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Path-breaking Research in the Pulp and Paper Industry, the Roles of Science, Government and Industry

Presentation at the Marcus Wallenberg Prize Awarding Symposium, Stockholm, October 10, 2003

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Definition of Path-breaking

Characterized by originality and innovation; pioneering.

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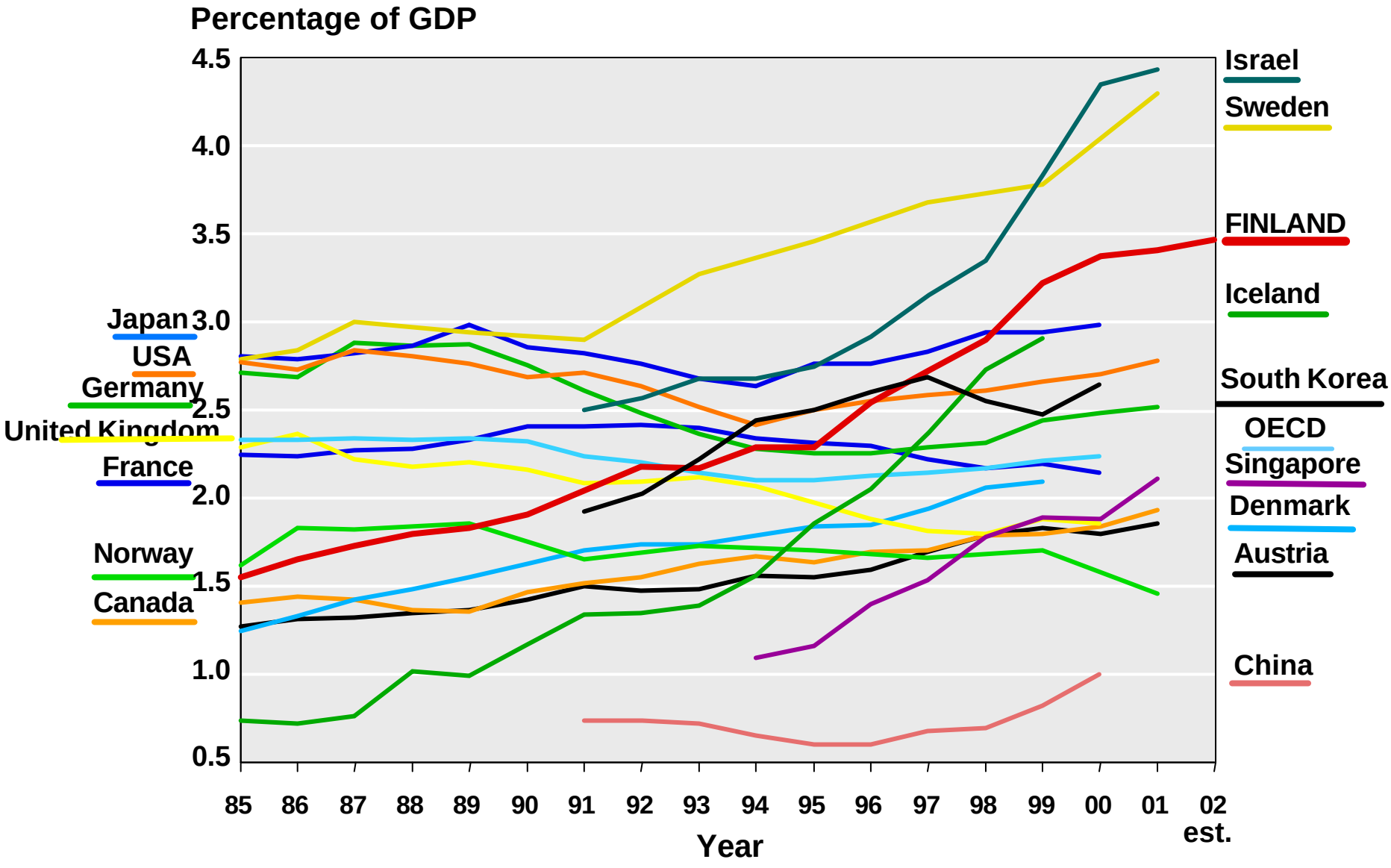
R&D input in some OECD countries



Distribution of Marcus Wallenberg Prizes according to the role of recognition

Type of recognition	Forests & Forestry	Mechanical Forest Industry	Chemical Forest Industry
New theoretical understanding	5	3	3.5
New (revolutionary) practical discovery	2	1	5.5

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What do you get as a nation with your R&D?

