

Patent citations & Non Patent Literature



What are citations ?

Have a look ! **DOCUMENTS CONSIDERED TO BE RELEVANT**

EP 1 000 000 A1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 20 3729

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 680 812 A (BOER BEHEER NIJMEGEN BV DE) 8 November 1995 (1995-11-08) * the whole document *	1, 10, 11	B28B5/02 B28B7/00 B28B1/29
A	NL 9 400 663 A (BOER BEHEER NIJMEGEN BV DE) 1 December 1995 (1995-12-01) * the whole document *	1, 3	
A	DE 35 46 191 A (NETZSCH MASCHINENFABRIK) 2 July 1987 (1987-07-02) * the whole document *	1-3, 8	

What are patent citations ?

Cited patent documents

What is Non Patent Literature ?

Cited publications that are not patent documents

For example:

- Scientific publications & articles
- Product manuals, technical notes commercial brochures
- Abstracts from specialised data bases (Medline , CAS,..)
- Published international standards and legislation
- Dissertations (published)

WWW ? Yes, examiner will make a print out.

Who cites ?

- The examiners during search procedure
- The applicant when he files the application
- Applicant and examiner during examination
- Parties involved in opposition
- Everybody: Article 115: Observations by third parties
- Other (earlier) search reports
- ...

→ *Defined for each cited document in PATSTAT via citn_origin (tls212)*

→ *Not un-common to EXCLUDE (self) citations by applicant from metrics*

Origin of the citation ?

- APP citations introduced by the applicant
- SEA citations introduced during search (from Search Report)
- ISR citations from the International Search Report
- EXA citations introduced during examination
- SUP citations from the Supplementary Search Report
- PRS "PRe-Search" citations (only for US applications)
- OPP citations introduced during opposition (published in B2))
- APL citations introduced during appeal by applicant
- FOP citations introduced at opposition by any third party
- TPO Third Party Observations (Art 115 EPC)
- CH2 citations introduced during the Chapter 2 phase of the PCT

Why are we interested in citations ?

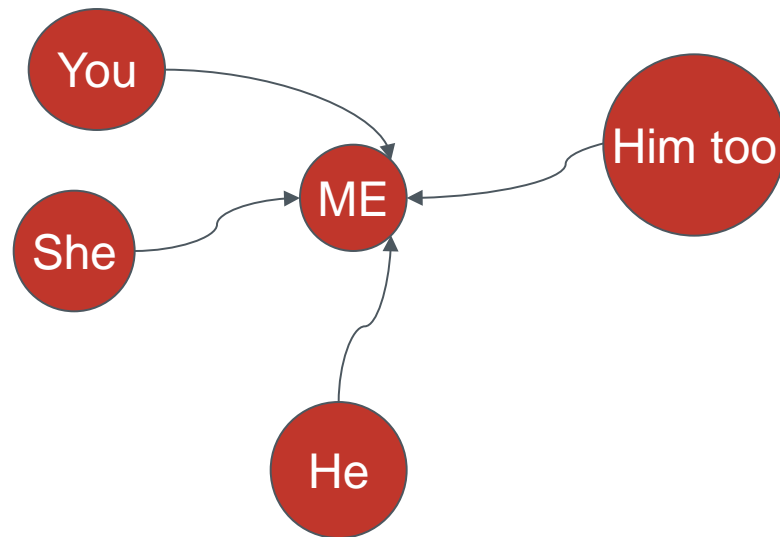
To retrieve cited prior art. ([Common Citation Document](#))

From a statistical point of view:

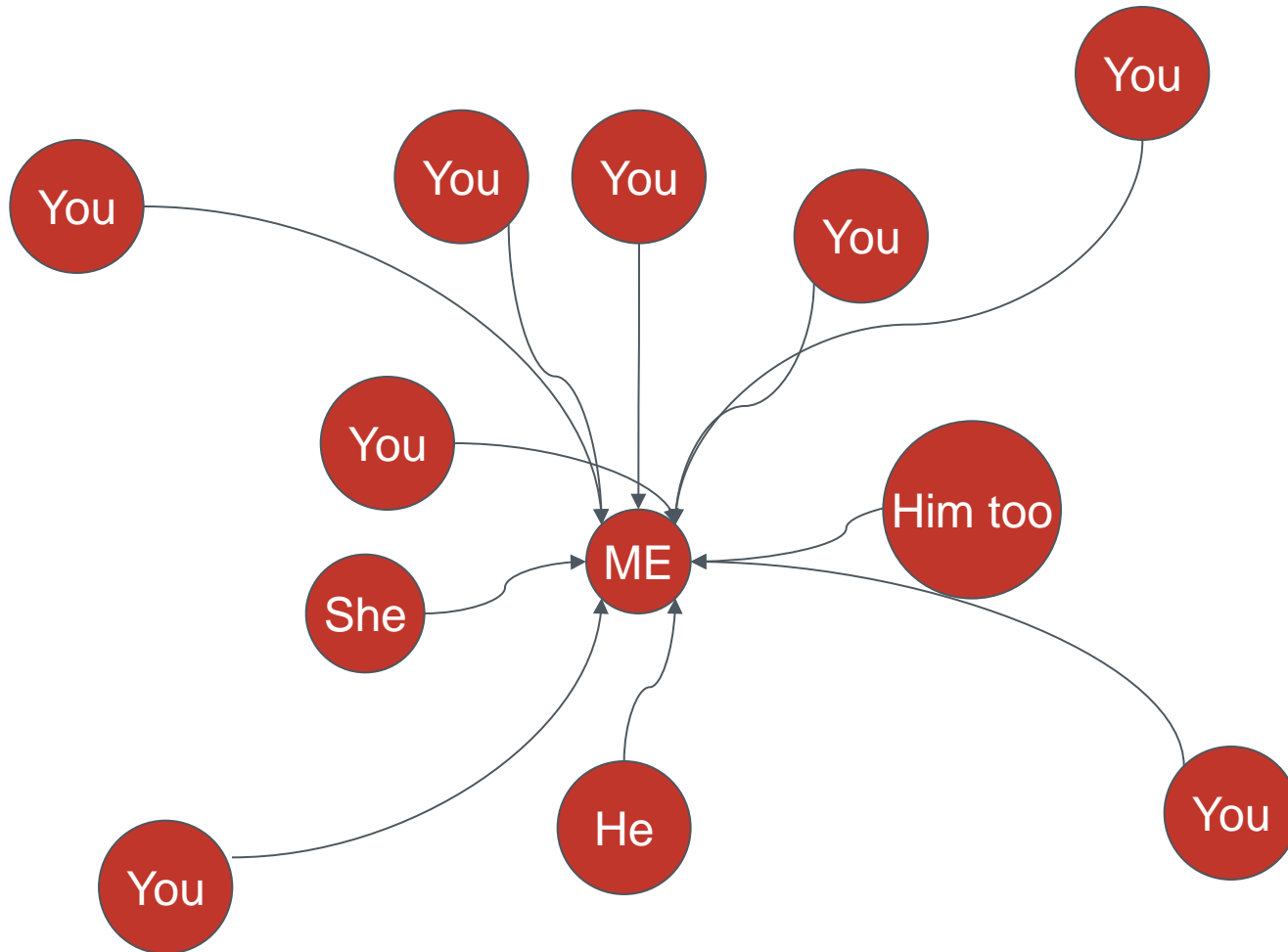
- ***To discover "relations" and "interdependencies"***
- ***To discover "valuable" patents -> value indicator***
- ***To discover potential infringers (litigation & licencing)***
- ***To discover potential partners (research & licencing)***
- ***Cross industry technology flows (policy)***
- ***Cross country/area technology flows (policy)***
- ***Patent offices → save work, patent prosecution highway***



I am important ! I have been cited 4 times !



