



European Patent Office

Forecasting the number of European patent applications at the EPO

Marc NICOLAS
Controlling Office
EPO, Munich

mnicolas@epo.org



EPO filing forecast

- Planning & Budgeting
- Patenting options in Europe
- Standard EPO methods
- Improving methodology
- New context

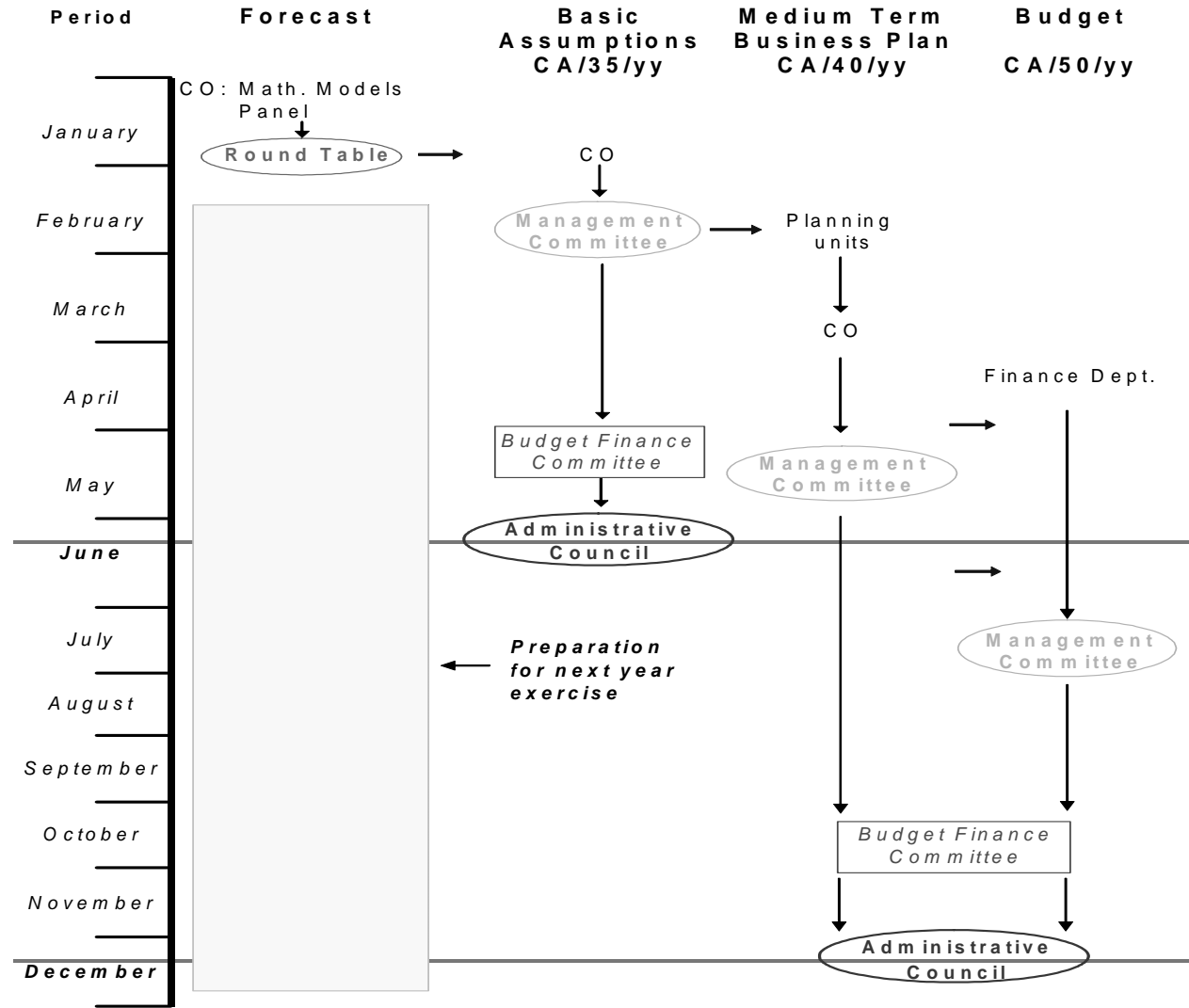


Planning & Budgeting

- Financial autonomy of the EPO → resource planning
- First step in the planning process
- 5 years plan: 1st year = budget
 years 2-5 = financial plan
- Reviewed each year
- Final approval by AC



