On the dimensions of productive third mission activities

A university perspective

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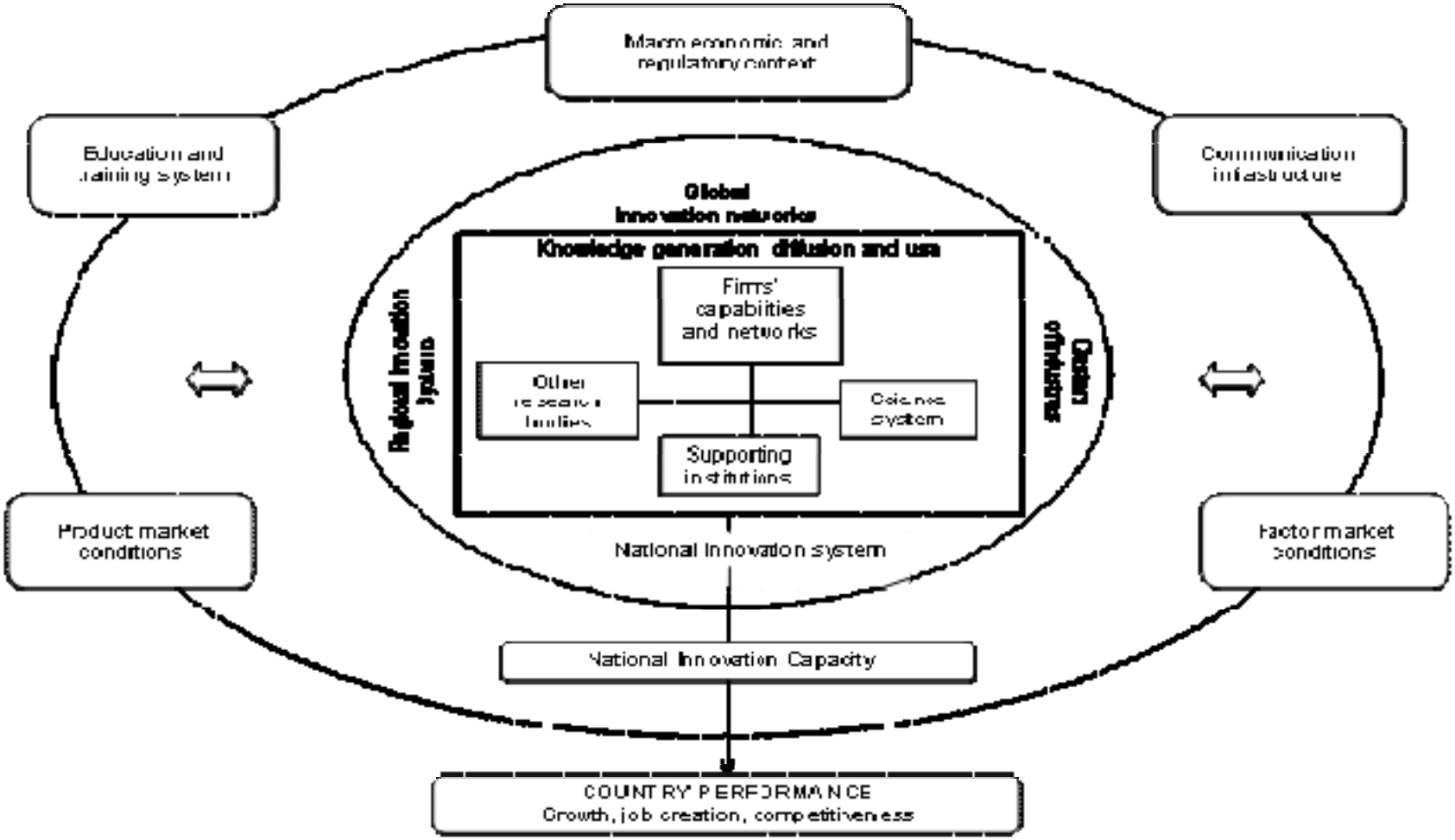
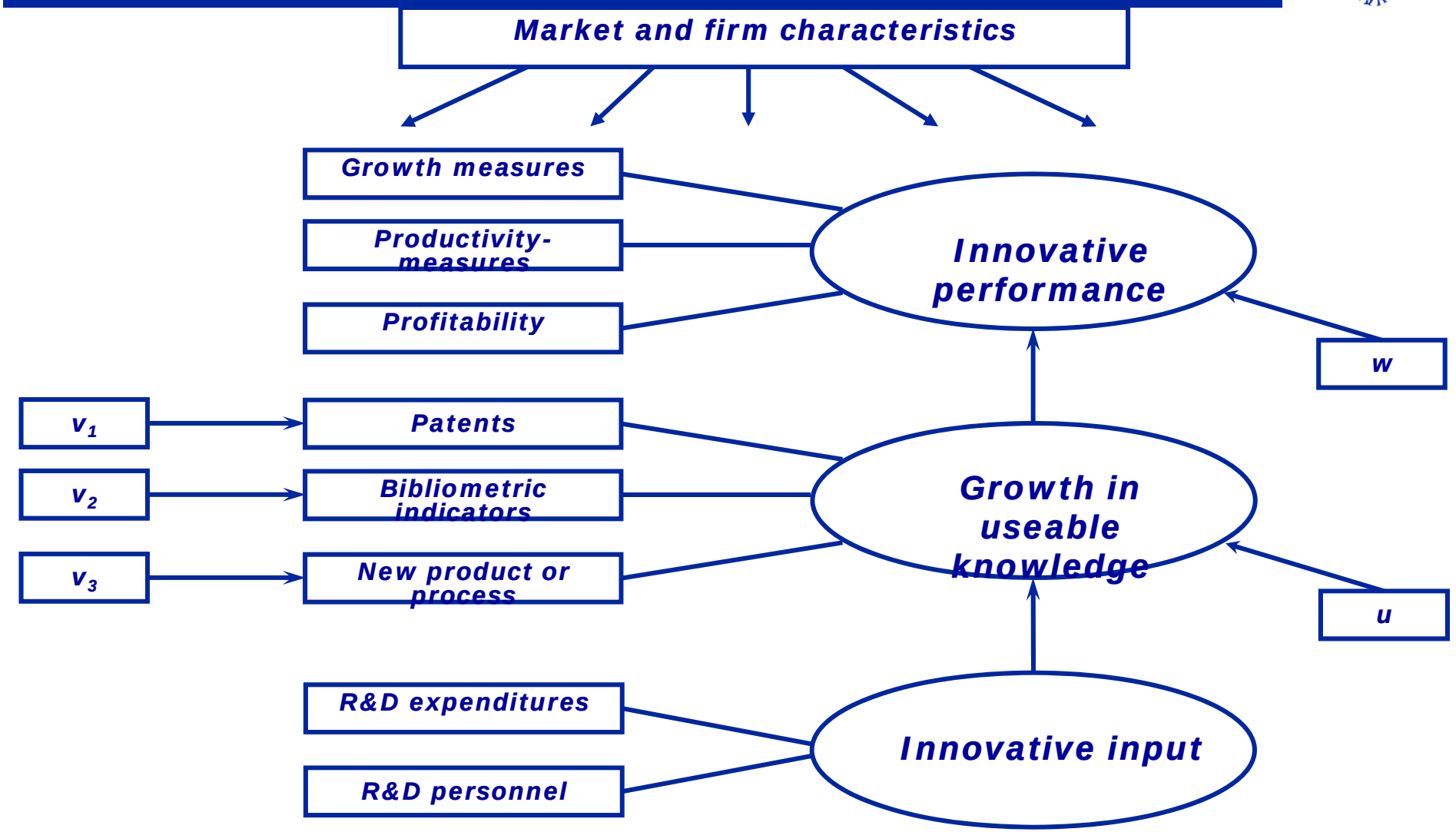
Monday, November 08, 2010