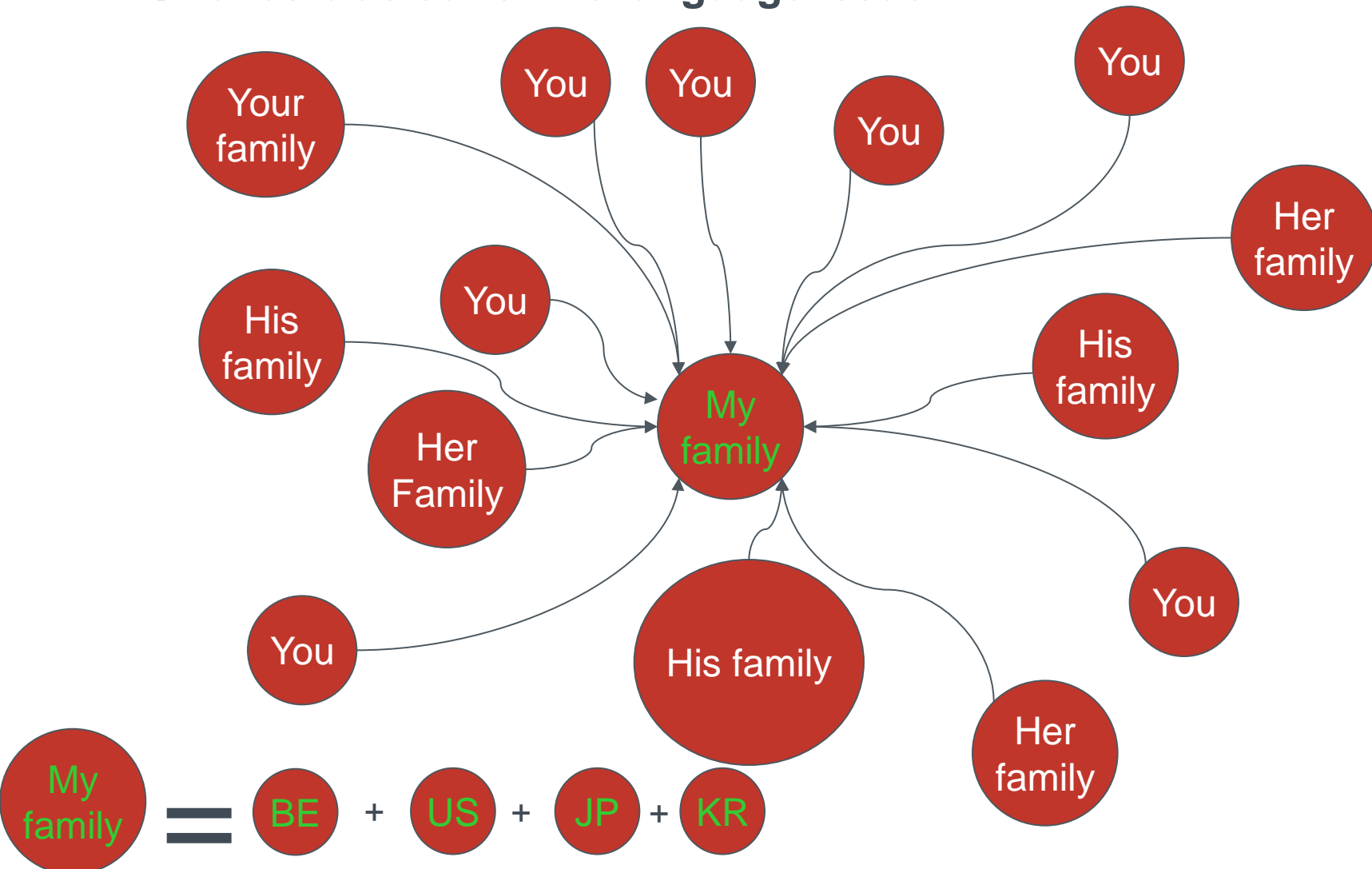
I am **VERY** important ! I have been cited many times



My family is **VERY** important !

We have been cited many times ... by many families

→ takes bias out of the language issue



Family – family citations via tls228_docdb_fam_citn

cited application

tls201_appln

*
appln_id
appln_auth
appln_nr
appln_kind
appln_filing_date
appln_filing_year
appln_nr_epodoc
appln_nr_original
ipr_type
internat_appln_id
int_phase
reg_phase
nat_phase
earliest_filing_date
earliest_filing_year
earliest_filing_id
earliest_publn_date
earliest_publn_year
earliest_pat_publn_id
granted
docdb_family_id
inpadoc_family_id
docdb_family_size
nb_citing_docdb_fam
nb_applicants
nb_inventors

tls228_docdb_fam_citn

*
docdb_family_id
cited_docdb_family_id

CITING

*
appln_id
appln_auth
appln_nr
appln_kind
appln_filing_date
appln_filing_year
appln_nr_epodoc
appln_nr_original
ipr_type
internat_appln_id
int_phase
reg_phase
nat_phase
earliest_filing_date
earliest_filing_year
earliest_filing_id
earliest_publn_date
earliest_publn_year
earliest_pat_publn_id
granted
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inpadoc_family_id
docdb_family_size
nb_citing_docdb_fam
nb_applicants
nb_inventors

Family – family citations example

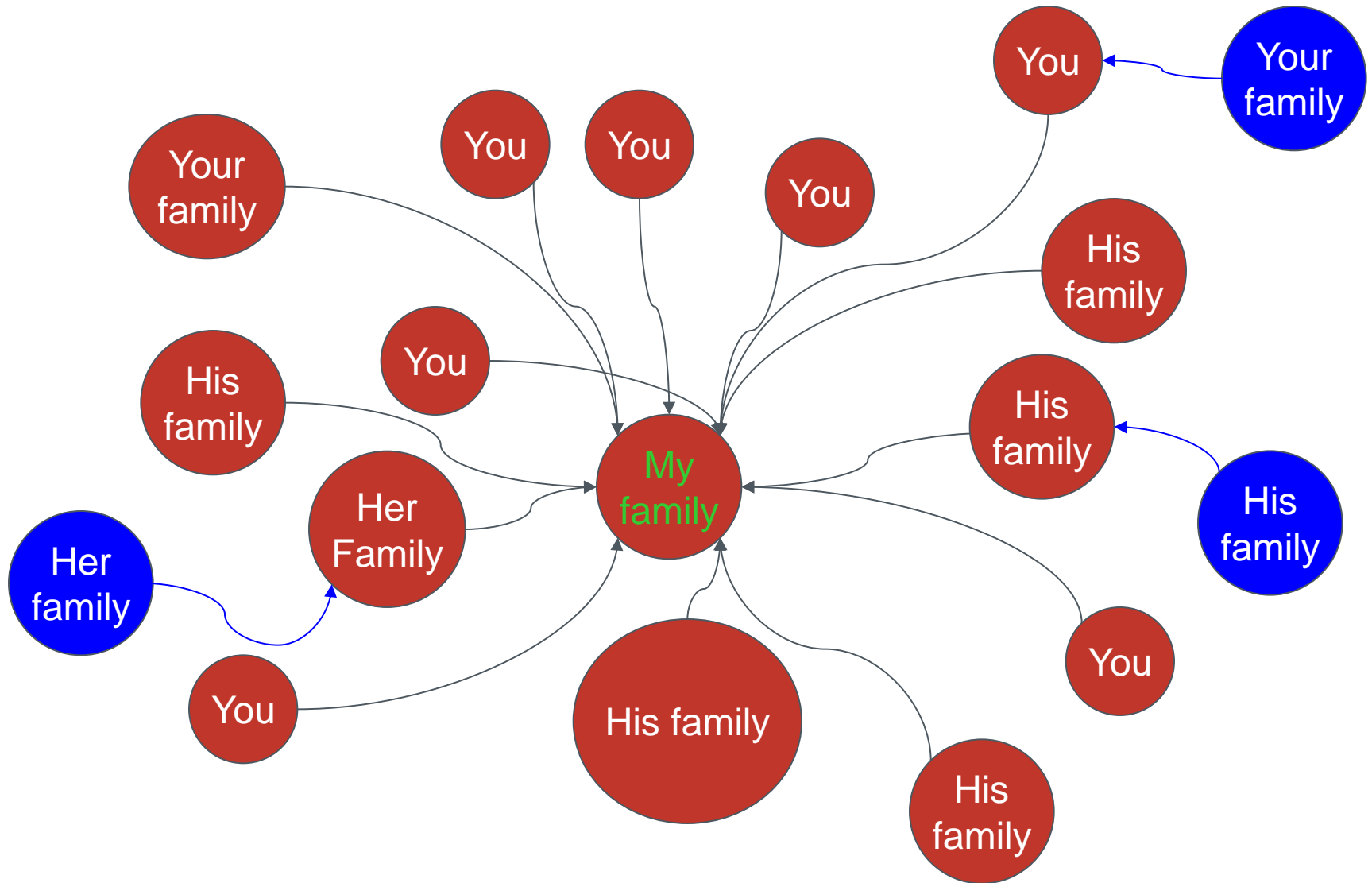
Retrieve all applications that belong to families that cite EP02731549
(or any of its family members)

```
SELECT tls201_appln.appln_auth, tls201_appln.appln_nr,  
tls201_appln.appln_kind, tls201_appln.appln_filing_date,  
  CITING.appln_auth, CITING.appln_nr, CITING.appln_kind,  
  CITING.appln_filing_date  
  
FROM tls201_appln INNER JOIN tls228_docdb_fam_citn ON  
tls201_appln.docdb_family_id = tls228_docdb_fam_citn.cited_docdb_family_id  
JOIN tls201_appln AS CITING ON tls228_docdb_fam_citn.docdb_family_id =  
  CITING.docdb_family_id  
  
WHERE tls201_appln.appln_auth = 'EP'  
      AND Tls201_appln.appln_nr = '02731549';
```

Family – family citations example - results

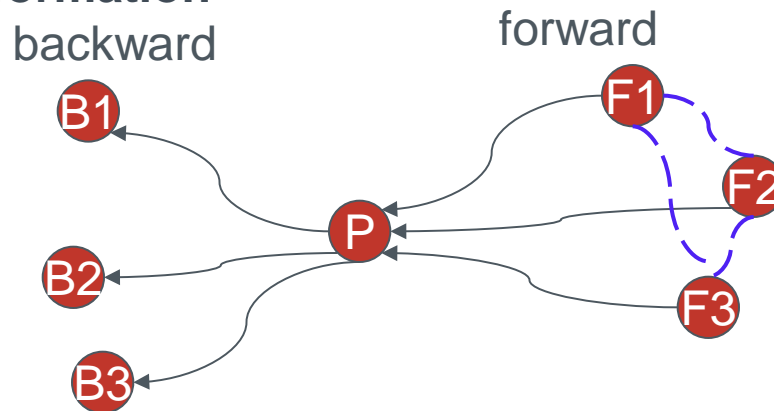
applications belonging
to citing families

appln_auth	appln_nr	appln_kind	appln_filing_date	appln_auth	appln_nr	appln_kind	appln_filing_date
EP	2731549	A	25-04-2002	US	14165202	A	07-05-2002
EP	2731549	A	25-04-2002	US	41850903	A	16-04-2003
EP	2731549	A	25-04-2002	US	78873604	A	26-02-2004
EP	2731549	A	25-04-2002	US	2004005963	W	27-02-2004
EP	2731549	A	25-04-2002	KR	20087020717	A	27-02-2004
EP	2731549	A	25-04-2002	DK	11184545	T	27-02-2004
EP	2731549	A	25-04-2002	ES	11184545	T	27-02-2004
EP	2731549	A	25-04-2002	EP	4715691	A	27-02-2004
EP	2731549	A	25-04-2002	JP	2006508892	A	27-02-2004
EP	2731549	A	25-04-2002	KR	20097002092	A	27-02-2004
EP	2731549	A	25-04-2002	CA	2683006	A	27-02-2004
EP	2731549	A	25-04-2002	EP	10170489	A	27-02-2004
EP	2731549	A	25-04-2002	CA	2707686	A	27-02-2004
EP	2731549	A	25-04-2002	AT	4715691	T	27-02-2004
EP	2731549	A	25-04-2002	DE	6,02004E+11	T	27-02-2004
EP	2731549	A	25-04-2002	MX	PA05009106	A	27-02-2004
EP	2731549	A	25-04-2002	BR	PI0407856	A	27-02-2004
EP	2731549	A	25-04-2002	CA	2516494	A	27-02-2004



