

INDI NEWS

Newsletter on Science & Technology & Innovation Indicators

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Composite indicators are becoming more and more popular for giving a clear overall picture. But what do they contain? The Commission has developed such indicators and we show here their components and what they show. The second article gives an overview of a recently submitted project under the CBSTII program, dealing with Mergers & Acquisitions where European firms were involved.

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Composite indicators – providing an overview of Europe's investment and performance in the knowledge-based economy

The Lisbon European Council in 2000 set the ten-year goal of making the EU the most competitive and dynamic knowledge-based economy in the world. However, monitoring the progress made by the Member States towards this goal is not an easy task. The knowledge-based economy is a complex, multidimensional phenomenon that cannot be captured by any single indicator. Composite indicators provide a way of addressing this problem. By aggregating a number of different variables, they are able to summarise the big picture in relation to a complex issue with many dimensions.

The Commission has therefore devised two composite indicators offering the first comprehensive overview of the progress made by the Member States in their transition to a knowledge-based economy: a composite indicator of investment in the knowledge-based economy, and a composite indicator of performance of the knowledge-based economy.

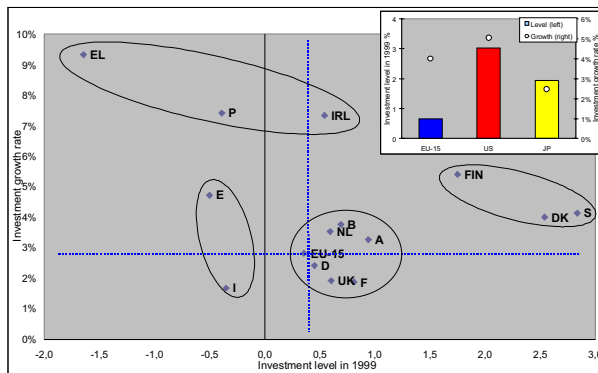
Composite indicator of investment in the knowledge-based economy

The composite indicator of investment in the knowledge-based economy addresses both the creation and diffusion of new knowledge. It includes key indicators relating to R&D effort: investment in highly-skilled human capital (i.e. researchers and PhDs), the capacity and quality of education systems (i.e. education spending and life-long learning), purchase of new capital equipment that may contain new technology, and the modernisation of public services (e-government).

Figure 1 shows on the horizontal axis the position of each country with regard to its investment level in 1999 and compared to the European average position (position of the EU in 1995=0). On the vertical axis, it measures the extent to which each country progressed over the years 1995-1999, in comparison with the European average growth. The results clearly show that the Union is still investing much less in knowledge than its main competitors, the US and Japan.

The box in figure 1 shows the investment level of the EU-15, US and Japan. In particular the gap between the European Union as a whole and the US, in terms of both investment level and investment growth, remains extremely wide. However, this overall picture masks big differences between the individual EU-Member States. For example, the Nordic countries (Denmark, Sweden and Finland) are in the lead, with investment levels and growth distinctly higher than in the US.

Figure 1: Composite indicator of investment in the knowledge-based economy. Relative country positions in 1999 and annual growth rate 1995-1999.



Source: DG Research, Key Figures 2002
 Data: Eurostat, DG INFSO
 Note: For more details about the calculations and methodology, see Annex IV in Key Figures 2002

A second group, made up of Greece, Portugal and Ireland, has built up strong momentum, which could see them catching up at a very rapid pace. By contrast, the rest of the European countries are around the European average (and, therefore, lagging behind the US), while certain big countries like Italy or Spain urgently need to make an extra effort.

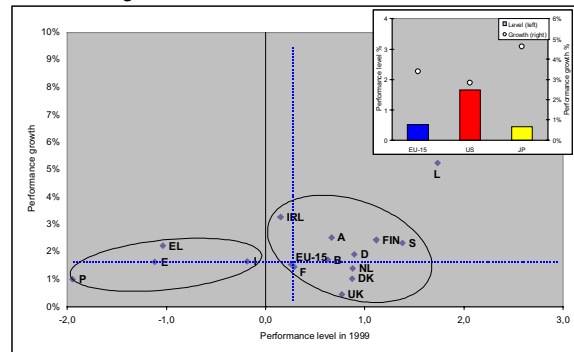
Composite indicator of performance of the knowledge-based economy

Investment in the knowledge-based economy is only one side of the story. The various elements of investment in knowledge as described above, need to yield successful outcomes if Europe’s goals are to be reached. In order to maintain and improve sustainable productivity high performance in science and technology, effective use of the information infrastructure and successful implementation of the education system are crucial.

