



Europäisches  
Patentamt  
European  
Patent Office  
Office européen  
des brevets

# Business use of patent information from PATSTAT



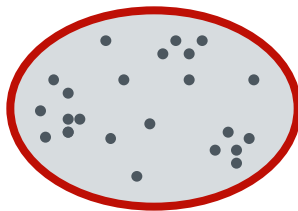
# Agenda

- Basics of patent analysis
- What is the PATSTAT product line?
- PATSTAT online: case study solar energy
  - Most important applicants and inventors
  - R&D cooperation
  - Most cited applications
- Conclusion

# Business use of patent information

## Basic search

- patent classes
- search concepts
- applicants
- countries of residence
- [...]



## Statistical analysis

$$q_{ijt} = AL_{ijt}^{\alpha} K_{ijt}^{\beta}$$

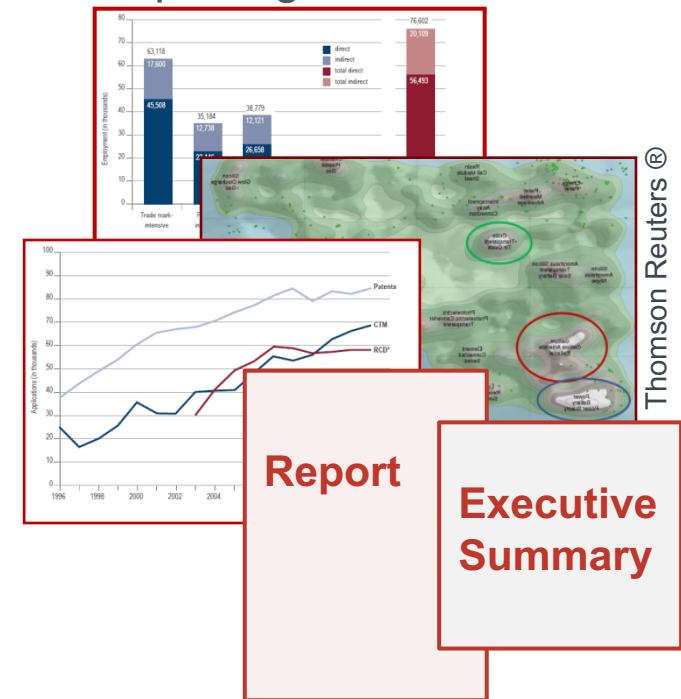
Period	(1)	(2)	ln(q) <sub>it</sub>
Estimation method	Fixed-effects regression	Fixed-effects regression	Fixed-effects regression
	274*** (0.002)	10.337*** (1.825)	12.000*** (1.825)
	333*** (0.002)	9.389*** (1.825)	9.389*** (1.825)
	10859 (11018)	0.4791 (0.05102)	0.4791 (0.05102)
Other_stock <sub>it-1</sub>	0.002** (9.7e-05)	0.0023* (0.0012)	0.0023* (0.0012)
Other_stock <sub>it-2</sub>	-5.1e-09** (2.5e-09)	-1.1e-08* (5.9e-09)	-3.6e-09 (1.2e-09)
Green_stock <sub>it-1</sub>	0.0698 (0.0791)	11.222** (0.0507)	11.222** (0.0507)
Green_stock <sub>it-2</sub>	-0.0122** (0.00058)	-0.0183* (0.00093)	-0.0183* (0.00093)
Green_stock <sub>it-3</sub>	2.0e-07** (1.0e-07)	5.0e-07* (3.2e-07)	1.4e-07 (3.2e-07)
Effects	Yes	Yes	Yes
	No	No	No
	No	No	No
	2036	1949	1949

Group 1

Group 2

## Processing results

- further analyses/processing
- visualisation
- reporting



# Basic search

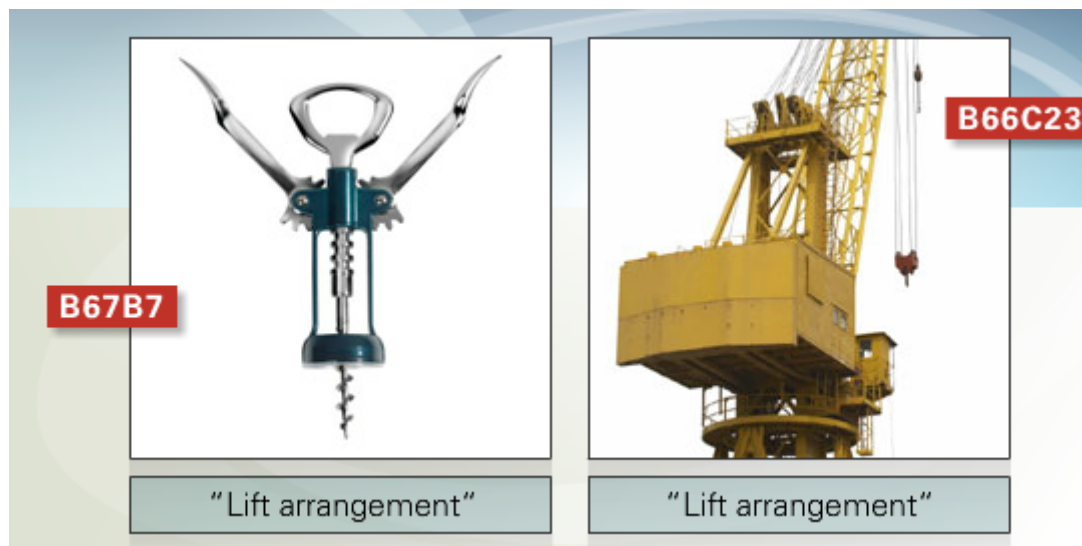
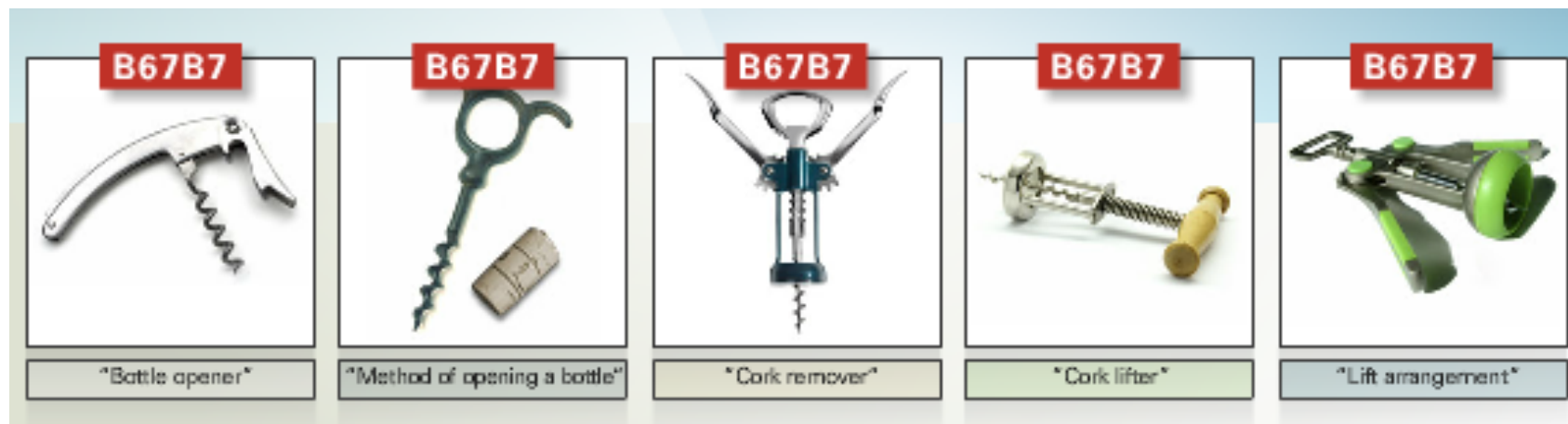
# Statistical analysis

## Processing results

# Data mining and text mining of unstructured information



# Patent Classification systems



[www.epo.org/pi-tour](http://www.epo.org/pi-tour)

