



Comparative analysis of knowledge production in analogous large European firms: how much do individual strategies matter?

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Introduction

- Research and industrial policy, be it at European or at national level, is mostly designed and assessed at sectorial level, using sectorial indicators as key monitoring tools.
- The examples presented in this (preliminary work) plead for caution when one intends to analyse globally industrial sectors that are populated by heavy weight actors, who could potentially develop diverging strategies

2 x 2 Comparatives case studies

- This research analyses, with a comparative approach, the production of knowledge in two pairs of analogous large European companies: two German companies from the Chemicals sector (Bayer and BASF) and two Swiss companies from the Pharmaceuticals sector (Novartis and Roche).

2x2 Comparatives case studies

	BASF	BAYER	NOVARTIS	ROCHE
Home Country	Germany	Germany	Switzerland	Switzerland
Industrial sector	Chemicals	Chemicals	Pharma	Pharma
Annual Sales 2007 (Mn \$)	32 631	57 951	27 222	27 871
Employees 2007	96 241	105 622	98 200	78 604
R&D investment 2007 (Mn \$)	1 399	2 645	4 386	5 010

Data

- **Data retrieval**
 - **Transnational priority patent applications** (PATSTAT) and **scientific publications** (WoS) produced by the 4 firms, using a **consolidated perimeter of the industrial groups** (ORBIS))
- **Data treatment**
 - Signing institutions in publications and applicants in patents: **Harmonisation of names and classification according to their institutional affiliations**
 - **Firm entities are singled out** in the signing institutions of publications and applicants of patents
- **Indicators**
 - **Collaborations**: copublications, coapplications, coinventions - share of collaborations considering the type of collaboration (internal or external to the firm), type and location of external entities
 - **Geography of knowledge production**: Countries of scientific and technological activities

Technological research 1/2

	Chemistry_DE	BASF	Bayer
Nb of patents	11124	6985	3954
DE	74,7%	75,4%	70,5%
US	10,8%	10,4%	17,5%
CH	2,1%	4,0%	0,4%

	Pharma_CH	Novartis	Roche
Nb of patents	4863	1412	3168
US	33,2%	43,8%	31,3%
DE	24,5%	13,8%	30,9%
CH	22,0%	17,6%	20,7%

Technological research 2/2

Homogeneous behaviours regarding inventive activities

- For the 4 firms, inventive activities are predominantly carried out within the perimeter of each firm – co-application is an exception.
- Each pair of firms tap in the same geographical zones for their inventions, with slight differences: Novartis relies more on the US; Roche relies more on Germany

Scientific research - Chemicals 1/2

Full counting	Chimie_DE	BASF	Bayer
%_US public research in top 20 partners	1,14%	3,72%	14,29%
%_US public research in top 50 partners	2,12%	5,26%	15,83%

Fractional counting	Chimie_DE	BASF	Bayer
%_US public research in top 20 partners	0,00%	4,89%	10,28%
%_US public research in top 50 partners	1,14%	8,37%	11,36%

Scientific research - Chemicals 2/2

Bayer's top collaborations involve more heavily US public research institutions than BASF's ones.

This share of research collaborations involving American partners from the public research sector is significantly higher for these two actors than for the whole sector

Scientific research - Pharma 1/2

Full counting	Pharma_CH	Novartis	Roche
%_US public research in top 10 partners	9,29%	75,1%	72,0%
%_US public research in top 20 partners	10,41%	61,5%	71,2%
%_US public research in top 50 partners	13,90%	53,0%	60,6%
%_US public all	18,65%	35,0%	35,4%

Fractional counting	Pharma_CH	Novartis	Roche
%_US public research in top 10 partners	5,59%	71,97%	64,79%
%_US public research in top 20 partners	6,57%	58,63%	66,82%
%_US public research in top 50 partners	9,36%	51,87%	58,35%
%_US public all	14,38%	36,11%	36,00%

Scientific research - Pharma 2/2

Roche's and Novartis's top collaborations involve more heavily US public research institutions, which account for more than half of the corporations top 20 or 50 collaborations, to be compared with less than 20 % for the whole swiss pharmaceuticals sector.

Where these differences come from?

