




Technical Intelligence from Patent Information

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WHAT IS A PATENT?

- Limited, exclusive right to an invention.
  - Given by the government
  - Allows the inventor to exclude others from making, using or selling the patented item.
  - In exchange for that right, the owner must describe to the world in the patent how to practice the invention.
- The invention may be a new or improved process, machine, manufacture or composition of matter.
- In the US, inventions must be new (novelty), useful and unobvious in order to be patentable.

WHAT IS A PATENT? (contd.)

- Since inventors tell the world what their inventions are in patents, patents are an incredibly rich source of information about useful and practical inventions -- from AIDS therapies to cellular telephones to carburetors.
- Roughly 3/4ths of the technical information in patents is not disclosed elsewhere.
- The portfolio of a company's technology can be very well described by their patents.
- New technology usually appears in patents because any prior disclosure of an invention renders the invention unpatentable.

WHAT IS A PATENT? (contd.)

- A patent is only good in the country in which it was issued.
  - A patent family is the set of patents describing the same invention in various countries.
  - Members of the family are called equivalents to each other.
  - By the Paris Convention, an inventor has up to a year from the date of the first filing (called the priority date) to apply for protection in other countries. Certain rights date from the priority date.

WHAT IS A PATENT? (contd.)

- Not all patent-type documents are really patents. Most are published patent applications. The published applications may or may not mature into granted patents with legal force.

DERWENT'S WORLD PATENTS INDEX

- The most comprehensive database of patent documents published worldwide.
- ~ 22 K Patent documents per week processed
- ~ 12K Per week are new inventions. English abstracts are prepared for them.
- Balance are patent publications equivalent to those already in the database.
- Over 11,600,000 inventions in the database

Coverage by Subject

- All technology back to 1974
- All chemistry back to 1970 (including food, detergents, water treatment, textiles, paper, printing, coating, photography, petroleum processes and products, chemical engineering, nucleonics, explosives, refractories, ceramics, cements, electronic materials, and metallurgy)
- Plastics, rubbers and other polymers back to 1966
- Agricultural chemistry back to 1965
- Pharmaceutical

IN WHAT AREAS IS A COMPANY DOING RESEARCH?

Consider the case of Millipore Corp. How can we analyze their patents to determine what their areas of research are and who their competitors are?

Before we go online, we determine;

- Millipore has over 3,000 products related to membranes.
  - Major products are used for analysis and purification
  - Principal separation technologies are based on membrane filters, certain chemistries, resins and enzyme immunoassays.
  - Marketing efforts focus on application development
- Research and Development activities, therefore, include
  - the extension and enhancement of existing separations technologies,
  - new membranes and apparatuses for new and old applications,
  - the upgrading of membrane-based systems, and
  - new separation applications for their products.

Source – Millipore web site

Which subjects do Millipore's patents fall into?

Online analysis reveals;

Top International Patent Classes

- C12Q001 Measuring or testing processes involving enzymes or microorganisms; compositions and their preparations
- G01N033 Investigating or analyzing materials by specific methods (not weighing, electromagnetic radiation, magnetic resonance, ...)
- C12M001 Apparatus for enzymology or microbiology
- B01D063 Apparatus in general for separation processes using semi-permeable membranes
- C02F001 Investigating or analyzing materials by the use of electric, electrochemical, or magnetic means

Who might be their competitors

Who else has patents in the same areas as Millipore? For simplicity, we only consider patents from IPC C12Q-001

- If we only look at raw US data:

TERM #	# OCC	# DOC	% DOC	PA
1	188	188	1.43	THE REGENTS OF THE UNIVERSITY OF CALIFORNIA
2	174	174	1.32	MILLENNIUM PHARMACEUTICALS, INC.
3	**144**	**144**	**1.10**	**ISIS PHARMACEUTICALS, INC.**
4	141	141	1.07	GENENTECH, INC.
5	133	133	1.01	AFFYMETRIX, INC.
6	**91**	**91**	**0.69**	**INCYTE PHARMACEUTICALS, INC.**
7	**83**	**83**	**0.63**	**INCYTE GENOMICS, INC.**
8	76	76	0.58	HUMAN GENOME SCIENCES, INC.
9	**76**	**76**	**0.58**	**ISIS PHARMACEUTICALS INC.**