Plenty of scientific articles

New competences that are used to build new businesses and provide better products, proceses and services, i.e. one is capable of turning R&D to better decision making, and through that, to national wealth

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Special characteristics of innovation in low tech and high tech industries

	Low tech industry	High tech industry
Competition criterion	price/quality	innovation
R&D intensity	low	high
Patenting	low	high
Innovation focus	process ("product")	product
Scale of innovation	incremental	fundamental
Source of innovation	Information already available in other areas	self (in co-operation) searched new information
Type of knowledge	tacit	practical, codified
Type of learning	learning by using	searching, exploring
Co-operation	customer - producer	university - producer
Skills and competencies	Practical knowledge + skills	theoretical knowledge + cognitive skills

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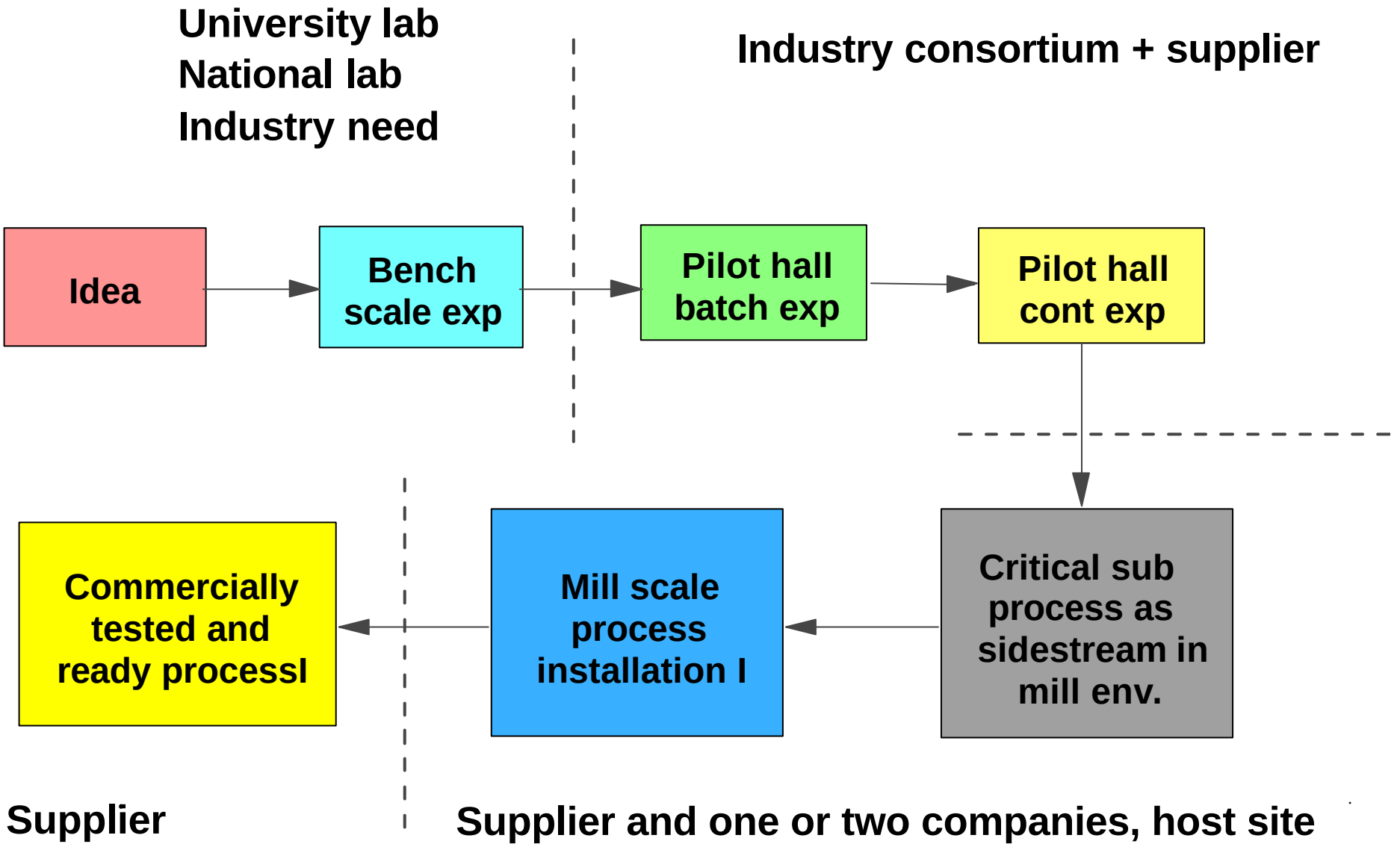
Specifics of new process development