# Citations

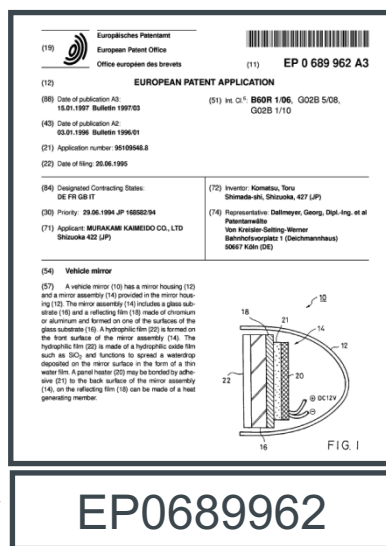
## **Cited**

- by an applicant
  - during search (in search report)
  - during examination
  - in an opposition/appeals procedure
- 
- **Backward** citations
  - **Forward** citations

# Forward and backward citations

Forward citations:  
later documents

Backward citations:  
earlier documents



JPS638602

JPH04328701

JPS61286802

US2478817

EP0689962

WO0037377

US2006105103

US2006181760

FR2912977

EP1460473

WO0037376

EP1099671

EP0978494

EP0820967

time

# What is PATSTAT?



# The PATSTAT product line: EPO Worldwide Patent Statistical Database



# PATSTAT as Raw Data (1)

- issued twice a year on USB memory sticks / electronic download
- designed for import into a relational database of your choice
- a collection of files in CSV format
  - unzipped:  
150 / 35 / 25 GB (PATSTAT Biblio / Legal Status / Register)
  - DB size with some indexes:  
≈ 350 / 25 / 40 GB

# PATSTAT as Raw Data (2)

- PATSTAT is not "plug & play". You need:
  - the appropriate hardware and software (database mgmt. syst.)
  - support from an IT specialist for creating DB and import data
  - SQL knowledge to make queries
- the data is stored locally under your full control

# PATSTAT online

# Solar Energy

- Who are the most prolific Italian applicants (or inventors) filing "solar energy patents" at the EPO?
- Who has close research collaboration?
- Which are outstanding patents in the field of "solar energy" from Italian inventors/applicants?

- Areas:

Solar thermal energy

Photovoltaic [PV] energy

Thermal-PV hybrids



CPC classification

Y02E10/40

Y02E10/50

Y02E10/60

# PATSTAT online interface layout: Search

The screenshot displays the PATSTAT online interface. The top navigation bar includes links for Preferences, Download, Print, Help, Search, Table, Result, Statistics, and a user status indicator. The left sidebar lists various tables and attributes, with a red box highlighting the 'Tables and attributes' section. The central query editor shows a SQL query with a red box highlighting the 'Query' section. The bottom section contains a 'Messages' area and a 'History' table, with a red box highlighting the 'Query history' section.

Tables and attributes

Query

```
SELECT distinct tls201_appln.appln_id, appln_auth, appln_nr, appln_kind, appln_filing_date
FROM tls201_appln JOIN tls224_appln_cpc ON
    tls201_appln.appln_id = tls224_appln_cpc.appln_id
WHERE appln_auth = 'EP' AND person_etry_code = 'IT'
AND (cpc_class_symbol LIKE 'Y02E 10/4%'
OR cpc_class_symbol LIKE 'Y02E 10/5%'
OR cpc_class_symbol LIKE 'Y02E 10/6%')
```

Messages

History

ID	Database	Result	Query
\$68	PATSTAT 2016	709	SELECT distinct tls201_appln.appln_id, appln...

Query history

# PATSTAT Cross reference chart: Applicants

Configure / view statistics

Cross-reference



Parameters



# Name harmonisation

AKTIENGESELLSCHAFT VOLKSWAGEN
FUORUKUSUAAGENUERUKU AG
FUORUKUSUWAAGEN AG
V O L K S W A G E N AKTIENGESE
V W AG
VOLKSWAGEN
VOLKSWAGEN A G
VOLKSWAGEN AG
VOLKSWAGEN AG VW
VOLKSWAGEN AKTIENGESELLSCHAFT
VW
VW AG
VW WOLFSBURG
WOLFSBURG VW
BRASI S A VOLKSWAGEN DO
BRASIL S A VOLKSWAGEN DO
BRASIL SA VOLKSWAGEN

- Control for variations of a given applicant name
- **Variants** are mapped on standard name:

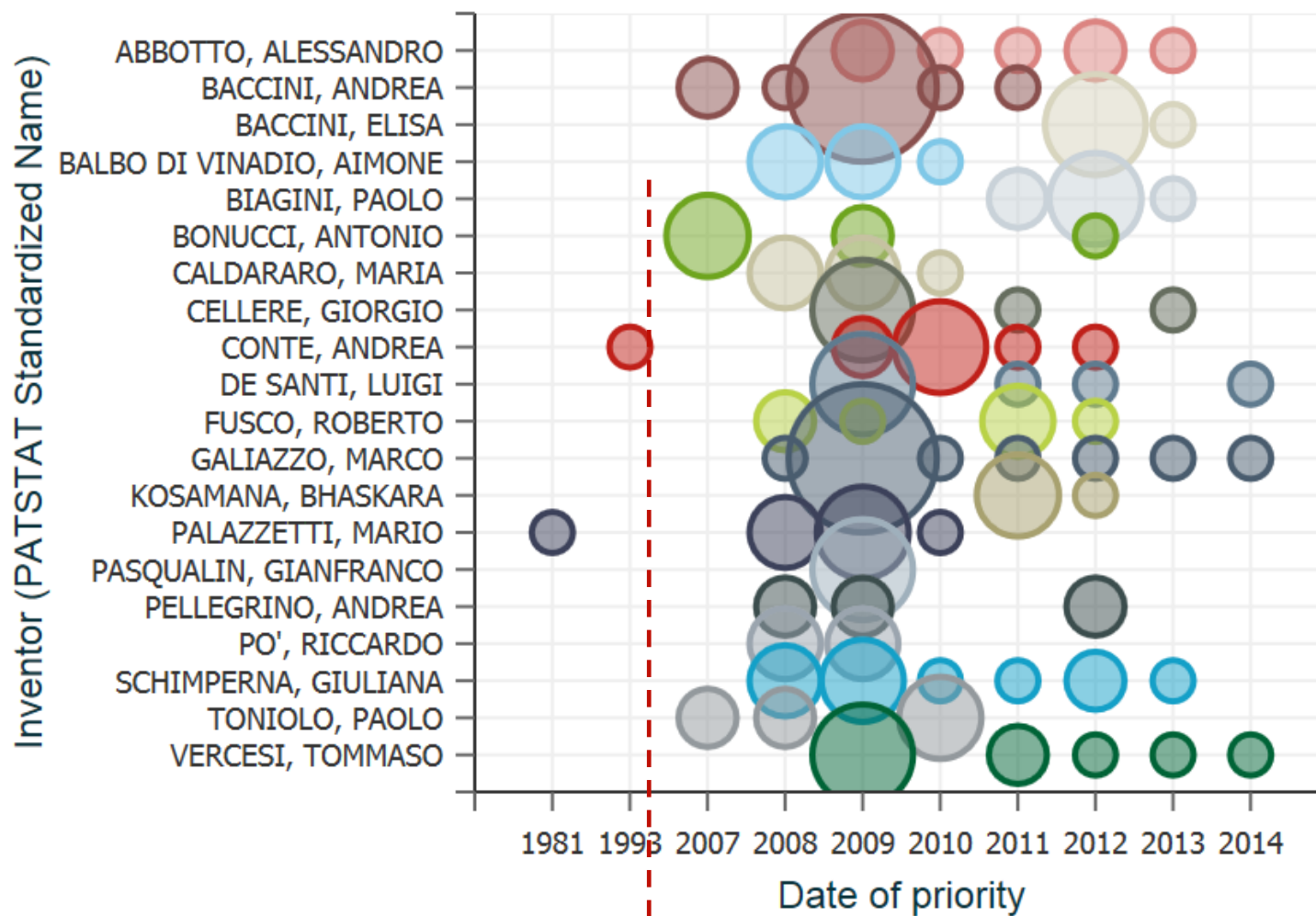


# Harmonised Names

original name, DOCDB standardized name,  
PATSTAT Std. Name, OECD Harmonized Applt Name