The changing "face" of innovation …

Actors and stakeholders in the innovation space …



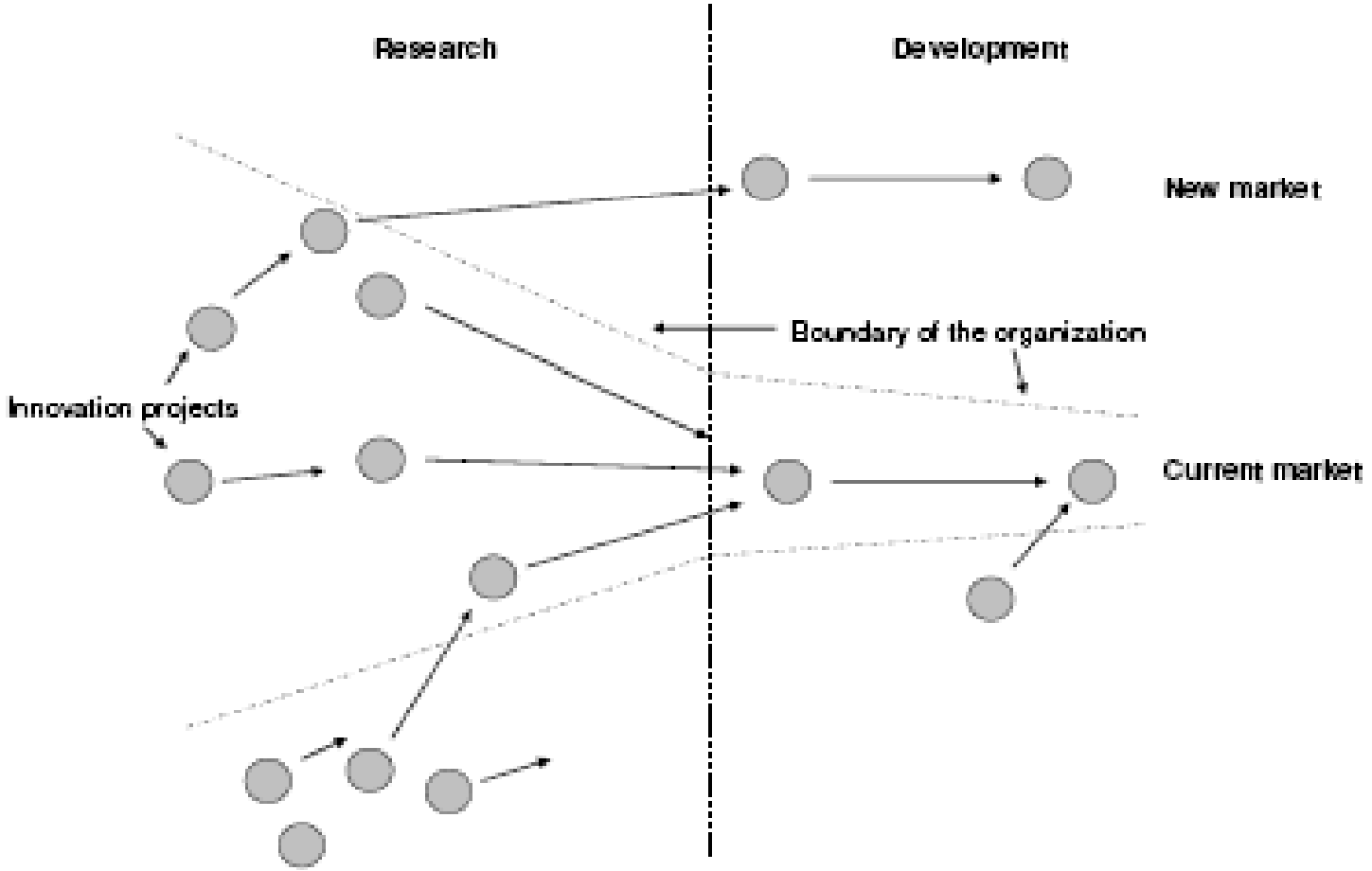
Actors and stakeholders in the innovation space …



