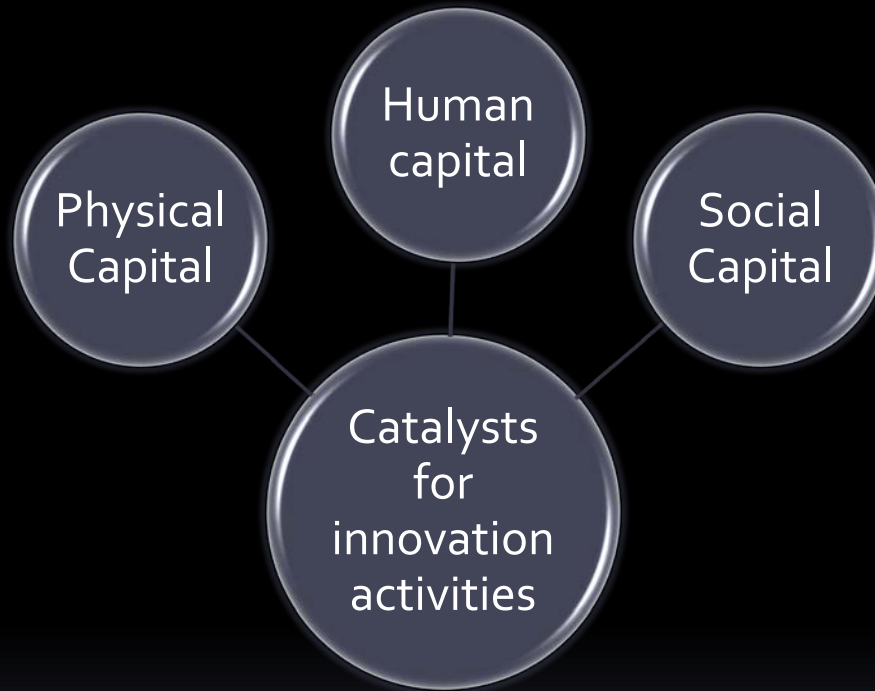




# Quantity vs quality of scientific publications: an analysis for main cities IN Spain (2001–2010)

Paper prepared for the 51st ERSAs Congress in Barcelona, 30th August - 3rd September 2011

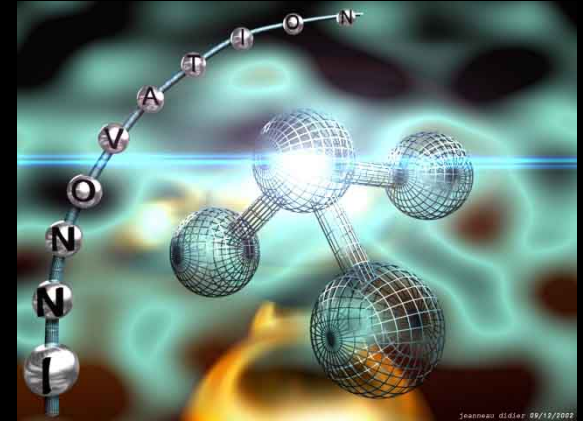
According to many investigations.....



In general, all studies agree in indicating that such activities tend to concentrate in a few metropolitan areas, with which it has been assumed that they have a high dependence on externalities and knowledge spillovers.

# The objectives of this research .....

The impact of social capital in the location of innovation activities, both at the metropolitan area of Barcelona and at the level of regions of the Spanish state.



The number of scientific publications on indexed journals is a measure, often used to measure the degree of strength of the scientific sector .