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- If we look at refined data – patentee codes

TERM #	# OCC	# DOC	% DOC	PACO	
1	606	606	3.05	BODE	BODE GENE DEV CO LTD SHANGHAI
2	517	469	2.36	SHAN	SHANGHAI BIOWINDOW GENE DEV INC
3	411	383	1.93	MILL	MILLENNIUM PHARM INC
4	342	320	1.61	INCY	INCYTE GENOMICS INC
5	276	276	1.39	ISIS	ISIS PHARM INC
6	248	246	1.24	FARB	BAYER
7	241	240	1.21	REGC	UNIV CALIFORNIA
8	238	220	1.11	HUMA	HUMAN GENOME SCI INC
9	222	161	0.81	SMIK	SMITHKLINE BEECHAM

Who cites Millipore's patents as prior art? What do those patents cover?

- `S MIFI/PACO.D` or `S MILLIPORE/PA.D` /STN
- Top citers of Millipore patents
  - Millipore
  - Seitz
  - Pall
- Sample of citing art

  TI Micro-filtration membrane with integral pre- and final- filter layers - by consecutive casting and pptn. of polymer solns. with decreasing viscosity to form layers with different pore sizes..

  PA (SEIW) SEITZ-FILTER-WERKE GMBH; (SEIW) SEITZ FILTER WERKE GMBH & CO

WHO ARE THE MOST PROLIFIC INVENTORS IN A GIVEN AREA?

- Suppose I live in Switzerland and I want to start a Chocolate Research Institute. Are there any inventors from Nestle whom I might want to recruit?

Online analysis finds the holder of the dream job

- JURY, M
- TRAITLER, H
- BECKETT, S T
- DAOUSE, A
- MACKLEY, M R

Research groups

- And the people who patent with Traitler are:
  - CHMIEL, O <--- Has more patents with Traitler than anyone
  - BERTOLI, C
  - DE PEDRO M T
  - DIEFFENBAC, A

Case Study – Summarize the patent position on 1,1,2,2-Tetrafluoroethane (CHF_2-CHF_2)

- Ideally, search DCR and MMS. We might want to also search BCE fragmentation codes, depending on how far back in time we want to go.
  - 188 records found

Chemical indexing gives you information buried more deeply in the patents – e.g. on new uses ...

103 Q433 Refrigerant

76 Q337 Printing; Coating composition (not Adhesive; Ink; paint; polish; Inorganic pigment; Liquid crystal - electrical; Cleaning composition)

36 Q131 Polymer blowing agent

19 Q431 Chemical engineering - Separation of solids; mixing; filtration

… or processes

14 N163 Purification by chemical reaction (and optional regeneration)

16 N164 Other purification, extraction, separation processes

21 N513 Reaction conditions 30ºC < T ≤ 200ºC

15 N514 Reaction conditions 200ºC < T ≤ 500ºC

How often are they applied to patents on tetrafluoroethane?