Planning Budgeting time frame



Forecasting the number of European patent applications at the EPO



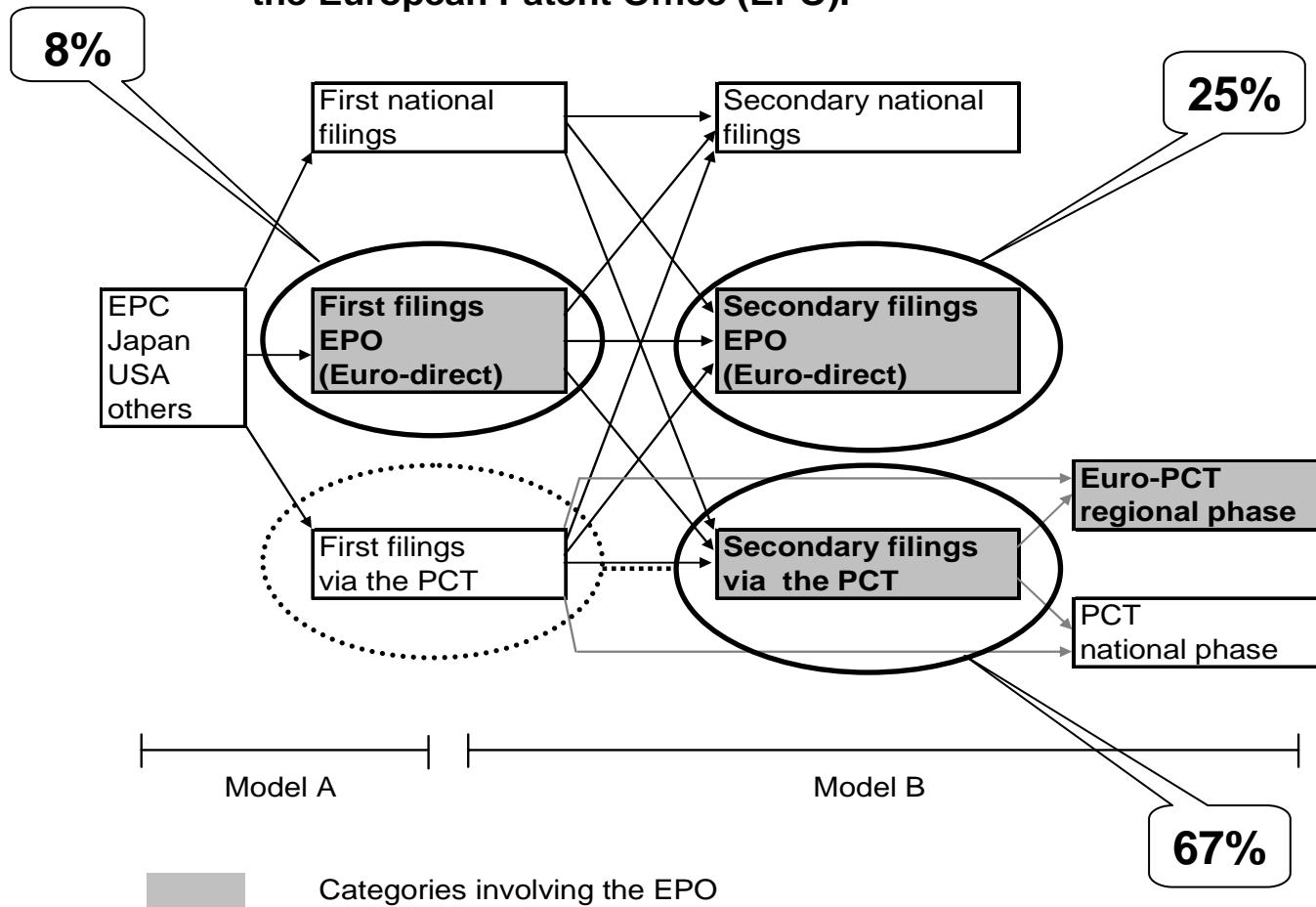
Patenting options in Europe

- Paris Convention → First filings + Subsequent filings
- 3 ways to obtain patent protection in Europe
 - national route
 - regional (European) route
 - national or European combined with the PCT
- EPO = supranational Office → attracts subsequent filings



Patenting options in Europe

Worldwide patenting system, highlighting the involvement of the European Patent Office (EPO).





Forecasting methods at the EPO

- Trend analysis: linear regression over time
- Transfer model: “most EP filings claim priority”
- Panel: 2000 applicants surveyed