Patent interdependencies

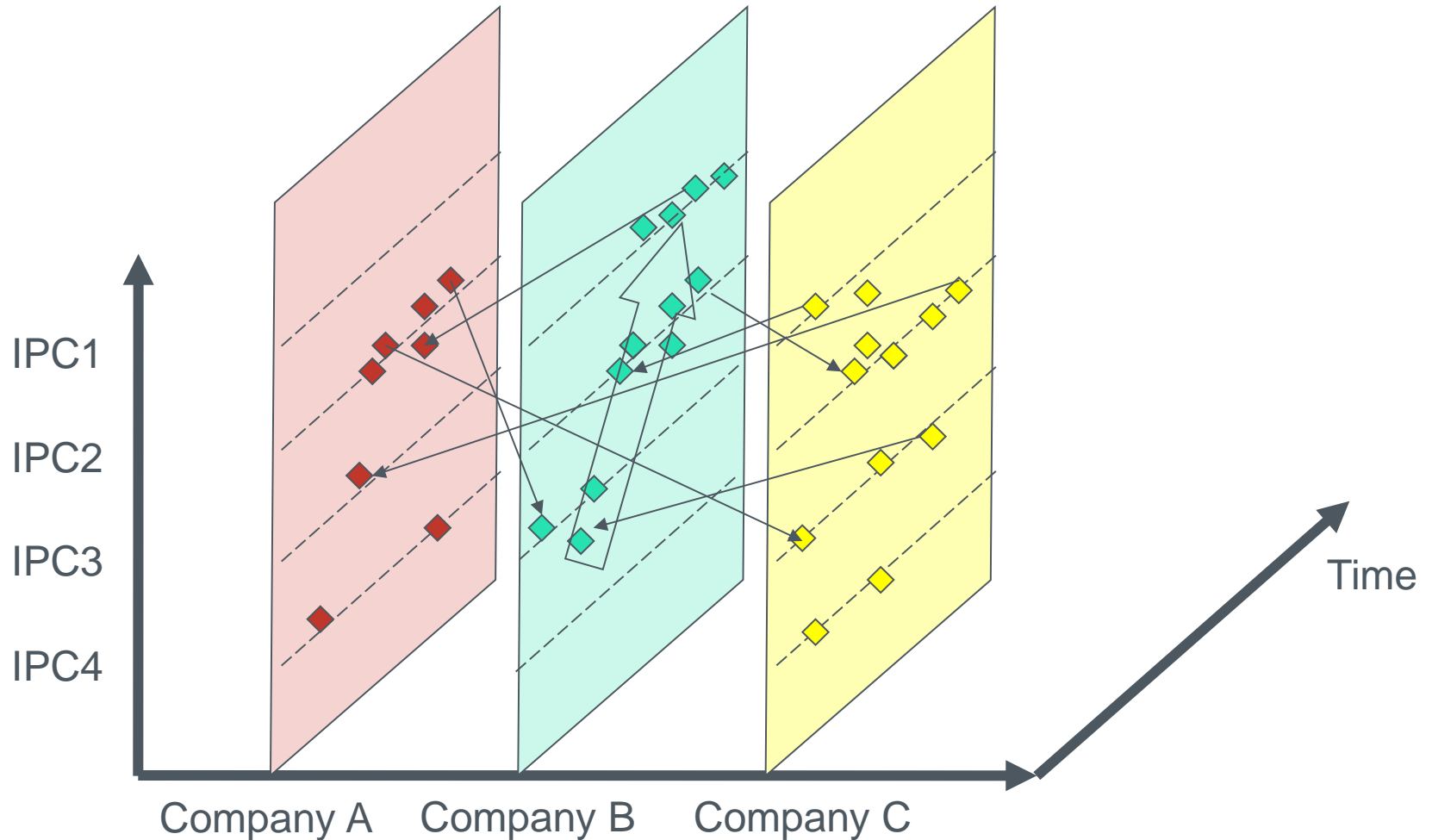
- Patent documents are often classified in various IPCs: Thus growing **interdependencies of IPCs** allow to identify growing interdependencies between technologies
- Citation information**



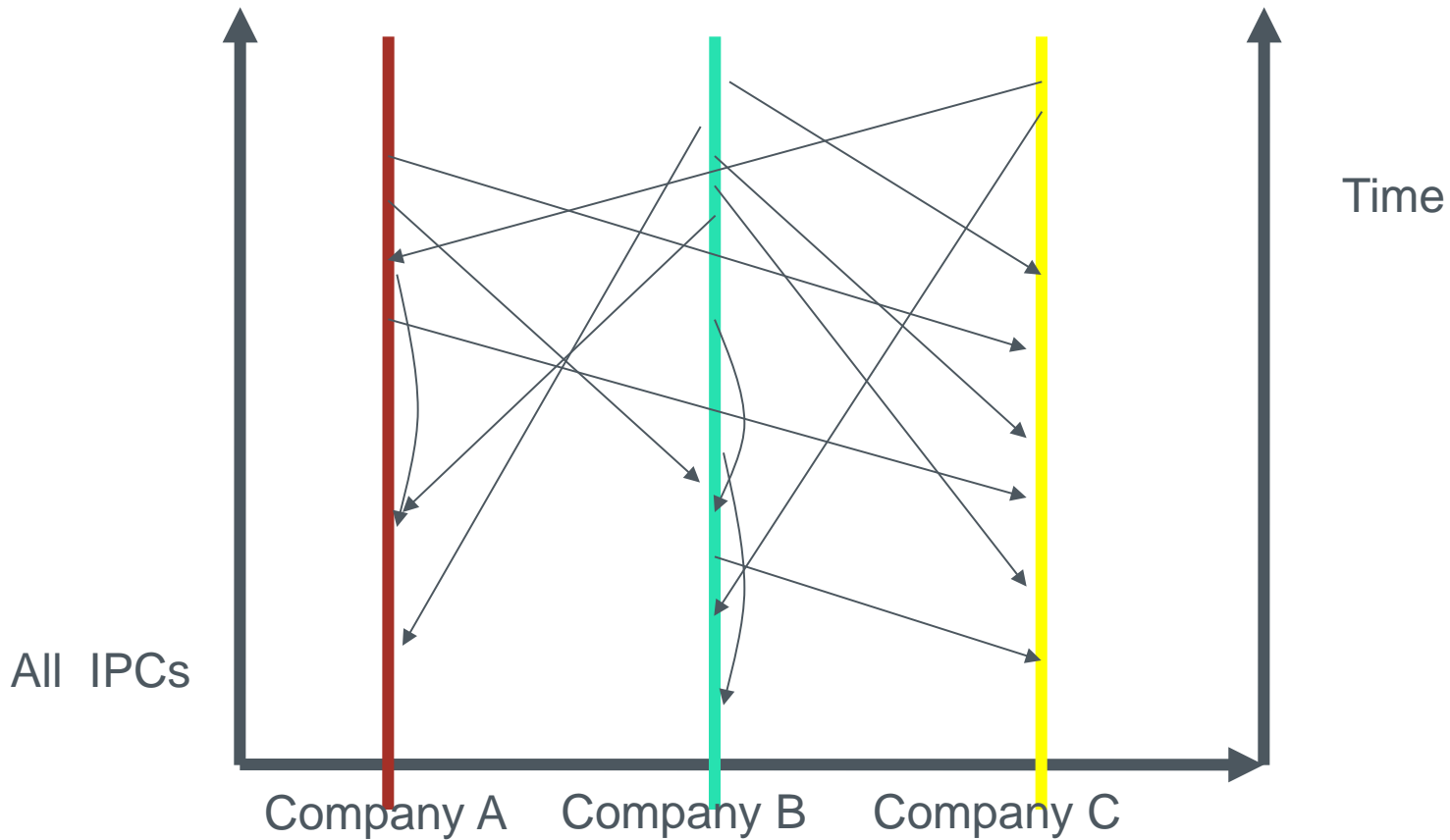
When assessing recent documents that do not receive soon citations, it appears to be reasonable to establish **connections** via forward citation.

Citation analysis should be consolidated on a **patent family** level, since the connectivity between inventions does not depend on which family member is cited. Family members represent the same invention.