. **Static analysis**

. **Dynamic analysis**

The state of production and productivity of 10 cities with the highest scientific production in Spain for the period 2001-2010

## The research data.....

1. In order to detect the cities that do have the highest scientific production a preliminary study of 239 cities in Spain has been carried out
2. Such an analysis was based consulting the 3 indexes of the ISI Web of Science (SCI-E; SSCI and A&HCI) for the year 2007
3. Having detected the top 10 cities, the data used in this study was obtained from Elsevier Scopus, since it provides on information not only of quantity but also quality.
4. Data coming from Elseiver Scopus is the number of papers and citations for the period 2001-2010 for all 4 knowledge areas: life science, health science, physical science, social and humanities
5. Studied cities are, in order of number of indexed papers: Madrid, Barcelona, Valencia, Granada, Seville, Zaragoza, Santiago, Murcia, Alicante and Oviedo. These ten cities accounts for 63% of Spanish indexed scientific production

# Methodology for measurement of quality

## Immediate impact factor (IIF)

$$IIF(x) = \frac{C(x)}{P(x)}$$

Where:

IF = immediate impact factor (x) = Year, which measures the impact, C = Total citations, P = Total Articles published in a the x year

## Five years impact factor (5IF)

$$5IF(x) = \frac{C(x-1-x-5)}{P(x-1)(x-5)}$$

Where:

HIF = 5 year impact factor, (x) = Year, which measures the impact, C = Total citations, P = Total Articles published in a specific period 5 years period

# The research findings.....

## Production and productivity in 2010 through the IIF

Publications		Citations		Impact factor	
Madrid	33.340	Barcelona	82.773	Barcelona	2,927
Barcelona	28.276	Madrid	76.719	Santiago	2,702
Valencia	10.391	Valencia	26.288	Oviedo	2,558
Granada	5.466	Granada	13.820	Valencia	2,530
Zaragoza	4.586	Zaragoza	10.111	Granada	2,528
Sevilla	4.429	Sevilla	9.646	Madrid	2,301
Murcia	3.345	Santiago	7.974	Alicante	2,256
Alicante	3.123	Murcia	7.118	Zaragoza	2,205
Santiago	2.951	Alicante	7.047	Sevilla	2,178
Oviedo	2.574	Oviedo	6.584	Murcia	2,128

Source: web sciverse Scopus

# The research findings.....

## Production and productivity in 2010 through the 5IF

### Quantity :

Madrid and Barcelona at the top in terms of quantity, with more than 60,000 publications (total 5 years).

### Quality:

Madrid is located in seventh place, below cities like Santiago and Oviedo with a lower scientific production (less than 7,000 publications).

Barcelona is located in the first position with a factor of 2.8.

Cities	Publications	Citations	5years impact factor
Barcelona	62.051	175.493	2,828
Santiago	6.699	17.418	2,600
Oviedo	5.921	14.934	2,522
Granada	12.601	30.653	2,433
Valencia	23.036	55.923	2,428
Alicante	7.152	17.108	2,392
Madrid	75.449	178.967	2,372
Zaragoza	10.060	23.391	2,325
Murcia	7.526	17.148	2,279
Sevilla	10.322	21.457	2,079