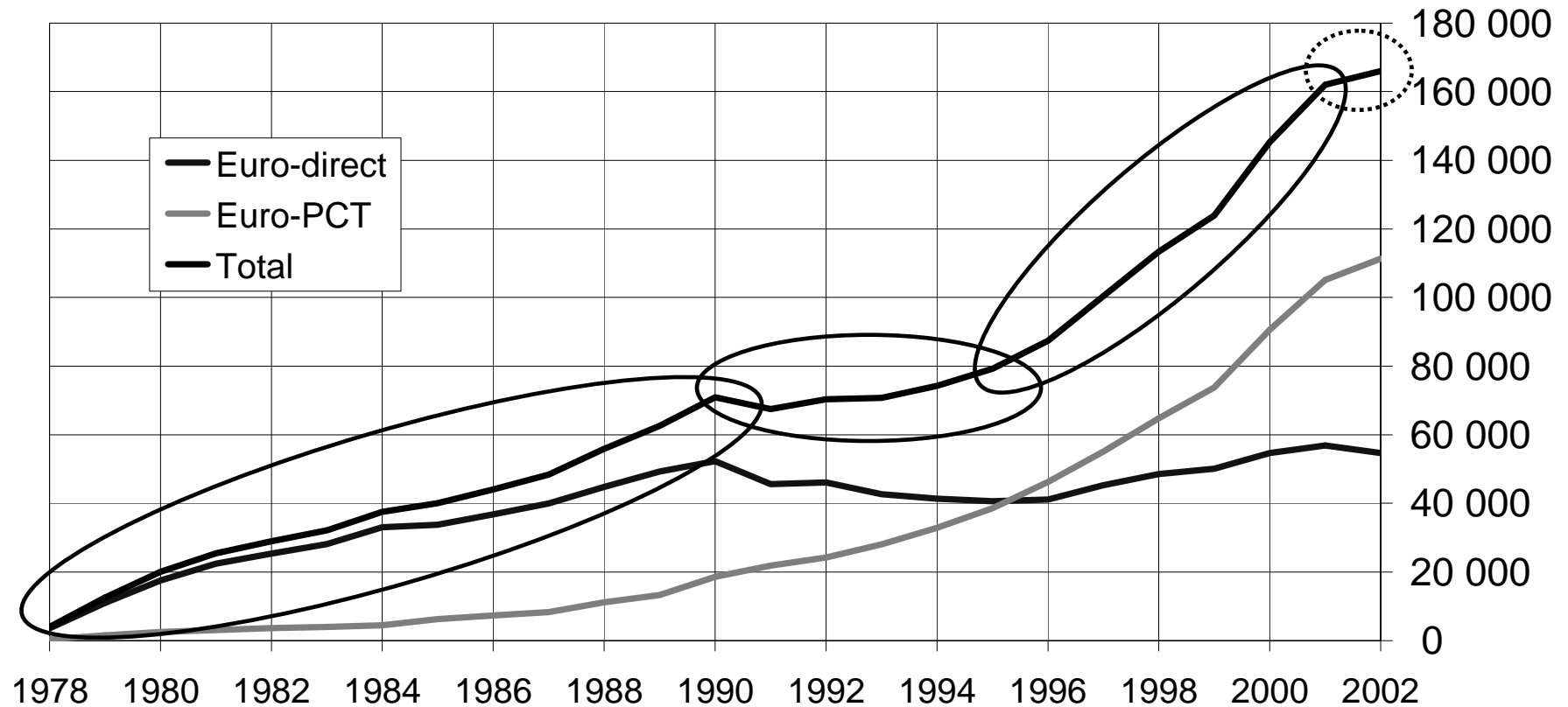


Trend analysis

- 3 phases in EP filings development:
 - centralisation effect → steady growth
 - move to PCT → decline in the direct route, exponential growth of PCT
 - globalisation → exponential increase
- End of the .com bubble
Office(s) mastering their workload → Start of a 4th phase ?

