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**COINVEST:**

**Competitiveness, Innovation and Intangible  
Investment in Europe**

# **Measuring Intangible Investment French Methods, Estimations and Issues**

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# The COINVEST Project

- Properly assess productivity and growth in the EU
- Why including intangibles in GDP evaluation ?
  - Service industries tend have a larger share in economies
  - Spending in intangibles is far from negligible
  - Intangibles can be comparable to tangibles in their duration
- Implement a common evaluation framework
  - Need for reliable and comparable data
  - Assess the compatibility of international and national statistics
  - Use common evaluation methods



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# Baseline: Corrado, Haltiwanger and Sichel (2005)

- Work based on the US economy
  - Capture the effect of the “new economy” on growth
  - Explain the fall in services industries productivity
- Accounting for intangibles as GFCF rather than IC
  - Because some spending in intangibles can increase productivity for a longer period than one year
  - IC does not appear in GDP evaluation whereas GFCF does



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# Baseline: Corrado, Haltiwanger and Sichel (2005) (*cont'd*)

- CHS identify the following intangibles as GFCF:
  - Computerized information
    - Computer software
    - Computer databases
  - Innovative property
    - Scientific and non-scientific R&D
    - Mineral exploration
    - Copyright and Licence costs
    - Financial innovation
    - Architectural and engineering design
  - Economic competencies
    - Brand equity (advertising and market research)
    - Firm-specific Human capital (training)
    - Organisational structure



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# The regulatory framework (1)

International standards already ask for the inclusion of intangibles in the National Accounts

- System of National Accounts, UN (1993, 2008)
  - Research and development
  - Mineral exploration and evaluation
  - Computer software and databases
  - Entertainment, literary or artistic originals
  - Other intellectual property products



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## The regulatory framework (2)

- European System of Accounts, EU (1995)
  - R&D (satellite account)
  - Mineral exploration
  - Computer software (includes databases)
  - Entertainment, literary or artistic originals
  - Other intangible fixed assets

European national statistics should include these items in the National Account as GFCF



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# The French Case

- Recorded as GFCF:
  - Computer software
  - Copyright and licence costs
  - Mineral exploration
  - Architecture and engineering design
- Still in IC but recorded as a distinct item:
  - Scientific and non-scientific R&D
  - Computer databases
  - Advertising and market research
- Not distinct IC:
  - Training
  - Organisational structure
  - Financial innovation



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# Computer software (1)

- Purchased software evaluation:
  - NACE 72.1

Product (NAF)	Label	Distribution	% of NACE 72.1 in 1999
72.1Z00 + Z20	Research and consulting in computing set-up	IC	55
72.1Z11	Engineering in computing system	GFCF	45
72.1Z12	Hardware turnkey contract	Double-count	0
<b>72.1</b>	<b>Hardware consultancy (Total)</b>	<b>45% GFCF, 55% IC</b>	<b>100</b>





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# Computer software (2)

- Purchased software evaluation:
  - NACE 72.2

Product (NAF)	Label	Distribution	% of NACE 72.2 in 1999
72.2ZA1 +ZB1	License fee for software package	GFCF	23
72.2Z1A	Consulting in software development	IC	8.7
72.2Z1B	non-standard software programming	GFCF	29
72.2Z1C	provision of programmers within turnkey contracts	60% GFCF, 40% IC	14.2
72.2Z1D	software maintenance	IC	10.7
72.2Z1Z	Other services in software development	IC	10.4
72.2Z20	Conception and development of software support	IC	4.2
<b>72.2</b>	<b>Software consultancy and supply (Total)</b>	<b>60.6% GFCF, 39.4% IC</b>	<b>100</b>



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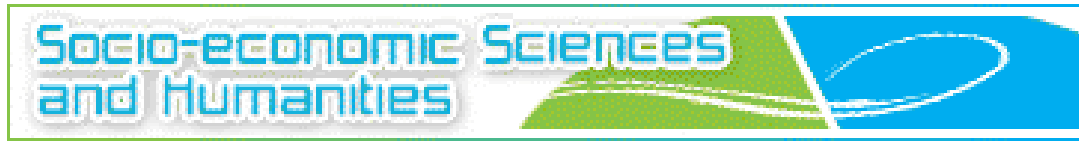
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## Computer software (3)

- Own-account Software evaluation:
  - Using an employer-employee database
  - Two occupations are retained:
    - “Engineers and software technical managers” (PCS 388a, b and c)
    - “Programmers and software technicians” (PCS 478a, b and c)

Product (NAF)	NACE 72	Other NACE
Produce own-account software	23%	85%
Other	77%	15%

- Time spent on programming software = 50%
- Non-labour costs = 85%



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## Databases

Purchased databases are not in GFCF. However, they are identified as intermediate consumption (NACE 72.4, NAF 72.4Z).

Own-account database production is already included in own-account software production. It is not clear whether we can disentangle between software and database producers.

