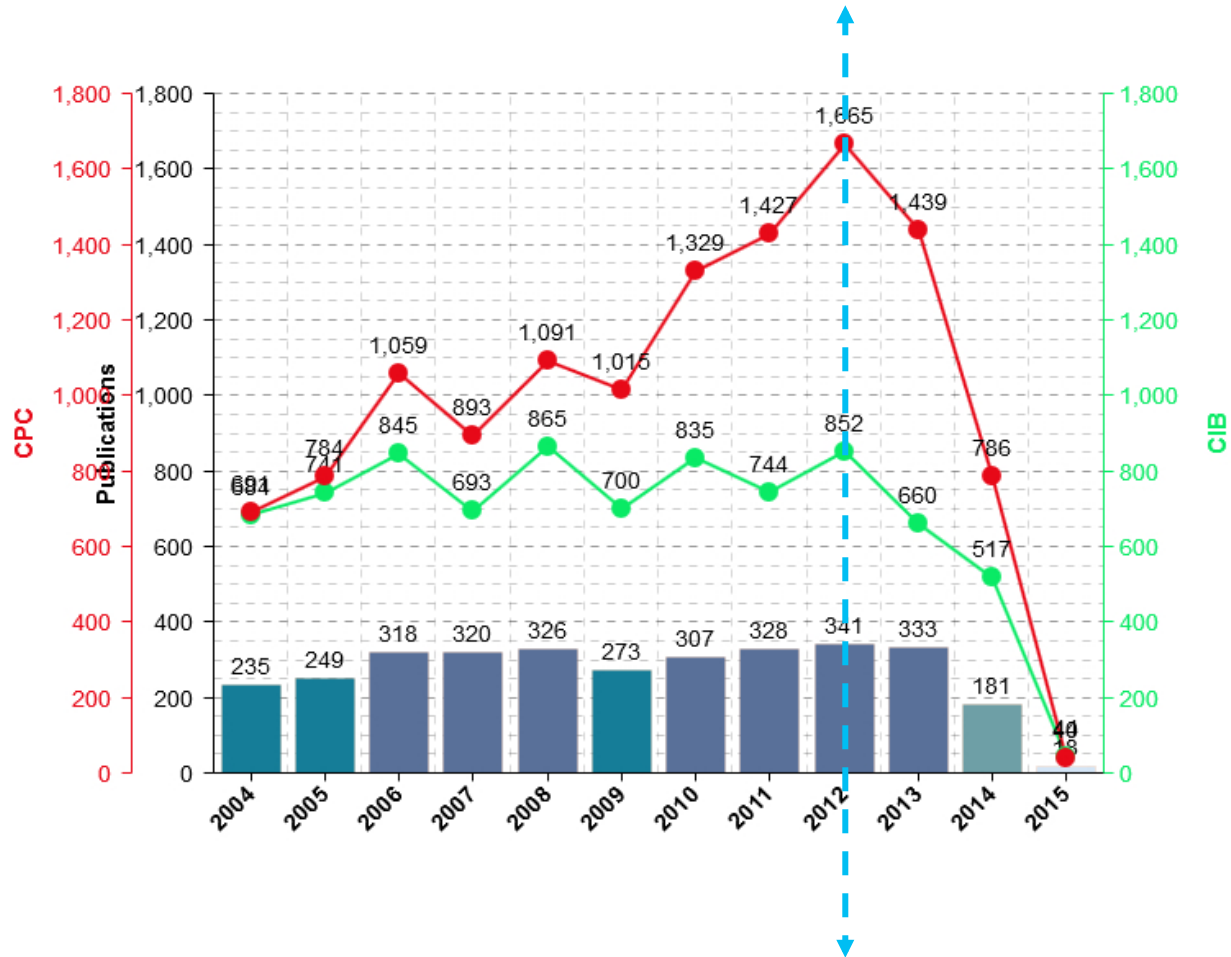
Investment trends & technological focus



PHARMACEUTICALS
BIOTECHNOLOGY
MEASUREMENT
MEDICAL TECHNOLOGY

Degree of specialisation

NETVAL
associates