Challenges in the innovation space require collaboration and openness …

When	Focus	Who?	Attention?
1960 – 70	TECHNOLOGY	Engineers Scientists	How to move technology from lab to market?
1970 – 80	PRODUCT	Marketing experts Business developers	Aligning new product development to fulfill market needs
1980 – 90	SERVICES	Marketing experts Business developers	Adding value through service innovation
1990 - 00	BUSINESS MODELS	Integrated internal approach, board level involvement	A integrated value perspective (IP, complementary assets, value chain …)
2000 – now	OPEN INNOVATION	Integration into innovation ecosystems	Make and buy, collaborative and distributed innovation

Open innovation: a mode of competition & cooperation …



Source: Chesbrough (2003, p. xxv).

TRIPLE HELIX MODE

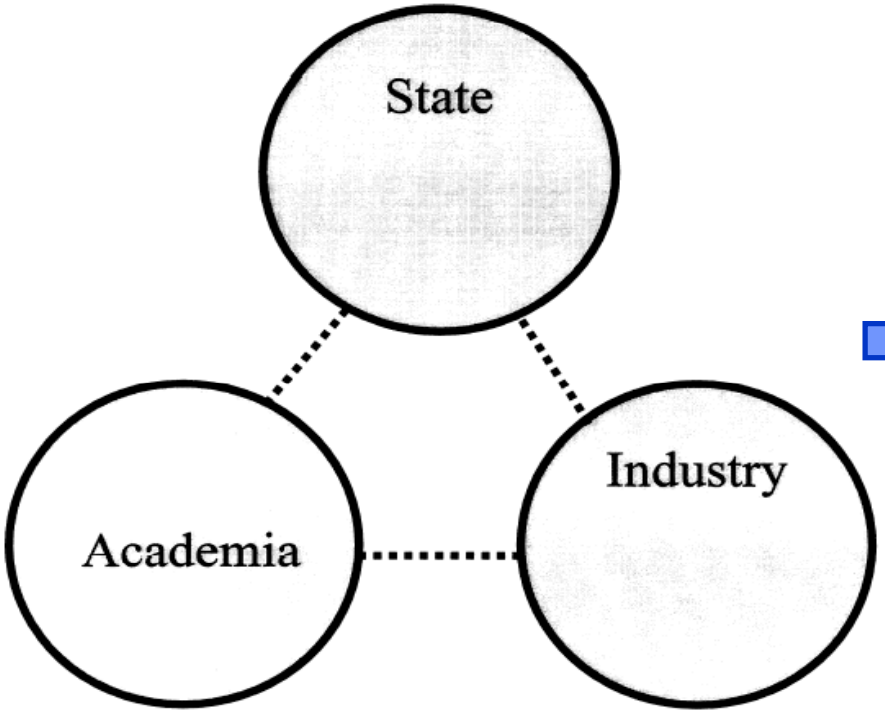


Fig. 2. A ''laissez-faire'' model of university–industry–government relations.