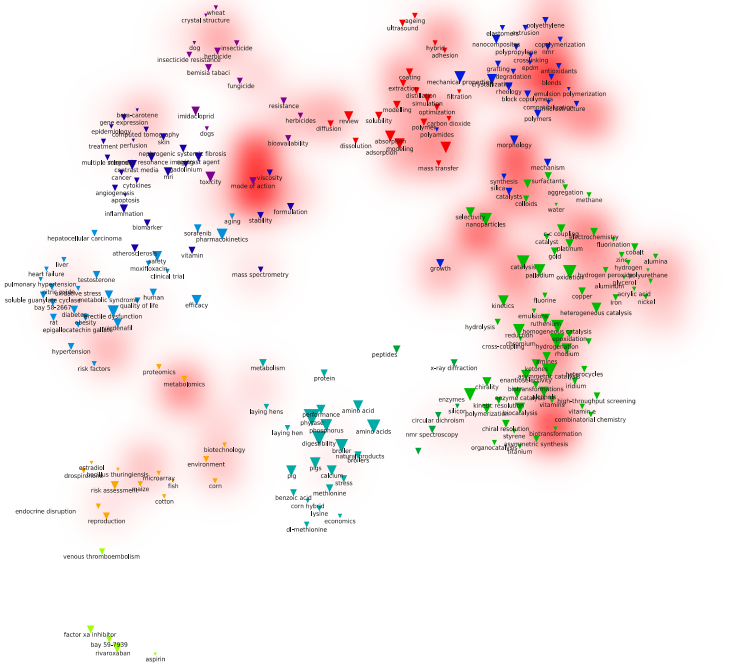
Activity profiles and history matter a lot: shared sectorial and national labels (German Chemicals, Swiss Pharma) gathers different « strategic animals » relying on different cognitive bases.

Roche controls the American biotechnology company Genentech and the Japanese biotechnology company Chugai Pharmaceuticals.

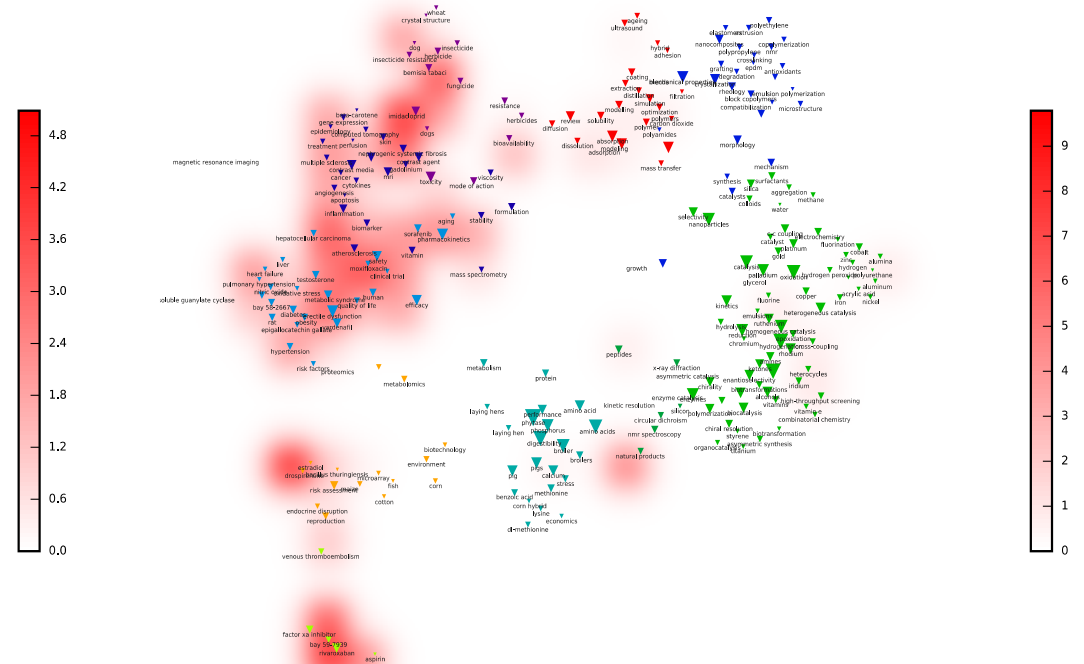
Novartis has divested its agrochemical and genetically modified crops business in 2000

