



“Sector specificities and the potential for GIN”

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KEY research question

- What GIN patterns are forming in the selected sectors (ICT, Agro, Auto)?





Dimensions of global knowledge flow...

- **Search, sensing**

- Gathering of information and ideas (scanning of external environments, personal networks of employees, conferences, trade-fairs, “listening posts”, publications)

- **Sourcing**

- Contractual R&D
- Patents, licenses
- Knowledge embodied in components, machinery (esp agro and auto)
- Mergers & acquisitions

- **Collaboration**

- Mutual exchanges of knowledge for the purpose of developing new knowledge
- Deepest inter-organisational interaction



Starting point...

- Literature suggest differences in GIN patterns between sectors
 - **Centrifugal forces;** i.e. access to markets, low-cost production sites, competencies, collaboration partners, complexity of industrial knowledge
 - **Centripetal forces;** i.e. competences embedded in own organization and surrounding innovation system at home, resources





Sector specificities and GIN

GIN

- Internal knowledge base codified - 'non-sticky'
 - Knowledge travels easily



or.. Not GIN

- Internal knowledge base tacit/experienced based - 'sticky'
 - Knowledge does not travel easily





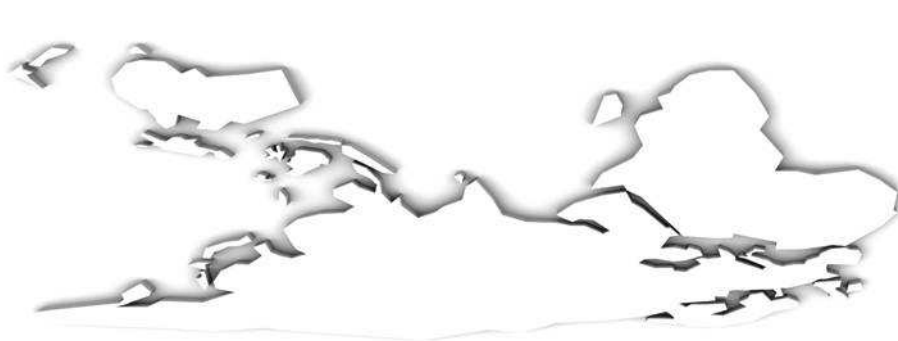
Sector specificities and GIN cont.

GIN

- Possible to protect your knowledge
- Ability to identify technological and market opportunities

or.. **Not GIN**

- Hard to protect your knowledge
- Not have the ability to identify technological and market opportunities





