

*Geography of Innovation: 3<sup>rd</sup> International Conference  
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## **Spatial scale of cooperation for innovation : the role of ICT and firm location**

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# Research motivations

Influence of access to external resources on firms' ability to innovate (Shearmur, 2011)

Adopting an approach based on knowledge accessibility rather than an approach based on knowledge externalities (Mc Cann 2007, Shearmur 2011)

Plurality of sources of knowledge for innovation which can be situated at different geographical scales (Freel 2003, Lorentzen 2007, Doran et al. 2012)

Topic of the research:

**Investigating SMEs' mobilization of cooperation and sources of ideas as resources to innovate**

# Framework: cooperation and sources of ideas

External sources of ideas or cooperation for innovation: firms do not have internally all the resources needed and/or share costs and risks (Chesbrough 2003; Tether 2002).

Positive effect of a wide range of cooperation on firm's innovation capacity (Laursen *et al.* 2006, Mongo 2013):

- Especially in technology-intensive activity (Klevorick *et al.* 1995)
- With different ways according to the type of innovation (product or process) (Freel and Harrison 2006)

The positive effect of combined knowledge sourcing and cooperation on the local, regional, national as well as global scales (Lorentzen 2007, Doran *et al.* 2012)

***RQ 1 : What are SMEs' forms of cooperation and sources of ideas?***

# Framework: location and ICTs

Urban areas are a high place of interaction and potential cooperation, hence innovation (Autant-Bernard *et al.* 2011, Mc Cann 2007).

But being located in an urban area is not a sufficient condition...

- Geographical proximity not always brings interaction and/or available resources on a territory are not always used (Aguilera *et al.* 2012, Galliano *et al.* 2013)

... nor a necessary condition

- Temporary forms of spatial proximity are an alternative (Bathelt and Schuldt 2008)
- Innovation networks go further than local area (Tanguy *et al.* 2014)

ICTs allow ubiquity for distant cooperation (Torre 2014)

Remote communication allowed by ICTs to transfer tacit knowledge (Aguiléra & Lethiais 2011)

***RQ2 : How location and ICTs affect SMEs' forms of cooperation and sources of ideas ?***

# Data collection



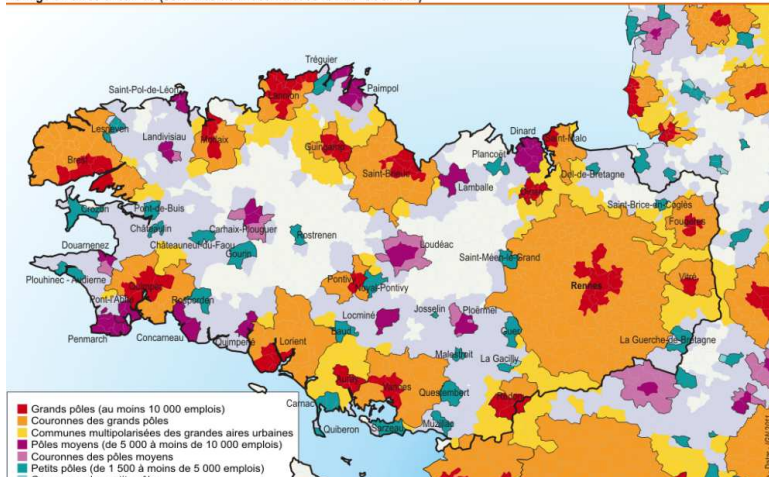
Two sources of data :

- A regional survey in 2015 (Marsouin observatory)
  - 1469 firms (10 to 250 employees) in the Brittany region
  - Information on:
    - Innovation
    - Cooperation and sources of ideas for innovation
    - ICT use
- Completed by data on firms location (French National Institute of Statistics INSEE)

# Data collection- The measures of location

## « Zoning in urban areas »

Zonage en aires urbaines (selon les données du recensement de 2008)