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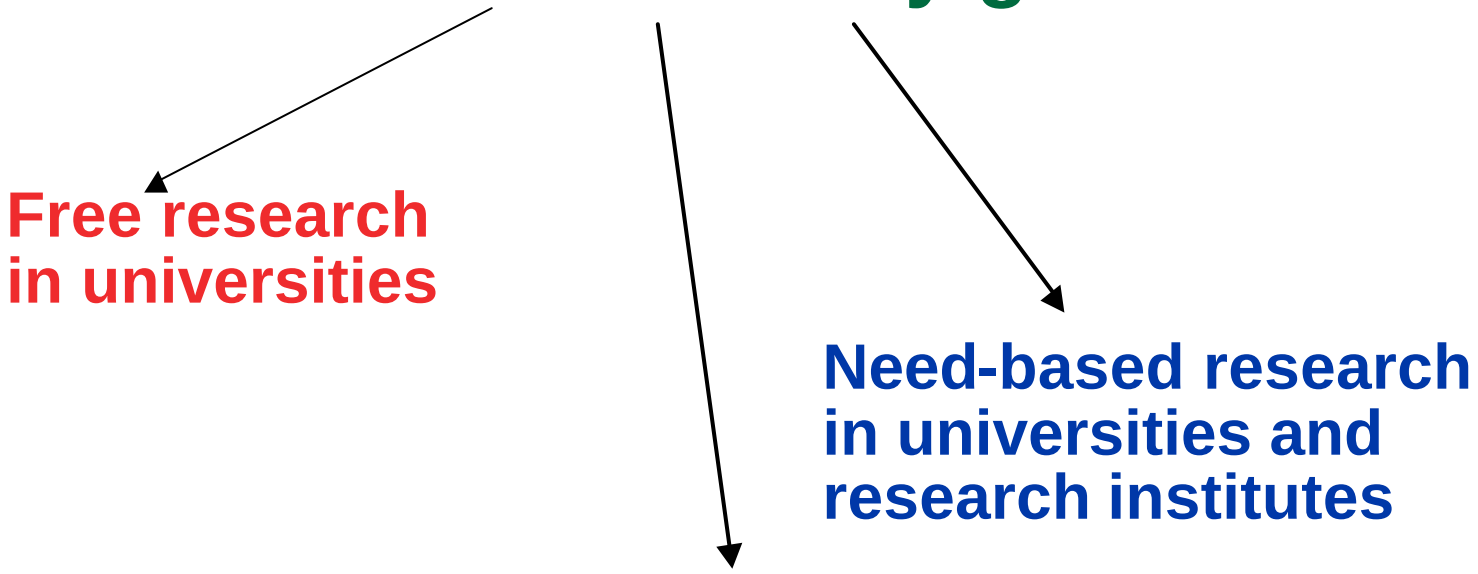
Where should the government R&D money go?



