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How intangible investments have evolved in EU area using  
both firm-level and national perspectives

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## INNODRIVE

### *Intangible Capital and Innovations: Drivers of Growth and Location in the EU*

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[www.innodrive.org](http://www.innodrive.org)

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## Why intangibles matter?

It is widely recognised that intellectual assets are major determinants of the generation of innovation and thus in the enhancement of growth, employment and competitiveness. However, our knowledge of the contribution of intangibles to economic performance is still incomplete.

While firms undoubtedly are at the centre of innovation and productivity growth, their activities are hard to analyse empirically. Furthermore, at the macro-level the national accounts data on capital formation focus primarily on fixed investment and have only recently attempted to measure investment in intangibles such as software, human capital, artistic creations and the value of intellectual property rights.

## What is INNODRIVE?

The INNODRIVE project aims at reducing our ignorance by providing new data on intangibles and new estimates of the capacity of intangible capital to generate growth.

# Intangible Capital

Corrado-Hulten-Sichel (2005)

Own Categories

## *Economic Competencies*

1) Brand Equity:

- Advertising
- Market Research

2) Firm-specific resources:

- Firm-specific human capital (e.g. training)
- Organization structure (e.g. management)

1) Organization capital

- Management
- Marketing
- Skilled administration

## *Innovative Property*

1) Scientific Research & development

2) Other Research & development:

- Non-Scientific Research & development
- Mineral exploration
- New motion picture films and other forms of entertainment
- New architectural and engineering design
- New product development in financial industry