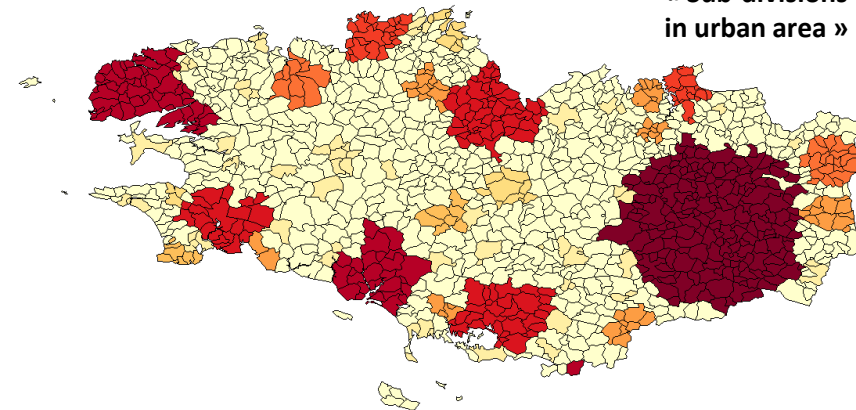
Les zones d'emploi de Bretagne en 2010

## « Employment area »



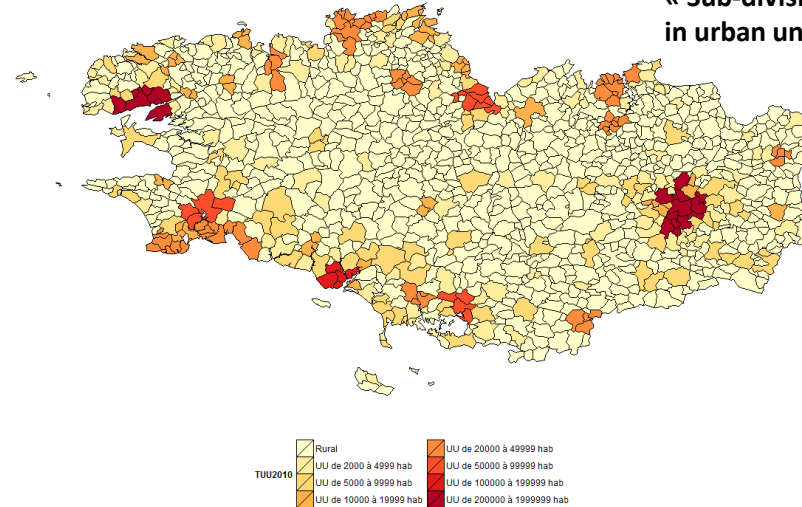
Zonage par tranche d'aire urbaine des communes bretonnes

## « Sub-divisions in urban area »



Zonage par taille d'unité urbaine des communes bretonnes

## « Sub-divisions in urban unity »



Geographic data from the French National Institute of Statistics (INSEE)

# Description of the data : innovation and cooperation

SMEs innovation and cooperation (N = 1469)

SMEs with innovation			SMEs with no innovation
711 (48%)			758 (52%)
New Product/services only	New processes only	New products/services & new processes	
259 (36%)	90 (13%)	362 (51%)	
Cooperation for innovation			
Yes	No		
269 (38%)	442 (62%)		

## Data processing : two steps

- **Descriptive analysis**
  - **Characterization of the spatial scale of ideas and cooperation for innovation**
- **Typological analysis**
  - **MCA + hierarchical classification**
    - **active variables:**

type of innovation; spatial scale of sources of ideas; type of cooperation partners and number of type; spatial scale of cooperation
    - **illustrative variables:**
      - **ICTs** : ICTs to support innovation, diversity of uses, ICTs skills
      - **Location** : geographical data (zoning in urban areas, size of urban area, size of urban unity, employment areas)
      - **General characteristics** : size, sector, single/multi units, sales, ...



# Descriptive analysis: the scale resources mobilization

## Three measures of the spatial scale of mobilization of resources (sources of ideas and cooperation) for innovation

Main spatial scale of **sources of ideas** for innovative SMEs

Local (<50kms)	Regional	National	International	Total
255 (35,9%)	130 (18,3%)	237 (33,3%)	89 (12,5%)	711 (100%)

Spatial scale of **cooperation**:  
1<sup>st</sup> distribution (7 modalities)

only local	35 (13,1%)
only regional	40 (15,0%)
only national	52 (19,5%)
only international	25 (9,4%)
multi-location close (local & regional)	25 (9,4%)
multi-location distant (national & internat.)	13 (4,9%)
multi-location (close & distant)	77 (28,8%)
Total	267 (100%)

Spatial scale of **cooperation** :  
2<sup>nd</sup> distribution (4 modalities)

only local	35 (13,1%)
reaching regional	65 (24,3%)
reaching national	97 (36,3%)
reaching international	70 (26,2%)
Total	267 (100%)

## Descriptive analysis: cooperation & sources of ideas

- There is a **link between the scale of cooperation and the scale of the sources of ideas**, but not a strict correspondence :
  - Among cooperative firms that declare mainly local sources of ideas :

30% cooperate with local partners only, 32% have at least a partner at the regional scale, 21% at the national scale and 17% at the international scale
  - Among cooperative firms that declare mainly international sources of ideas :

57% cooperate at the international scale, 40% cooperate at the national scale and 3% cooperate at the regional scale