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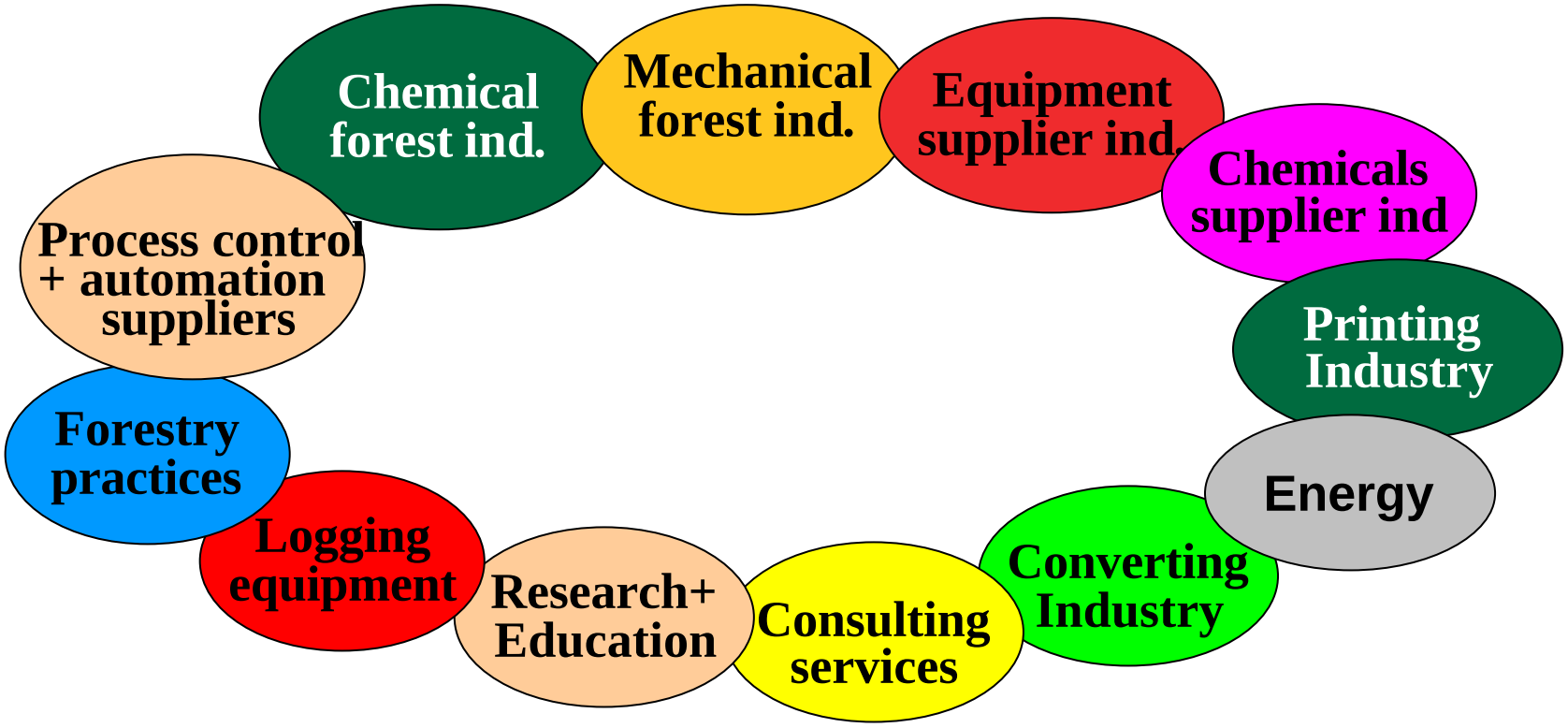
The Finnish Forest Industry Cluster



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Science and Technology Policy Council of Finland

2003 **Knowledge, innovation and internationalisation**

ISBN 951-53-2485-8 (pdf)
ISBN 951-53-2484-X (printed)