Scientific profiles of BASF and Bayer

basf, 2006-2010

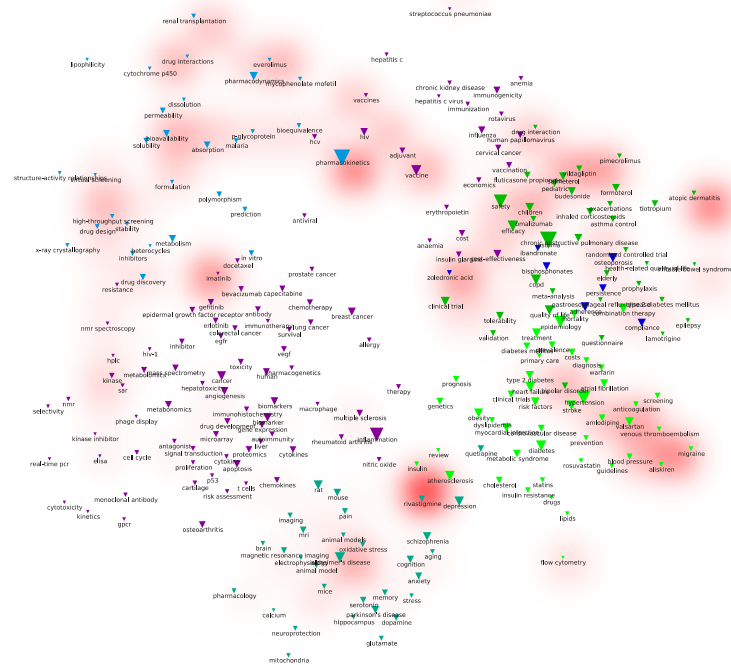


bayer, 2006-2010

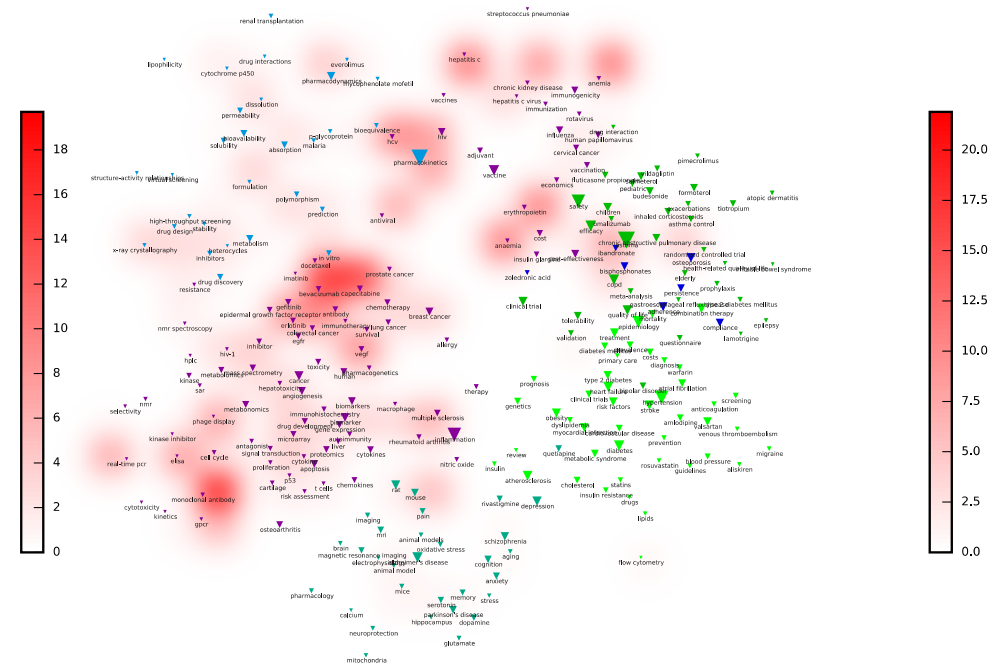


Scientific profiles of Novartis and Roche

Novartis, 2006-2010



Roche, 2006-2010



The challenge

Sectorial information appears to be not sufficient for understanding industrial dynamics, especially when large players develop diverging strategies.

The advantages of positioning indicators reflecting individual strategic behaviours are well recognised

As policies cannot be informed solely by a series « case studies », we need identifying clusters of firms sharing similar key characteristics, regarding strategies, market presence, knowledge production...