1) Research & development

## *Digitalized information - ICT capital*

1) Software

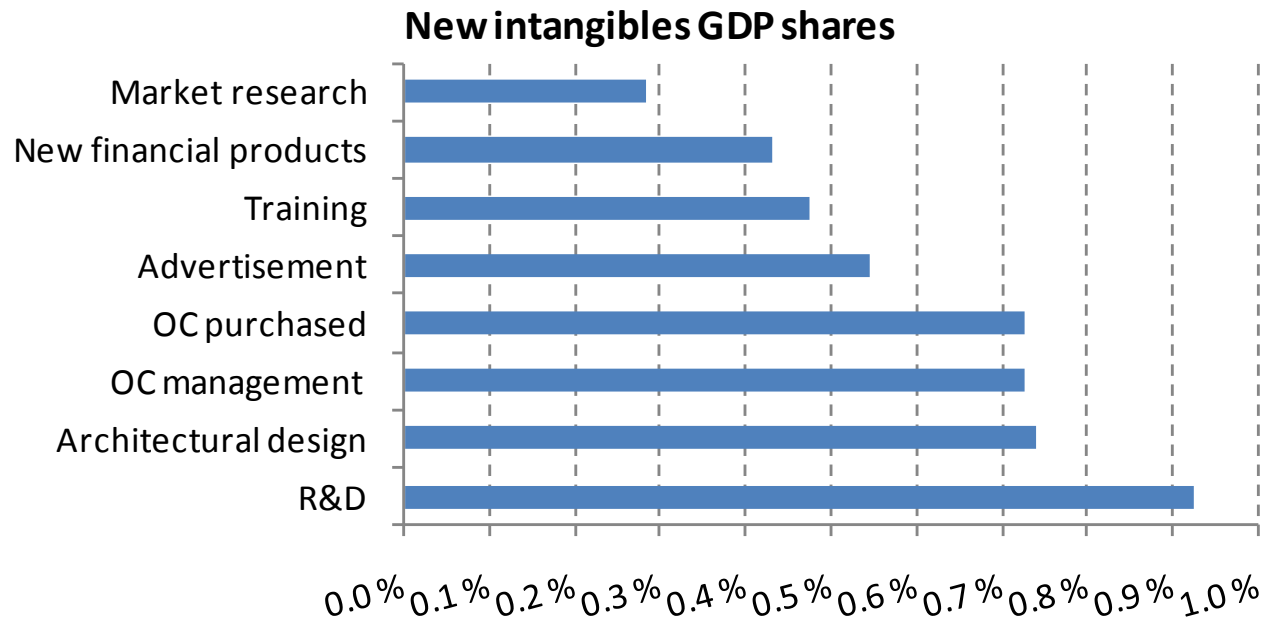
2) Database

1) ICT personnel assets

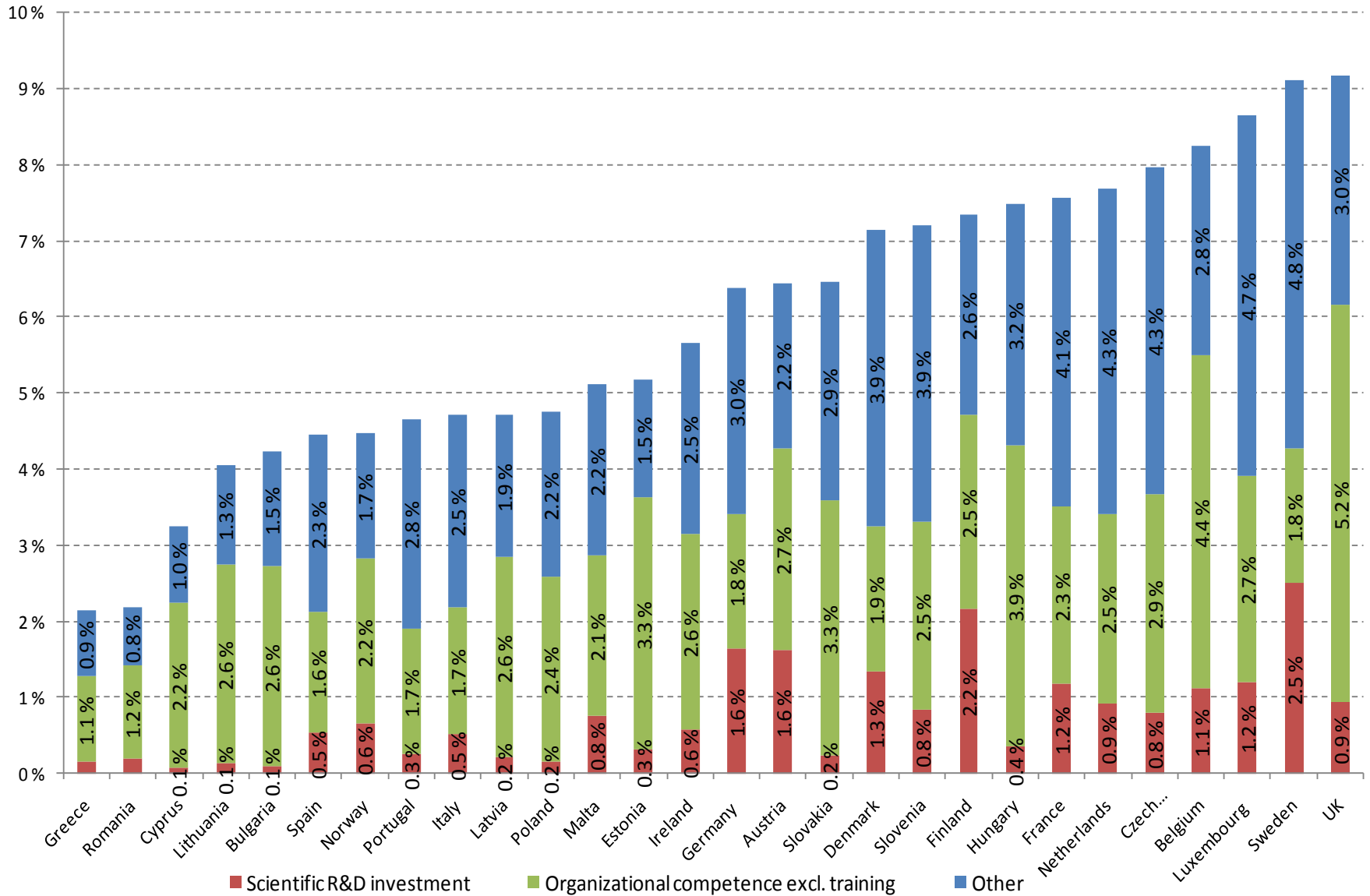


# Country-level expenditures of intangible investment and capital

- Official data sources homogeneous across countries (mainly Eurostat surveys, national accounts data and supply and use tables, data from National Statistical Institutes) to guarantee reproducibility and international comparability (LUISS).
- New Intangible investment not included in national accounts (Corrado Hulten Sichel type) 5.5% of GDP