	original name	DOCDB standardised	PSN (PATSTAT Std, Name)	HAN (OECD)
1	TOYOTA MOTOR CORP	TOYOTA MOTOR CORP	TOYOTA MOTOR CORPORATION	TOYOTA MOTOR CORP
2	Toyota Jidosha Kabushiki Kaisha	NISSAN MOTOR	HONDA MOTOR COMPANY	TOYOTA JIDOSHA KK
3	NISSAN MOTOR CO LTD	HONDA MOTOR CO LTD	NISSAN MOTOR COMPANY	NISSAN MOTOR CO LTD
4	HONDA MOTOR CO LTD	TOYOTA MOTOR CO LTD	HYUNDAI MOTOR COMPANY	HONDA MOTOR CO LTD
5	Hyundai Motor Company	HYUNDAI MOTOR CO LTD	ROBERT BOSCH	NISSAN MOTOR CO
6	Robert Bosch GmbH	BOSCH GMBH ROBERT	AISIN AW COMPANY	HYUNDAI MOTOR CO
7	HONDA MOTOR CO., Ltd.	AISIN AW CO	MAZDA MOTOR CORPORATION	BOSCH ROBERT
8	Nissan Motor Co., Ltd.	MAZDA MOTOR	DENSO CORPORATION	HONDA GIKEN KK
9	MAZDA MOTOR CORP	FUJI HEAVY IND LTD	FUJI HEAVY IND	DENSO CORP
10	HONDA GIKEN KOGYO KABUSHIKI KAISHA	DENSO CORP	KUBOTA CORPORATION	HONDA MOTOR CO

# PATSTAT Cross reference chart: Inventors



Kyoto Protocol signed 1997

# Italian Applicants/Inventors filing EP applications in environmental technology

Configure / view statistics

Cross-reference ▼

Parameters

## Parameters for Cross-reference

Parameter 1 (X axis)

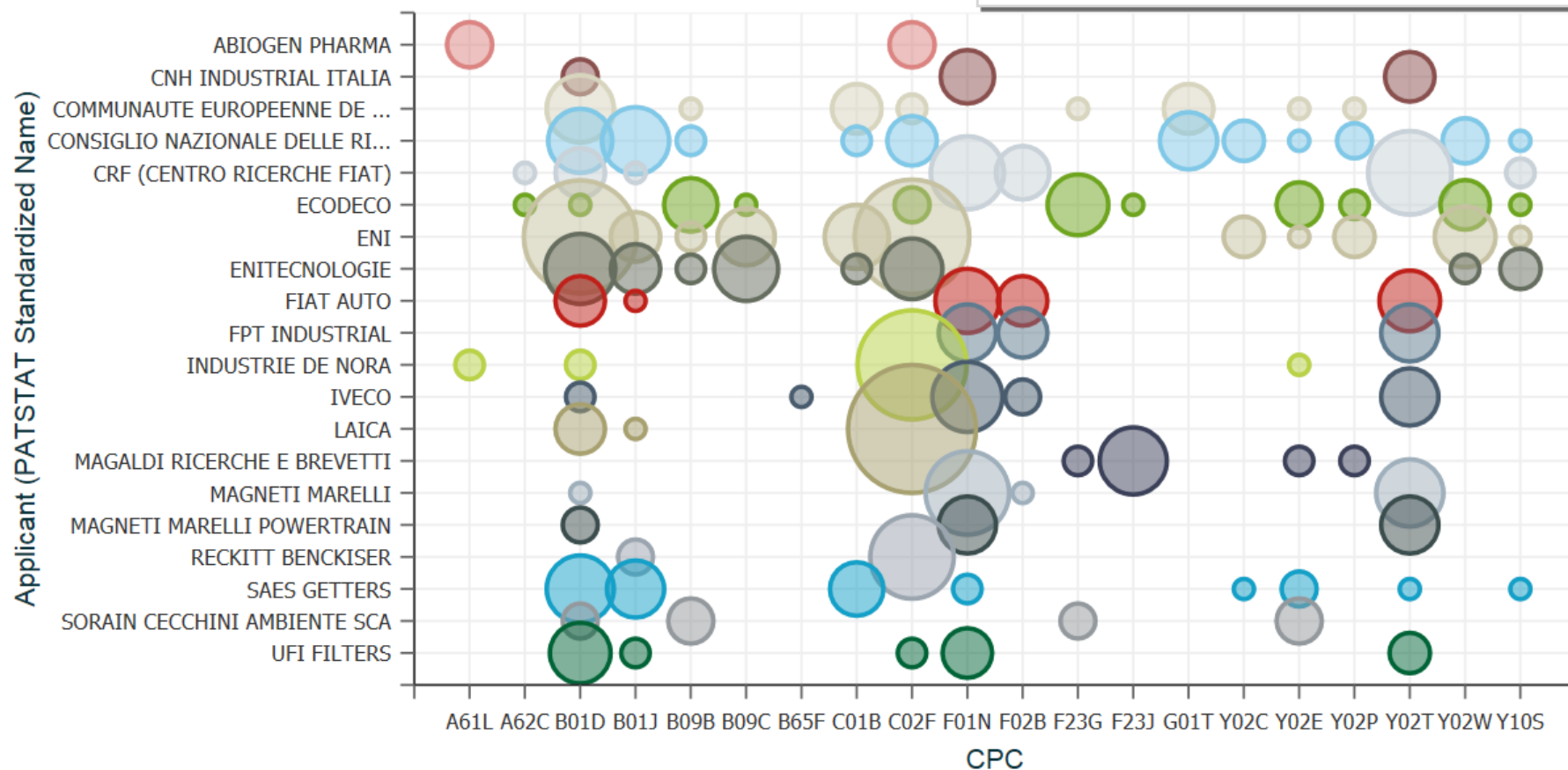
CPC

technical field: Environmental technology

Parameter 2 (Y axis)

Applicant (PATSTAT Standardized Name)

top 20 of the search result list



# Italian Applicants/Inventors filing EP applications in environmental technology

Configure / view statistics

Cross-reference ▼

Parameters

## Parameters for Cross-reference

Parameter 1 (X axis)

CPC

technical field: Environmental technology

Parameter 2 (Y axis)

Applicant (PATSTAT Standardized Name)