## Descriptive analysis: spatial scale & location

- **The spatial scale of cooperation depends on the location of the firm:**
    - Firms located in large urban center have a higher probability to cooperate on a large spatial scale than firms located in rural area, but :
      - the relation is not linear : the urban center that cooperate at the farthest scale (Brest) is not the largest urban center of the region (Rennes)
      - firms located in medium urban centers are over-represented among those which cooperate at the international scale (only)
- *Location in large urban center does not imply the mobilization of resources for innovation in the same area but facilitates access to distant resources***

## Descriptive analysis: spatial scale & ICTs

- **The spatial scale of cooperation depends on the ICTs appropriation:**
  - ICTs variety and internal computer skills are associated to larger scale of cooperation and ideas
- ***ICTs as an alternative to geographical proximity in cooperation for innovation***

# Results : Typological analysis

Selecting a partition into **5 classes** on 269 innovating and cooperating SMEs

## **(A) International multi-cooperating SMEs (N= 30)**

5+ categories of cooperation partners  
including research partners (public or private)  
Spatial scale of cooperation: reaching international  
for the majority

Urban area 200 000-500 000 (36% / 13%)  
Urban unity 100 000-200 000 (23% / 9%)  
Brest Employment area (33% / 17%)  
10 to 50% ICT trained employees (50% / 20%)  
At least an IT engineer (33% / 11%)  
Growing main market (60%/33%)  
Nearly one in two SMEs in the industrial sector

## **(C) Globalized and digitalized cooperating SMEs (N= 42)**

Sources of ideas mainly international (95%)  
Cooperation at international scale (65%)  
Public research cooperation (33%)

### No location variables

ICT department (40% / 21%)  
Use of ICTs (videoconference, ERP, ...)  
Variety of ICT (12% / 4%)  
Industrial sector (45% / 27%)  
Belonging to an international group (38% / 17%)  
No local customers (95%/ 82%)  
No close suppliers (93% / 79%)

## **(B) International multi-cooperating SMEs excluding research (N= 82)**

3 or 4 categories of cooperation  
partners

No research partner  
Sources of ideas: national for the  
majority

### No location variables

Multi-scale cooperation including  
international (49% / 34%)  
More than 50% ICT trained  
employees (30% / 20%)  
Close customers (42% / 31%)

## Results : Typological analysis

Selecting a partition into **5 classes** on 269 innovating and cooperating SMEs

### **(D) Moderate intra-regional cooperating SMEs (N= 54)**

SMEs with 2 categories of cooperation partners  
Spatial scale of sources of ideas: local (42%) and regional (31%)  
Spatial scale of cooperation : regional (40%)

Urban areas 25 000-35 000 (14% / 6%)  
No computer skills (85% / 67%)  
Sector = Finance and Insurance (9% / 3%)

### **(E) Mono-cooperating SMEs (N= 61)**

Only one category of partner (95%)  
Low international scale of sources of ideas (6%)  
or international scale of cooperation (3%)

Rural areas (35% / 22%)  
Construction sector (25% / 14%)  
Declining main market ( 33% / 23%)  
Low ICT use

# Conclusion

Main results :

- Large **diversity of SMEs innovation practices**, in terms of diversity of cooperation partners and scale of mobilization...
- ... that are affected by the location of the firm and its ICT use
- ...but: location is not the major determinant
- Innovation does not necessarily require cooperation
- No incidence of the type of innovation (product/process)

***Work in progress : to be completed with a qualitative analysis in order to better apprehend innovation and to better understand the way resources are mobilized***

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# Description of the data : general characteristics

## Characteristics of SMEs (N = 1469)

Multi-location							
Single-unit company				Multi-unit company			
1095 (74.5%)				374 (25.4%)			
Activity sector							
Trade	Logistics	Catering Accommodation	Finance insurance	Industry	Construction	information communication	Other services
349 (23,8%)	104 (7,1%)	79 (5,4%)	31 (2,1 %)	338 (23,0%)	340 (23,1%)	122 (8,3%)	106 (7,2%)
Employment size classes							
10 to 19 employees		20 to 49 employees			50 to 249 employees		
828 (56,4%)		467 (31,8%)			174 (11,8%)		
Sales Revenues in 2014							
Less than 1 million		Between 1 and 2.5 million	Between 2.5 and 5 million		5 million and more	not specified	
242 (16,5%)		346 (23,6%)	226 (15,4%)		652 (44,4%)	3 (0,2%)	

# Description of the data : location

Fig. Sub-divisions in urban area (N = 1469)