**Figure 1: Intangibles as share of GDP (%) 2005: EU – 27 countries (and Norway)**

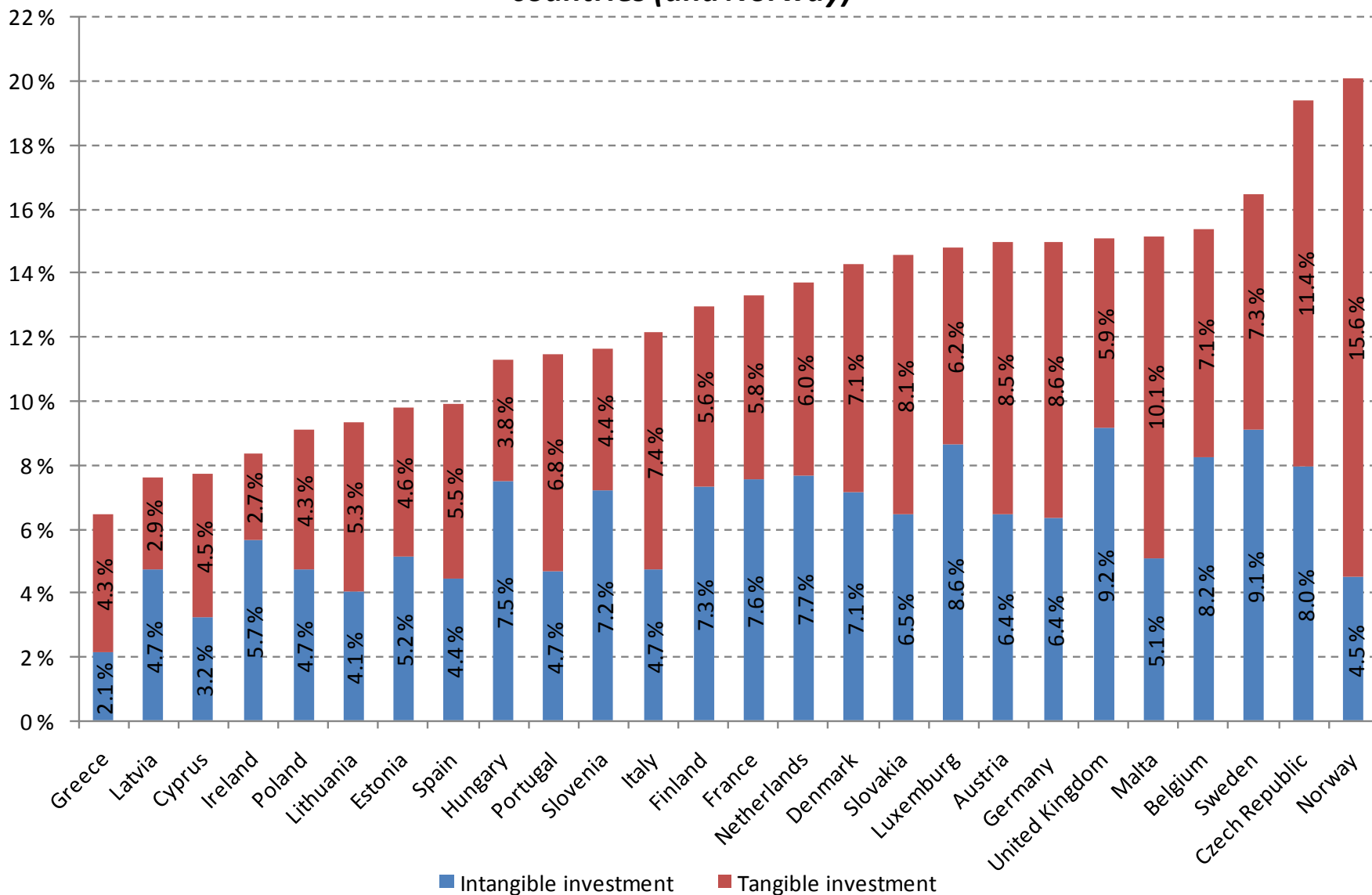




# Company level intangible investment and capital

- All countries with traditionally high rates of R&D (Sweden, Finland, Germany) rank above average in terms of their investment in intangibles
- Many non-R&D intensive countries rank high: the UK, Belgium the Czech Republic, the Netherlands, Hungary
  - Innovation model that emphasises organisational competence.
- Czech Republic (architectural design), France (training) and Netherlands and Luxembourg (new financial product) are intensive in other type of intangibles

**Figure 2. Tangible and Intangible Investment as share of GDP (%) 2005: EU – 27 countries (and Norway)**



Source: Innodrive, [www.innodrive.org](http://www.innodrive.org)



# Intangible and tangible investment

- Total tangible and intangible investments are fairly evenly distributed throughout Europe.
  - Norway, Czech Republic Sweden, Belgium and Malta rank as the top countries in the half of countries with business investment intensity between 13%-20% of GDP
- Countries with relatively low intangible investment have high levels of tangible investment.
  - An indication about the degree of transition towards knowledge economy in 2005
- Czech Republic (architectural design), Sweden and France (training) are intensive in other type of intangibles (also new financial product, non-scientific R&D capital and databases and software).

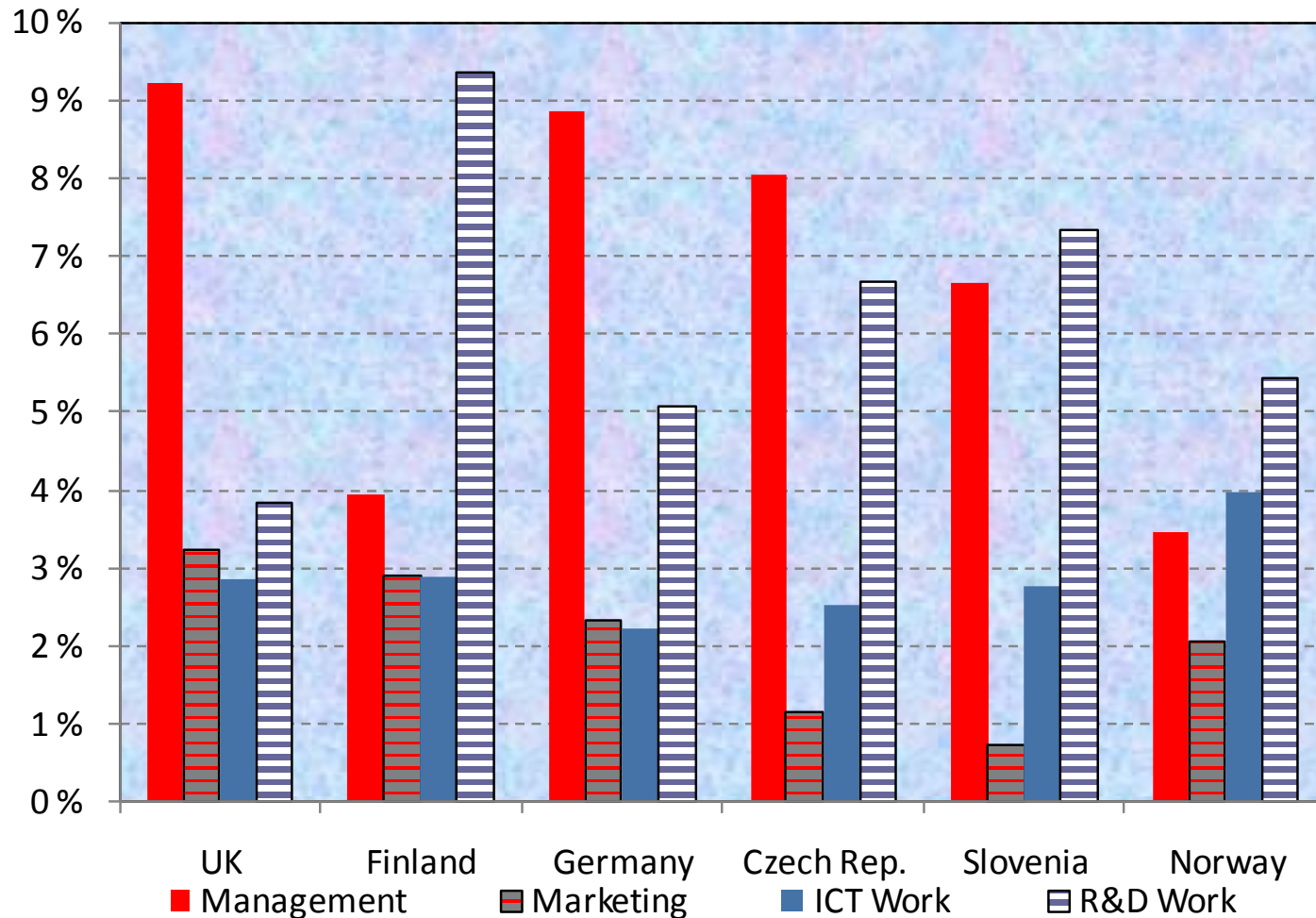


# Intangible at company level: LEED data

- Finland (UNIVAASA) 1995-2008
  - 2,933 firms cover 400,000 workers
- UK (NIESR) 1998-2006
  - 10,000 firms 20% of GVA in relevant industries
    - Annual business inquiry, annual survey of hours and wages
  - Matched at the 3-digit industry level to Labour Force Survey data on shares of workers with five skill categories
- Norway (NORSTAT) 1999-2006
  - 6,202 firms and 21,816 firm-year observations for the period 2003–06
- Germany (DIW) 1999-2003
  - 1.5 million establishments about 20 million workers Social Security Dataset (SSD)
- Czech Republic (CERGE–EI) 2000-2007
  - 2,000 firms and over 1 million workers annually
  - AMADEUS database
- Slovenia (IER) 1994-2004
  - Balance sheet data, income tax statements at the individual level and the Statistical Register of Employment (SRDAP)
  - up to 500,000 workers in 26,000 firms across 11 years