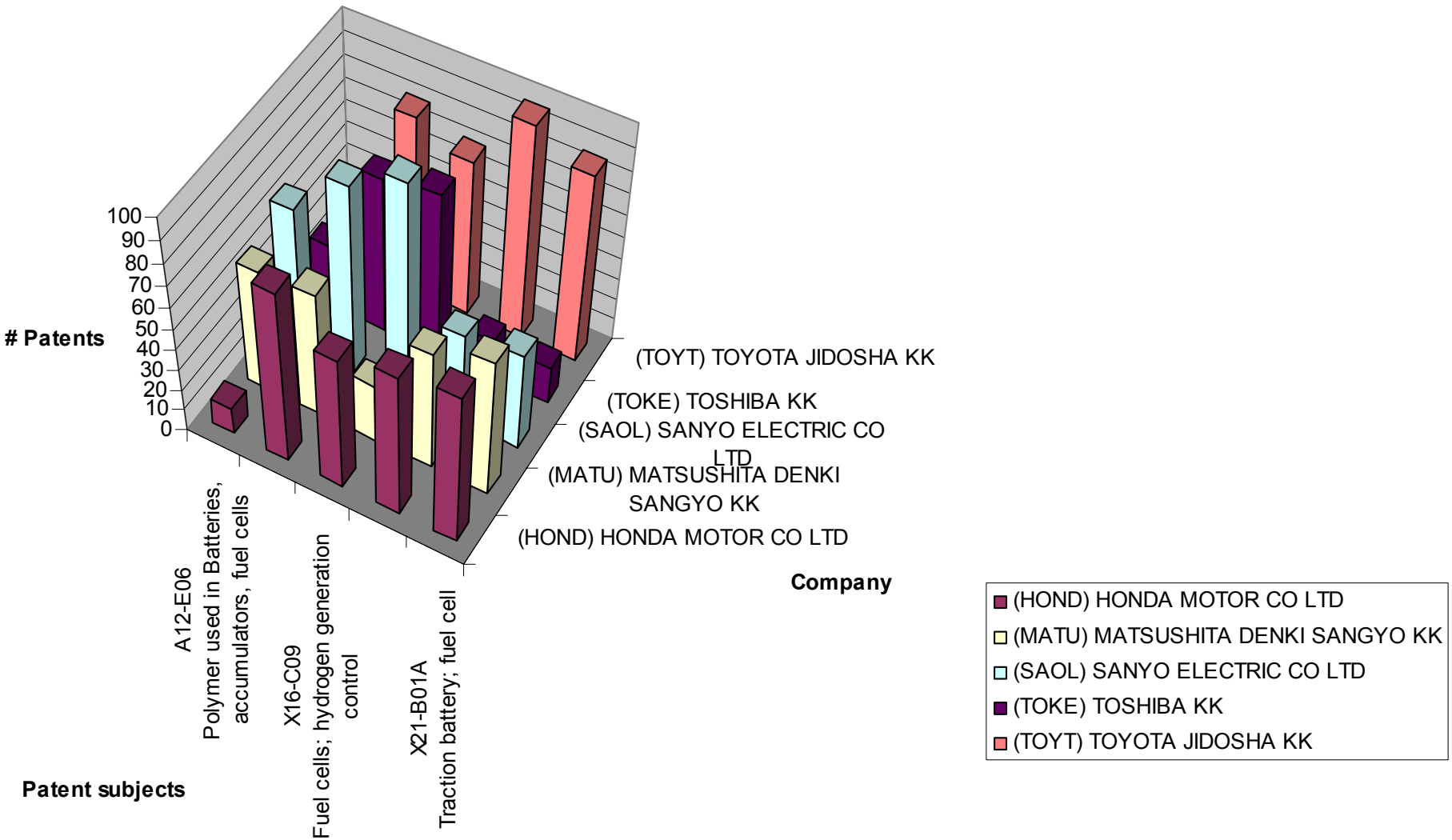
151	M78?	Use of a compound
31	M781	Use of one compound
133	M782	Use of two or more compounds
27	M740	Apparatus
25	M720	Known compound is produced
14	M750	Compound is detected or removed
2	M730	Compound is used in a synthetic process
0	M710	New compound or intermediate
0	M760	Compound is a medium for a substance being analysed, detected or used in a diagnosed
0	M77?	Complexes
0	M770	Molecular complex
0	M771	Acid addition salt
0	M772	Onium salt

In a given area of technology, who are the players and what are they doing?