Source: web sciverse Scopus

**Stable: Barcelona, Santiago and Oviedo**

**Up: Granada; Alicante and Murcia**

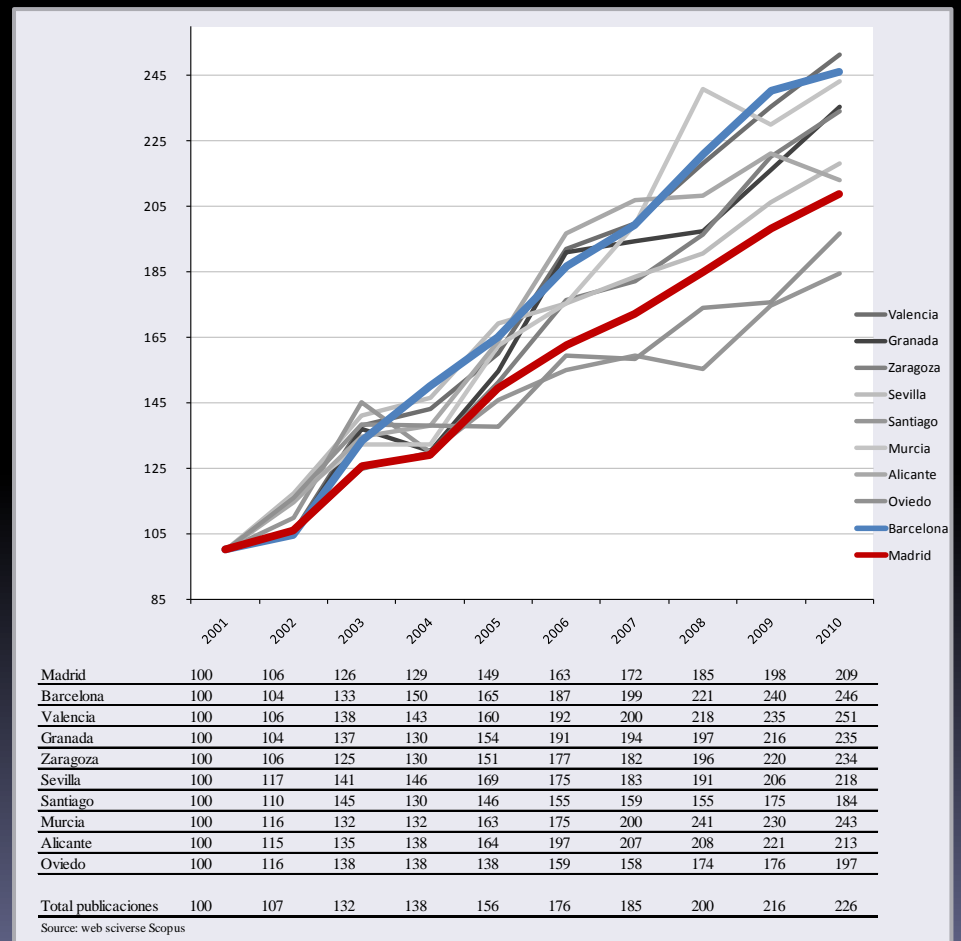
**Down: Valencia, Madrid, Sevilla**

# The research findings.....

## The global evolution of scientific publications (2001-2010)

**Doubled their scientific production :**  
All cities studied with the exception of Santiago, and Oviedo .

**Most significant increases :**  
The cities located on the Mediterranean coast Barcelona, Valencia and Murcia with values greater than 140%.



# The research findings.....

## Evolution of quality, through the IIF.

### Quality :

Santiago, Barcelona, and Seville increased their IIF, the rest is quite stable and in Madrid and Valencia decreases

Distance between the highest factor and the lowest factor is:

2006 Barcelona – Granada = 1,284

2010 Barcelona – Granada = 1,638

### Barcelona & Madrid:

2006

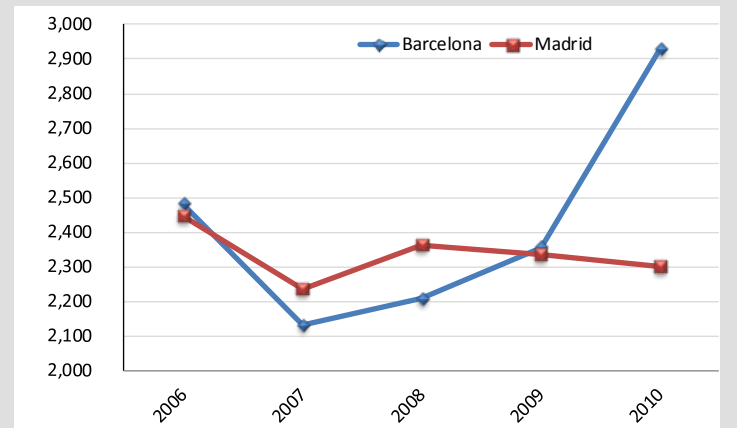
The difference between two cities was small with only 0,037 points.

2010

The situation is very different, Barcelona is located above Madrid by 0,626 points.