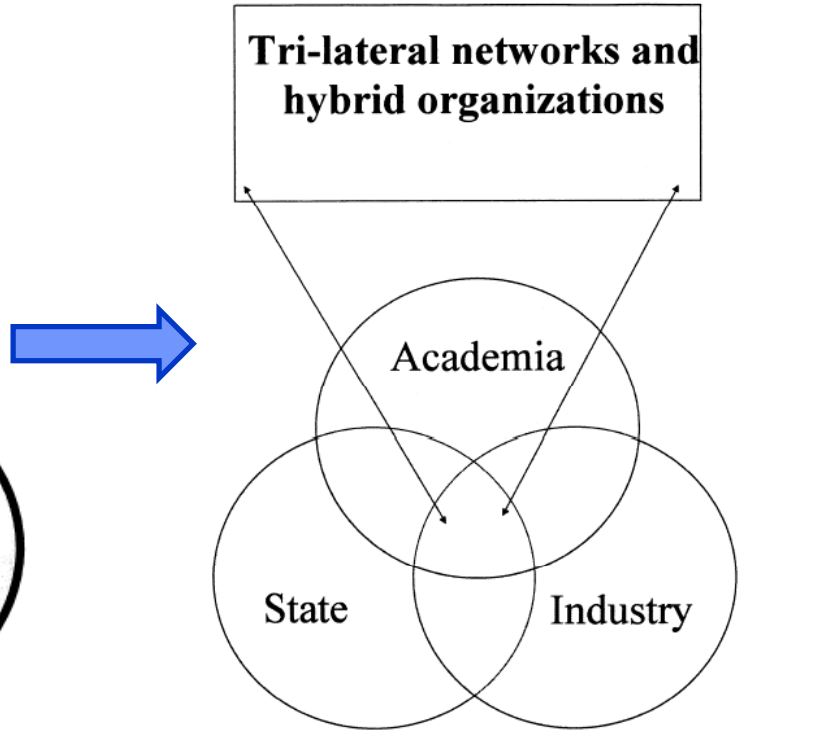


Fig. 3. The Triple Helix Model of University–Industry–Government Relations.

Leading to a variety of policy views in the innovation space …

- Fostering curiosity-driven research --- stimulating demand-driven research --- the emergent strategic basic research agenda
- Policies geared towards individuals --- institutions --- networks
- Policies driven towards larger infrastructures & technology integration --- smaller, creativity driven projects
- Need for complementarity and additionality between and within instruments
- … European universities occupy a focal position in these emergent & hybrid processes …

The role of the university in the innovation ecosystem …

The changing role of "ISLs" …

- **Understanding the need for industry – science links:**
  - **Start-up of technology-oriented enterprises by researchers from the science-base generated at the research institute;**
  - **Collaborative research, i.e. defining and conducting R&D projects jointly by enterprises and science institutions, either on a bi-lateral basis or on a consortium basis;**
  - **Contract research and know-how based consulting by science commissioned by industry;**
  - **Co-operation in graduate education such as temporary practical studies at enterprises or the joint supervision of thesis projects;**
  - **Advanced training for employees, i.e. further education for enterprise staff in research and innovation related topics;**
  - **Systematic exchange of research staff between companies and research institutes via internship programs and leave-of-absence assignments.**

The changing role of "ISLs" …

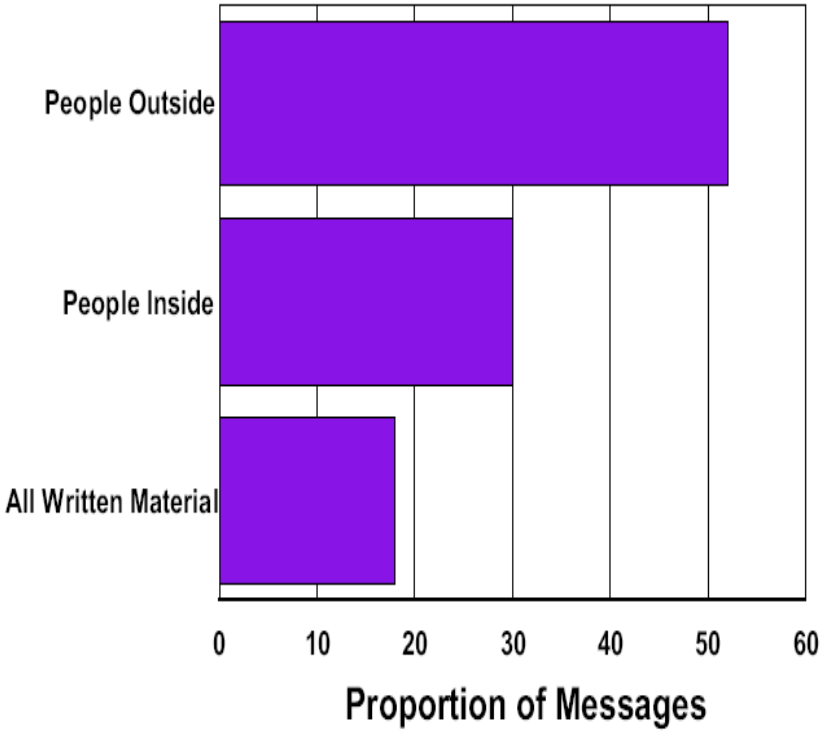
- **Understanding the need for industry – science links:**
  - **Development of Intellectual Property Rights (IPRs) by science both as a tool signaling their technology competence as well as serving as a base for licensing technologies to enterprises. Those IPRs are not limited to the establishment of patent portfolios, but also include the protection of design typologies, the establishment of frameworks for Material Transfer Agreements (MTAs), the protection of databases, the property rights on tissue banks, etc. ➔ companies increasingly demand properly protected academic research results;**
  - **In this context *IP is and will* remain important ➔ one of the big misinterpretations of "open innovation" is that IP is superfluous, a nuisance, at odds with cooperation … the original writings on "open innovation" are not at all directed against IP …**
  - **On the contrary, they signal that IP will have to be dealt with in a more sophisticated & complex way than before;**