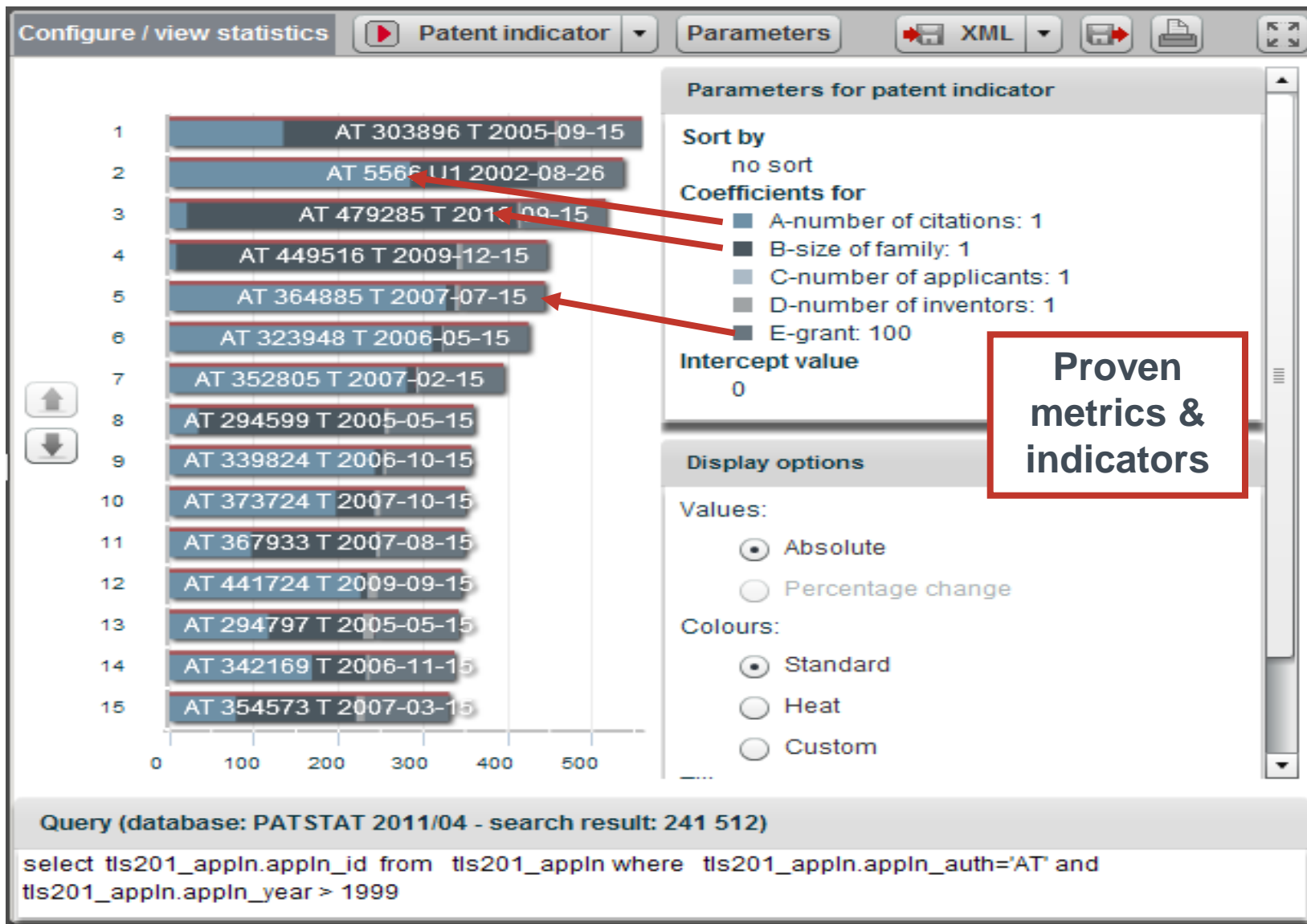
3D Scatter Graph to identify patent clusters



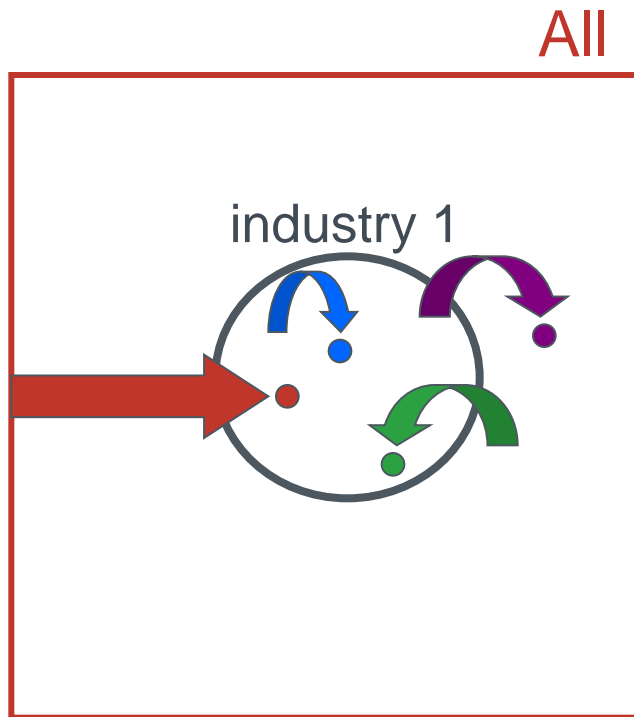
Interconnection between companies



Patent indicator in PATSTAT online



Knowledge transfer and citation analysis



A: What are most influential patents of the industry?

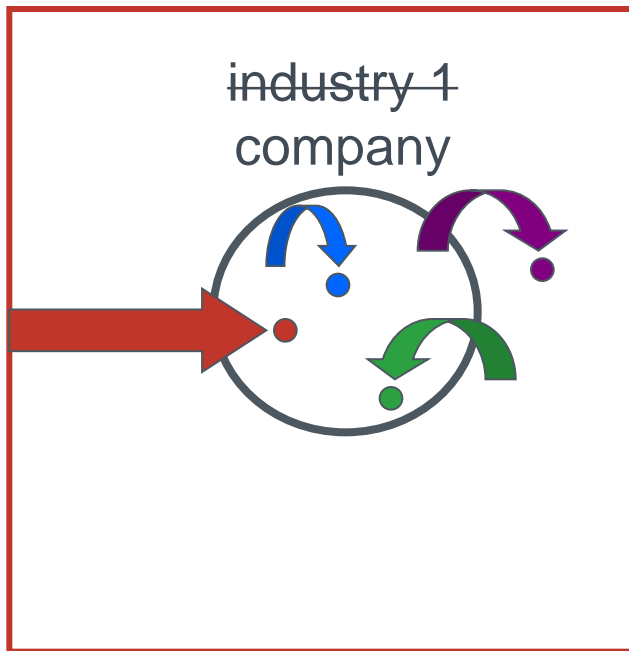
B: Where is the industry's technology mostly used

C: Which technology does the industry build on?

D: What are the most influential patents used in the industry

Knowledge transfer and citation analysis

All



Country → technology flow
Patent office → citation (patent) quality

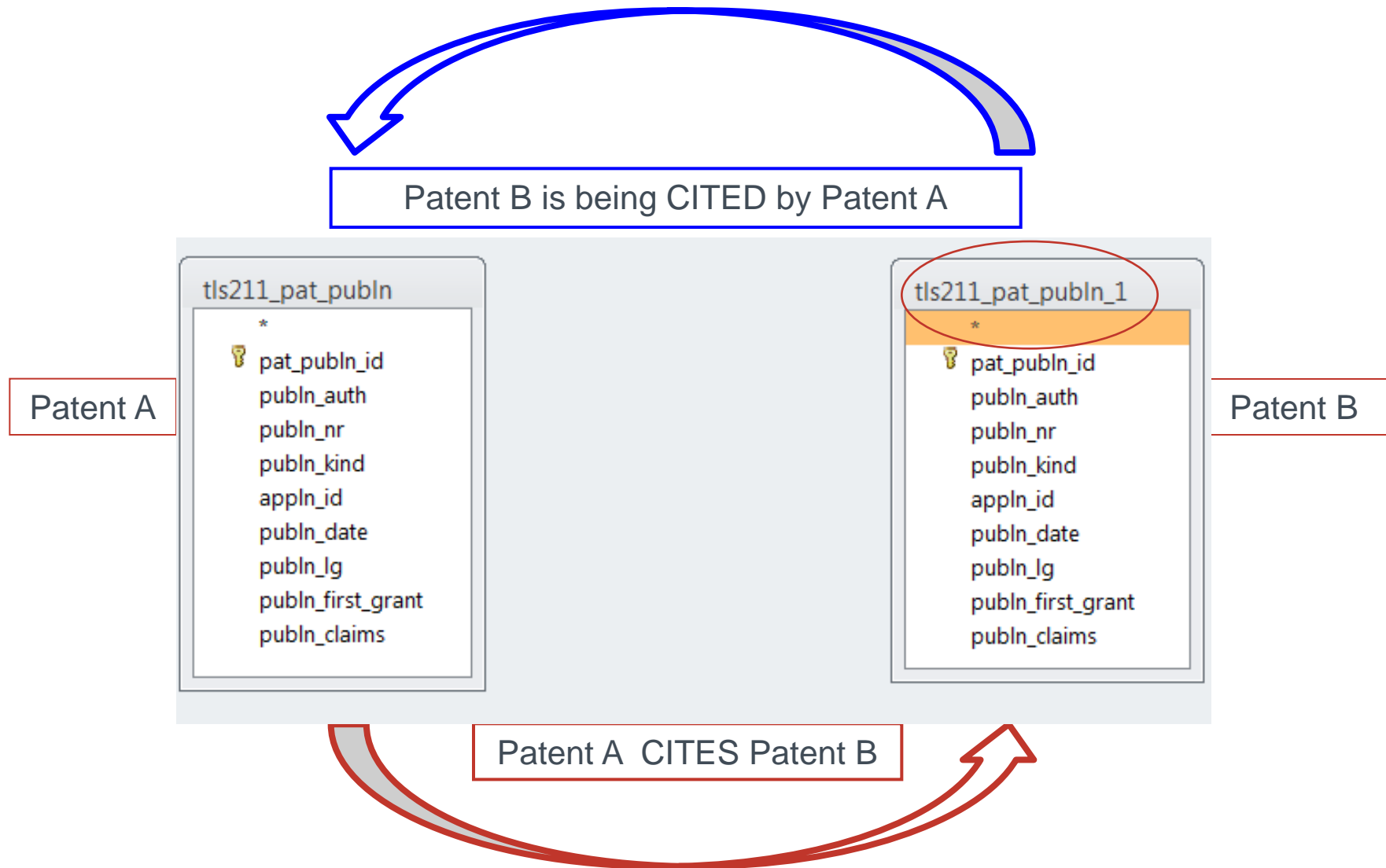
A: What are most influential patents of the industry company ?