- Example - Fuel cells

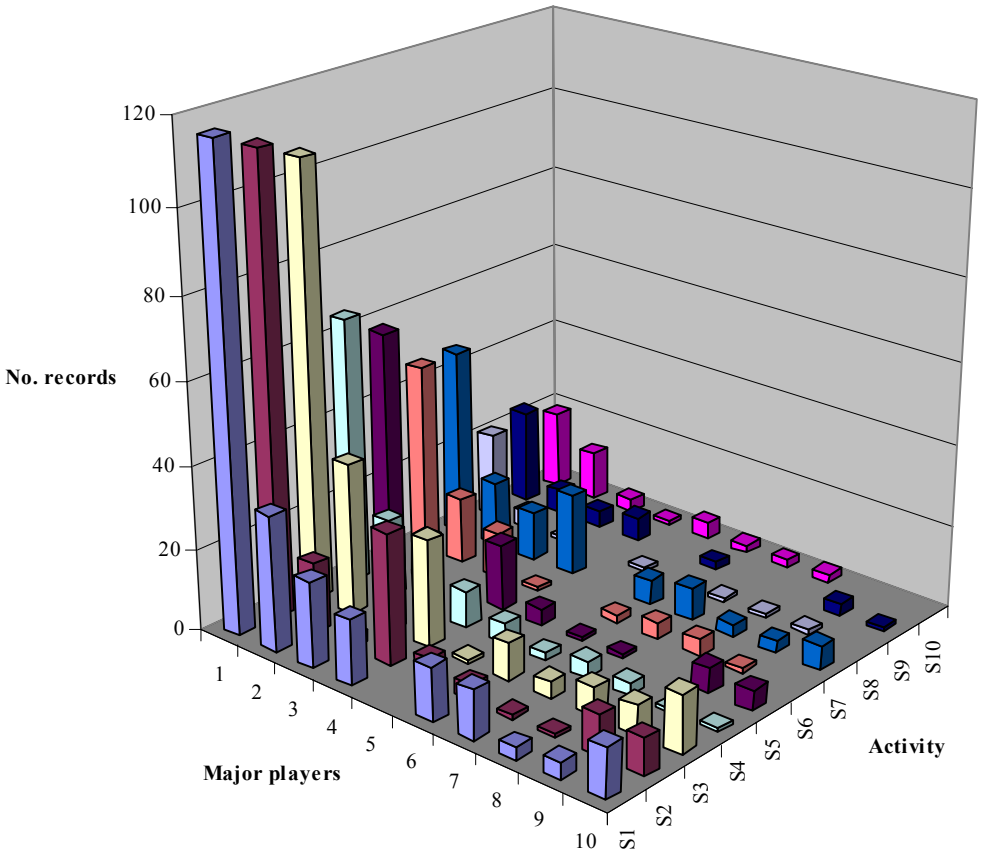
Sum of Doc						
MC	(HOND) HONDA MOTOR CO LTD	(MATU) MATSUSHITA DENKI SANGYO KK	(SAOL) SANYO ELECTRIC CO LTD	(TOKE) TOSHIBA KK	(TOYT) TOYOTA JIDOSHA KK	Grand Total
A12-E06 Polymer used in Batteries, accumulator	13	58	67	30	14	429
L03-E04 Solid oxide electrolyte cells	81	59	88	72	81	866
X16-C09 Fuel cells; hydrogen generation control	63	28	100	76	72	746
X21-A01F Electric motor car	68	56	43	19	98	643
X21-B01A Traction battery; fuel cell	72	65	46	18	87	628
Grand Total	1123	1103	1134	672	1491	12642

Patent Overview



		Patent Assignees (long)	1	2	3	4	5	6	7	8	9	10	11
		# Records	155	699	309	216	151	145	124	111	95	69	59
Derwent Classifications (Cleaned)	# Records	1	X16-Electrochemical Storage	L03-Electro-(in)organic - chemical feature	E36-Non-metallic elements, semi-metals (	X21-Electric Vehicles	A85-Electrical applications	H06-Gaseous and liquid fuels - including p	H04-Petroleum processing - including trea	J04-Chemical/physical processes/apparat	X22-Automotive Electrics	Q14-Electric propulsion, seating	X12-Power Distribution Components and (
1	123	TOYOTA JIDOSHA KK (TOYT)	116	33	21	16		13	12	3	4	12	1
2	116	HONDA MOTOR CO LTD (HOND)	111	17	3	32	6	4	1	1	10	9	
3	112	NISSAN MOTOR CO LTD (NSMO)	106	37	23	26	1	9	4	7	7	14	2
4	65	MATSUSHITA DENKI SANGYO KK (MATU)	65	19	9	9	5	2	4	3	1	1	2
5	62	HONDA GIKEN KOGYO KK (HOND)	58	10		16	4	1	1		6	5	
6	48	MITSUBISHI JUKOGYO KK (MITO)	46	16	11	1		2	4	4	1		
7	47	BALLARD POWER SYSTEMS AG (BALL-N	46	16	12	20		6	8	3	3	6	
8	24	BALLARD POWER SYSTEMS INC (BALL-N	21	4	1		1		1	1	1		
9	23	SONY CORP (SONY)	23	6	4	6		2			3	1	
10	20	MATSUSHITA ELECTRIC IND CO LTD (MAT	19	12	3	1	4	2	2	2			