Sector specificities

Knowledge Base

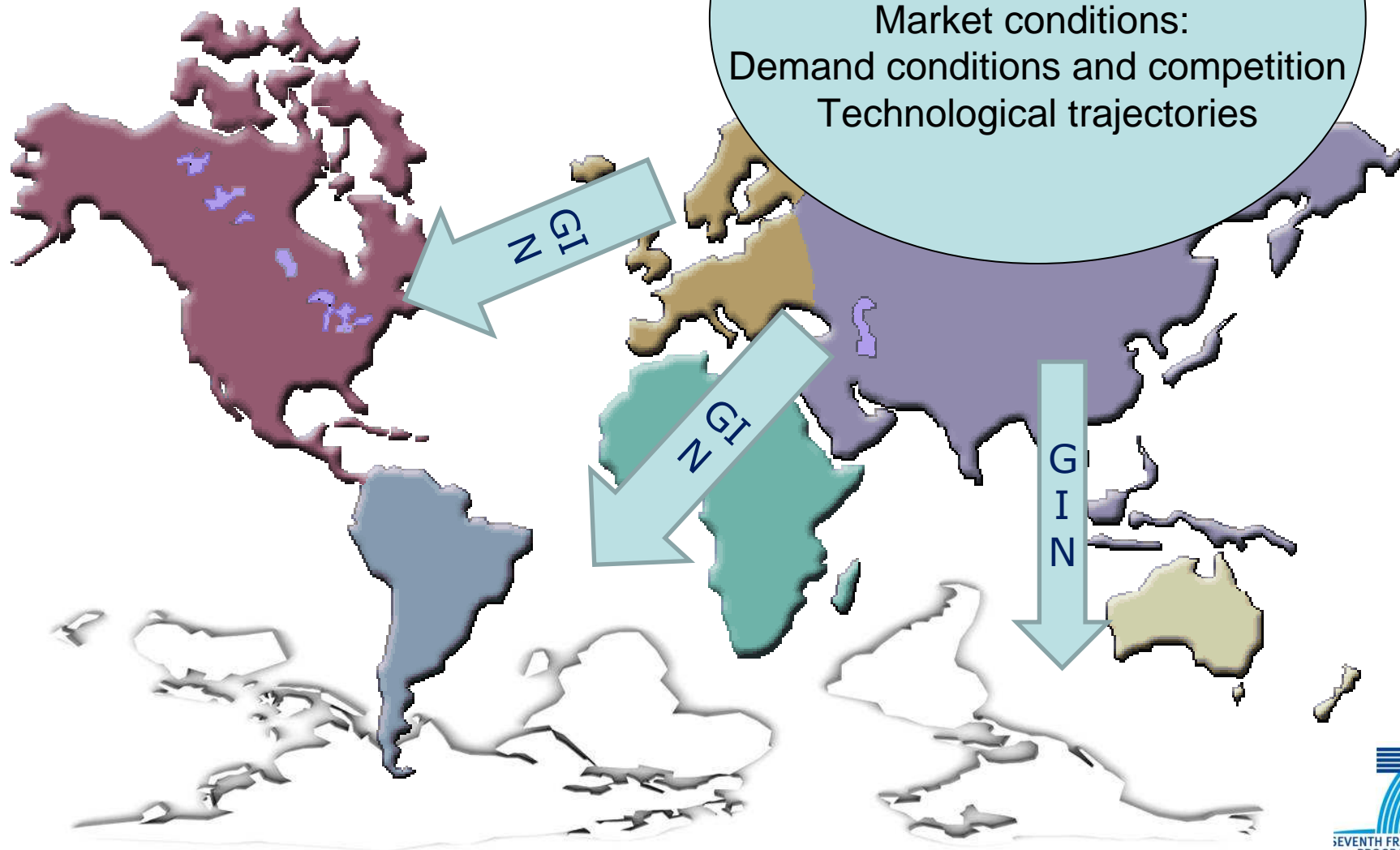
Cumulativeness of knowledge

Appropriability of knowledge

Market conditions:

Demand conditions and competition

Technological trajectories





The data

- **ICT report based on input from 5:** **NORTH:** Estonia (IBS, survey and case), Sweden (Lund, survey and case), Norway (Nifu step, survey and case) **SOUTH:** China (Gucas, survey and case), India (CDS, survey)
- **AGRO report based on input from 2:** **North:** Denmark (CBS, survey and case), **South:** South Africa (UP, survey)
- **AUTO report based on input from 4:** **North:** Italy (LDA, survey and case), Sweden (Lund, survey and cases) and Germany, **South:** Brazil (FUNDEP, survey and case)





The survey

COUNTRIES	ICT	AUTO	AGRO	TOTAL
Brazil		69 (25.9%)		
China	243 (2.7%)			
India	324 (25.2%)			
South Africa			84 (16.9%)	
TOTAL emerging markets	567	69	84	720
Denmark			49 (23.3%)	
Estonia	17 (14%)			
Germany		53 (4.7%)		
Norway	181 (11.9%)			
Sweden	171 (10.3%)	24 (14.3%)		
TOTAL developed countries	369	77	49	495
Total	936	146	133	1215






Sectoral characteristics

Sectors	Size
<p>Auto</p> 	<p>Few large independent automotive producers, a number of large international suppliers and a substantial number of small and medium sized (SMEs) component suppliers (up to 249 employees).</p>
<p>ICT</p> 	<p>Small, stand-alone firms (5-49)</p>
<p>Agro</p> 	<p>Large scale technologically advanced producers, and smaller specialised niche firms</p>