Main players & Technological relationship

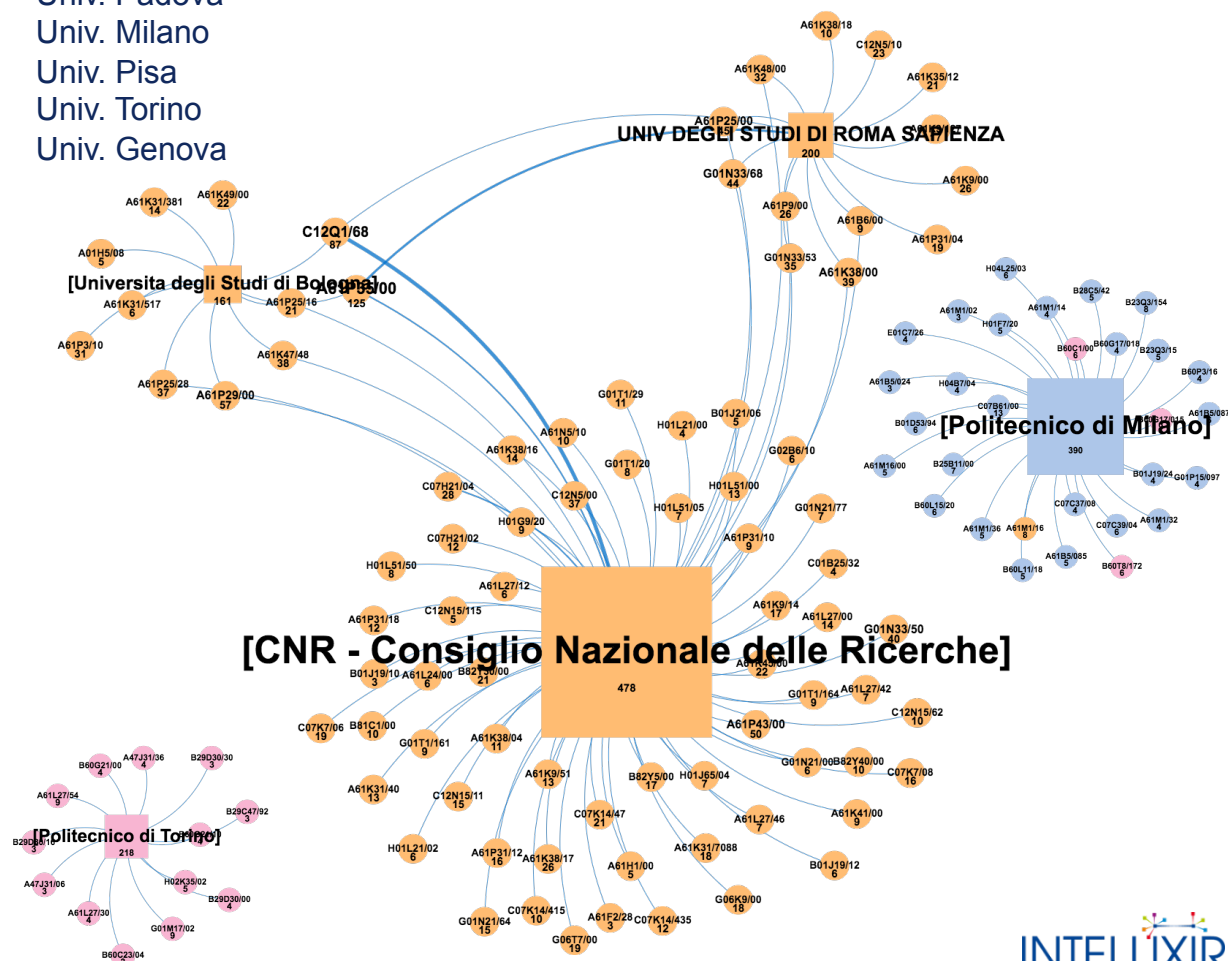
MAIN PLAYERS

CNR
POLIMI
Univ. Roma Sapienza
POLITO
Univ. Bologna
Univ. Padova
Univ. Milano
Univ. Pisa
Univ. Torino
Univ. Genova