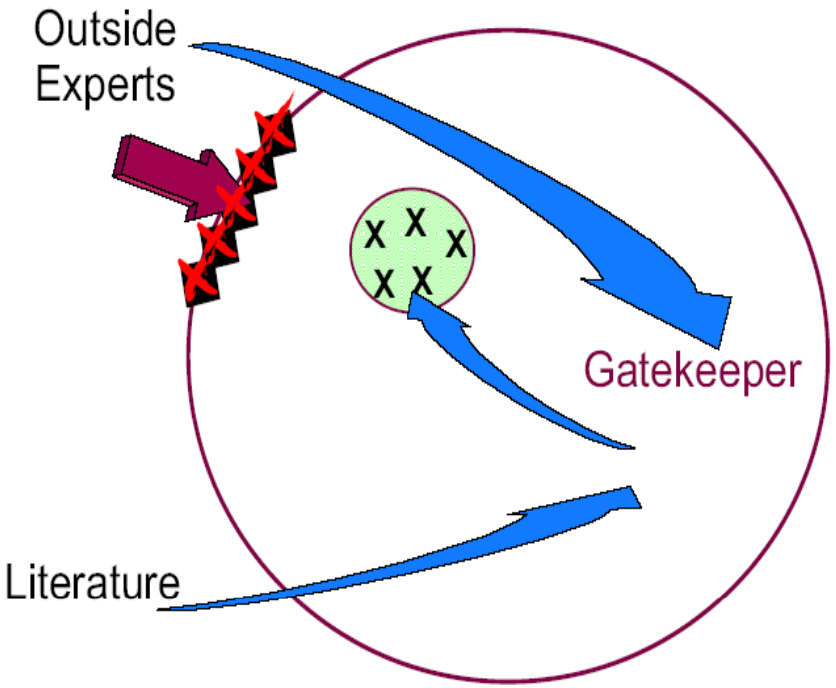
The changing role of "ISLs" …

- **Understanding the need for industry – science links:**
  - **Hence, the emergence of innovative *joint* science & technology platforms to foster clustering of competencies & resources (at various levels, e.g. IMI-initiative EC, CD3-EIF/LRD, SIM, CTBI, …) to enhance exploitation potential & likelihood, joining forces on IPRs;**
  - **Moving from IP transfer to the joint generation & exploitation of IP, including the creation of joint financial returns. Thereby stressing the need for industry to respect academic rights & the need for scientists to understand industry imperatives;**
  - **Given the increasing shift in emphasis by public authorities from non-directed R&D funding to strategic basic research & innovation, they also further push the frontier in the direction of joint IP generation & exploitation;**
  - **Of course, never neglecting the continuous need for informal mechanisms: gatekeeping, signaling posts, ……**