B: ~~Where is the industry's technology mostly used~~
What other companies cite our patents ?
→ competitors ?

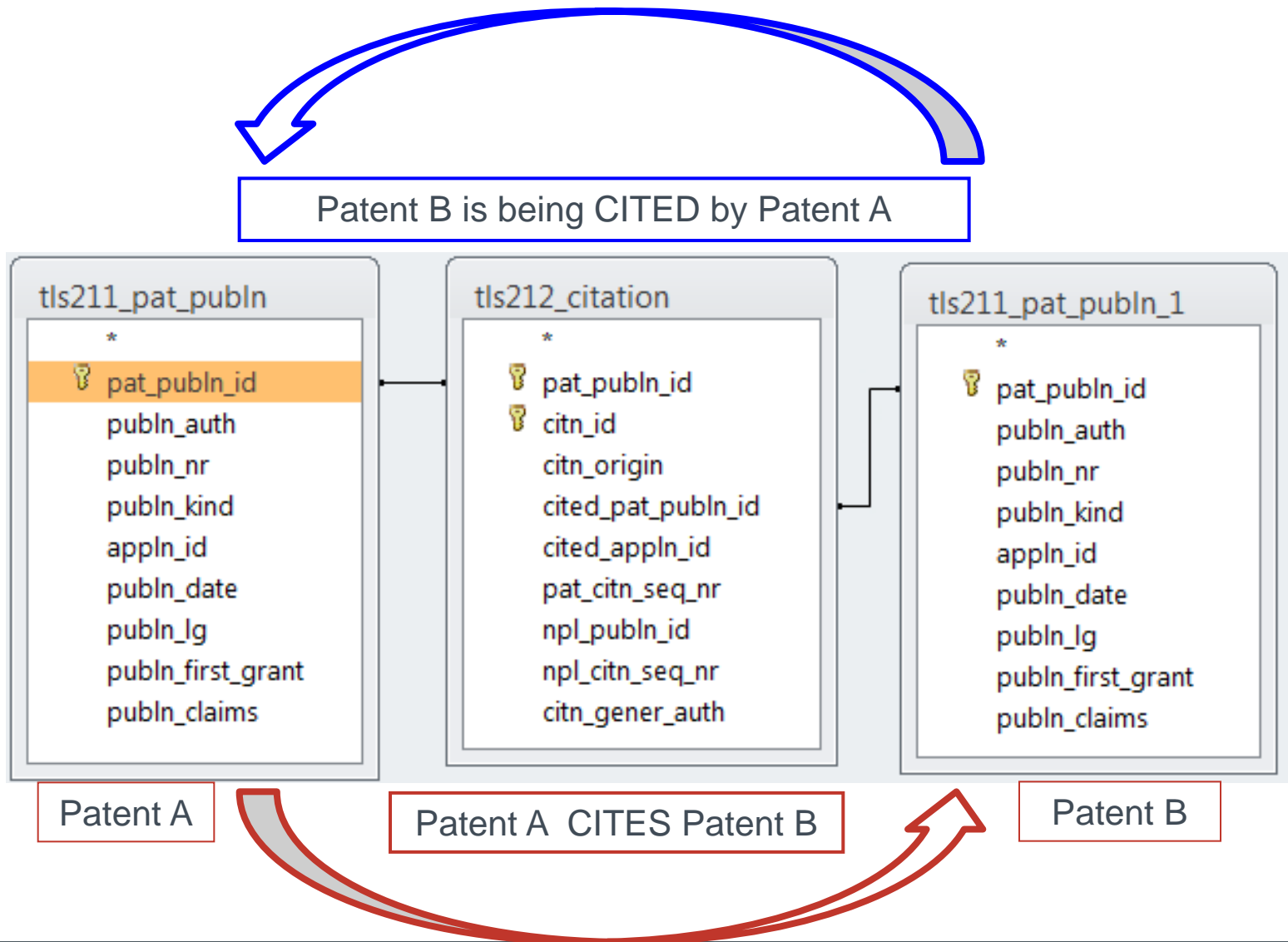
C: ~~Which technology does the industry build on?~~
Who is cited by our patents ? FTO ?

D: ~~What are the most influential patents used in the industry~~
Self citations....