top 20 of the search result list

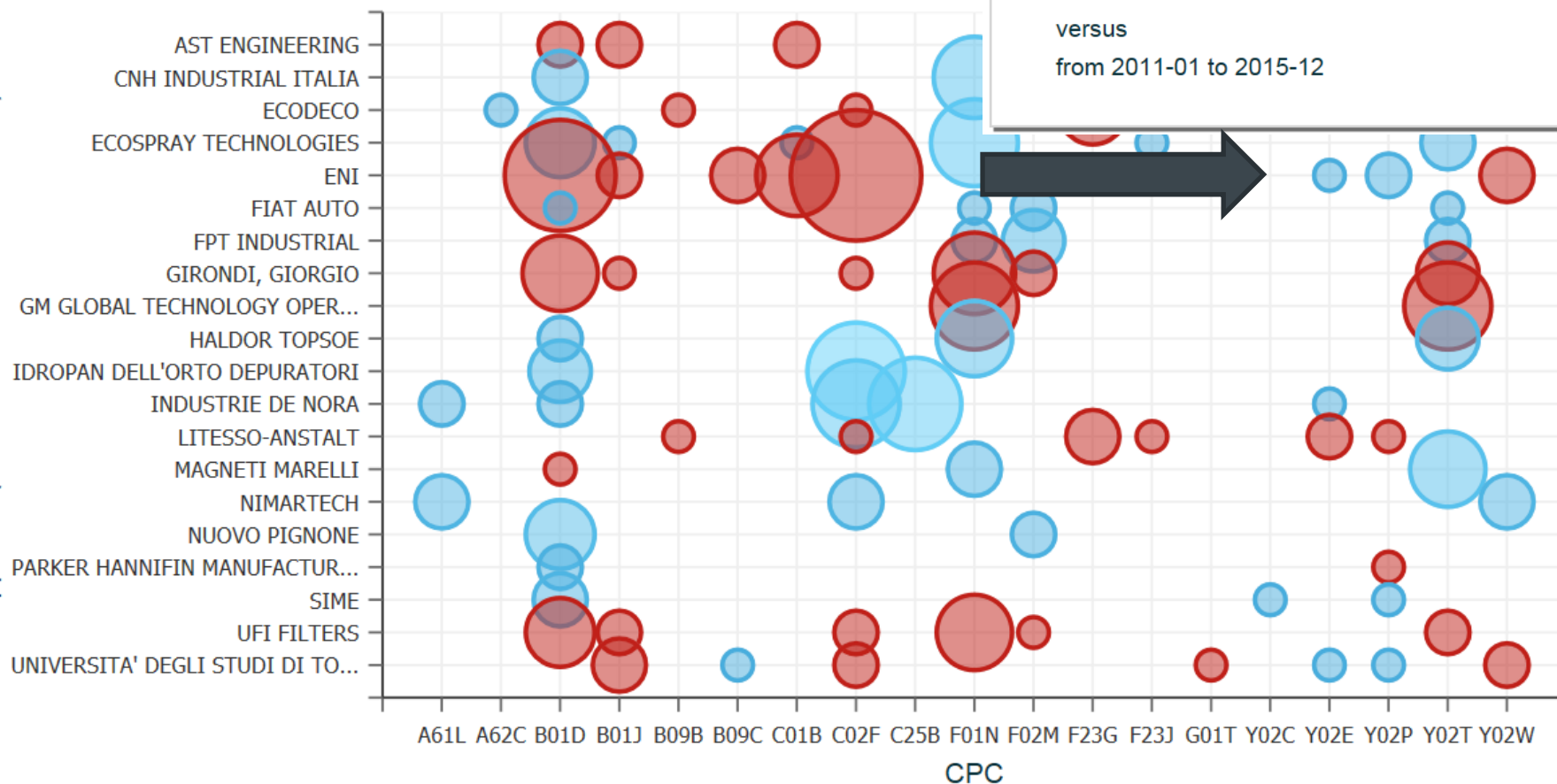
Compare

from 2006-01 to 2010-12

versus

from 2011-01 to 2015-12

Applicant (PATSTAT Standardized Name)



# Italian Applicants/Inventors filing EP applications

## Parameters for Cross-reference

Parameter 1 (X axis)

Applicant (PATSTAT Standardized Name)  
top 20 of the search result list

Parameter 2 (Y axis)

Applicant (PATSTAT Standardized Name)  
top 20 of the search result list

Configure / view statistics

Cross-reference ▼

Applicant (PATSTAT Standardized Name)

CONSIGLIO NAZIONALE DELLE RI...

CRF (CENTRO RICERCHE FIAT)

PIRELLI

STMICROELECTRONICS

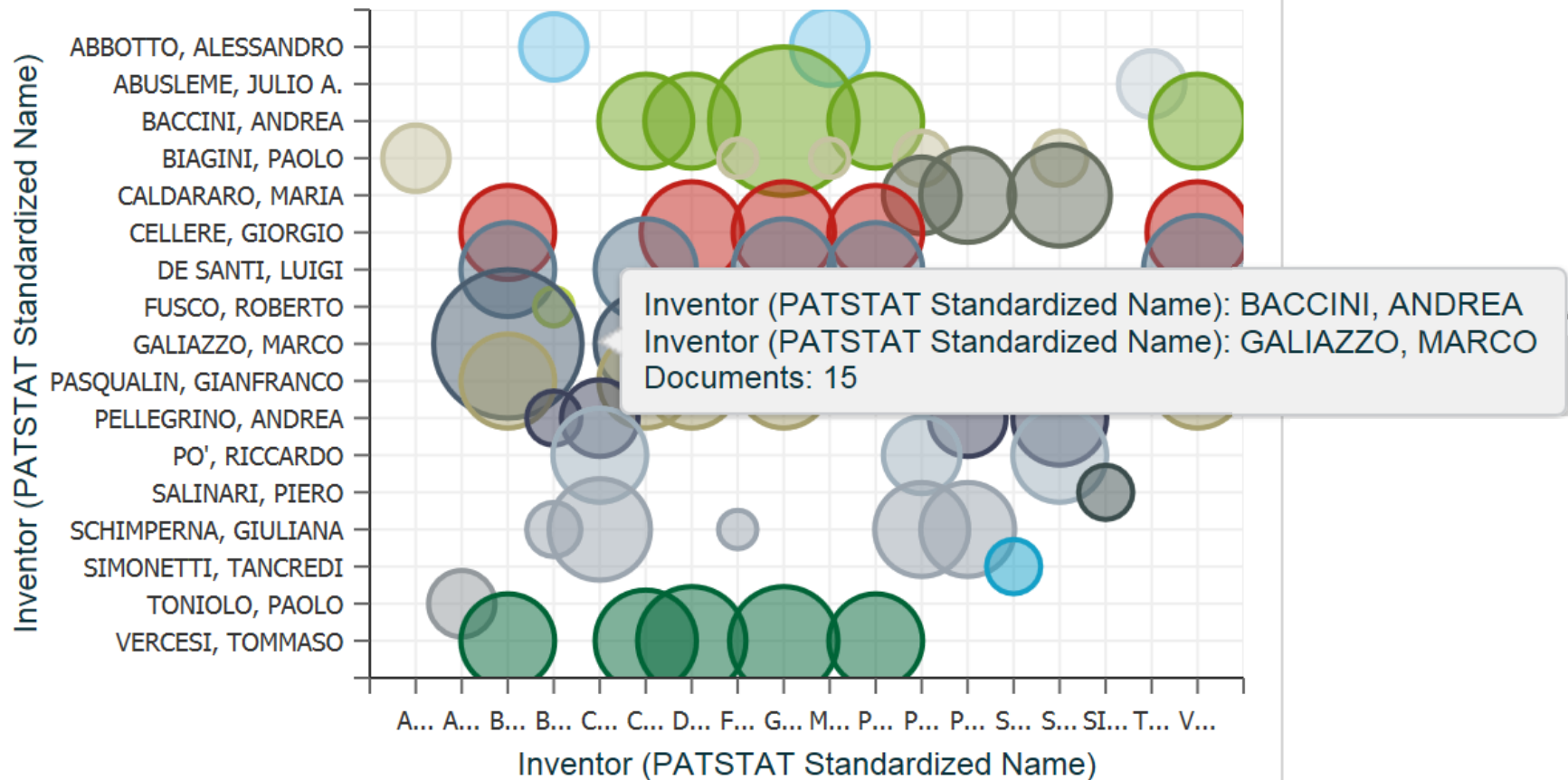
TELECOM ITALIA

CONSIGLI... CRF (CENT... PIRELLI STMICROE... TELECOM ...