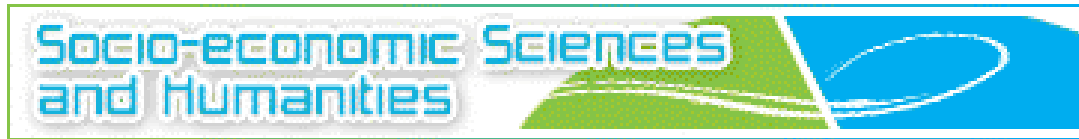


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# Copyright and licence costs

- In 2004 INSEE recorded 2,538 million euros in motion picture, radio and sound recording (NACE 92).
  - Copyrights GFCF is considered to be the total amount of production for own final use in the following NACE:
    - 9211. Motion picture and video production
    - 9212. Motion picture and video distribution
    - 9213. Motion picture projection
    - 9220. Radio and television activities
    - 9231. Artistic and literary creation and interpretation
    - 9232. Operation of art facilities
    - 9233. Fair and amusement parc activity
    - 9240. News agency activity
    - 9251. Library and archives activities
    - 9252. Museums
    - 9253. Botanical and zoological
    - 9261. Operations of sport arenas and stadiums
    - 9262. Other sporting activities
    - 9272. Other recreational activities
    - 9271. Gambling and betting activities



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# Mineral exploration, Architecture and Engineering design

- In 2004 INSEE recorded 13,431 million euros in architecture & Engineering (Excluding households)
- In 2004 INSEE recorded 18 million euros in mineral exploration, 0.001% of GDP and 0.005% of total GFCF



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# Advertising and market research

- IC in national accounts
  - Total in 2004 = 27 000 million Euros including:
    - 98.2% by private sector
    - 11.8% by public sector
  - 23.9% of private sector expenditures are inter-industry (sub-contracting)
  - 20 031 million euros Ad purchase
  - Distribution across media & non-media:
    - 34.83% = media
    - 65.17% = non-media
  - Rooijen-Horsten, Bergen et Tanriseven (2008), France Pub:
    - 82% of news papers advertising are brand-forming
  - 78.55% of total advertising could be brand-forming



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# Measurement Issues (1)

- Training (work in progress)
  - Which type of training should be retained ? Initial training, continuing vocational training
  - “Purchased” training will be evaluated using firms’ tax bills
  - How to account for “internal training”. Managers spend some time training their employees
- Organisational structures
  - ???
  - Methods already used (20% of managers compensation) show non-suitability due to non-comparable occupation nomenclatures.



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## Measurement Issues (2)

- Financial innovation
  - Corrado, Haltiwanger and Sichel (2005), Hao, Manole and Van Ark (2008)... use the same fuzzy proxy for financial innovation (20% to 30% of fin. industry intermediate inputs).
  - In the US, data on financial R&D are provided by National Science Foundation (NSF) through R&D survey, but underestimated due to the inability of financial firms to assess their own R&D activity
  - Large differences between the two results, 75 billion USD with CHS and 1.6 billion USD with NSF



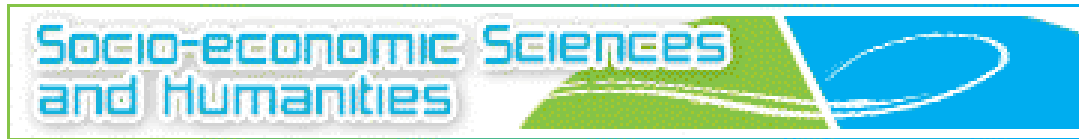


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## Measurement Issues (3)

- Financial innovation (*cont'd*)
  - Hunt (2008) proposes an estimation based on employment.
  - Assuming that the following are “research occupations”:
    - o Software engineers
    - o Computer programmers
    - o Scientists (including social scientists)
    - o Research managers
    - o Actuaries
    - o Mathematicians
    - o Operation researchers
    - o Statisticians
    - o Architects
    - o Cartographers
    - o Surveyors



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## Measurement Issues (4)

- Differences in occupation nomenclature may lead to not fully comparable data when GFCF measurement is based on employment
  - Example: ILO's ISCO vs INSEE's PCS



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COINVEST items	<u>Computer software and database</u>		
	Nomenclature	Code	Label
ISCO 2008 (ILO)	251	Software and applications developers and analysts	<ul style="list-style-type: none"> <li>○ System analysts</li> <li>○ Software developers</li> <li>○ Web and multimedia developers</li> <li>○ Application programmers</li> </ul>
	252	Database and network professionals	<ul style="list-style-type: none"> <li>○ Database designers and administrators</li> <li>○ Computer network professionals</li> </ul>
PCS 2003 (INSEE, France)	388a	Engineers, software R&D	<ul style="list-style-type: none"> <li>○ Programmers</li> <li>○ Software engineers</li> <li>○ Development engineers</li> </ul>
	388b	Engineers and executives, maintenance and users support	<ul style="list-style-type: none"> <li>○ Database manager</li> <li>○ Network manager</li> <li>○ Technical support</li> <li>○ Maintenance manager</li> </ul>
	388c	Project manager, ICT manager	<ul style="list-style-type: none"> <li>○ System designer</li> <li>○ Project manager</li> <li>○ ICT manager</li> </ul>
	478a	Software development technicians	<ul style="list-style-type: none"> <li>○ Programmer</li> <li>○ Technical engineer</li> </ul>
	478b	Production and operation technicians	<ul style="list-style-type: none"> <li>○ Production manager</li> <li>○ Operation technician</li> <li>○ Operation manager</li> </ul>
	478c	Support, maintenance and installation technicians	<ul style="list-style-type: none"> <li>○ Technical agent</li> <li>○ Office assistant</li> <li>○ Maintenance programmer</li> </ul>



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# French estimations

<u>In 2004</u>	HMA (2008)		INSEE	
	Million euros	% GDP	Million euros	% GDP
Software	14 211	0.86	25 232	1.53
Databases	738	0.04	1 092	0.07
R&D	34 724	2.09	24 335	1.46
Mineral exploration	0	0	18	0.001
Copyrights & License costs	3 144	0.19	2 538	0.15
Financial innovation	9 666	0.58	?	?
Architecture & Engineering	14 927	0.90	13 431	0.81
Advertising	22 763	1.37	15734	0.95
Market research	4 444	0.27		
Human capital	24 986	1.51		
Organisational structure	37 496	2.26	?	?