Technological drivers and characteristics

Sectors	Technological drivers and characteristics
Auto 	<p>Production-intensive (volume producers), complex product systems, a cross-sectoral industry</p> <p>Electronics, software development and mechatronics and new materials are key technologies – science based. Cases also show more R&D activity and networks in early phases of innovation</p>
ICT 	<p>Science-driven; Shows high shares of R&D activity</p> <p>Hardware production codified, Software production more craft-like prone to trial and error focused on development of new services and application</p>
Agro 	<p>Supplier-driven and resource based with low R&D; suppliers lead to important technical advances</p> <p>Also science-driven change inside agro-processing-related value chains (biotech)</p>



Innovative activity differs by sector (survey)

	Organizational Type	R&D	Innovation (new to world) %			
			Product	Service	Market	Org
A G R O	Standalone company	25,7 %	12,2 %	5,3 %	48,3 %	35,5 %
	MNC Subsidiary	52,4 %	23,8 %	6,3 %	40,0 %	18,8 %
	MNC HQ	-	-	-	-	-
I C T	Standalone company	48,1 %	15,4 %	10,9 %	57,3 %	39,9 %
	MNC Subsidiary	65,8 %	16,3 %	13,8 %	41,4 %	34,3 %
	MNC HQ	81,1 %	20,7 %	8,8 %	44,1 %	31,9 %
A U T O	Standalone company	47,9 %	13,7 %	7,0 %	50,0 %	31,6 %
	MNC Subsidiary	62,5 %	28,1 %	8,3 %	46,2 %	32,0 %
	MNC HQ	57,1 %	28,6 %	0,0 %	50,0 %	33,3 %



Offshoring of production and/or innovation

Sectors	Relatively few responses
Auto 	Firms offshore production, seldom offshore only innovation. Offshoring of innovation seem to follow production (From GPN to GIN?)
ICT 	Less propensity to offshore production or innovation in North than South, GPN and GIN do not always overlap – a jump to GIN (do not follow traditional trajectories)
Agro 	Less propensity to offshore production or innovation



Global innovation collaboration

Sectors	Global innovation collaboration
Auto 	<p>Low shares of global innovation collaboration</p> <p>With whom: Along the value chain (vertical relationships)</p> <p>Where: Often located in 'region' (Europe/Brazil)</p> <p>Cases show: regional innovation collaboration with knowledge infrastructure in pre-competitive stages</p>
ICT 	<p>Low shares of global collaboration</p> <p>Successfull cases show;</p> <p>With whom: Along the value chain and with knowledge infrastructure</p> <p>Where: Broad geographical networks</p>
Agro 	<p>Low shares of global collaboration</p> <p>With whom: Along the value chain</p> <p>Where: Regionally/nationally</p> <p>Cases show; broad linkages functionally and geographically</p>



Preliminary finding is that...

- Overall: modest GIN in all sectors
- There are some sector variances – but; we see a combination of firms that are international in terms of markets and in terms of technology sourcing and linkages.... In all sectors across North and South
- A one-size-fits-all solution is not advisable.





- Subsector technologies define the types of actor that engage internationally/globally
- ...and they have different barriers with regard to GIN entrance
 - In Agro and Auto, where the physical nature of the products impose different types of limitations on selling abroad, these limitations need to be focused on and addressed (i.e. improving logistic systems for carparts, improving longevity and transport efficiency for fresh produce from SA, etc)
 - *The characteristics of enzymes or plant-based medicines are more international in scope than fresh flowers...*





- GIN actors seems to grow out of dense national links (agro food in Denmark, ICT in Norway) or from comparative advantages arising from local resources (e.g. the agrofood niche markets targeted by SA agro).
 - Encourage these niches and improve their embeddedness in the local clusters





Thanks for your attention/questions

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