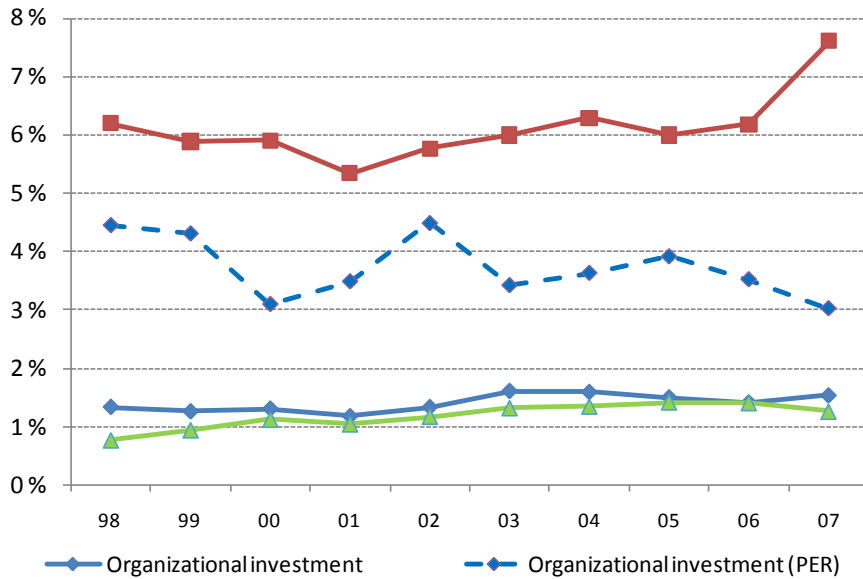
Figure 1. Share of management, marketing, ICT and R&D workers at around 18% (percentage of all workers, 2003)



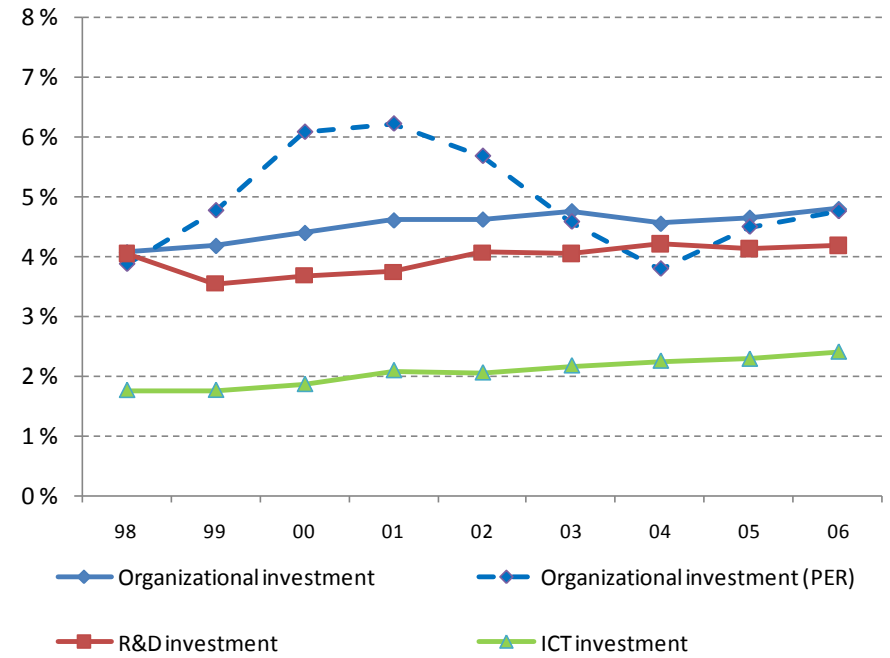
- Organisation worker share (management and marketing) varies between 13% and 5.5%
- R&D workers between 9% (Nordic countries) and 4% (UK)