Cities	Immediate impact factor					
	2006	2007	2008	2009	2010	2010-2006
Barcelona	2,483	2,131	2,208	2,355	2,927	0,444
Santiago	2,166	2,436	2,332	2,494	2,702	0,536
Oviedo	2,580	2,228	2,307	2,555	2,558	0,022
Valencia	2,765	2,583	2,626	2,484	2,530	0,236
Granada	2,227	2,197	2,229	2,458	2,528	0,301
Madrid	2,446	2,236	2,361	2,335	2,301	0,145
Alicante	2,135	2,131	2,208	2,355	2,256	0,121
Zaragoza	2,058	2,057	2,277	2,421	2,205	0,146
Sevilla	1,749	1,773	1,846	2,064	2,178	0,429
Murcia	1,771	1,947	2,041	2,223	2,128	0,357

Sources: Web sciverse Scopus



# The research findings.....

## Evolution of productivity, through the 5IF.

### Quality :

2006-2010: an increase in all cities studied (few in Valencia) except for Madrid that decreases

The highest growth: Santiago, Zaragoza and Murcia

Distance between the highest factor and the lowest factor is:

2006 Barcelona – Sevilla = 0,874

2010 Barcelona – Sevilla = 0,749

### Barcelona & Madrid:

2006

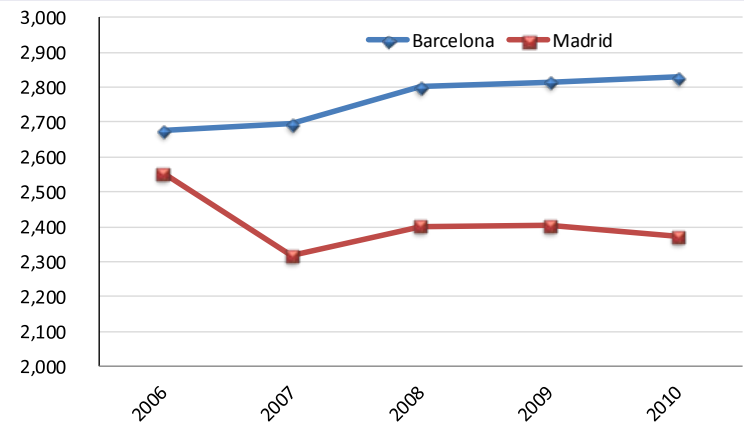
The difference between two cities was small with only 0,121points.

2010

The situation is very different, Barcelona is located above Madrid by 0,456 points.

Cities	2006	2007	2008	2009	2010	2010-2006
Barcelona	2,674	2,694	2,801	2,816	2,828	0,154
Santiago	2,146	2,326	2,322	2,550	2,600	0,454
Oviedo	2,333	2,221	2,434	2,546	2,522	0,189
Granada	2,291	2,249	2,300	2,466	2,433	0,142
Valencia	2,391	2,369	2,386	2,437	2,428	0,037
Alicante	2,235	2,238	2,337	2,362	2,394	0,159
Madrid	2,553	2,316	2,401	2,405	2,372	-0,181
Zaragoza	1,972	2,098	2,245	2,426	2,325	0,353
Murcia	1,933	2,089	2,146	2,314	2,279	0,346
Sevilla	1,800	1,898	1,944	2,081	2,079	0,278

Sources: Web sciverse Scopus



## Final remarks .....

1. There are not clear relations between the number of indexed papers and the registered cities, a clear example is the case of Madrid and Barcelona, or the fact that small cities have important impact factors
2. The simple comparison of impact factors among cities is tricky since the citation process immediacy is biased by the scientific area . More analysis need to be done in order to control de different structure of knowledge fields in the cities.
3. The cities along the Mediterranean coast have significantly increase their indexed papers, nevertheless of these cities only in Barcelona the quality indexes have improved significantly
4. Putting the attention in Madrid and Barcelona, this later seems to expand quickly both the quantity and quality of indexed papers

THANK YOU

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