2000 **Review 2000: The Challenge of Knowledge and Know-how**

ISBN 951-53-2118-2

1996 **Finland: A Knowledge-based Society**

ISBN 951-53-1099-7

1993 **Towards an Innovative Society: A Development Strategy for Finland**

ISBN 951-47-8492-8

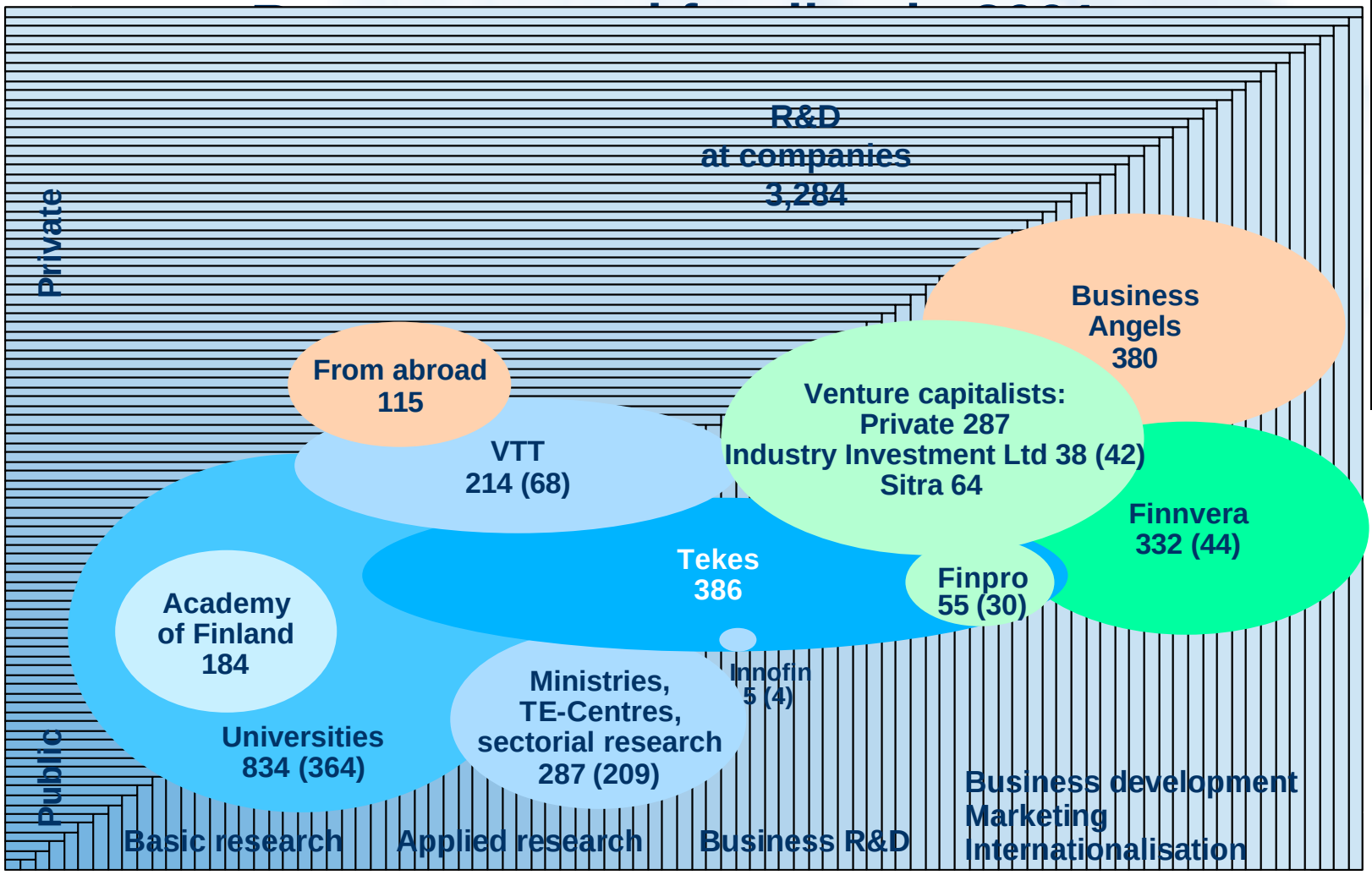
1990 **Review 1990: Guidelines for Science and Technology Policy in the1990's**

ISBN 951-47-4317-2

1987 **Science and Technology Policy Review 1987**

ISBN 951-47-1110-6

Innovation system



The figures represent the total extent of each organisation in million euros in 2001. In parenthesis the share that is funded from the State budget. The funds of Tekes, the Academy of Finland and Innofin are funded entirely from the State budget.