# Intangible investment as share of new value added

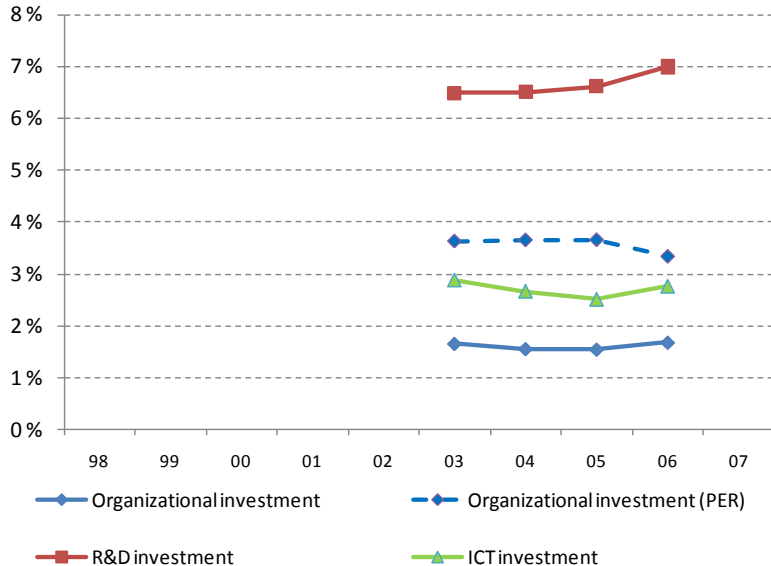
## FINLAND



## UK



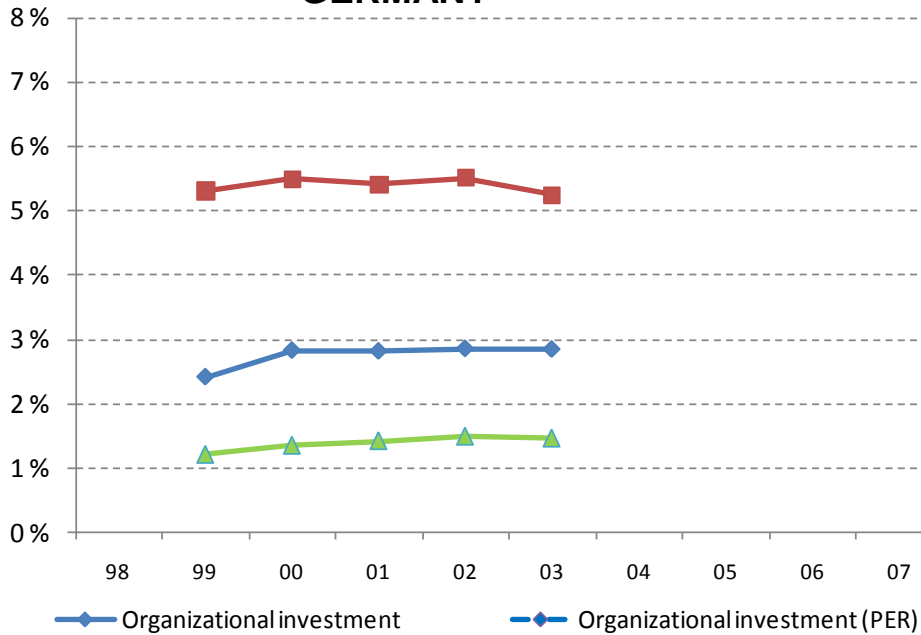
## NORWAY



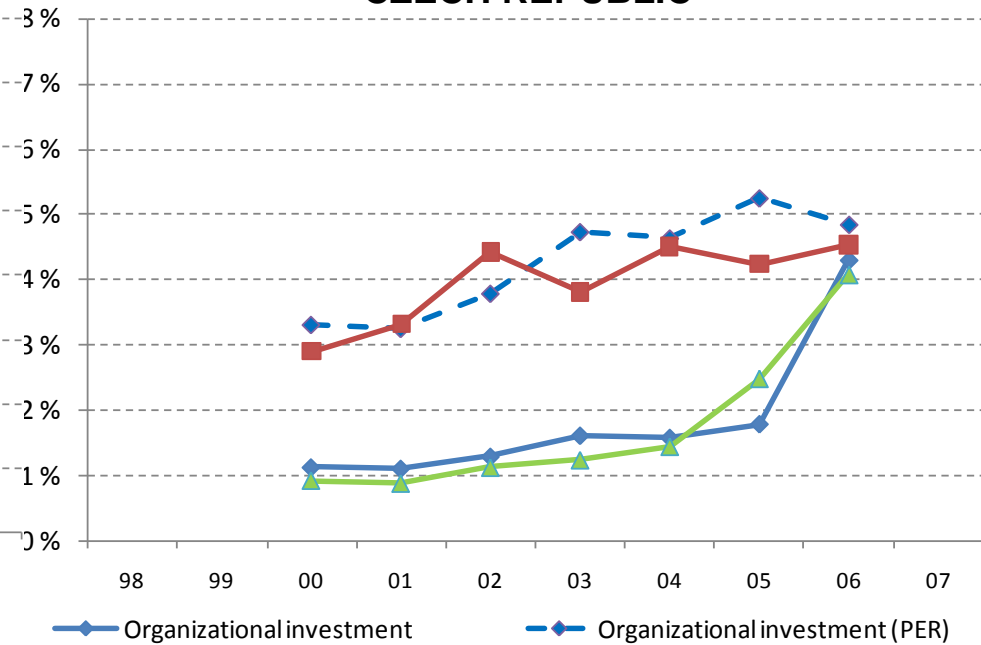
- FIN, NOR : R&D 6.0% exceeds OC, FIN ICT 1%, NOR ICT 2%
- UK OC 5% exceeds R&D UK ICT 2%