ACCELERATIONS

INFN (11)
Politecnico di Bari (5)
Campus BioMedico Roma (5)

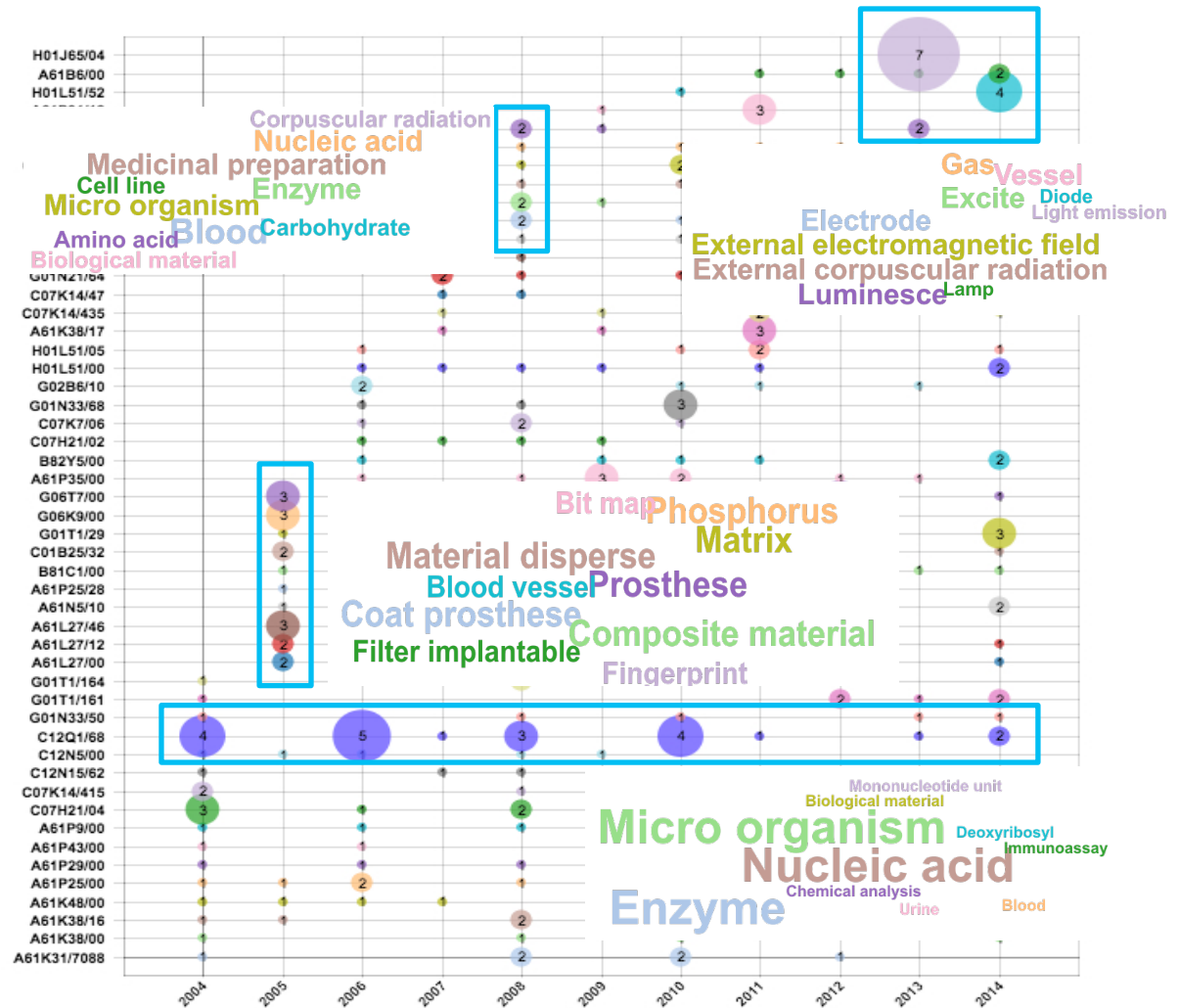
NETVAL
associates



Technological evolution



Consiglio Nazionale
delle Ricerche



IPC CODES ACCELERATION

H01J65/04 (7): Lamps without any electrode inside the vessel

G01T1/161 (5): Measuring radiations, Applications in the field of nuclear medicine