The second composite indicator presented here, regroups these four most important elements of the achievement, or the ‘performance in the transition to the knowledge-based economy’. The elements are: labour productivity, scientific and technological performance, usage of the information infrastructure and effectiveness of the education system.

Figure 2 shows on the horizontal axis the position of each country with regard to its performance level in 1999 and compared to the European average position (position of the EU in 1995=0). On the vertical axis, it gives the progress made in this area over the years 1995-1999, in comparison with the European average growth.

Figure 2: Composite indicator of performance in the transition to a knowledge-based economy. Relative country positions in 1999 and annual growth rate 1995-1999



Source: DG Research, Key Figures 2002
 Data: Eurostat, EPO, USPTO, ISI/CWTS, DG-INFSO
 Note: For more details about the calculations and methodology, see Annex IV in Key Figures 2002

Taken as a whole, the EU-15 is lagging behind the US in terms of performance level. However, in the second half of the 1990s, a majority of European countries managed to improve their performance level at a more rapid pace than the US. Nevertheless, this higher growth is still not sufficient to eliminate the existing gap between the EU and the US in the short-term, and certainly not by 2010. Therefore, it is necessary not only to increase the volume of investment made in the knowledge-based economy, but also to improve the way it is allocated and implemented. This is of great importance especially for Greece, Italy, Portugal and Spain, a group of countries lagging behind the EU average in terms of performance level at the end of the nineties and with a rate of growth around the EU average. (For more details of the composite indicators of investment and performance in the knowledge-based economy, see “Key Figures 2002”).

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Report: Mergers & Acquisitions

Who: the team of researchers

From 2000 until 2002, the European Commission, DG Research, financed a study entitled ‘Mergers and Acquisitions and Science and Technology Policy’. The study was carried out by an international team of researchers coming from the Catholic University of Leuven, the Politecnico di Milano, IESE and the Pompeu Fabra University in Barcelona, Reading University and IDEA Consult. The latter was also responsible for the co-ordination of the project.

What: the main objective

The main objective of the study was to analyse the impact of industrial restructuring operations like Mergers and Acquisitions (M&A) on R&D performance and employment in European companies which have undergone such operations in recent years. The surge in merger and take-over activity has indeed stimulated a vigorous debate among policy-makers, academics and the public about the consequences of these transactions for the competitiveness of the EU economy.

How: the methodology

What is interesting about this study is the focus of its investigation. Very few empirical studies exist that have investigated the consequences of industrial restructuring – through mergers and acquisitions – on the companies' technological activities. Those that do exist mainly focus on the US and US companies. This study filled a gap and investigated – through a case study methodology – 31 successful merger or acquisition deals closed in Europe in the last fifteen years involving 62 companies, all active in medium- and high-tech industries.

Results of the study

The results of the three research topics are as follows:

1. The motivation of Mergers and Acquisitions

Even in medium- and high-tech industries, R&D related motivations of M&A are far less important than non-R&D related ones. The main motivations of M&A are increase in market share and broadening of product mix. However, there are considerable differences according to the type of deal; for example, merging companies active in complementary technological fields will show a stronger R&D related interest than those operating in the same technological areas.

2. The impact of Mergers and Acquisitions on R&D activity

Economies of scale in R&D do not seem to be a key driver of M&A, unlike economies of scope in R&D. Technology fusion and recombination allow merging firms to develop new technological capabilities. Furthermore, exploitation of firm-specific technological capabilities in the partner's product-markets result in more efficient exploitation of the given stock of technological capabilities. Economies of scope in R&D prove to be especially important for firms operating in complementary technological fields.

Acquisitions of privately held (small) firms by listed (larger) firms are associated with a positive effect on R&D. They allow firms to enter into new technological fields and benefit from the new sources of technological knowledge. They result in greater increases of both R&D effort and R&D output than for other firms.