# Intangible investment as share of new value added

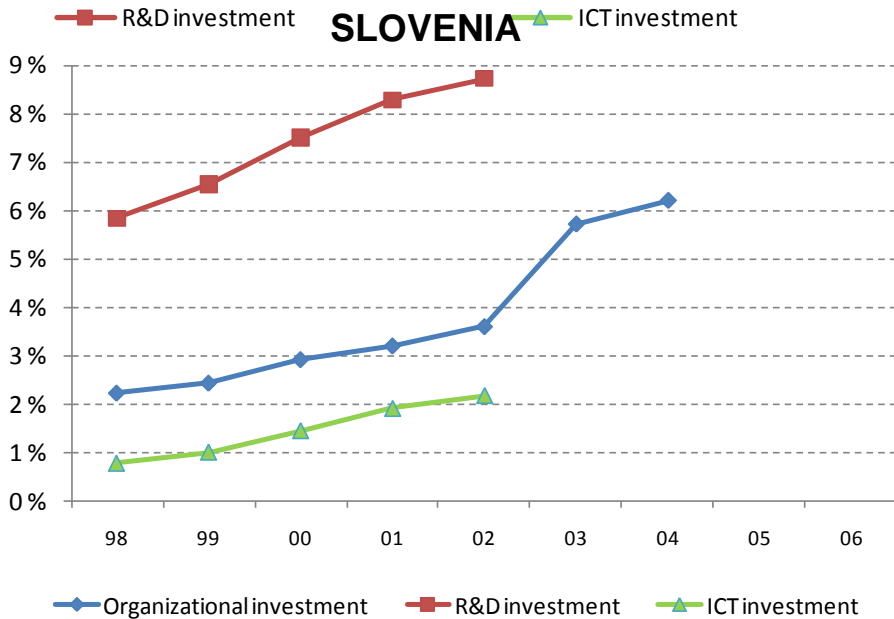
## GERMANY



## CZECH REPUBLIC



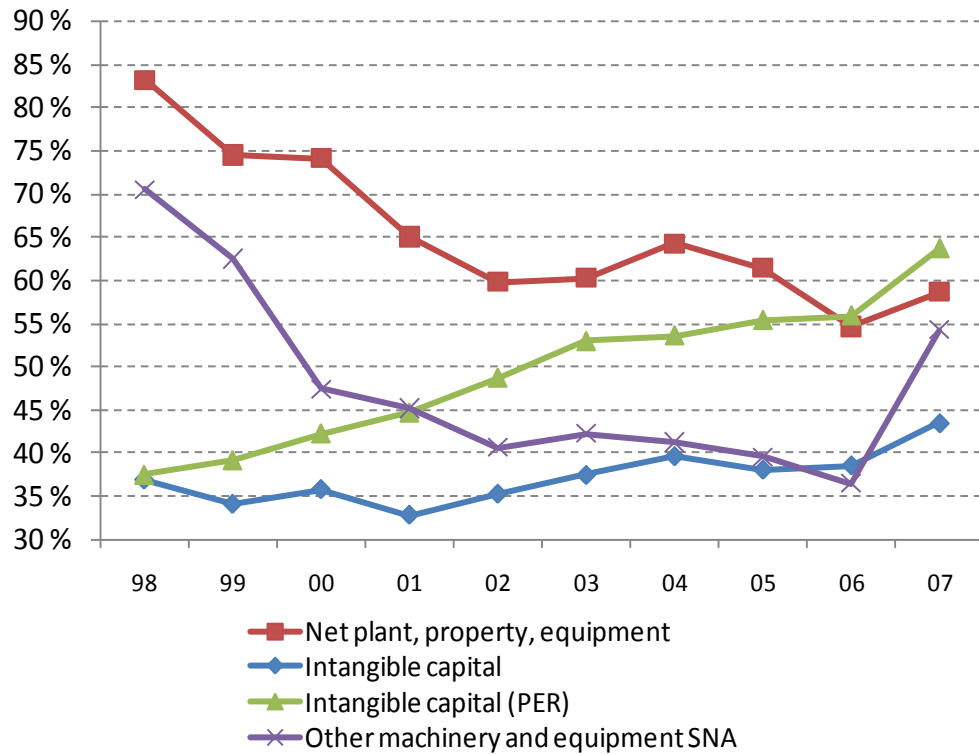
## SLOVENIA



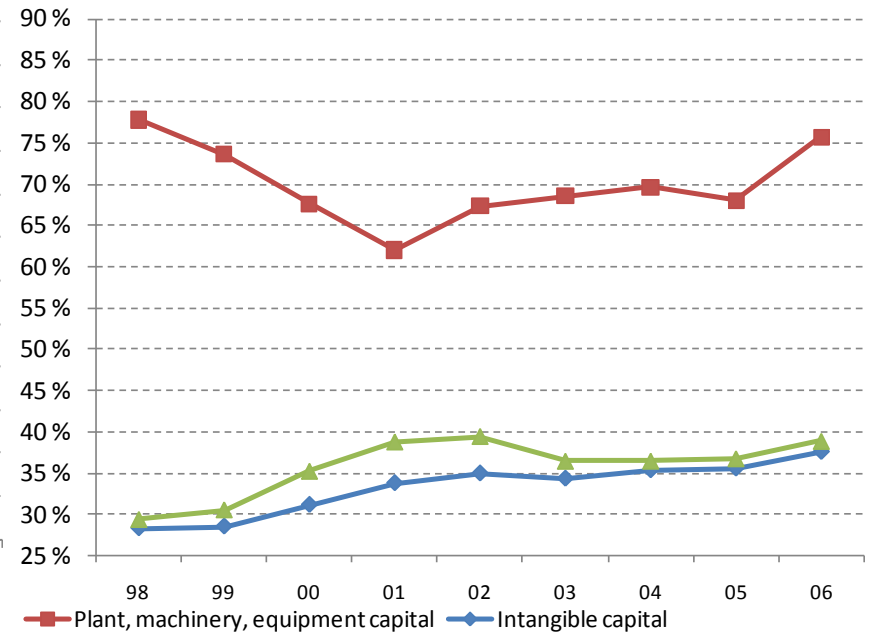
- GER, CZ : R&D 4-5% exceeds OC 2-3%, ICT 1%, CZ up to 4% by 2005
- SLV R&D 6% or above data from 2003 unreliable