The principle of „citation links“ in PATSTAT

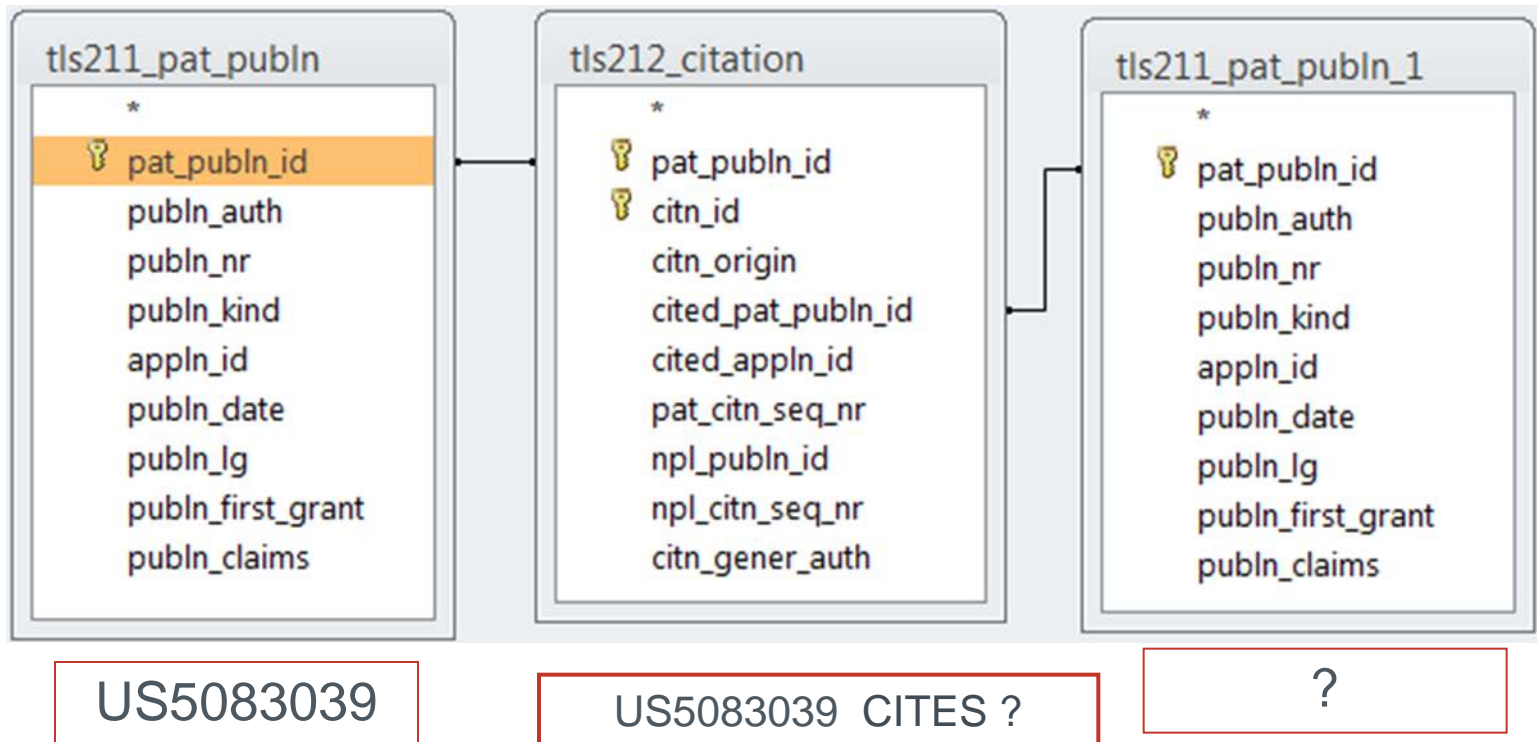


The principle of „citation links“ in PATSTAT



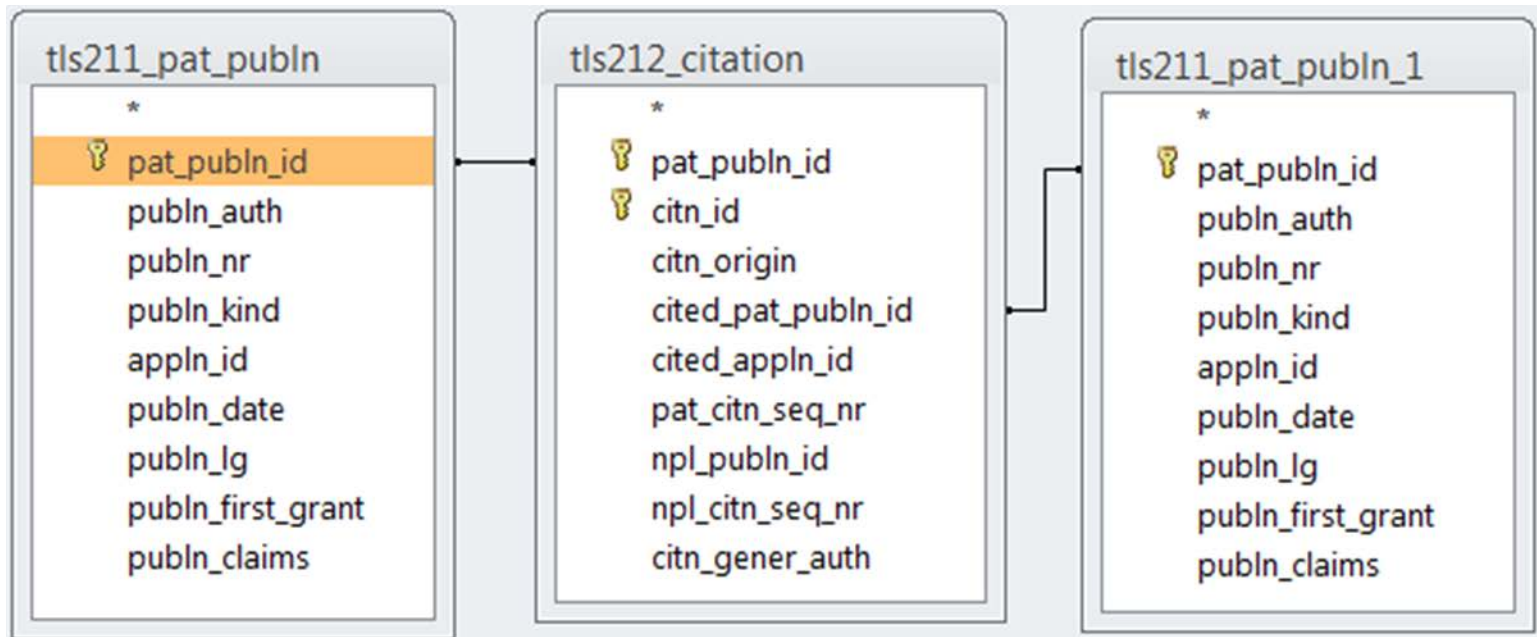
Exercise: Backward citations (backward in time)

Find all publications cited by US5083039



Exercise: Backward citations

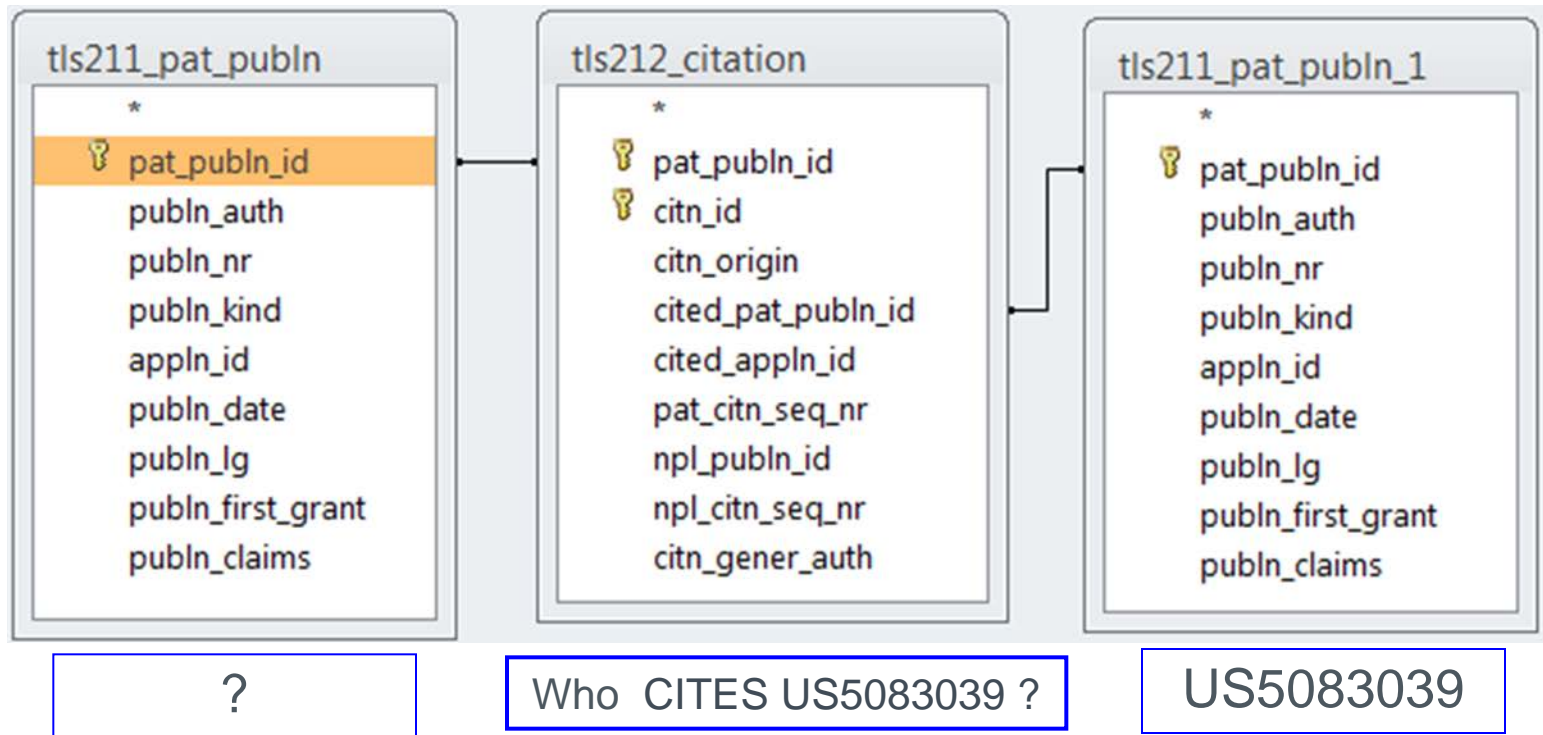
Find all publications cited by US5083039



```
SELECT citing.publn_auth, citing.publn_nr, citing.publn_kind, cited.publn_auth,  
cited.publn_nr, cited.publn_kind  
FROM tls211_pat_publn as citing JOIN tls212_citation ON citing.pat_publn_id =  
tls212_citation.pat_publn_id  
JOIN tls211_pat_publn AS cited ON tls212_citation.cited_pat_publn_id = cited.pat_publn_id  
WHERE citing.publn_auth='US' AND citing.publn_nr= '5083039';
```

Exercise: Forward citations

Find all publications that cite US5083039



Use same query but
change attributes in
the **WHERE** clause

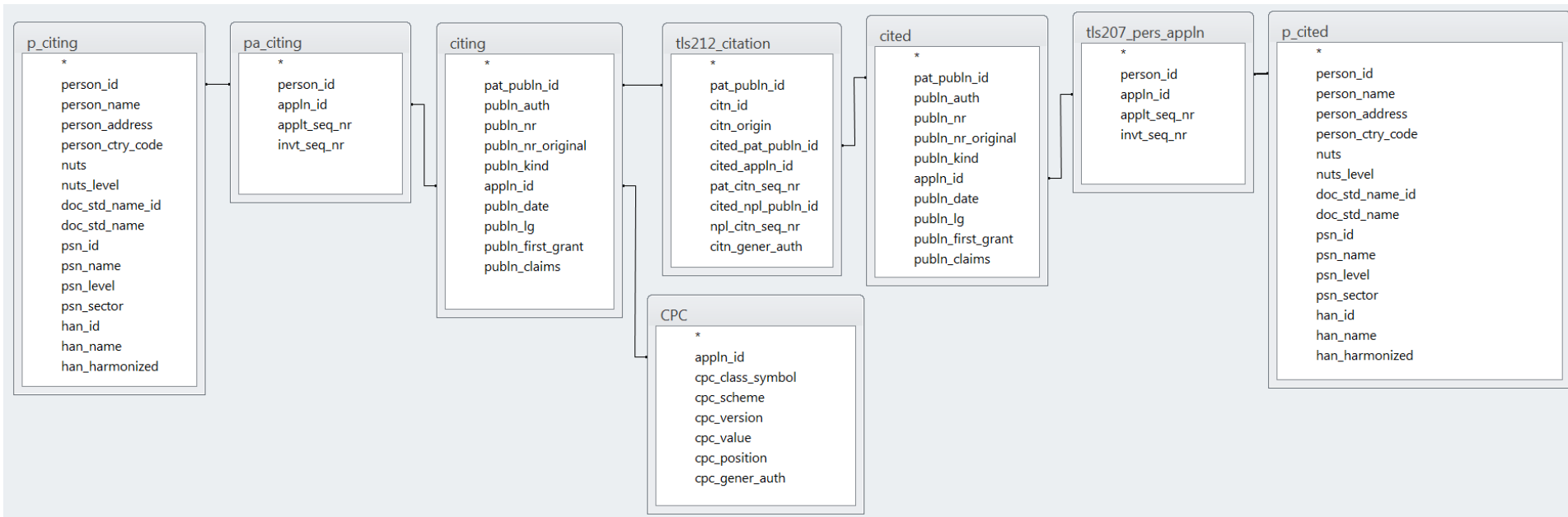
Example: a bit more complicated

Make a list of all applicants active in the paper industry, together with the citing applicants and count the number of time they were cited. Limit the corpus (sample) to EP publications filed > year 1999
→ This guarantees "some" uniformity on citing procedures.