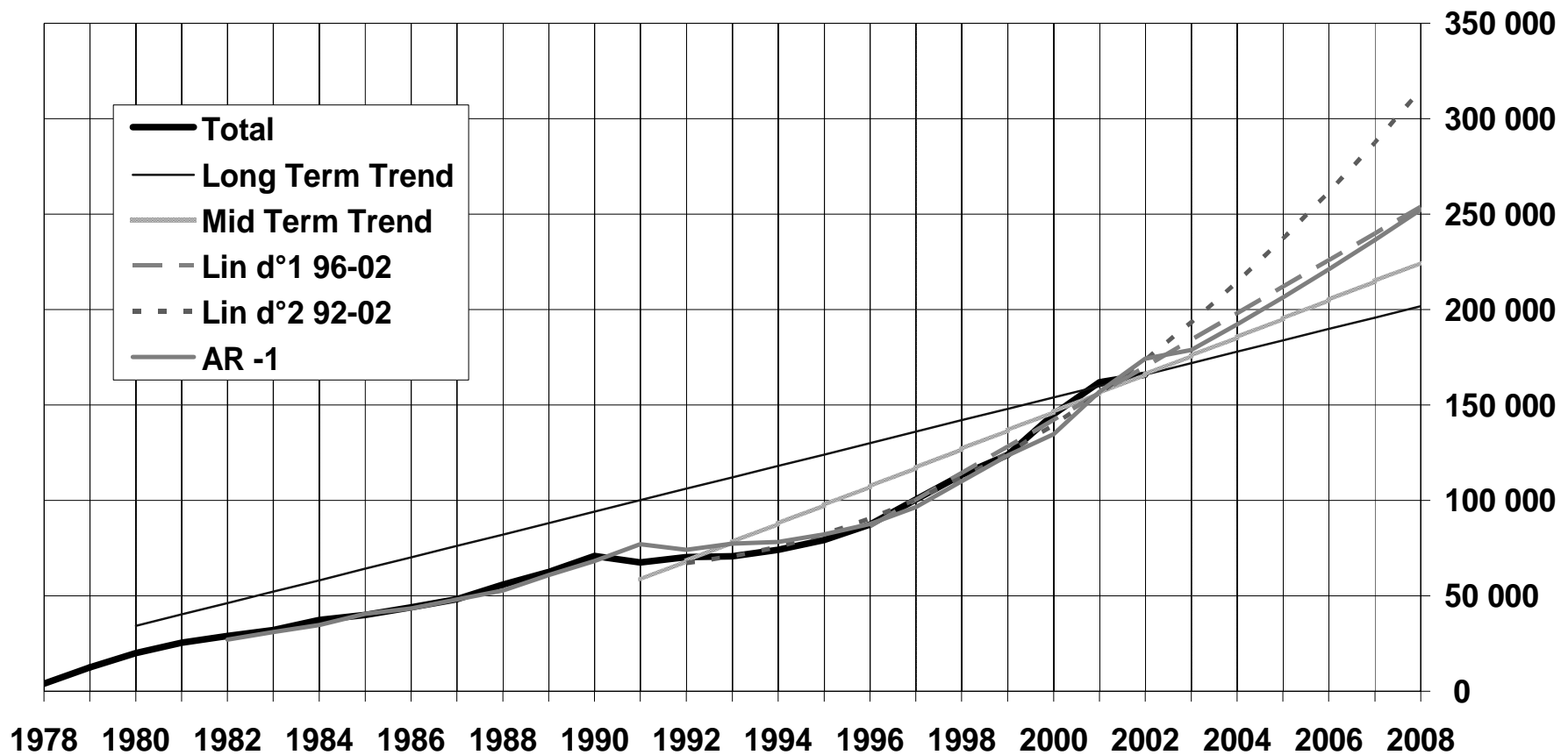


European Patent Application Filings



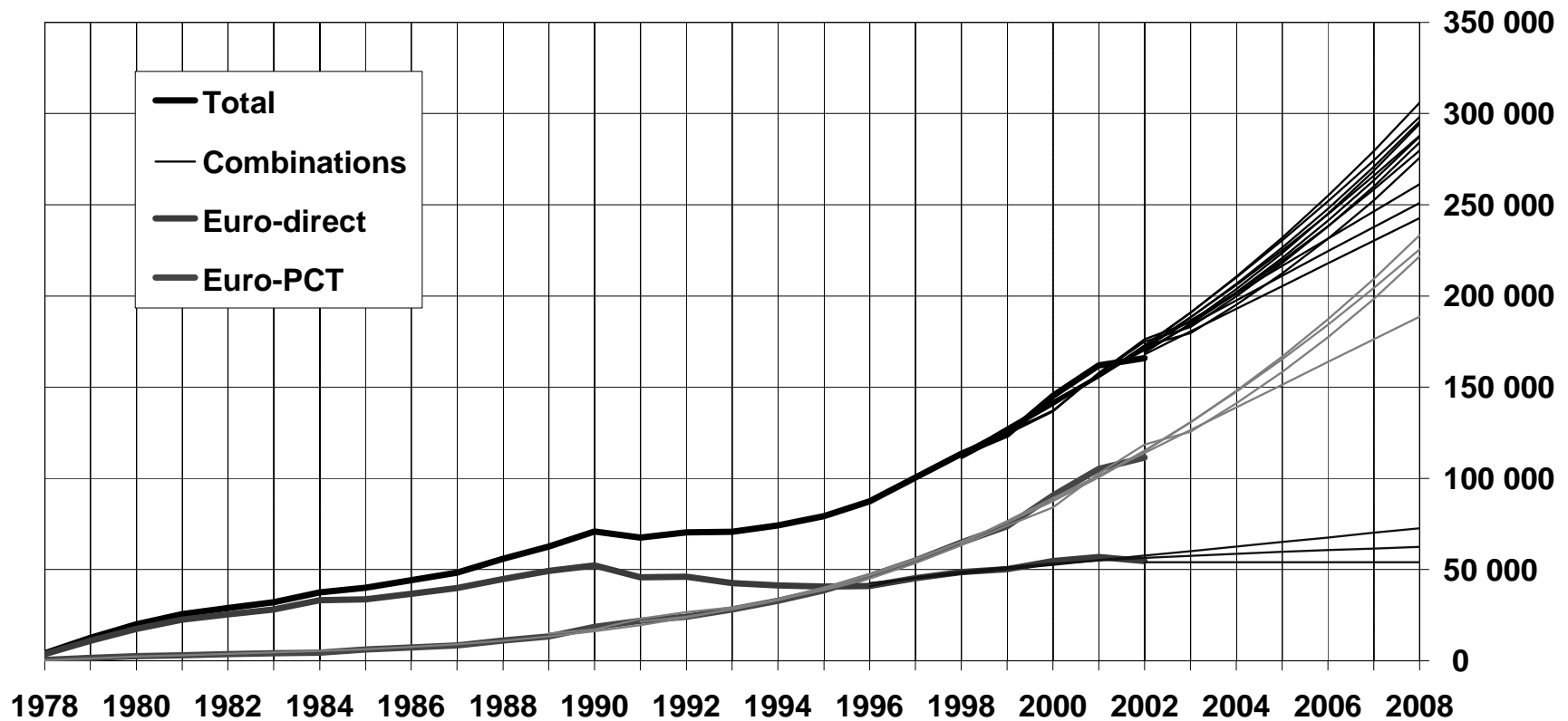


European Patent Application Filings Direct extrapolations





European Patent Application Filings Combinations of independent extrapolations





EPO transfer model

- 80% of the worldwide first filings are applied for in Europe, Japan or the USA;
- 89% of the EP applications are subsequent filings (2001);
- 90% of EP filings are originating from Europe, Japan or the USA (2002);
- shares of other countries increased from 3% to 10% since 1978;



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EPO transfer model

4 steps process:

1 - to extrapolate the number of first filings in Europe, Japan and the USA;

2 - to extrapolate the transfer ratios of first filings into European patent application the year after per bloc of origin;

3 - to extrapolate the proportions of first filings directly applied at the EPO per bloc of origin;

4 - to adjust for the rest of the world.



EPO transfer model by bloc

<i>Step 1</i>	<i>Step 2</i>			
FF.Europe _{y-1}	x	TR.Europe _{y-1}	=	SF.Europe _y
FF.USA _{y-1}	x	TR.USA _{y-1}	=	SF.USA _y
FF.Japan _{y-1}	x	TR.Japan _{y-1}	=	SF.Japan _y
		Σ		SF.3B _y
<i>Step 3</i>				
SF.Europe _y	/	(1 - %EPFF.Europe _y)	=	TF.Europe _y
SF.USA _y	/	(1 - %EPFF.USA _y)	=	TF.USA _y
SF.Japan _y	/	(1 - %EPFF.Japan _y)	=	TF.Japan _y
		Σ	/	Wgt.3B _y = TF _y
<i>Step 4</i>				

- FF.Ba_y* First filings by residents of bloc a in year y
- TR.Ba_y* Transfer Rate to EPO of FF of bloc a in year y
- SF.Ba_y* Subsequent filings at the EPO from bloc a in year y
- %EPFF.Ba_y* Proportion first filings in filings at the EPO from bloc a in year y
- TF.Ba_y* Total filings at the EPO from bloc a in year y
- Wgt.3B_y* Share of 3B (Europe, USA and Japan) in total filings at the EPO in year y
- TF._y* Total filings at the EPO in year y