Applicant (PATSTAT Standardized Name)

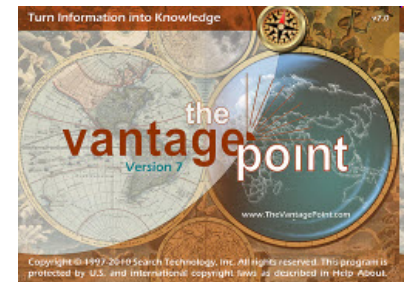
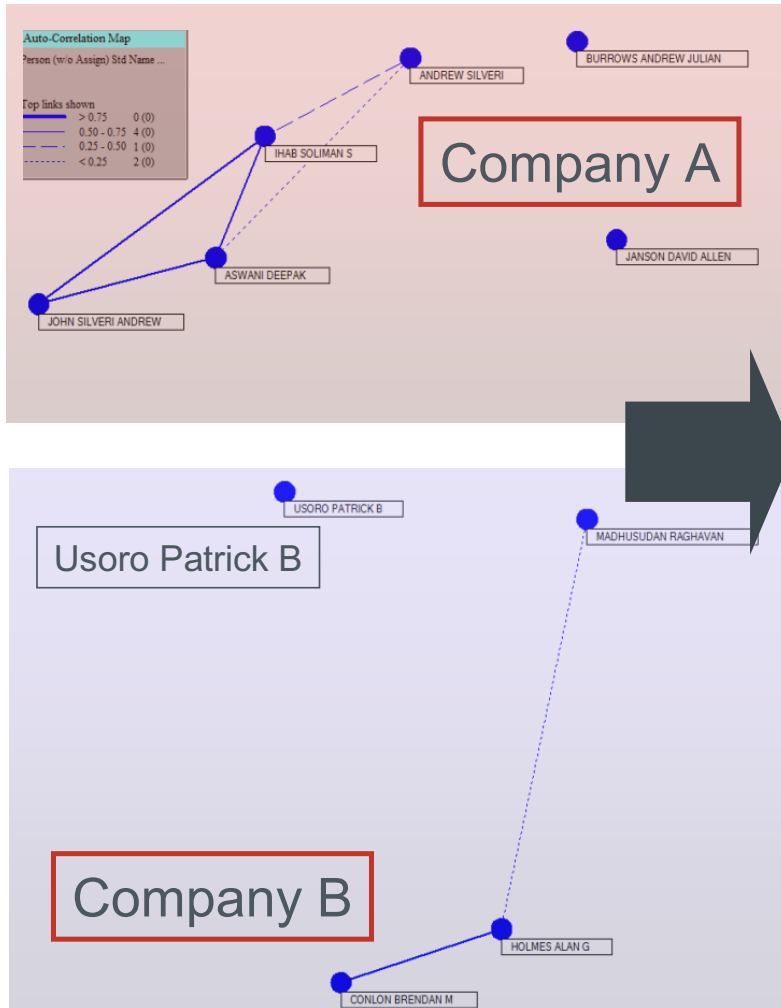
Applicant (PATSTAT Standardized Name): PIRELLI  
Applicant (PATSTAT Standardized Name): TELECOM ITALIA  
Documents: 67

# PATSTAT Cross reference chart: Inventor networks



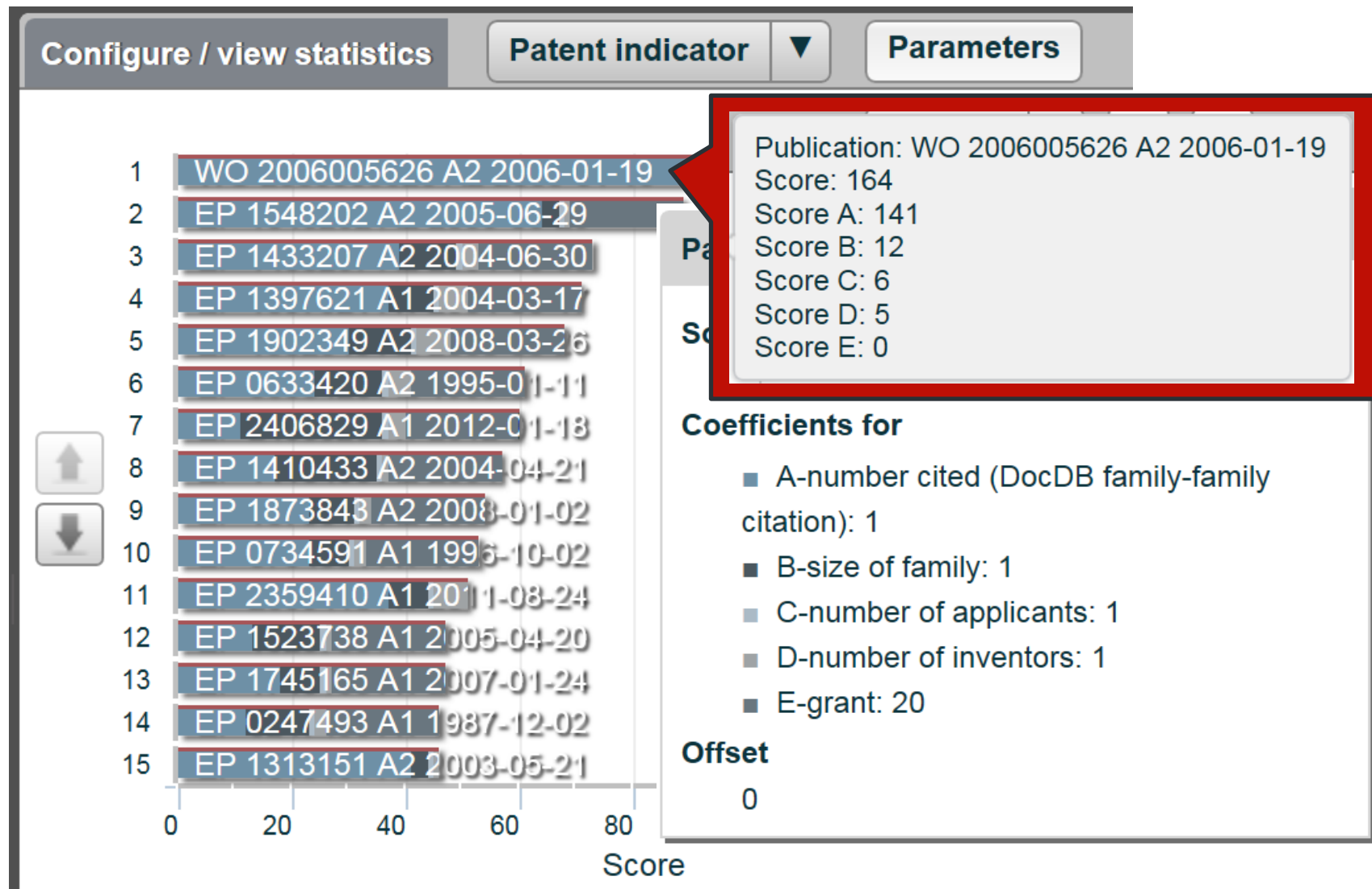
# Assessment of potential co-operation in mergers and acquisitions

Auto-correlation: Co-inventors (top 10)