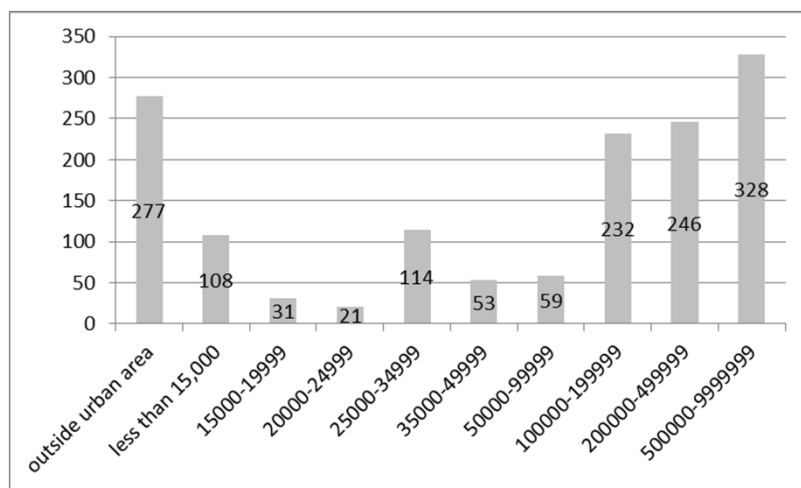
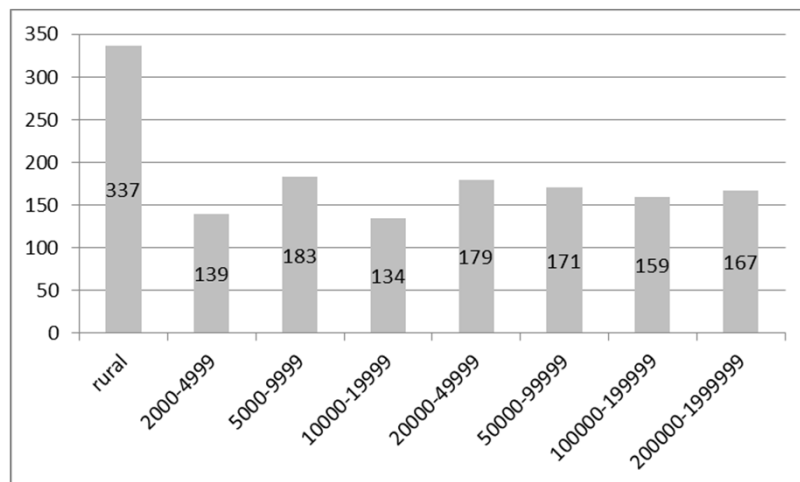


Fig. Sub-divisions in urban unity (N = 1469)



Tab. «employment area » (N = 1469)

Dinan	30	(2,0%)
Guingamp	22	(1,5%)
Lannion	35	(2,4%)
Loudéac	19	(1,3%)
Saint-Brieuc	120	(8,2%)
Brest	227	(15,5%)
Carhaix	12	(0,8%)
Morlaix	41	(2,8%)
Quimper	166	(11,3%)
Fougères	30	(2,0%)
Redon	20	(1,4%)
Rennes	377	(25,7%)
Saint-Malo	42	(2,9%)
Vitré	37	(2,5%)
Lorient	111	7,6%
Ploermel	16	1,1%
Pontivy	24	1,6%
Vannes	140	9,5%

Tab. «zoning in urban area » (N= 1469)

Large urban center	662	(45,1%)
periphery of major urban centers	350	(23,8%)
multi-polarized commune in large urban center	89	(6,1%)
medium center	123	(8,4%)
small center	57	(3,9%)
other commune multi-polarized	133	(9,1%)
isolated communes outside influence of centers	55	(3,7%)

Tab. «zoning in urban area » (N=1469)  
(with 3 classes)

Large urban center	662	(45,1%)
Periurban	439	(29,9%)
Rural	368	(25,1%)

# Descriptive analysis: characterizing the spatial scale of cooperation (2<sup>nd</sup> distribution )

## Local cooperation

N=35

Low use of ICT  
No formation to ICT

Rural areas

## Regional cooperation

N=65

No internal computer skills  
No use of advanced ICT tools (ERP, videoconference, web site, ...)

Location is not discriminant

## National cooperation

N=97

Internal computer skills

Large urban center, ZE Rennes  
Urban unity up to 200.000  
Urban area up to 500.000  
Rural area under-represented

## International cooperation

N=70

Use of numerous ICT tools, even advanced tools (ERP, videoconference, web site, ...)

Urban area from 200.000 to 400.000 hab.  
Urban unity from 100.000 to 200.000 habitants  
ZE of Brest