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Origin = EPC

Year	First filings EPC area			Trend	Euro subs. applications (EPC priority)				Total Euro Filings from EPC			
	Dom. N	EPOFF	Total		Actual	rate	trend	Predicted	Actual	% FF	Trend	Forecast
1997	98362	3782	102144		40004	39,2%	39%		45929	11,5%		
1998	101098	5261	106359		44714	42,0%	40%		51824	11,4%		
1999	106085	5918	112003		47709	42,6%	42%		56396	12,1%		
2000	112464	6802	119266	120690	52230	43,8%	44%	53313	64368	13,0%		
2001	116832	8200	125032	122163	55407	44,3%	46%	56214	69592	13,8%		
2002	112800	11000	123800	123033	60216	49,0%	48%	58881	69943	13,9%	13,9%	68392
2003				123654			50%	61456			14,5%	71879
2004				124138			52%	63983			15,1%	75359
2005				124534			53%	66482			15,7%	78850
2006				124871			55%	68962			16,3%	82376
2007				125163			57%	71429			16,9%	85933
2008				125421			59%	73887			17,5%	89531

Step 1

Consolidation : Combined result

Origin = USA

Year	First filings USA			Trend	Euro subs. applications (USA priority)				Total Euro Filings from USA			
	Dom. N	EPOFF	Total		Actual	rate	trend	Predicted	Actual	% FF	Trend	Forecast
1997	106892	560	107452		32631	30,4%	30,0%		32725	1,9%	2,4%	
1998	119214	607	119821		37052	30,9%	31,1%		36869	2,5%	2,6%	
1999	132767	909	133676		41320	30,9%	32,1%		40441	2,7%	2,8%	
2000	146581	1089	147670		49683	33,6%	33,1%		48145	2,6%	3,0%	
2001	161786	1231	163017		55200	34,2%	33,1%		53702	2,4%	3,2%	
2002	172667	1236	173903	173903	55200	31,8%	31,8%	61604	55903	2,2%	2,2%	63006
2003	177847	1244	179092	179092	55200	30,8%	30,8%	65389	55903	2,2%	2,2%	66862
2004				188046			37,6%	70703			2,2%	72280
2005				197449			38,7%	76384			2,2%	78071
2006				211270			39,8%	84028			2,1%	85864
2007				226059			40,9%	92368			2,1%	94365
2008				241883			41,9%	101463			2,1%	103634

Step 2

Year	Tri-Bloc	Tri-Bloc EP filings	EP Filings	Tri-Bloc share	Trend	Total Euro
1998		104862	113338	92,5%	92,6%	
1999		114154	123866	92,2%	92,3%	
2000		133556	145237	92,0%	92,0%	
2001		147881	161143	91,8%	91,7%	
2002	153837	148718	164000	90,7%	91,3%	168423
2003	162697				91,0%	178748
2004	173109				90,7%	190856
2005	183907				90,4%	203478
2006	196734				90,1%	218443
2007	210303				89,7%	234340
2008	224680				89,4%	251254

Step 4

Origin = Japan

Year	First filings Japan			Trend	Euro subs. applications (Japan priority)				Total Euro Filings from Japan			
	Dom. N	EPOFF	Total		Actual	rate	trend	Predicted	Actual	% FF	Trend	Forecast
1997	339045	240	339285	345335	13988	4,1%	4,2%	14475	14794	1,7%	1,7%	
1998	349211	255	349466	353690	15132	4,3%	4,5%	16057	16100	1,7%	1,7%	
1999	357379	236	357615	360310	16077	4,5%	4,9%	17612	17612	1,7%	1,7%	
2000	357531	238	357769	365810	19310	5,4%	5,2%	19154	19154	1,7%	1,7%	
2001	384201	256	384457	370527	23096	6,0%	5,6%	20691	20691	1,7%	1,7%	
2002	383609	244	383853	374661	22654	5,9%	5,9%	22226	22226	1,0%	1,0%	22440
2003	372101	217	372318	378346			6,3%	23762			0,8%	23956
2004				381673			6,6%	25300			0,7%	25470
2005				384708			7,0%	26840			0,5%	26982
2006				387500			7,3%	28384			0,4%	28494
2007				390086			7,7%	29932			0,2%	30005
2008				392496			8,0%	31483			0,1%	31515

Step 3

Forecasting the number of European patent applications at the EPO



EPO Applicant survey

- Introduced in 1996 to receive input from users
- Objective = intention of filings in year y , $y+1$ and $y+2$
- Mail questionnaires (Aug-Sep)
- Analysis Nov-Dec
- 2 groups
 - panel of the top 450 applicants = 16% of filings
 - random group of 2 000 applicants = 20% of filings (overlapping)
- Response rate: 35%