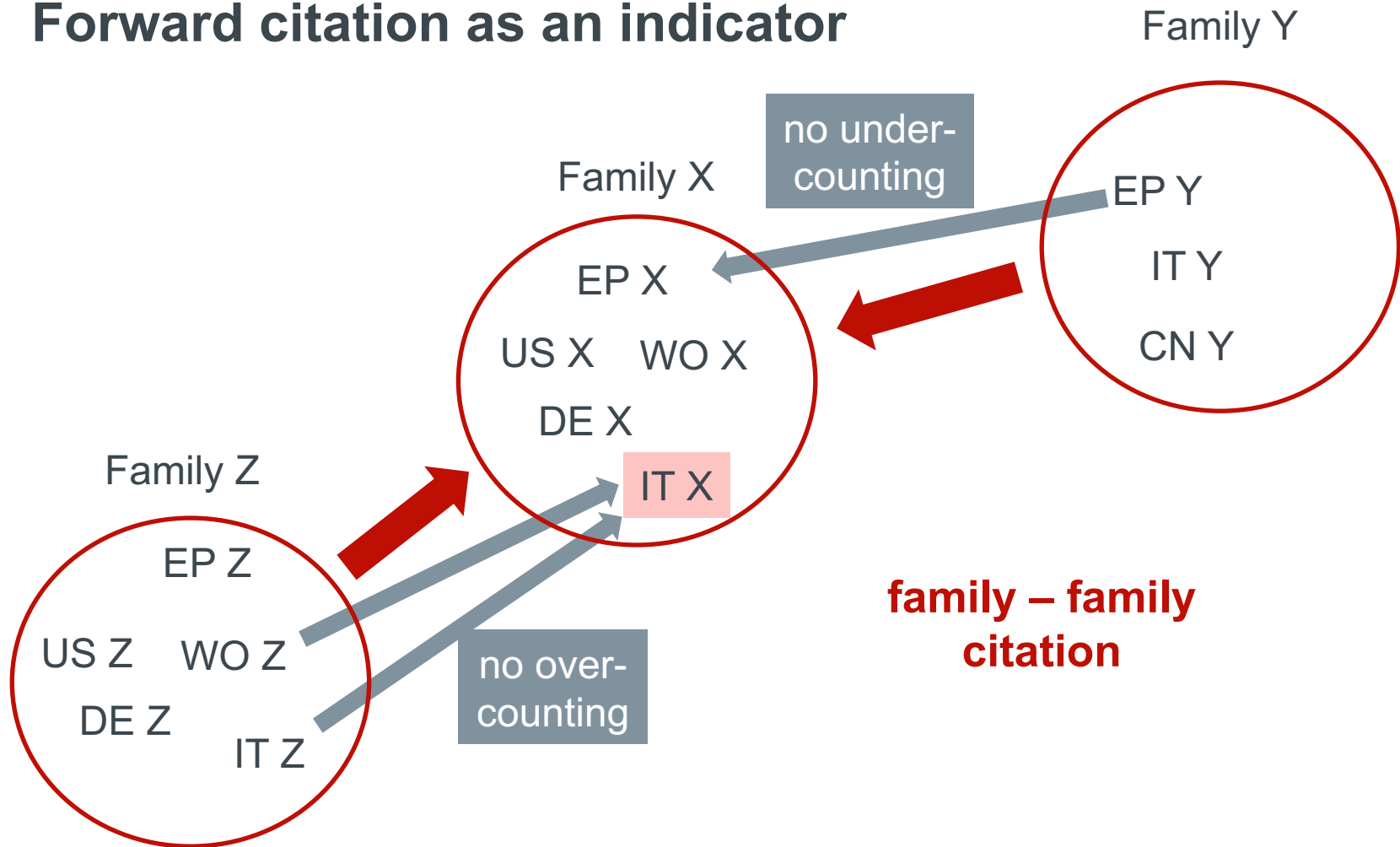


# PATSTAT Online indicators: Solar energy





# Forward citation as an indicator



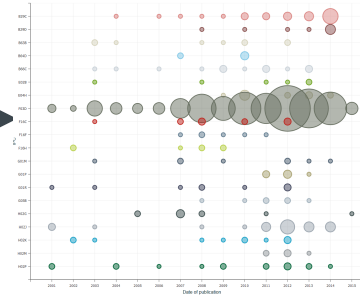
# PATSTAT Downloads

Download  
on user's PC

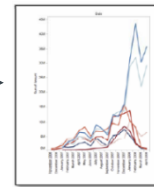
## PATSTAT Online

The screenshot shows the PATSTAT Online web interface. At the top, it says 'PATSTAT Online'. Below that is a navigation bar with links: Home, Preferences, Download, Print, Help, Search, Table, Result, Statistics. The main area displays a SQL query for 709 rows. The query is:   
`SELECT distinct t1s201_appin.appin_id, appin_auth, appin_nr, appin_kind, appin_filing_date  
FROM t1s201_appin JOIN t1s224_appin_cpc ON  
t1s201_appin.appin_id = t1s224_appin_cpc.appin_id  
JOIN t1s207_pers_appin ON  
t1s201_appin.appin_id = t1s207_pers_appin.appin_id  
JOIN t1s206_person ON  
t1s207_pers_appin.person_id = t1s206_person.person_id  
WHERE appin_auth = 'EP' AND person_pty_code = 'IT'  
AND (cpc_class_symbol LIKE '%02E 10/4%'  
OR cpc_class_symbol LIKE '%02E 10/5%'  
OR cpc_class_symbol LIKE '%02E 10/6%')`  
Below the query, there is a 'Messages' section showing a timestamp and a message: '08:44:56 [SELECT - 709 row(s), 3.307 secs, server #0] Result set fetched'. At the bottom, there is a 'History' table with columns: ID, Database, Result, Query. The first row shows: ID: \$68, Database: PATSTAT 2016 Autumn, Result: 709, Query: SELECT distinct t1s201\_appin.appin\_id, appin\_auth, appin\_nr, appin\_kind, appin\_filing\_date

graphs (pdf)

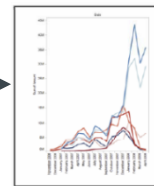


Result Table



local analysis /  
visualization  
(single table)

Patstat subset



local analysis /  
visualization  
(multiple tables in  
PATSTAT data  
structure)

# Top cited applicant/inventors: Family – Family citation

[Home](#)
[Preferences](#)
[Download](#)
[Print](#)
[Help](#)
[Search](#)
[Table](#)
[Result](#)
[Stat](#)

[Query](#)
1 269 rows

```

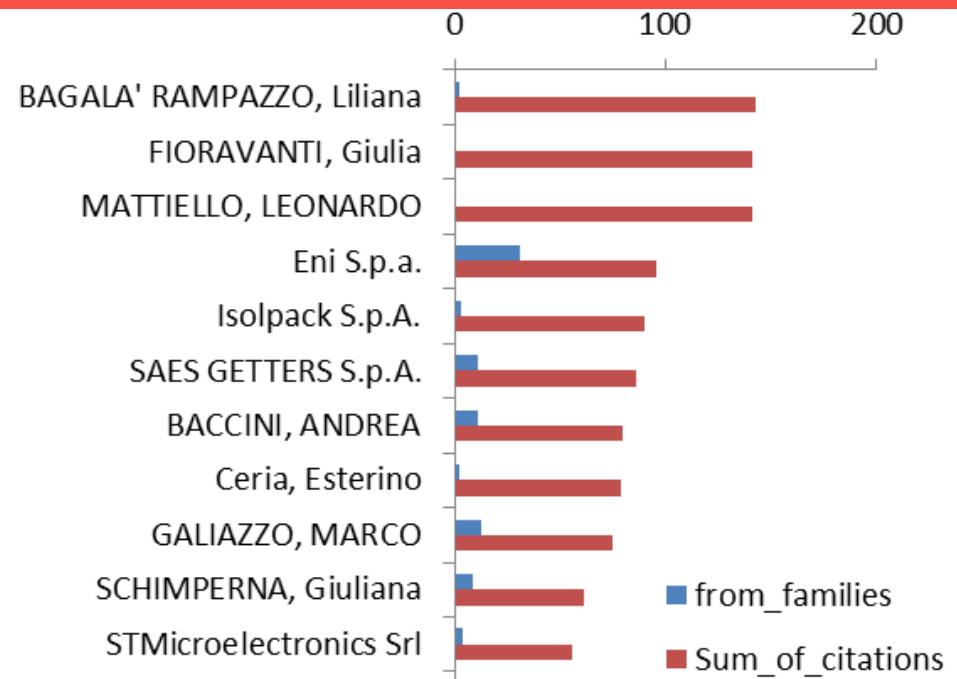
select person_name as name, count(a.famID) AS from_families, sum(a.citation) as Sum_of_citations
From
(SELECT distinct docdb_family_id as famID, tls206_person.person_name , tls201_appln.nb_citing_docdb_fam AS citation