The changing role of "ISLs" …

- **Understanding the need for industry – science links:**

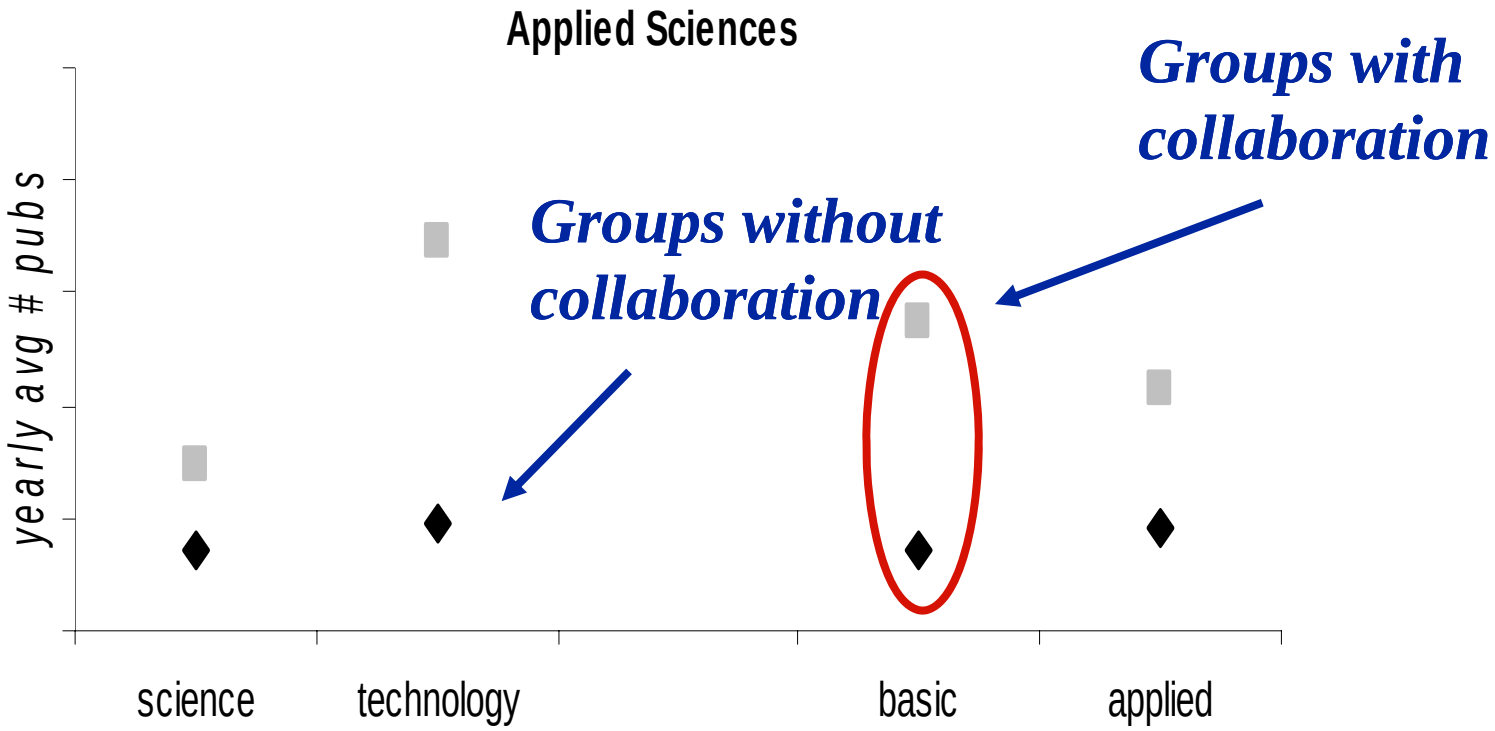




T. Allen, MIT

Collaboration: a positive effect …
From financial to cognitive spillovers …

- **Groups involved in technology transfer also publish basic scientific work (data based on ISI-SCIE):**



Source: Van Looy, Debackere et al., Research Policy, 2004

Collaboration: a positive effect …

- ***What about academic inventors?*** ***(Van Looy, Callaert, Debackere, 2006)***

	Inventors	*Non-inventors*
Complete sample	35,8	11,7
Sample without outliers (# pubs < 90)	22,8	12,1

Publication output:

Mean Difference	***Std. Deviation***	***Std. Error Mean***	***95% Confidence Interval of the Difference***		***t***	***df***	***Sig. (2-tailed)***
Complete Sample			*Lower*	*Upper*			
24,1482	50,12	8,860	6,07	42,21	2,726	31	,010
Sample Without Outliers			*Lower*	*Upper*			
10,7210	18,25	3,389	3,77	17,66	3,163	28	,004

Collaboration & Performance …

Table – Result of $\chi 2$ test comparing publication distributions of inventors & non-inventors

	Nature of Publications				
	1	**2**	**3**	**4**	Total
Observed					
Inventors	23	119	257	188	587
Non Inventors	79	221	186	181	667
Total	102	340	443	369	1254
Expected					
Inventors	47,75	159,15	207,37	172,73	587
Non Inventors	54,25	180,85	235,63	196,27	667
Total	102	340	443	369	1254
Significance	Significance; p<0,0001				

Technology oriented	Applied----	Type 1------	Applied Technology
	Basic-------	Type 2------	Engineering Science – Technological Science
Science oriented	Applied----	Type 3------	Applied research – Targeted Basic Research
	Basic-------	Type 4------	Basic Scientific Research

The diverse role of IPRs…

(Source: du Plessis, Van Looy, Magerman, Debackere, 2006)

	EPO Granted Patents			USPTO Granted Patents		
APY	Patents assigned to university	Patents invented by university researchers	Total number of patents related to university	Patents assigned to university	Patents invented by university researchers	Total number of patents related to university
1991	7	13	20	1	15	16
1992	2	10	12	7	18	25
1993	5	9	14	3	19	22
1994	2	10	12	6	33	39
1995	3	10	13	24	57	81
1996	3	10	13	3	51	54
1997	2	4	6	10	42	52
1998	0	4	4	8	41	49
1999	0	0	0	5	39	44
2000	0	0	0	1	7	8
2001	0	0	0	0	1	1
Total	24	70	94	68	323	391
AVG	2,18	6,36	8,55	6,18	29,36	35,55

75%

83%

What about industry? CIS-survey

(Source: Faems, Van Looy, Debackere, 2005)

TABLE 3: Descriptive statistics and correlations

Variable	Mean	S	Correlations					
			Turn Over New Products	Turn over Improved Products	Size	R&D Intensity	σ-Collaborations	# Exploitation oriented collaborations
Turnover New Products	0.09	0.08	1					
Turnover Improved Products	0.13	0.11	.18**	1				
Ln(Size)	5.22	1.44	-.00	.03	1			
R&D Intensity	0.05	0.06	.16*	.11	-.01	1		
σ -Collaborations	1.69	1.95	.15*	.15**	.44**	.12	1	
#Exploitation oriented collaborations	0.89	1.43	.22**	.24**	.36**	.11	.76**	1
#Exploration oriented collaborations	0.74	1.34	.25**	.13	.48**	.24**	.69**	.59**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