Major players and their actions



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Motor Oil Additives

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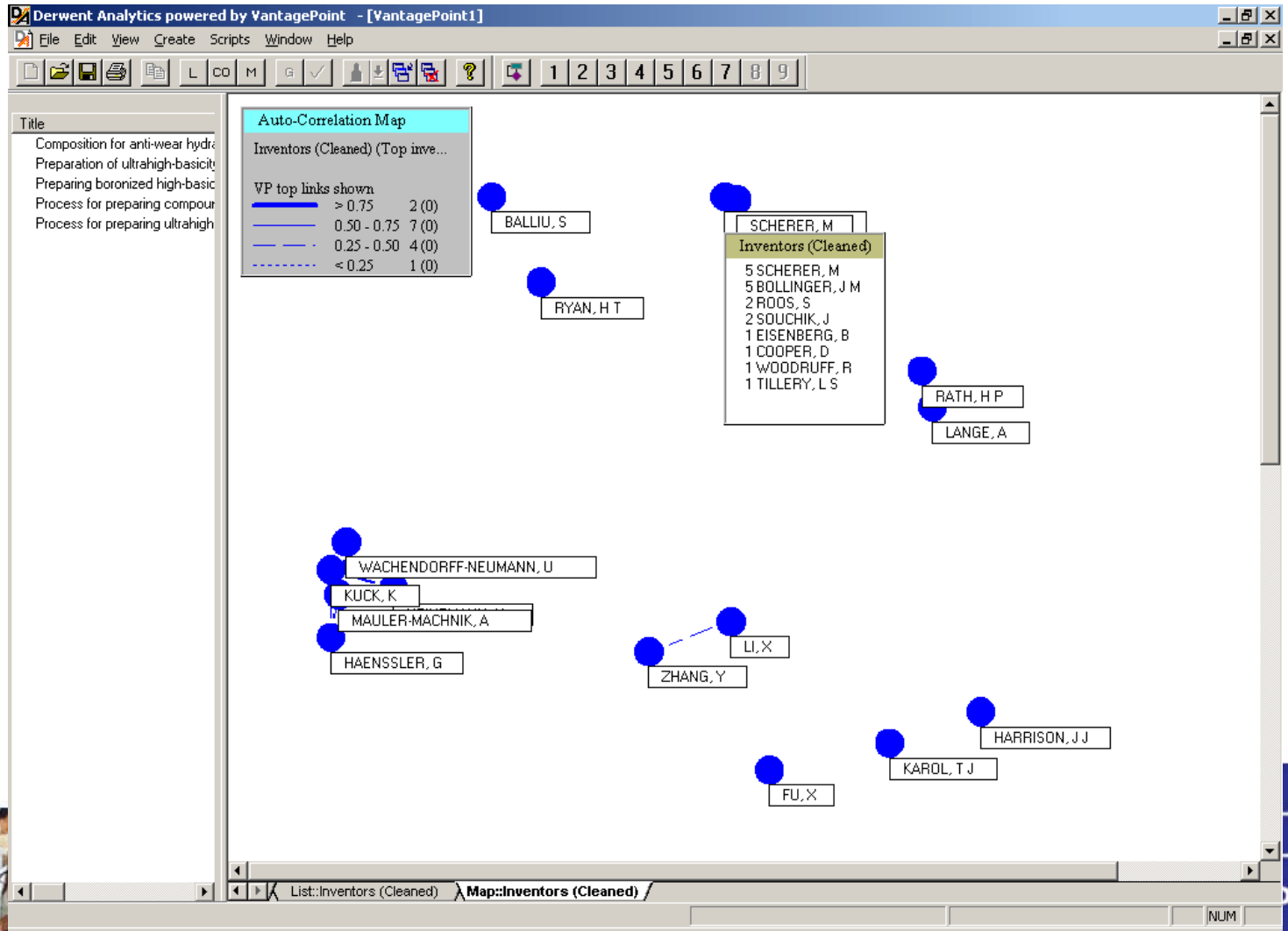
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			Patent Assignees (long)	1	2	3	4	5	6	7	8	9	10	
2			# Records	415	92	89	36	30	25	25	22	17	12	
3	International Classifications (Main) (4-digit)	# Records	1	C10M	C07C	C08F	C07D	A01N	C09K	C10L	C07F	C08G	C08L	
4	1	35	LUBRIZOL CORP (LUBR)	24	3	10	1		1	1	1	1	1	
5	2	31	SANYO CHEM IND LTD (SANN)	24		2				4				
6	3	22	NIPPON OIL CO LTD (NIOC)	22										
7	4	20	BASF AG (BADI)	2	2	13				3		3	2	
8	5	32	EXXONMOBIL RES & ENG CO (ESSO)	28					2					
9	6	20	IDEMITSU KOSAN CO LTD (IDEK)	14	2	2					3	1		
10	7	19	INFINEUM INT LTD (INFM)	17	2					1				
11	8	18	BAYER AG (FARB)		3	1	13	3	1					
12	9	13	SHELL INT RES MIJ BV (SHEL)	6	5	3	2							
13														