A61B6/00 (4): Apparatus for radiation diagnosis

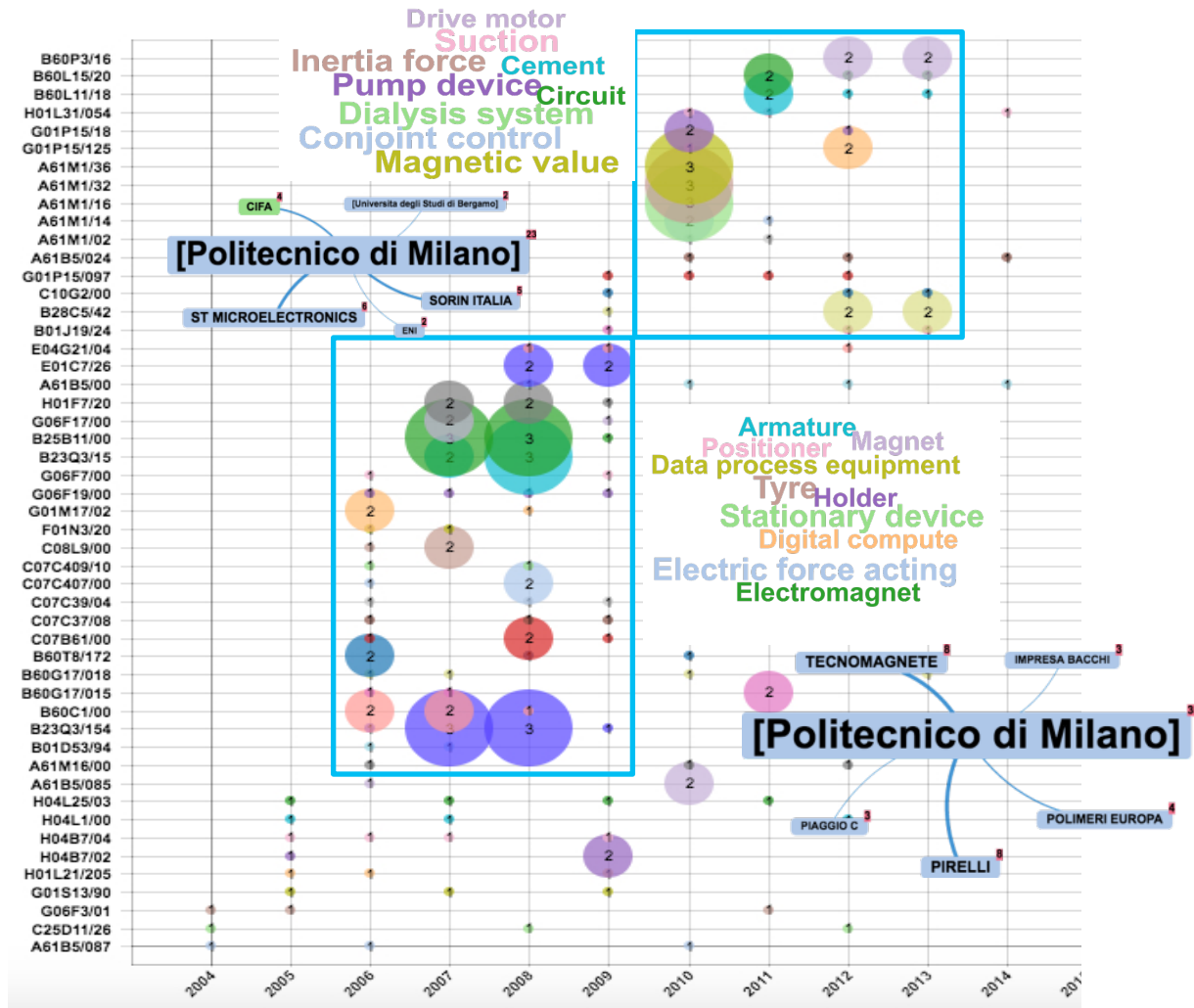
H01L 51/51 (4): Solid state devices using organic materials as the active part, specially adapted for light emission, (OLED) or (PLED)