# Intangible capital as share of new value added

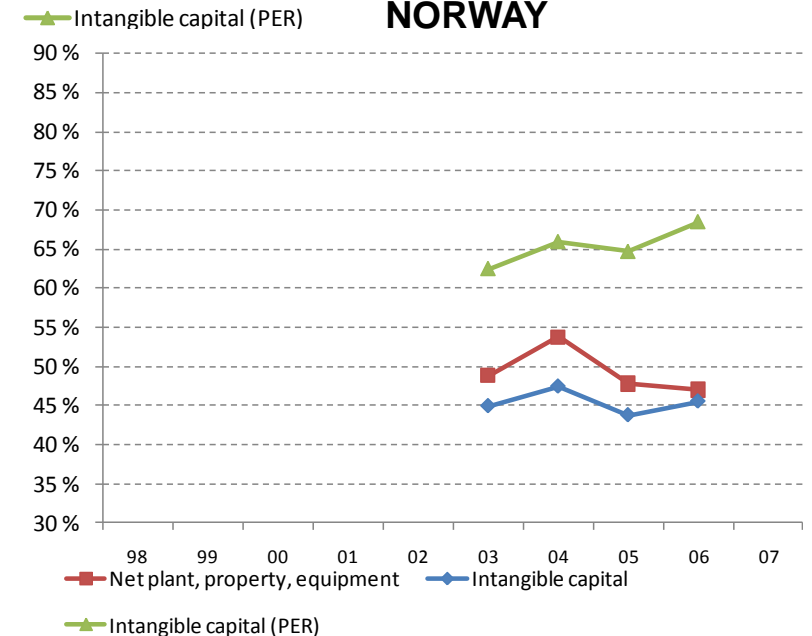
## FINLAND



## UK



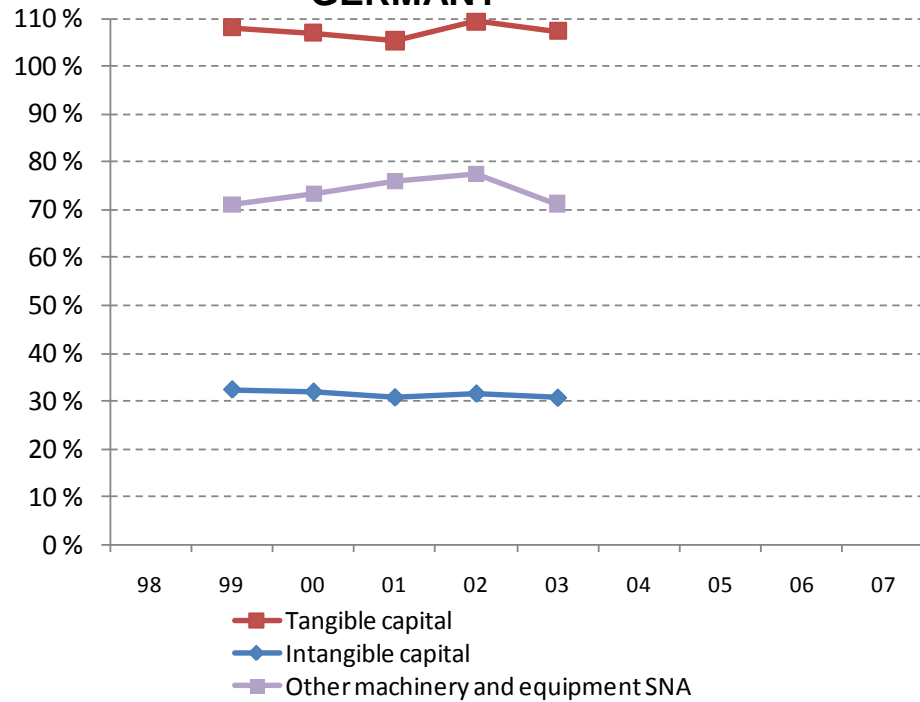
## NORWAY



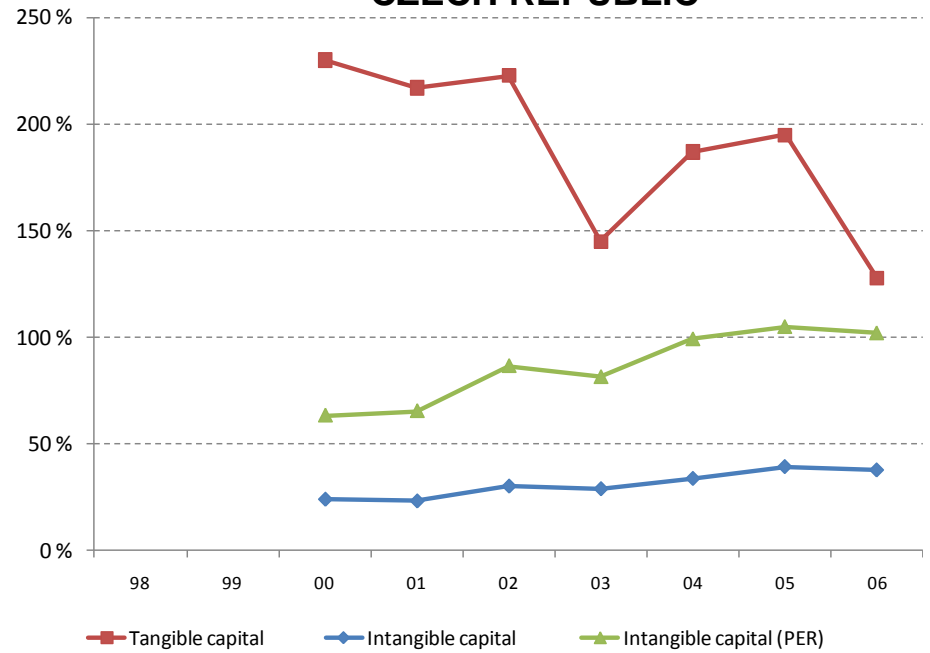
- FIN, NOR: Intangibles 40-45% less than tangibles,
- UK Intangibles 40%, tangibles 75%

# Intangible capital as share of new value added

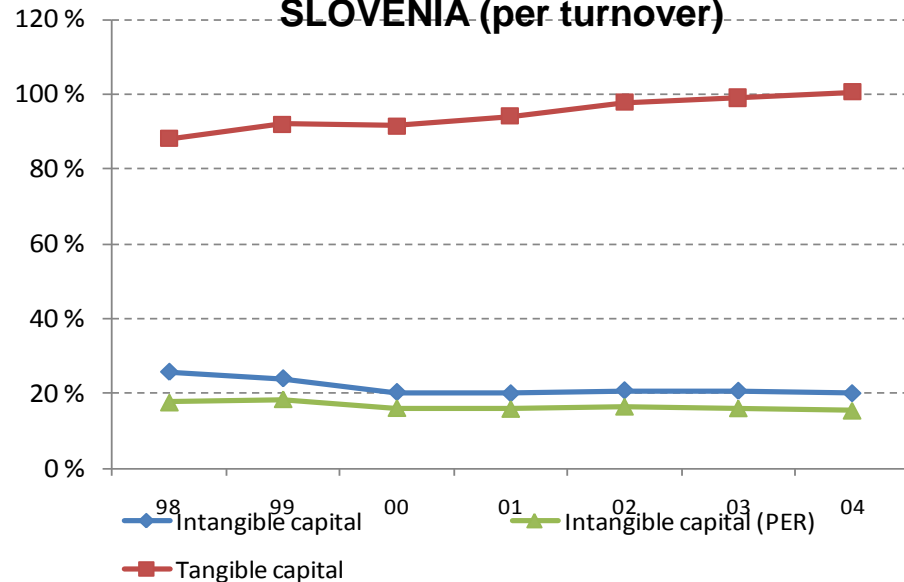
## GERMANY



## CZECH REPUBLIC



## SLOVENIA (per turnover)



- GER, CZ : intangible capital 30% below tangible capital,
- SLV intangible capital 20% of turnover below tangible capital