You can further limit to > 5 citations, and exclude self citations.

→ Competitor Watch !

psn_name -->cited	psn_name --> citing	CountOfappln_id
3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	AQF TECHNOLOGIES	14
3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	3M INNOVATIVE PROPERTIES COMPANY	8
3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	SURFACTOR GERMANY	7
A. AHLSTROM CORPORATION	VOITH PAPER PATENT	10
A. AHLSTROM CORPORATION	VOITH PATENT	8
AAF-MCQUAY	JOHNS-MANVILLE CORPORATION	8
ACUMETER LABORATORIES	A*WARE TECHNOLOGIES, L.C.	10
AGENCY OF INDUSTRIAL SCIENCE AND TECHNOLOGY OF MINISTRY OF	FPIINNOVATIONS	12
AGENCY OF INDUSTRIAL SCIENCE AND TECHNOLOGY OF MINISTRY OF	WEYERHAEUSER COMPANY	8
AGFA-GEVAERT	FAVINI	10
AGFA-GEVAERT	KODAK	8
AGFA-GEVAERT	UNION CAMP CORPORATION	8
AGFA-GEVAERT	DYNIC CORPORATION	7
AHLSTROM MACHINERY	ANDRITZ	8
AICA KOGYO COMPANY	ALUMINIUM FERON & COMPANY	9
AIKAWA IRON WORKS COMPANY	ANDRITZ	7
AIR LIQUIDE CANADA	MESSER AUSTRIA	10
AIR PRODUCTS AND CHEMICALS	KIMBERLY-CLARK CORPORATION	18
AIR PRODUCTS AND CHEMICALS	NISSIN CHEMICAL INDUSTRY COMPANY	8
AIR PRODUCTS AND CHEMICALS	FORT JAMES CORPORATION	7
AIR PRODUCTS AND CHEMICALS	NATIONAL STARCH AND CHEMICAL INVE	6
AJINOMOTO COMPANY	P&G (PROCTER & GAMBLE COMPANY)	8
AKZO	KEMIRA	9
AKZO	BAYER CHEMICALS	6
AKZONOBEL	KEMIRA	10
AKZONOBEL	SOLVAY	9
AKZONOBEL	UPM-KYMMENE CORPORATION	8
AKZONOBEL	GEORGIA-PACIFIC CORPORATION	7
AKZONOBEL	POHLEN, ALFRED	6
AKZONOBEL	ARMSTRONG WORLD INDUSTRIES	6
ALBANY INTERNATIONAL CORPORATION	ICHIKAWA COMPANY	64
ALBANY INTERNATIONAL CORPORATION	VOITH PATENT	39
ALBANY INTERNATIONAL CORPORATION	VOITH PAPER PATENT	18
ALBANY INTERNATIONAL CORPORATION	HEIMBACH & COMPANY	18
ALBANY INTERNATIONAL CORPORATION	KIMBERLY-CLARK CORPORATION	18
ALBANY INTERNATIONAL CORPORATION	ASTENJOHNSON	13
ALBANY INTERNATIONAL CORPORATION	THOMAS JOSEF HEIMBACH & COMPANY	12
ALBANY INTERNATIONAL CORPORATION	SCAPA GROUP	10
ALBRIGHT & WILSON	Novozymes A/S	30
ALBRIGHT & WILSON	STORA ENSO	16
ALBRIGHT & WILSON	KEMIRA	6
ALCELL TECHNOLOGIES	ANDRITZ	8
ALCOA (ALUMINUM COMPANY OF AMERICA)	VEREINIGTE ALUMINIUM-WERKE	6
ALLIED COLLOIDS	BASF (BADISCHE ANILIN & SODA FABRIK)	35
ALLIED COLLOIDS	LAPORTE INDUSTRIES	32
ALLIED COLLOIDS	SNF	31
ALLIED COLLOIDS	CIBA SPECIALTY CHEMICALS WATER TR	27
ALLIED COLLOIDS	EKA CHEMICALS	22
ALLIED COLLOIDS	CYTEC TECHNOLOGY CORPORATION	15



```

SELECT p_cited.psn_name, p_citing.psn_name,
       Count(cited.appln_id) AS CountOfappln_id
FROM ...
WHERE Left(cpc_class_symbol,3)='D21' AND tls207_pers_appln.applt_seq_nr = 1
      AND pa_citing.applt_seq_nr =1 AND cited.publn_auth = 'EP'
      AND citing.publn_auth = 'EP' AND p_cited.psn_name <> p_citing.psn_name
GROUP BY p_cited.psn_name, p_citing.psn_name
HAVING (((Count(cited.appln_id))>5))
ORDER BY p_cited.psn_name,Count(cited.appln_id) DESC;
  
```

Example : Calculation of citation ratio

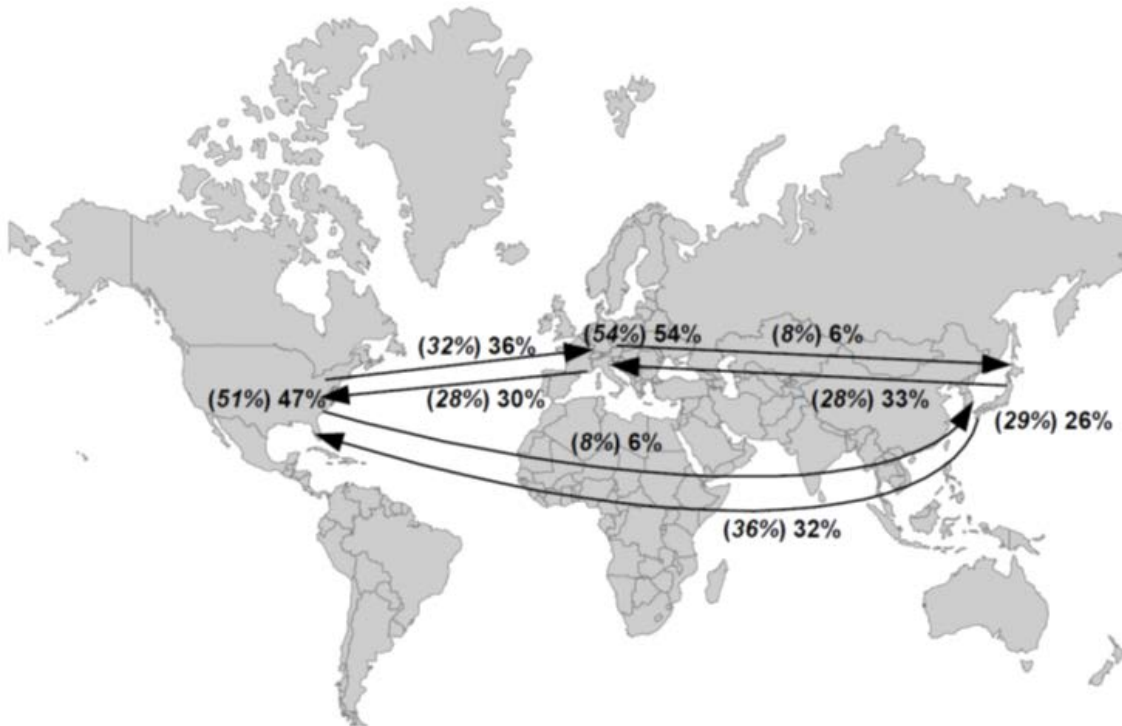
distinct patent cited / number of citations

Applicant	Number of patents that have been cited	Number of citations	ratio
GE (GENERAL ELECTRIC COMPANY)	1541	7334	21,01%
UNITED TECHNOLOGIES CORPORATION (UTC)	487	2818	17,28%
ENERCON (ALOYS WOBLEN)	424	2149	19,73%
SIEMENS	489	1685	29,02%
VESTAS WIND SYSTEMS	373	1575	23,68%
HITACHI	420	1510	27,81%
WESTINGHOUSE ELECTRIC CORPORATION	263	1398	18,81%
MITSUBISHI HEAVY INDUSTRIES	443	1270	34,88%
BOEING COMPANY	259	1071	24,18%
REPOWER SYSTEMS	211	901	23,42%
SUNDSTRAND CORPORATION	116	848	13,68%
MITSUBISHI ELECTRIC CORPORATION	282	788	35,79%
GM (GENERAL MOTORS CORPORATION)	183	725	25,24%
U.S. WINDPOWER	16	714	2,24%
TOSHIBA CORPORATION	254	676	37,57%
MESSERSCHMITT BÖLKOW BLOHM	94	651	14,44%
ROLLS-ROYCE	151	531	28,44%
THE UNITED STATES OF AMERICA AS REPRESENTED BY THE ADMINISTRATOR OF THE	54	522	10,34%
THE UNITED STATES OF AMERICA AS REPRESENTED BY THE SECRETARY OF THE NAVY	93	439	21,18%
AERODYN ENGINEERING	63	437	14,42%
CLIPPER WINDPOWER TECHNOLOGY	40	392	10,20%
GRUMMAN AEROSPACE CORPORATION	21	391	5,37%
HONEYWELL INTERNATIONAL	128	379	33,77%
SNIA (AEROSPATIALE SOCIETE NATIONALE INDUSTRIELLE)	67	374	17,91%
DENSO CORPORATION	114	369	30,89%
ALLIEDSIGNAL	54	347	15,56%
NORDEX ENERGY	150	331	45,32%
ROBERT BOSCH	146	323	45,20%
FUJI HEAVY IND	103	310	33,23%
THE UNITED STATES OF AMERICA AS REPRESENTED BY THE UNITED STATES	29	307	9,45%
THE STATE OF OREGON ACTING BY AND THROUGH THE STATE BOARD OF HIGHER	5	303	1,65%
NORTHERN POWER SYSTEMS	32	299	10,70%
3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	30	298	10,07%

NPL citations –what does it tell us ?