```

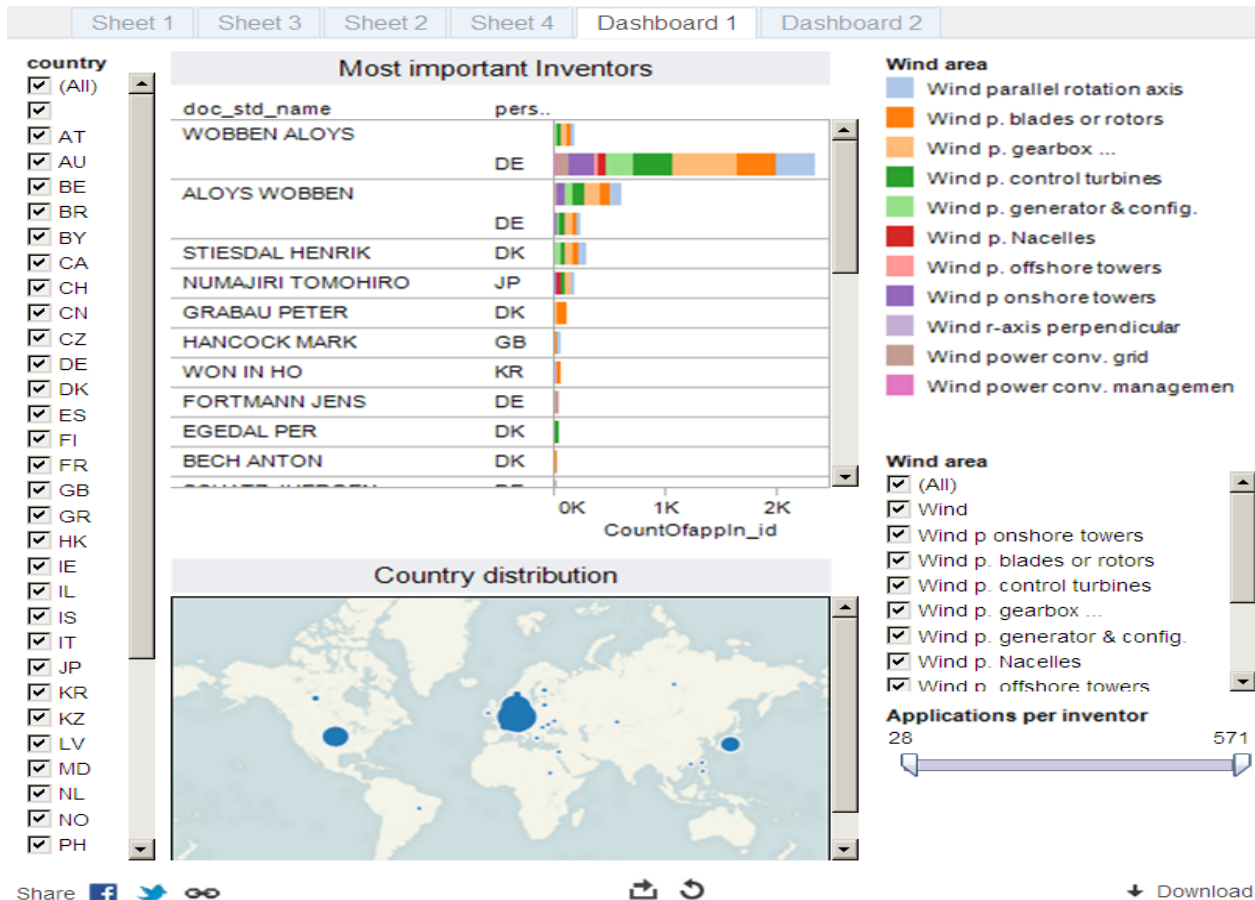
Result table 1 / 1 269

Row	name	from_families	Sum_of_cita
1	BAGALA' RAMPAZZO, Liliana	2	143
2	BAGALA, RAMPAZZO, Liliana	1	141
3	FIORAVANTI, Giulia	1	141
4	MATTIELLO, LEONARDO	1	141
5	Eni S.p.a.	31	96
6	Isolpack S.p.A.	3	90
7	SAES GETTERS S.p.A.	11	86
8	BACCINI, ANDREA	11	80
9	Ceria, Esterino	2	79
10	GALIAZZO, MARCO	13	75
11	SCHIMPERNA, Giuliana	9	61
12	STMicroelectronics Srl	4	56

Excel for own queries



# Example: Wind Energy applications Technologies vs. Countries

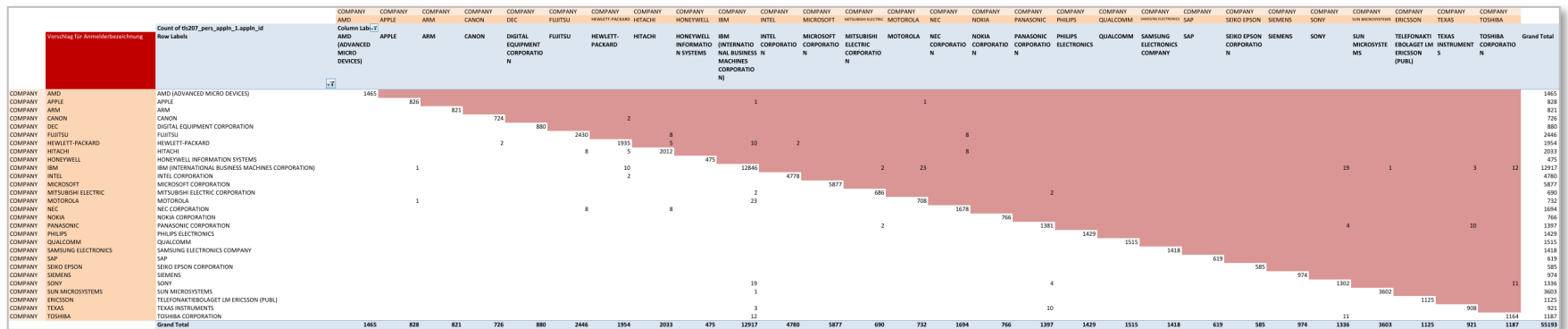


<http://public.tableausoftware.com/views/WindimportantInventorsandApplicants2/Dashboard1?:embed=y>