# Company-level intangible capital

- The expenditure-based approach gives only part of the picture regarding the value of intangibles when they are owned by the firm
  - Employees are not fully compensated for the value of intangible production.
- The performance-based approach increases the relative importance of organisational investment
  - Supported by its impact on the market value of Finnish listed firms.
- Company level productivity is strongly related to firms' own intangible capital as well as to regional intangible capital, suggesting positive regional spillovers
  - Intangibles have public good characteristics

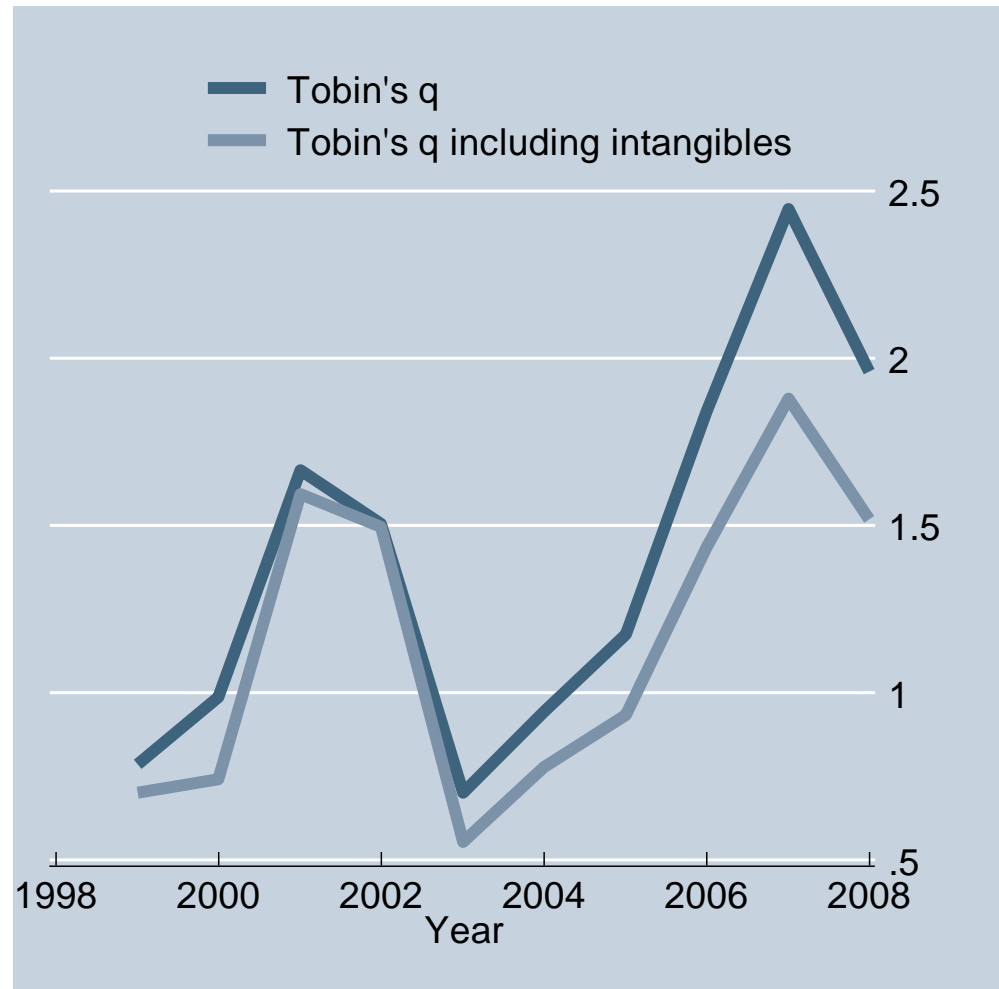


# Average Tobin's q and intangibles per fixed assets

Data 65 firms listed in Helsinki Stock Exchange 1998-2008

Tobin's q = Market value / replacement value of fixed capital

Intangibles using performance-based measurement





# Intangible capital: some insights

- In longer term intangibles increased and have explained productivity growth
  - UK: intangible capital doubled between 1970 and 2004
  - US: accounts 18% of multi-factor productivity growth 1995-2004
    - Faster growth than in Europe
- Recent development in the 2000s
  - Intangibles have mostly constant share of GDP
- Capital market allocation
  - Tangibles are less useful as collateral in intangible capital intensive firms
- Management decisions
  - Proper financial reporting should account for investment in intangibles
- National saving and investment are largely underestimated



# Key messages

- GDP in the EU27 area is 5.5% higher after including all intangibles.
- Intangibles are important in market valuation of the companies and the source of future growth across European countries.
- Countries with less tangibles invest more in intangible capital shows an indication about the degree of transition towards knowledge economy.
- Countries are specialised in R&D capital (Nordic countries), economic competences (the UK, Belgium, Hungary, Slovakia) or in other type of intangibles.
- Economic competence is one of the key drivers of growth, accounting for three times more investment than in R&D.
- Intangible capital is agglomerated in metropolitan areas: the greater Helsinki area accounts for 49% of all intangibles in Finland; the London City-Region 41% of UK intangibles and the top-ten regions accounting for 48.3% in Germany.



# Key messages

- The total share of intangible capita type workers is typically around 18%, while the type of activity differs from one country to another.
  - Reliance on R&D investment is not enough or may even crowd out other type of intangibles.
- Intangibles explain market valuation of companies beyond standard economic analysis
- Intangible capital is agglomerated in metropolitan areas: the greater Helsinki area accounts for 49% of all intangibles in Finland; the London City-Region 41% of UK intangibles and the top-ten regions accounting for 48.3% in Germany