- there are no patents (yet) to refer to ? New -breakthrough technology ?
- science strength of a patent
- which scientific journals are potentially contributing to innovation ?
(innovation impact factor)
- which scientific journals contribute to a specific technological field ?
- what companies have patents with above average NPL citations ?
- policy: impact of public funded R&D (universities) on innovation
- knowledge flow from public R&D to private R&D
- collaboration networks between scientist (co-authors) (FB ?)

NPL citations –what does it tell us ?



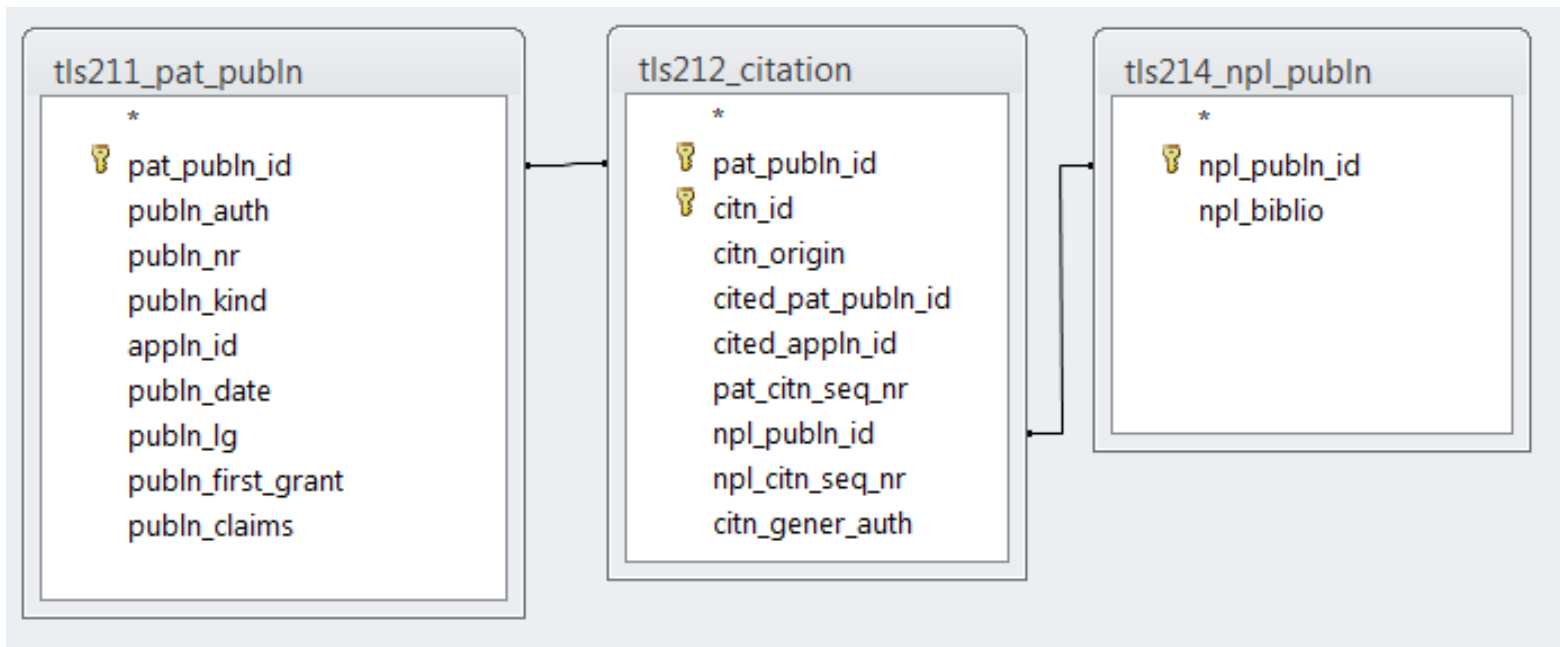
Proportion of scientific references to be found in patents, divided by region of origin.
 For example: “EU → US = 30%” implies that 30% of the scientific publications cited in EU-patents, in a specific technology field, originate from research conducted in the US.
 The proportions of local references are also depicted in the respective regions.
 Based on the "authors" of the papers.

Percentages between brackets (1987-1991) others 1992-1996 .

(Traces of Prior Art: An analysis of non-patent References found in patent documents
 Julie Callaert et al.)

Exercise: NPL literature links

Find all NPL citations from US6501875



US6501875 ?

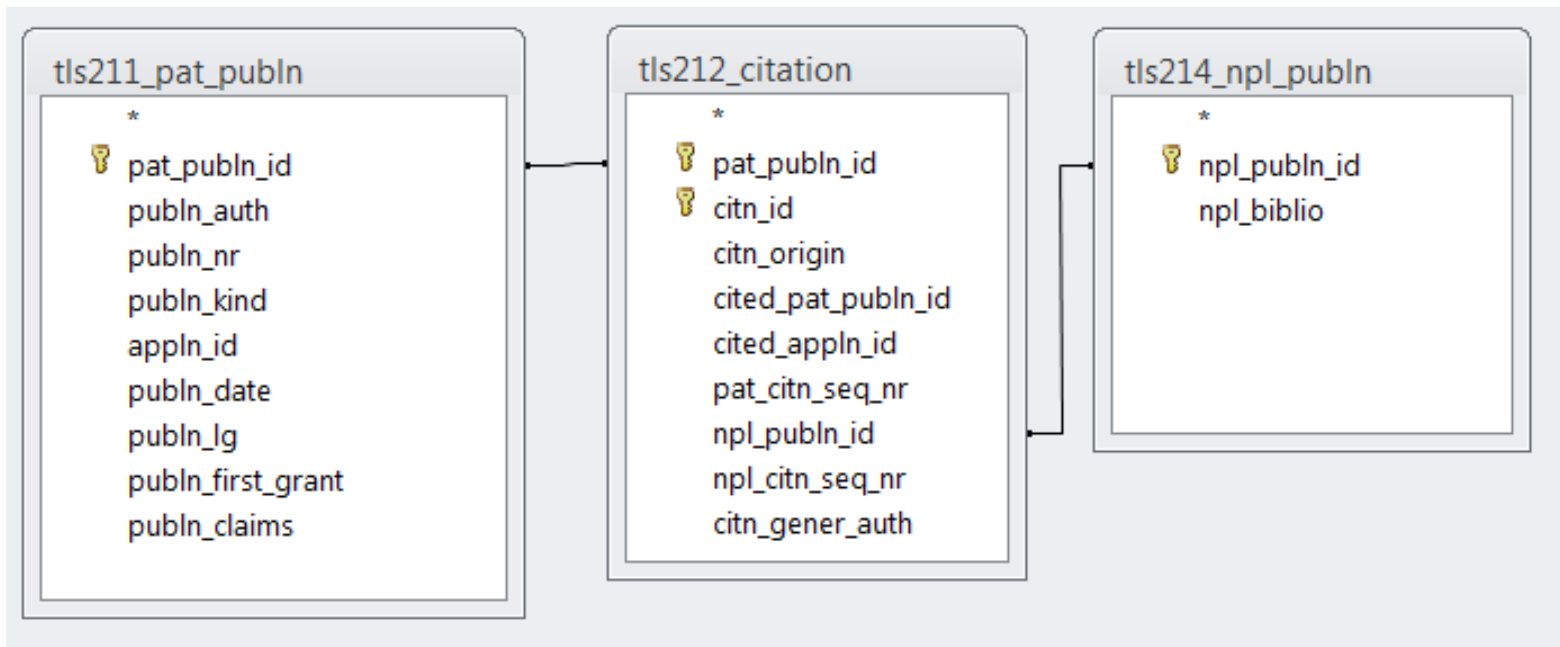
npl_biblio

McCallion et al., Side-polished fiber provides functionality and transparency, (Abstract) Laser Focus World, vol. 34, No. 9, p. S19-20, S22, S24, PennWell Publishing, Sep., 1998.

Das et al., Automatic determination of the remaining cladding thickness of a single-mode fiber half-coupler, (Abstract) Optics Letters, vol. 19, No. 6, p. 384-6, Mar. 15, 1994.

Exercise: NPL literature links

Find all NPL citations from US6501875



```
SELECT citing.publn_auth, citing.publn_nr, citing.publn_kind, npl_biblio
FROM   tls211_pat_publn as citing JOIN tls212_citation
      ON citing.pat_publn_id = tls212_citation.pat_publn_id
JOIN   tls214_npl_publn ON tls212_citation.npl_publn_id =tls214_npl_publn.npl_publn_id
WHERE  citing.publn_auth = 'US' AND citing.publn_nr= '5083039';
```

Questions ?