EPO Applicant survey

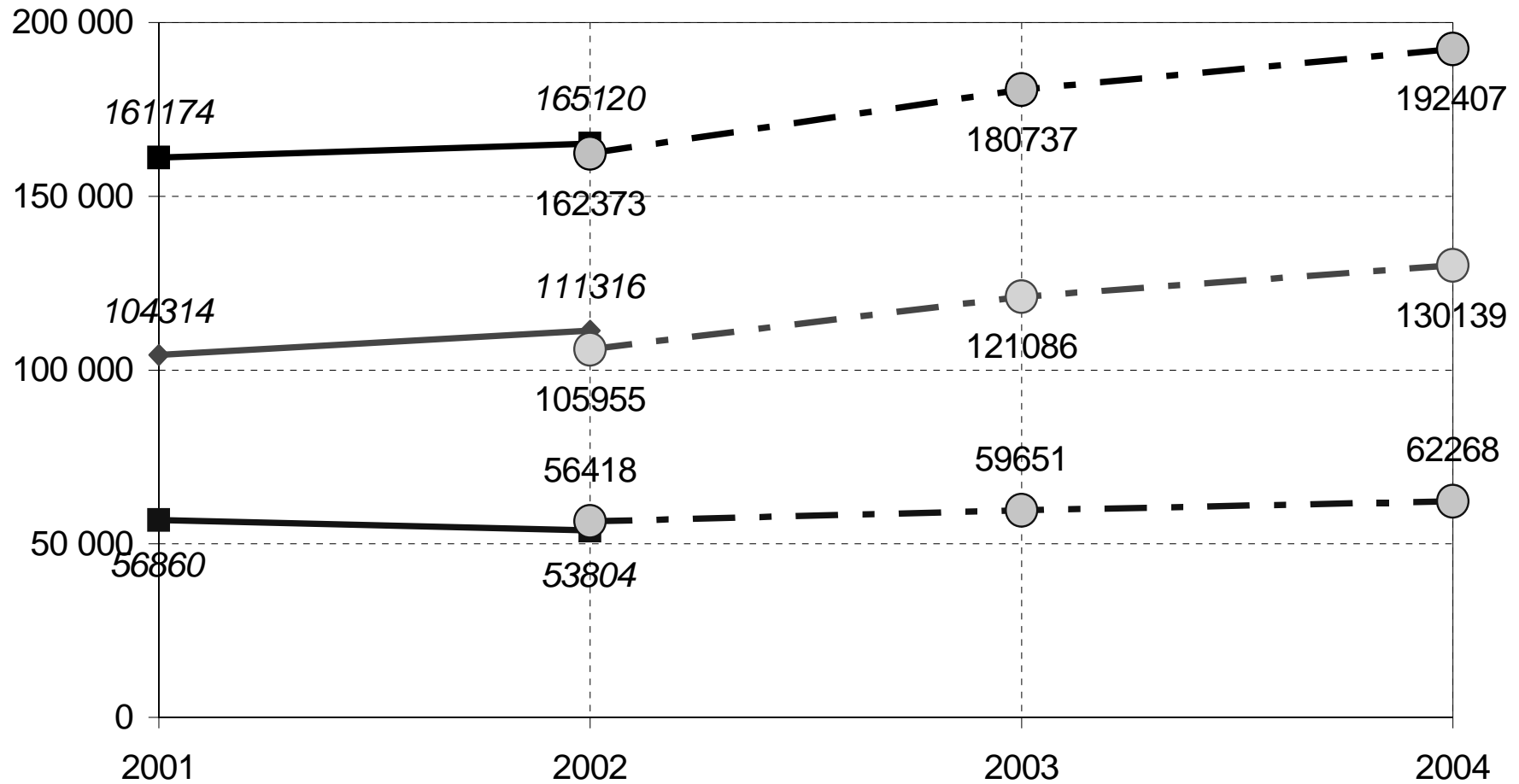
➤ Biggest Group → Composite Index (per bloc and type of filing)

$$CI = \frac{\sum_{i=1}^n x_i}{\sum_{i=1}^n A_i}$$

Where n is the number of applicants in the sample,
and summation is taken over the sample members $i = 1, \dots, n$.
 x_i is the intended number of filings reported by the i th sampled applicant in 2002.
 A_i is the known number of applications made by the i^{th} sampled applicant in 2001.



Forecast issued from the Biggest Group





EPO Applicant survey

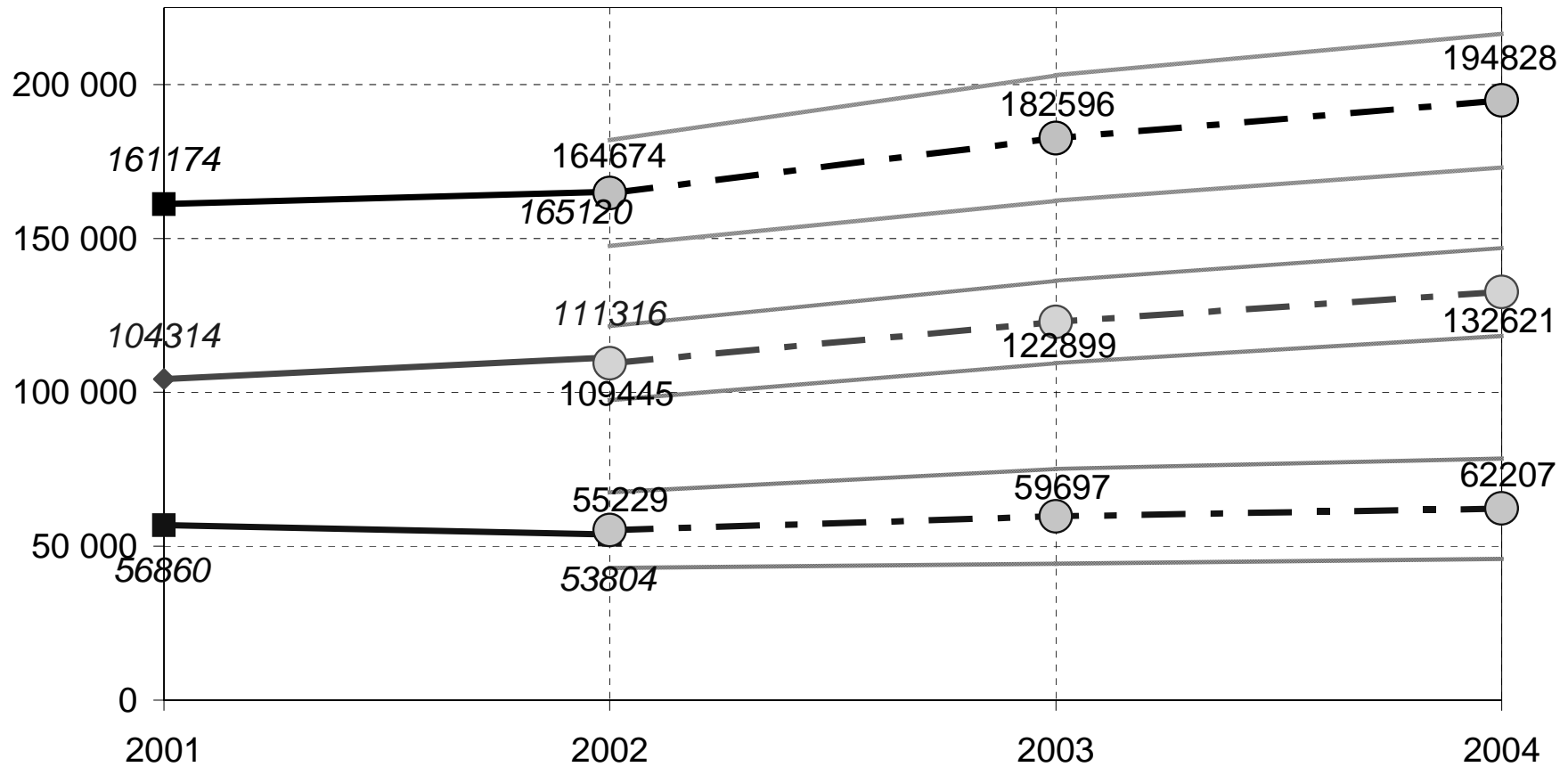
- Random Group → Q index on Log transformed data (per bloc and type of filing)