Technological evolution



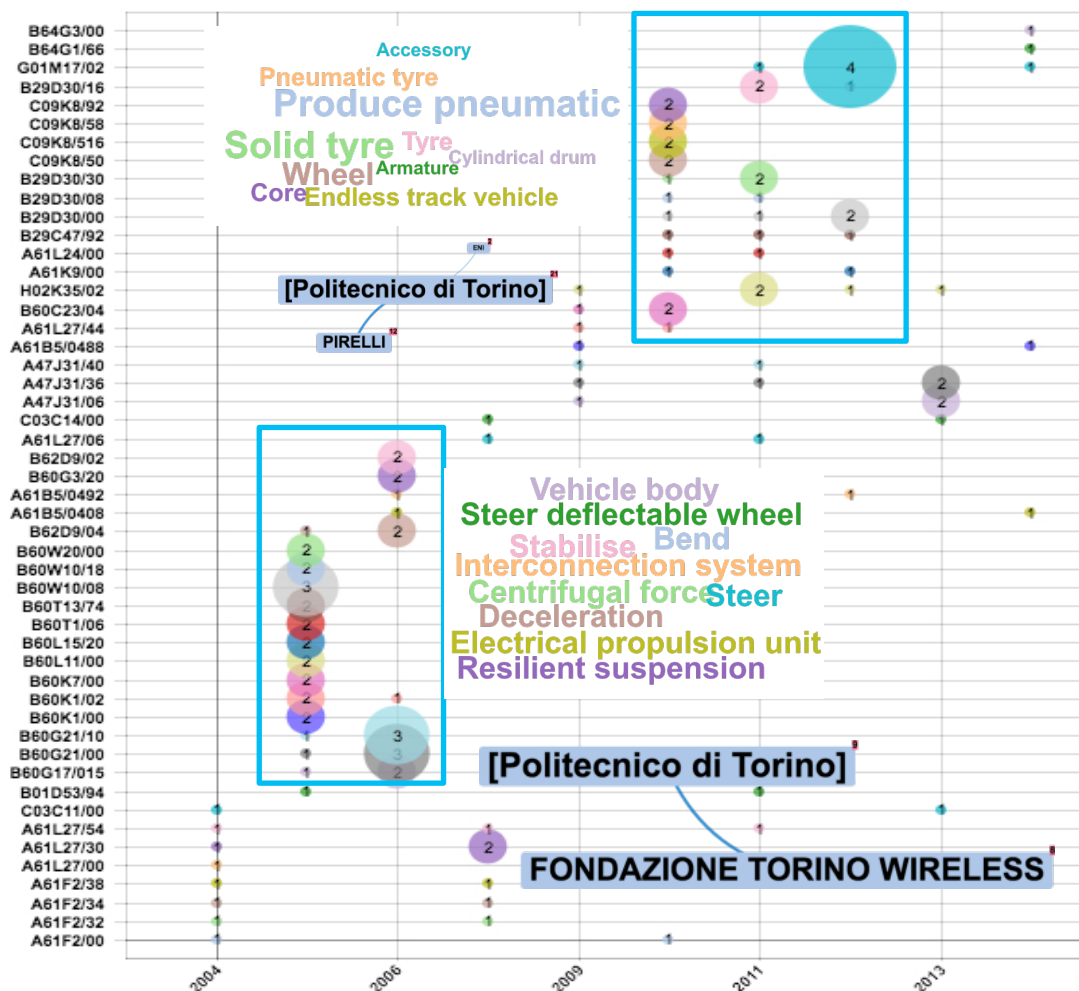
POLITECNICO
MILANO 1863

**Politecnico di
Milano**



Technological evolution

Politecnico di Torino



IPC CODES ACCELERATION

G01M17/02 (5): Testing of vehicles, of wheeled or endless-tracked vehicles, of tyres

A47J31/06 (2): Apparatus for making beverages, Filters or strainers for coffee or tea makers