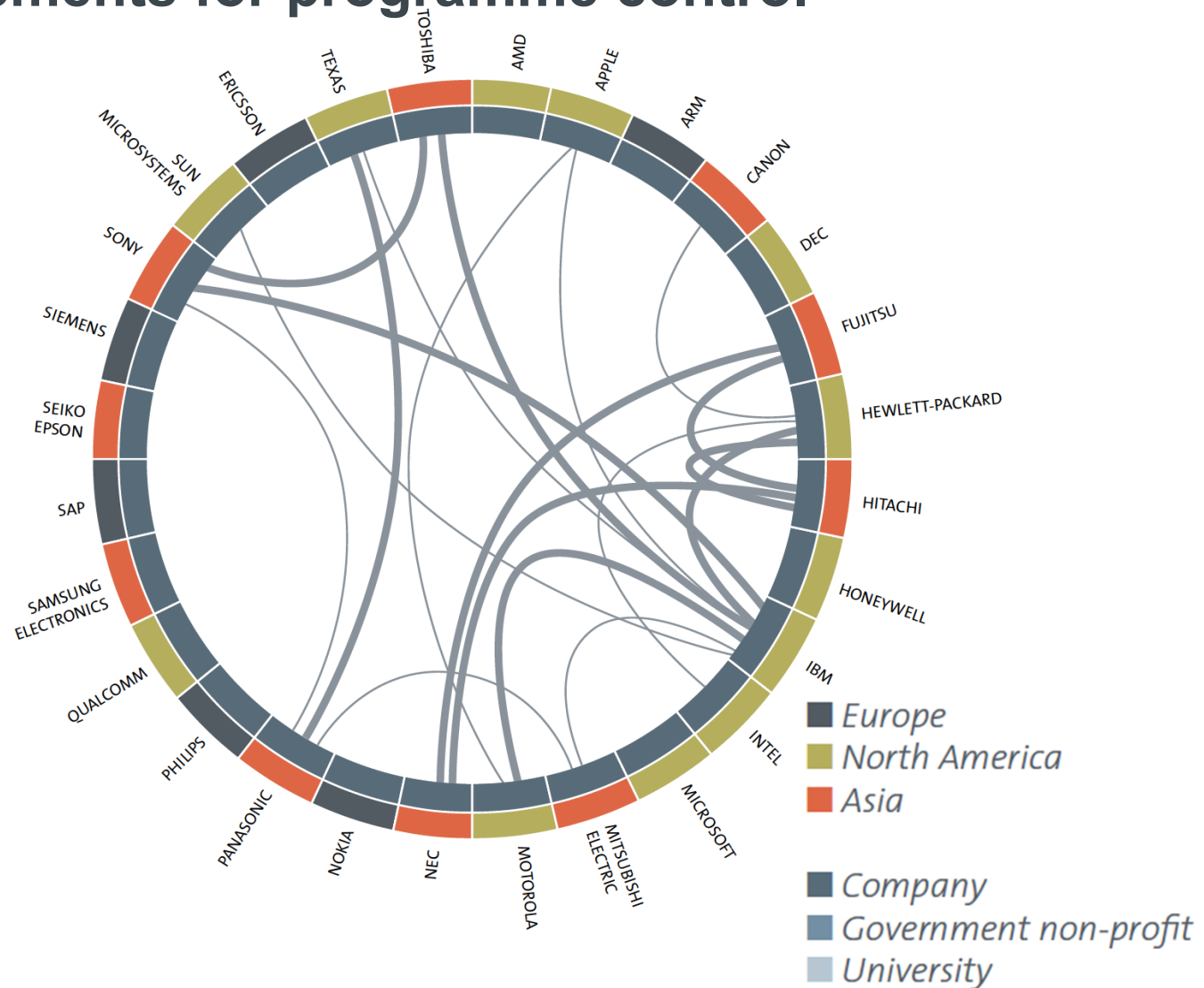
# Appropriate data visualisation

- Complex data often too cluttered to reveal patterns
- Easier for a reader to see and understand patterns rather than to read tables
- Example: co-application behaviour in the field of 'arrangements for programme control':

## Data table



# Co-applicants in the area of arrangements for programme control



# Companies in the fuel cell business

Company technology overlap

assignee

UTC

BALLARD  
POWER  
SYSTEMS

PLUG  
POWER  
INC

HYDROGE  
NICS CORP

FUELCELL  
ENERGY  
INC

IDATECH  
LLC

Taxonomy (group)

Control

Fuel/gas supply  
arrangements,  
storage facility;  
combustion products..

Automotive

Electrodes

Fuel cell housing,  
stack, and sealing  
arrangements/Constr  
uctional details of ce..

Battery cooling,  
heating etc.

Fuel Processing

Testing/Location  
faults

High Power  
Converters

assignee: BALLARD POWER SYSTEMS  
Taxonomy (group): Electrodes  
% of Total Distinct count of family\_num: 36,50%  
Distinct count of family\_num: 50

Company temporal

assignee range

UTC <87

87-90

91-94

95-98

99-02

03-06

BALLARD  
POWER  
SYSTEMS

<87

87-90

91-94

95-98

99-02

03-06

PLUG  
POWER  
INC

<87

87-90

91-94

95-98

99-02

03-06

HYDROGE  
NICS  
CORP

<87

87-90

91-94

95-98

99-02

03-06

FUELCELL  
ENERGY  
INC

<87

87-90

91-94

95-98

99-02

03-06

IDATECH  
LLC

<87

87-90

91-94

95-98

99-02

03-06

Sheet Link (range)

☒ (All)

☒ <87

☒ 03-06

☒ 87-90

☒ 91-94

☒ 95-98

☒ 99-02

Sheet Link (Taxonomy (g..

☒ (All)

☒ Others, Anode/cathod...

☒ Automotive

☒ Aviation/Marine

☒ Battery cooling, heati...

☒ Control

☒ Data Processing

☒ Domestic Electrical A...

☒ Electrodes

☒ Fuel cell housing, sta...

☒ Fuel Processing

☒ Fuel/gas supply arran...

☒ High Power Converters

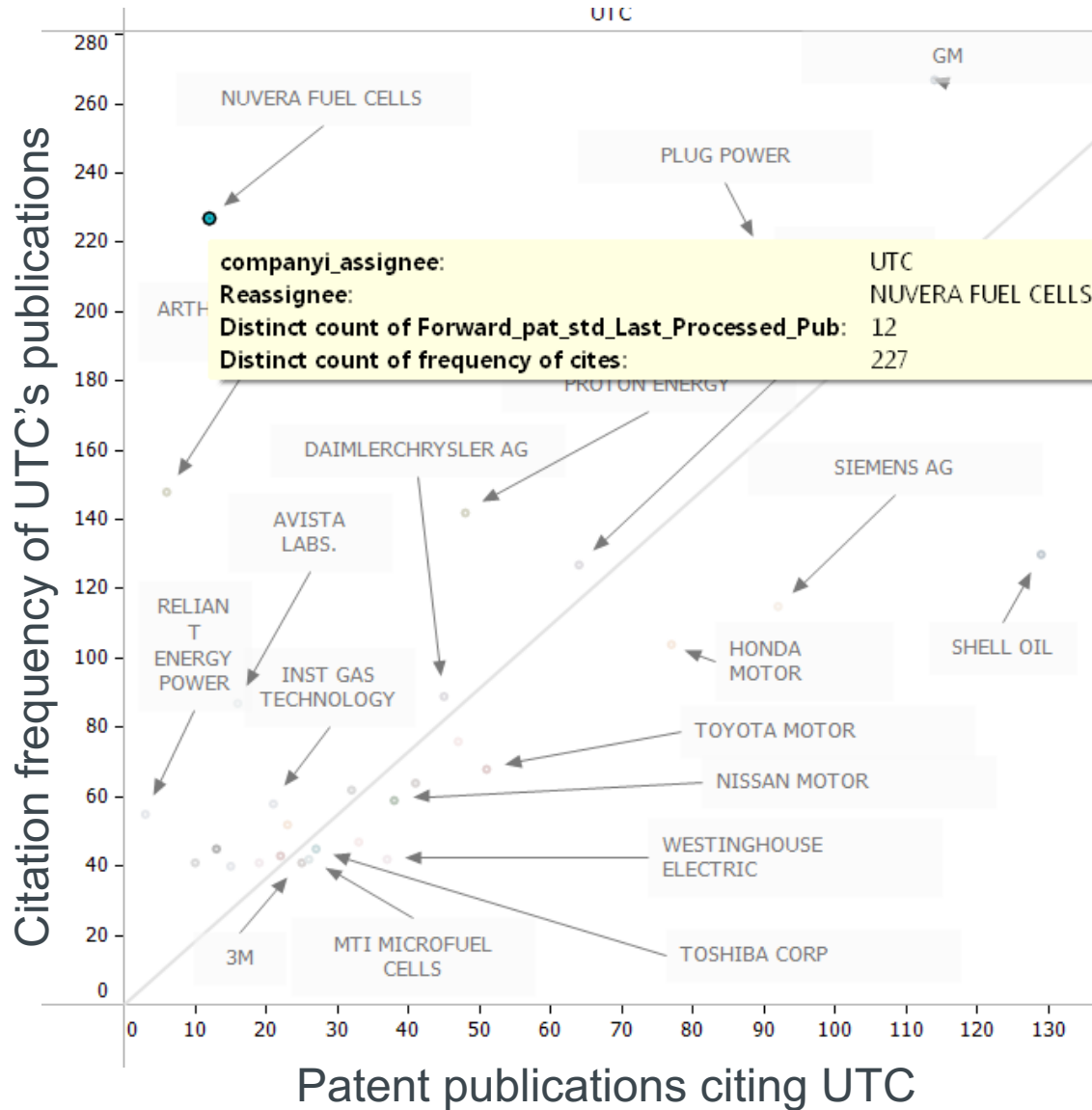
☒ Low Power Conversio...

☒ Power Generation an...

☒ Power Supply and Di...

☒ Testing/Location faults

# Fuel cells: Cooperation or litigation?



What advice can be given to UTC?



# Conclusion

- The PATSTAT product line comprises expert tools for statistical analysis of patent data
  - Bibliography
  - EP register
  - Worldwide legal status
- PATSTAT online comprises ready made visualisations for business use of patent information
- More expert analysis and visualisation tools can be used with PATSTAT DATA
- Further information on [EPO website](#)

# Thank you for your attention!

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