$$Q = \exp \frac{\sum_{i=1}^n q_i \text{Log}(I_i)}{\sum_{i=1}^n q_i}$$

where $\text{Log}(I_i)$ is the natural logarithm of the individual index $I_i = x_i / A_i$.
 q_i is the probability of applicant i being selected for the sample.

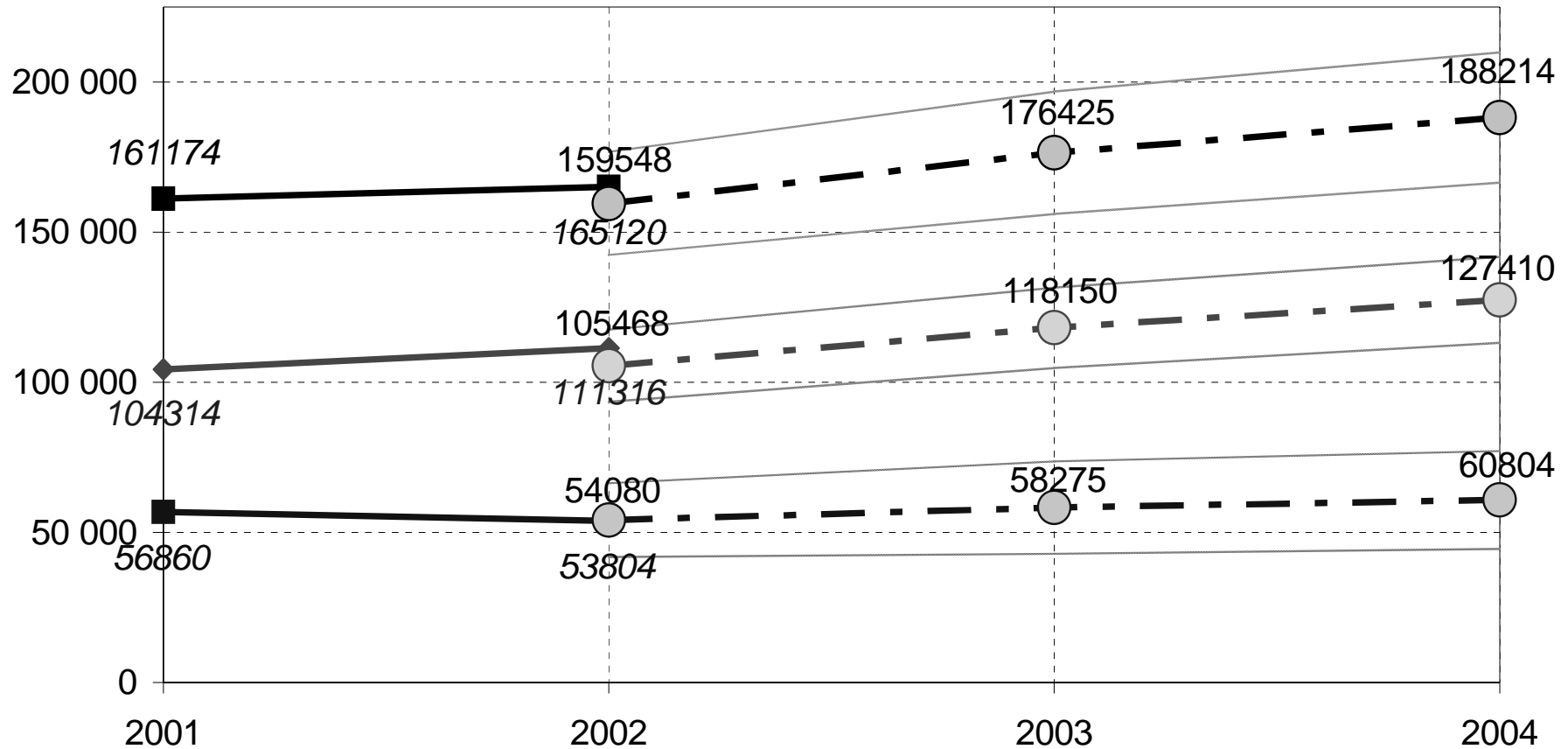


Forecast issued from the Random Group





Forecast issued from the Random Group with a non-response correction





Use of the forecast on EP filings

- Consolidation during a Round Table on forecasting and planning

Preference given to the bloc-wise transfer model
and to the Random Group with correction

- One planning scenario presented to EPO management,
with other key parameters

- Approval by AC

↳ Detail plan (MTBP)