3. The impact of Mergers and Acquisitions on employment

With a few exceptions, all types of M&A exhibit a negative short-term impact on employment levels. Decreases are larger the more similar the product markets and the technological fields merging firms are in. A substantial positive impact on employment levels is associated with the situation where a privately held small firm is acquired by a generally much larger public company. However, the number of such deals is small and there may be an upward bias due to self-selection.

Finally: recent trends in Mergers and Acquisitions in Europe

The study also investigated recent M&A trends, using data on announced take-over activity over the period 1985-1999. Due to deregulation, privatisation, technological developments and requirements, new financing instruments and the need to rationalise business activities in a climate of enhanced global competition, a clear upward trend in M&A can be seen with a strong acceleration since 1994. The value of transactions in 1999 was more than seven times higher than the corresponding value in 1993.

Cross-border mergers become more important within the EU

In 1999, about 56% of all mergers and acquisitions in the EU involved firms located in the same Member State. Although they still account for more than half of the total amount of operations, this indicates a downward trend as national transactions in 1992 accounted for 68% of all operations involving EU companies. The increase in the number of Community cross-border mergers reflect very well the ongoing Europeanisation of industries as a result of market integration.

EU firms have become more active as bidders in international acquisitions

Over the period 1991-1999, the number of international operations with an EU target has risen by 36%. Throughout the 1990s, EU enterprises have remained consistently attractive for non-European investors. However,

even more striking is the strong growth (231%) over the same period of international acquisitions where the bidder is a European firm.

Most targeted sectors are business services, distribution, industrial machinery, food, and chemical industries

Among the ten most targeted sectors during the period 1998-1999, the business services sector, including the activities of holding companies, ranks first and shows a very sharp increase from the period 1996-1997. Distribution ranks second, although its share has declined. Both these sectors are strongly affected by recent liberalisation measures. The merger intensive industries in manufacturing include mainly industrial machinery, food and chemical industries.

British, French, German and Dutch firms remain the most active bidders

What variations are seen across EU Member States? British, French, German and Dutch firms remain the most active bidders in cross-border M&A. Germany and the southern Member States show relatively high shares as target countries, and show lower bidder activity than what might be expected from their economic significance.

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Miscellaneous

Conferences & workshops

The Sixth Research Framework Programme (FP6) launch Conference

During 11-13th November, FP6 was launched in Brussels with a large conference and exhibition. It was Europe's largest research conference so far; more than 8.000 participants and 200 speakers from 61 countries attended this successful event. For further information:

http://europa.eu.int/comm/research/conferences/2002/index_en.html

Benchmarking

Two interesting workshops on benchmarking themes were recently held. The first one dealt with "Human Resources in RTD - The effects of brain drain and counteracting measures", and took place in Leipzig, on 17-18 October 2002.

The second was on "Local and Regional Clustering of R&D. Maximising the Potential of Geographical Proximity" and took place in Helsinki, on 19 November 2002. Results and information on future related events will be available on-line from www.tekes.fi

EUROSTAT

The annual meeting of the Working Party was held in Luxembourg, 13-15th November 2002. For more information and documents see: <http://forum.europa.eu.int/Members/irc/dsis/rdi/home>

7th International S&T indicators conference 2002

This bi-annually conference took place from the 25-28th September in Karlsruhe, Germany. The subtitle of the conference "The challenge of measuring knowledge structures in science and technology" describe the policy relevant setting of this conference. Several papers presented dealt with questions concerning indicators for measuring excellence, evaluation of research performance, benchmarking, topics highly related to ERA and the knowledge-based economy. The best papers will be published in a special volume of *Scientometrics*.

New Publications

Key Figures 2002

The Key Figures 2002 booklet was published at the beginning of November and was already distributed to many people at the FP6 launch conference. The booklet is available on-line from our website

<http://www.cordis.lu/rtd2002/indicators/home.html>

Key Figures 2002 combines key data for the knowledge-based economy such as the composite indicator, structural data on R&D spending, researchers, mobility, and productivity. At the same time it includes updates of the benchmarking indicators.

Studies now available on our website:

- Biosoft: **Scientific and Technological Performance by Gender. A feasibility study on Patent and Bibliometric Indicators**
- KUL: **Linking Science to Technology : Bibliographic References in Patents**
- SPRU: **An International Benchmark of Biotech Research Centres**

<http://www.cordis.lu/rtd2002/indicators/publications.html>