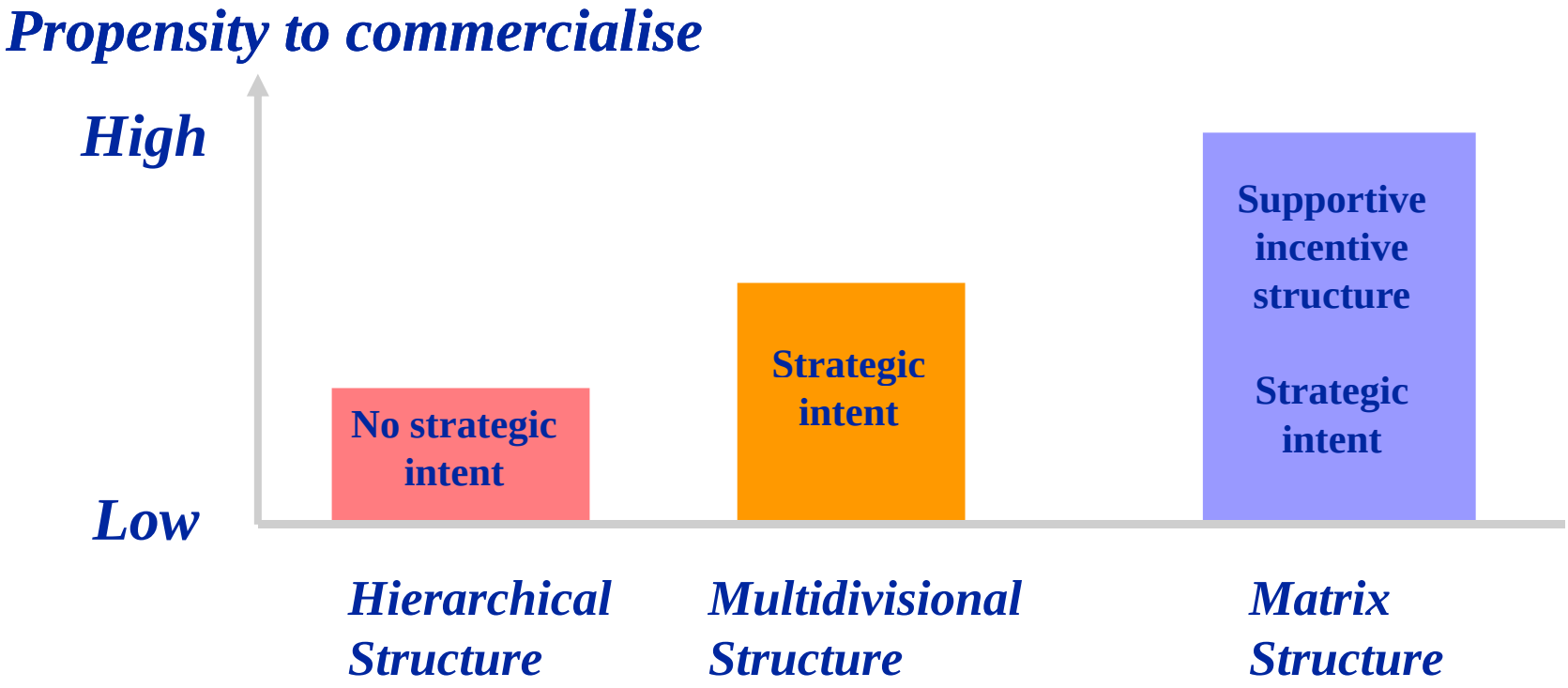
What about industry?

TABLE 5: Results of Tobit Analysis – Dependent variable: Presence/Proportion of turnover resulting from new products.