TEKES

DM 32190

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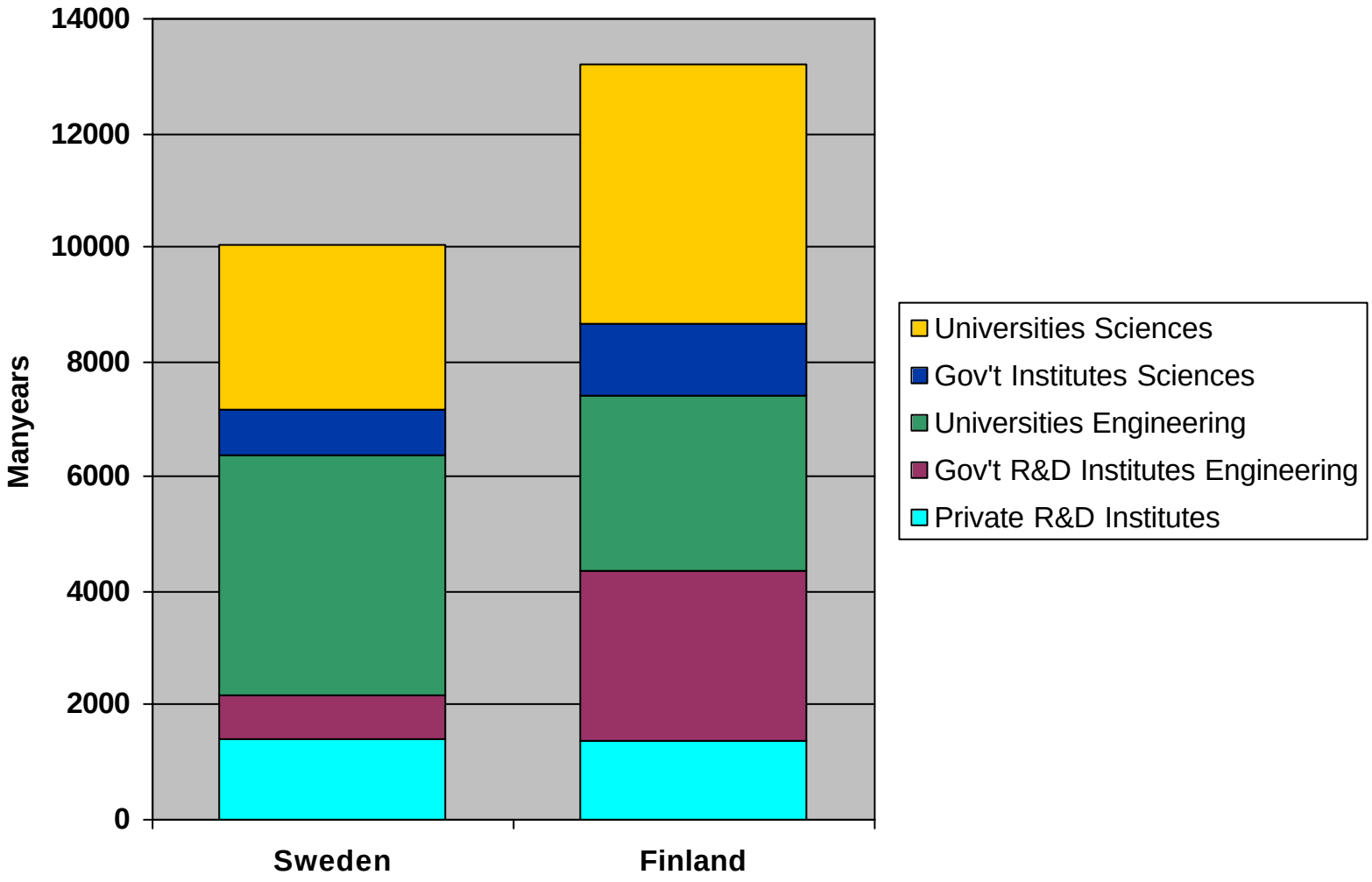
Manyears spent in publically funded R&D 1999



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Sweden and Finland

While the Swedish research community is rather fragmented with very little money and people crossing the border between universities and private companies, the Finnish situation is still characterized by cooperation in clusters and clear innovation systems.