Auto Correlation Map – Who works with Whom



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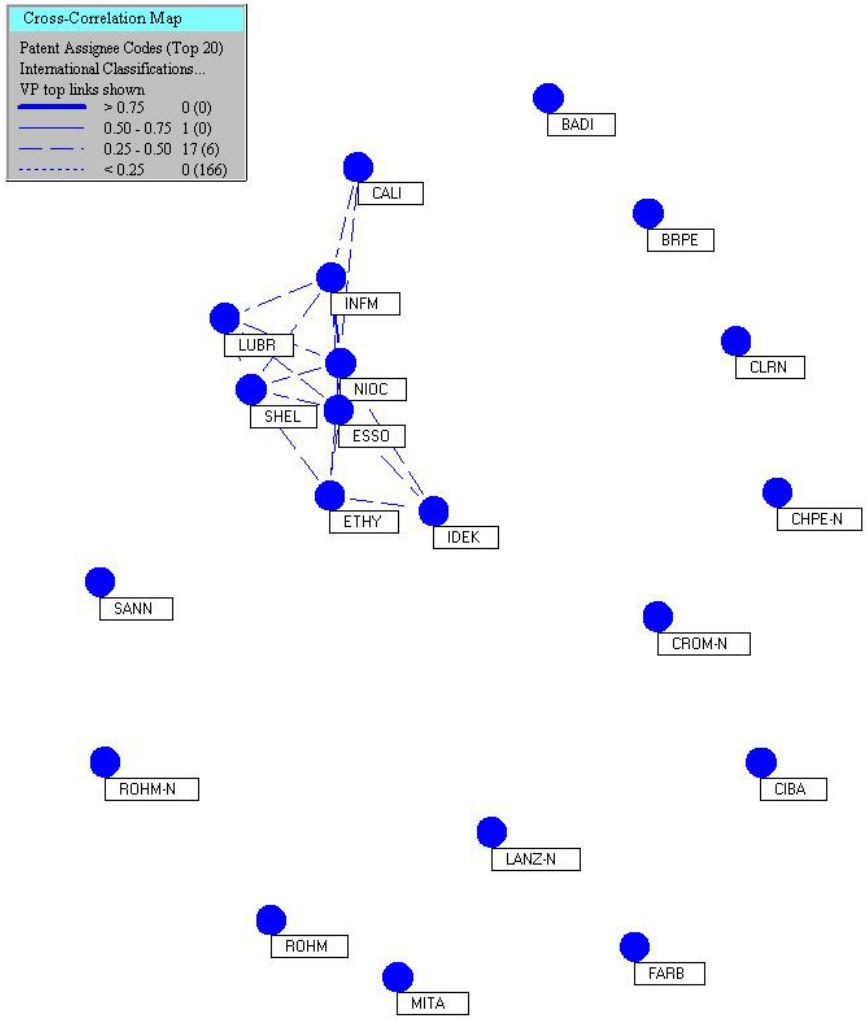
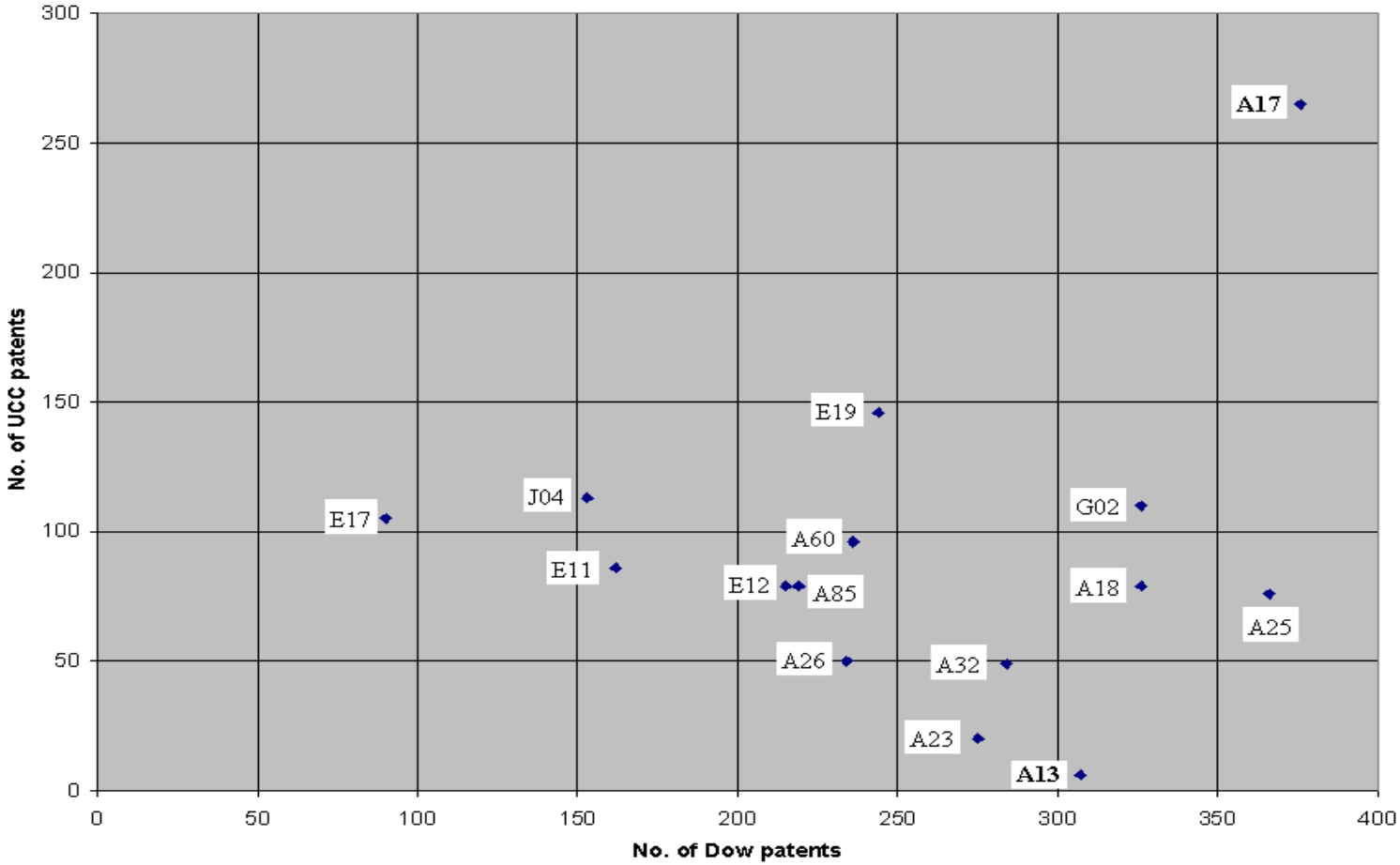
Cross Correlation Maps - Motor Oil Additives



Mergers and Acquisitions - How well do patent portfolios fit?

- Consider the case of Dow Chemical and Union Carbide, whose merger was announced in August 1999 and completed in Feb 2001. How well did their patenting activities complement each other before the merger?



A13 Polymers of aromatic mono-olefins; including polystyrene.

A17 Polymers of unsubstituted aliphatic mono-olefins; including polyethylene

E17 General Organic - Other aliphatics



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