↳ Budget



Improvement of Forecasting Methodology

- Trilateral cooperation = Exchange of methods and results
Econometrics models
Harmonisation of survey
- Research Programme = External methodological support
- Forecast per technical areas = New orientation



Trilateral Forecasting Activities

- Exchange of techniques and results

Econometric models for first filings

Use of partner data for transfer model type techniques

- Development of a global model

Multivariate modelling of trilateral flows of filings

- Harmonisation of applicant surveys



EPO Research Programme

- Methodology for patent filing forecast
- 5 themes and 4 projects retained
 - Time series analysis
 - Time series methods
 - International patenting patterns
 - Sector base forecasting - microeconomic
- 3 years programme (2002-2004)
- EPO to implement recommendations



EPO Research Programme

Preliminary results

- Dynamic linear model of monthly filing data may provides accurate short distance forecasts;
- Aggregation of forecasts by bloc of origin may give more accurate forecasts
- Aggregation of forecasts per technical areas does not necessary lead to more accurate forecasts;
- ARMAX and state space models to be tested to forecast filings from lagged R&D;
- Final reports expected end of 2004



Forecast per technical areas

- Full deployment of *BEST* working method
- New objective: EPO to grant patent in 3 years (on average)
- Re-organisation of the EPO examining departments

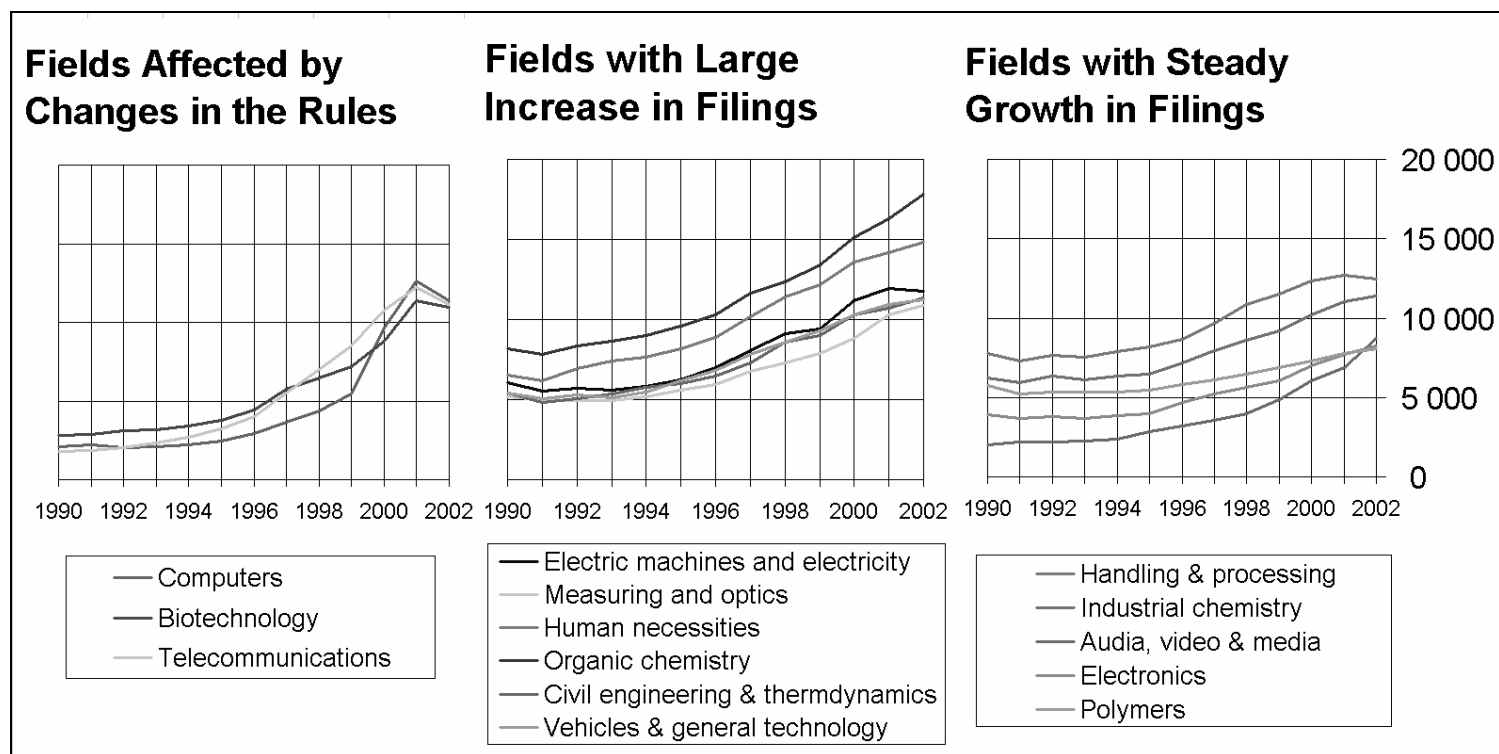
2 DGs → 14 Joint Clusters (*JC*)

- More autonomy
of the JC → Planning per JC → Forecast per JC
to monitor resources



Forecast per technical areas


- Different trend in filings
- Different patenting patterns





Forecast per technical areas

- Trend analyses replicated per JC
 - Data available ✓
 - Timeliness ↘

- Transfer models
 - First filings by bloc and JC ?
 - Definition of JC on basis of the IPC 

- Survey
 - To augment the sample size ✓
 - To review questionnaire ✓



Conclusions

- Methods used
 - Trend analyses
 - Transfer model
 - Applicant survey

- Research programme
 - Methodology support
 - Recommendations to be implemented

- New challenge
 - Forecast for 14 Joint Clusters



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Thank you