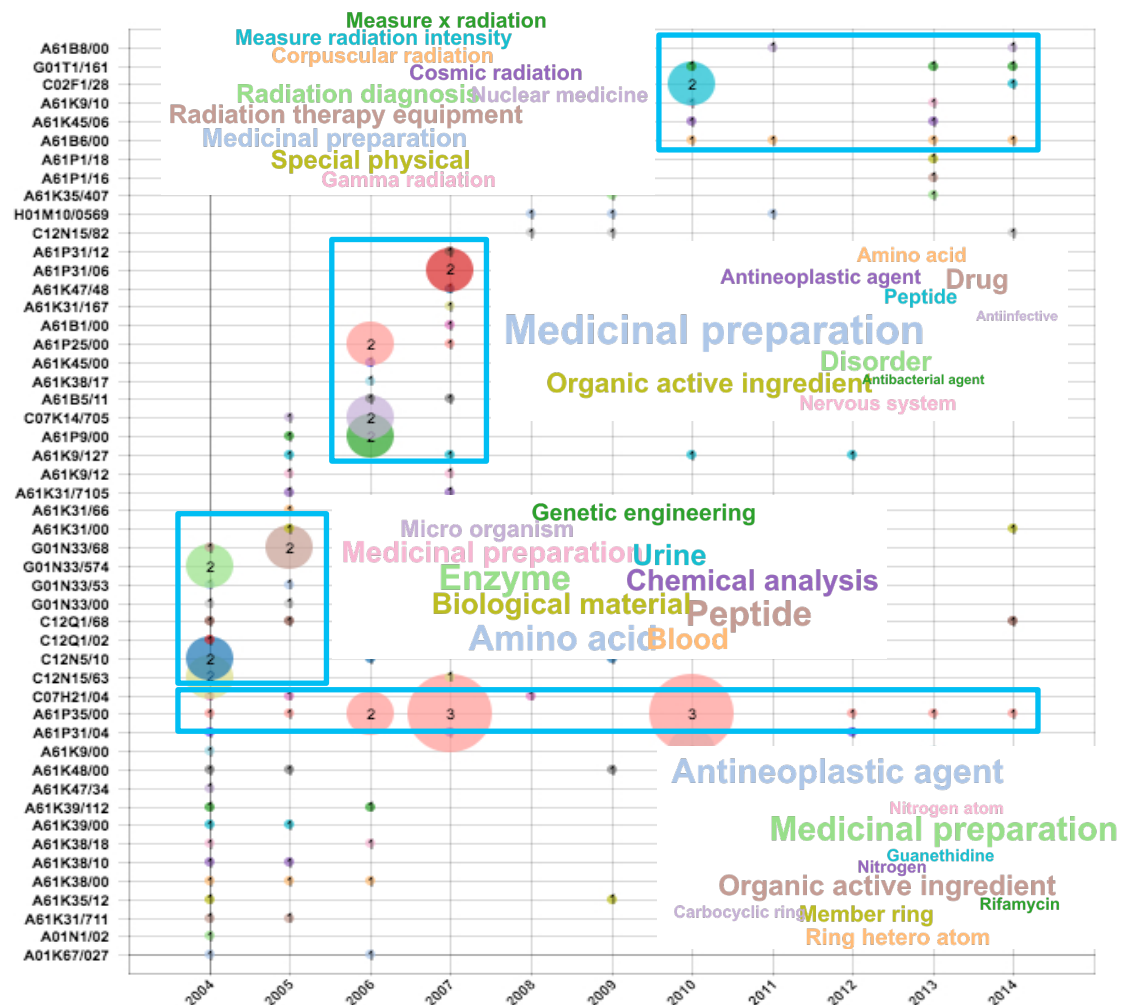
H04L1/00 (2): Arrangements for detecting or preventing errors in the information received

Technological evolution



SAPIENZA
UNIVERSITÀ DI ROMA

Univ. Roma
Sapienza



IPC CODES ACCELERATION

G01T1/161 (2) : Measuring radiations, Applications in the field of nuclear medicine

H01Q17/00 (2): Devices for absorbing waves radiated from an aerial

Limits of the study

«Buffer period» 18 months

Next steps

- Include publications
- Research projects
- ...

Take away

Use patents as source of information

...IP and communication ?



Grazie !



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