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Sweden and Finland

While the Finnish technology policy has shown a strong record of continuity and a long-term view, the Swedish research policy has been under continuous debate and is still rather vague.

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Sweden and Finland

When Finland decides to fund a certain research program there is also a planning in parallel for how to utilise the results that are expected to be obtained.

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National P&P technology programs during the past 15 years

Finland

	M€
? Functional paper	13
? Pulping "package"	10
? Sytyke (Environm.)	3
? Carboh. & process ind.	3
? Fibre (energy savings)	7
? Web (energy savings)	10
? Sustain. paper (energ.)	20
? Electronic printing	12
? Cactus (low water cons.)	16
? Wood Wisdom	33
? Pigments as raw material	4
Total	141 M€

Out of this TEKES has paid about 60 – 70 %

Sweden

	M€
? NSP (New recovery boiler)	3
? KAM (Closed loop pulpmill)	11
? FRAM (continuation)	5.5
? WURC (accumulated)	12 (cont.)
? BiMaC (2002 – 2007)	8
? Black Liquor Gasific.	>5
? Faxen hydrodynamics	6
? Start-up support to Karl-stadt and MidHögsk.	21
? SSVL(environment research)	>10
? Optiträ (wood constr.)	2
? PFT (Paper,ink,print)	15
? T2F (Printing technology)	11
? S2P2 (Surface Science & Print)	2
? FPIRC (Forest Prod. Ind. Res. C)	5.6
? ACREO (Paper electronics)	3
Total	115 M€

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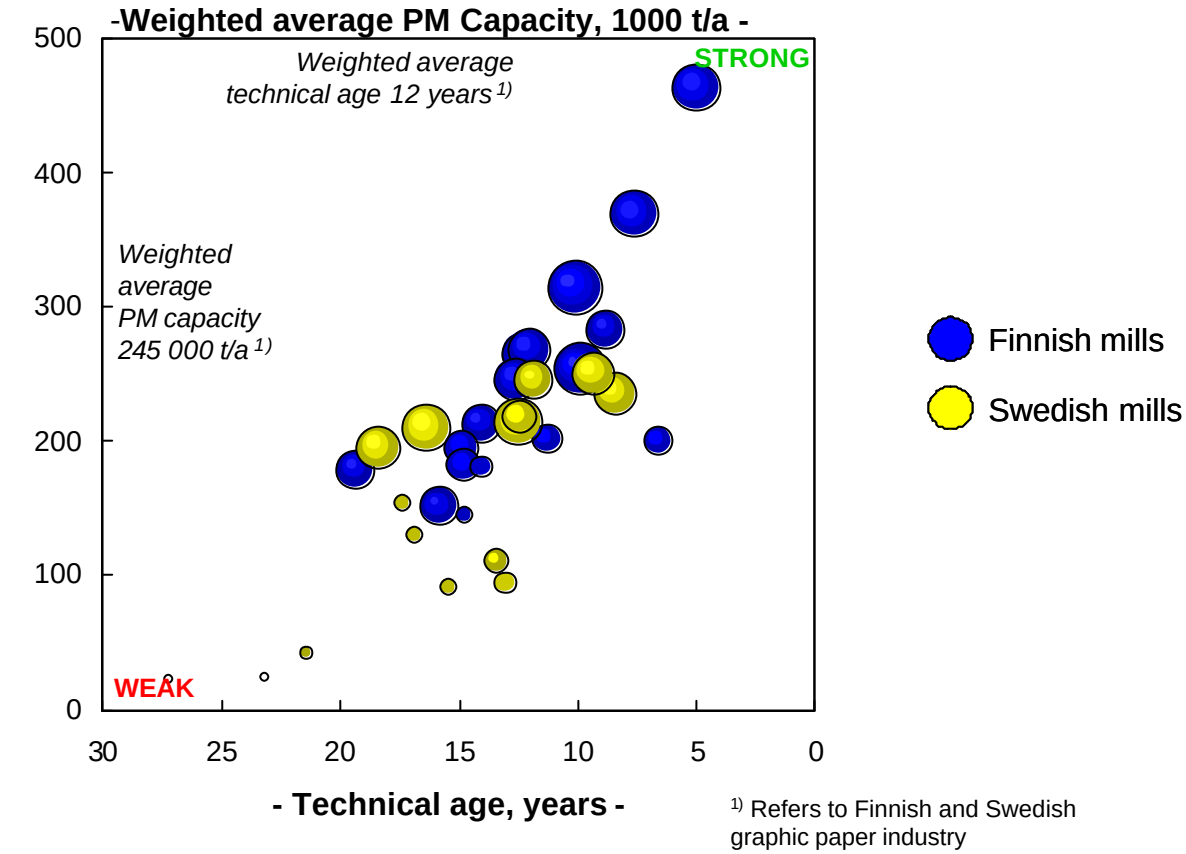
Industry structure by mill