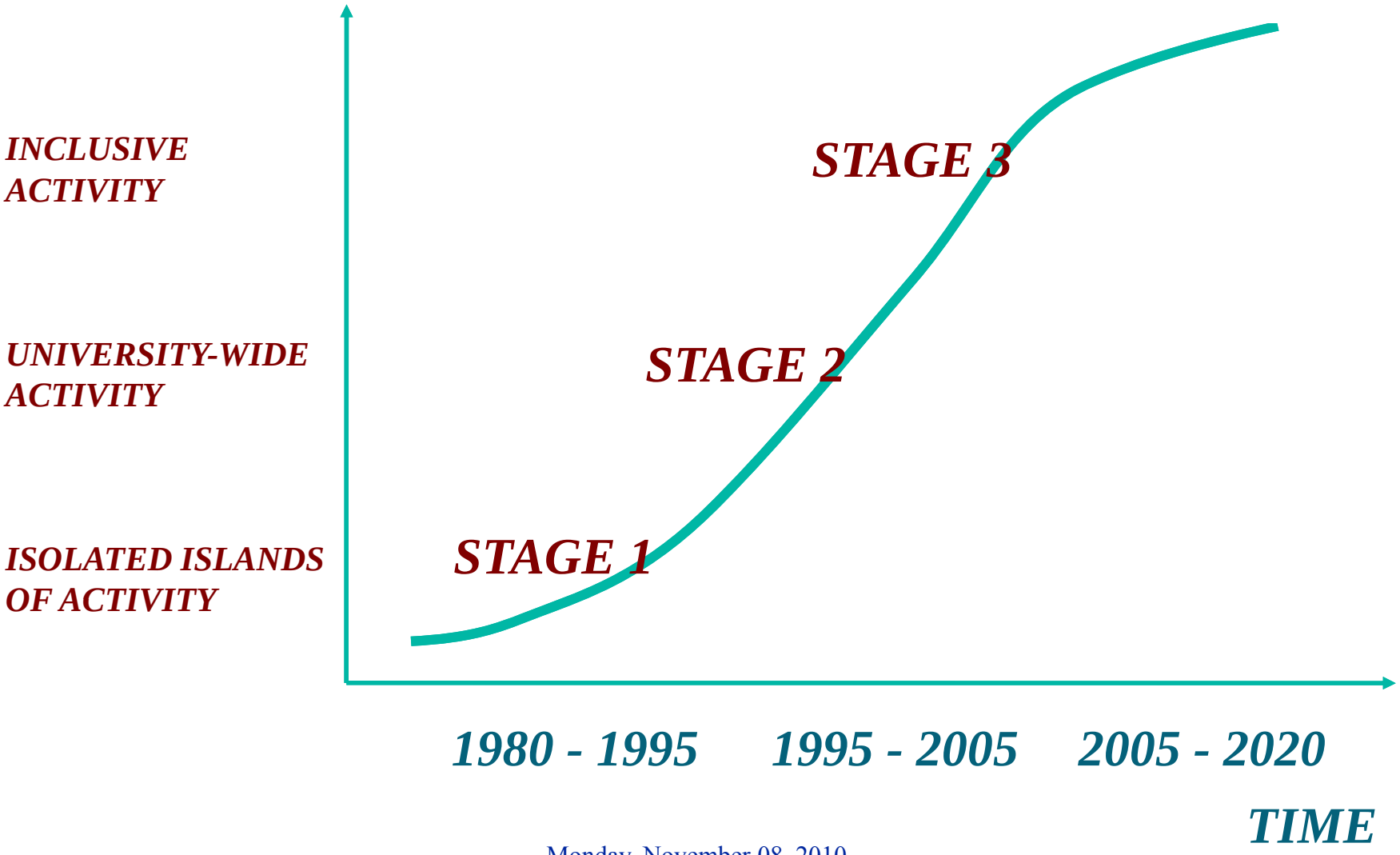
Variable	Estimate	St Error	Chi-Square	Pr > ChiSq Label
Intercept	0.082	0.036	5.200	0.023
Foreign Subsidiary	0.004	0.016	0.073	0.788
Size	-0.012	0.006	4.340	0.037
Textile, Fur, Leather	0.058	0.038	2.391	0.122
Wood & Paper	0.060	0.038	2.478	0.116
Chemicals and Pharmaceuticals	0.016	0.028	0.313	0.576
Metals and Manufacturing	-0.000	0.030	0.000	0.989
Machines	0.011	0.031	0.136	0.713
Electrical Equipment	0.014	0.030	0.207	0.649
Transport	0.068	0.036	3.693	0.055
Furniture	0.046	0.048	0.904	0.342
R&D Intensity	0.208	0.005	2.678	0.085
# Exploitation oriented collaborations	0.009	0.005	2.679	0.102
# Exploration oriented collaborations	0.017	0.006	7.18	0.007
Number of Obs.: 221				
Censored observations: 43				
Noncensored observations: 178				
LR chi^2: 32.61				
Prob > chi^2: <0.005				
Pseudo R^2: 0.129				

Organizing for academic technology transfer …

Organizational paradigms



TTO IMPACT & VISIBILITY
3 STAGES OR GENERATIONS



Stage 1: Isolated islands of activity

- Technology transfer “emerges” and is “tolerated” as an activity within academia
- No “best” practices, but lots of experimenting & learning
- Situated at the periphery of the academic activity spectrum
- Activities not taken into account when assessing academic performance
- Focus on legal issues, no integrated business model, fragmented vision on the TTO business, limited organizational capabilities and structure

Stage 2: University-wide activity

- Technology transfer becomes a third mission, alongside education & research, though not mutually integrated with those activities
- Appropriate “best practices” emerge, capabilities develop and grow
- Creation of a professional organization, not any longer at the periphery, but fully embedded within the academic activity spectrum
- Activities are taken into account when assessing academic performance
- Full-scope business model, integrating legal – IP – business development – regional development dimensions, into the TTO

Stage 3: Inclusive activity

- Full fledged professional organization, embedded within the university, possessing the necessary degrees of freedom to achieve its mission
- Mission is not any longer alongside education & research, but it is more holistic, active cross-fertilization amongst the 3 activities is promoted, pursued and sought after
- Advent of inclusive & entrepreneurial innovation platforms within the university, by nature cross-disciplinary, via the TTO
- From business development to business genesis & creation
- Direct & interactive impact on entrepreneurial & innovation dimensions within education & research

Thank you!

Questions?