Graphic papers – Finland and Sweden



1) Refers to Finnish and Swedish graphic paper industry

Size of the bubble reflects the mill's relative graphic paper capacity

JAAKKO PÖYRY
Jaakko Pöyry Consulting

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Comparison of Pulp & Paper Industry related developments in Finland and Sweden

	Finland		Sweden	
Category	**1970**	**2001**	**1970**	**2001**
Pulp production, Mt/a	**6.2**	**11.2**	**8.2**	**11.0**
Paper production,Mt/a	**4.3**	**12.5**	**4.4**	**10.5**
Consulting activity	Pöyry, Ekono	Pöyry, PI, CTS	ÅF. IVL, Pöyry NLK (Celpap)	Pöyry, ÅF-IVL
Machinery suppliers	**Valmet, Tampella Ahlström, Wärtsilä (P&P firms had own mach. comp.)**	**Metso, Kvaerner Andritz,Vaahto**	**KMW, Sunds Defibrator, Udde-valla MV,** BTG	**Metso**
Chemical suppliers	**Kemira, Oulu, Raisio, others**	**Raisio, Kemira**	**KemaNord, EKA, AGA, Dow, others**	**EKA-Chem. (Akzo-Nobel), BIM**
Harvester mfrs	**Lokomo, Valmet, Farm.tractor modif.**	**Timberjack,Ponsse Valmet (Kone)**	**Volvo BM, Ösa, Kockum, Farming .tractor modficat.**	**Timberjack,Deere Valmet (Kone), Rotne**
Joint central research	KCL, VTT	**KCL,VTT, Län-nen laboratoriot**	STFI, YKI,IVL Packforsk	STFI, YKI
Joint marketing	yes	no	no	no
Prod. cap. (P&P) M.+D.Sc./a	35 / 4	115 / 20	15/2	43/19
Globalisation in P&P	**Nordland, Star, Kitimat, Tivoli**	**3 firms are among the 12 big ones**	**Stora, SCA**	SCA

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Criteria for results

One may state that

- when the three parties – industry, government and science – work together, great results will be achieved,
- high quality basic research needs to be complemented by high quality need-oriented R&D and preparations for the result implementation and
- active and well-composed innovation systems are needed to transform research into prosperity for the welfare state.

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Proposal

- Marcus Wallenberg Foundation establishes another prize.
- Marcus Wallenberg Research Recognition Award
- It would be awarded to such a leader (CEO, COO, or Senior Executive VP) who has fostered, supported and effectively utilized results of long term (applied) basic research during the past 3 to 5 years period.
- A selection committee will evaluate the applications and make the recommendation to the Foundation.
- The purpose of this award is to activate strategic long term research in the minds of the top management of the pulp and paper companies.


Thank you!
Questions?