REPORTS

Evaluation of cooperative research

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This report looks at evaluation studies of a number of cooperative academic–industry research programmes in Europe, and suggests that indirect economic benefits should be taken into account as well as motives and goals of participating firms.

In Europe a wave of cooperative research programmes involving consortia of private and public partners started out in the mid-1980s. During that period, in several parts of Europe, the academic community was active on a national and international level but did not appear to maintain a strong and continuous link with industry. The apparent apathy of public scientific institutions contrasted with the activity of the private industrial sector, which was involved in restructuring negotiations of worldwide R&D inter-firm agreements.

Cooperative research—a tool to allocate public support to R&D

Before assessing the actual achievements of the current cooperative research policy, we should keep in mind that the process of innovation is based on scientific ideas. Such ideas are mainly produced by public research centres and universities which are therefore at the core of cooperative research programmes. However, at a more conceptual level, the linear model which relates basic research to exploitation revealed itself to be too simplistic. A large spectrum of models has been produced since then, to interpret the multiple pathways by which 'technology push' flows of information interact with 'market pull' ones.[1] Public support for R&D was forced to integrate partly this new vision of the role of science and technology in the European industrial economy.

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Industrial impact of cooperative research

Cooperative research programmes —both European, and within the member states of the Community—have been conducted at three different levels in order to exploit fully the potential of the European university systems.

First, *basic academic research* was promoted as a source of knowledge and also as a source of skills.[2] The impact of the Community programme to support basic and strategic research in certain fields, (energy, biotechnology etc) or to build multinational networks of scientists, can be assessed through numerous bibliometric parameters. These indicate technological achievements and increased transnational exchanges of scientists.[3]

Second, *cooperative research with industry* favoured the creation or the expansion of basic scientific and technological research within participating firms. It has evolved through the development of in-house expertise in participating firms as some duplication of the academic scientific activities is inevitable in order to absorb the output of collaborative research.[4] The scheme has sig-

nificantly reduced the gap between university and industry, which was peculiar to some of the European countries in the early 1980s.

Interesting observations came from a study carried out by CSI (Paris) on the impact of the EC Framework Programme on French research performance. It shows that a significant number of doctoral students were trained under the umbrella of the research consortia, and also that the scientific production of industrialists involved in cooperative research was often higher than the publication rate of public sector partners.[5]

Finally, the evaluation of case-studies also revealed that the results of technological partnerships do not necessarily translate into the commercial success of new products and processes. It will be interesting to assess whether the implementation of cooperative research programmes at national and transnational levels has displaced the gap formally identified outside the firm between academics and companies to *a new barrier within the firm* (Figure 1) at the interface between research activities and other strategic units. For example, the Alvey evaluators recognized the excellent scientific and networking performance of such a cooperative programme but were less convinced by direct industrial exploitation of the scientific output.[6] Within some US firms, D. Mowery has noticed that change in the competitive and technological environment has reduced the capacity of the in-house industrial research laboratory to influence the direction of research and thereby exploit linkages between basic and applied research.[7]

The findings of MERIT based on a sample of industrial partnerships, show that R&D cooperation is not necessarily related to profitability.[8] However, they do not take account of parameters linked with the R&D organization of the participating firms and therefore could not substantiate such a hypothesis.[9]

In order to improve the cost-effectiveness of public support, we should assess cooperative research in terms of the evolution and the dynamics of a technoeconomic network of R&D activities and partners, rather than limiting ourselves to the socioeconomic return from a classical investment. Rather than

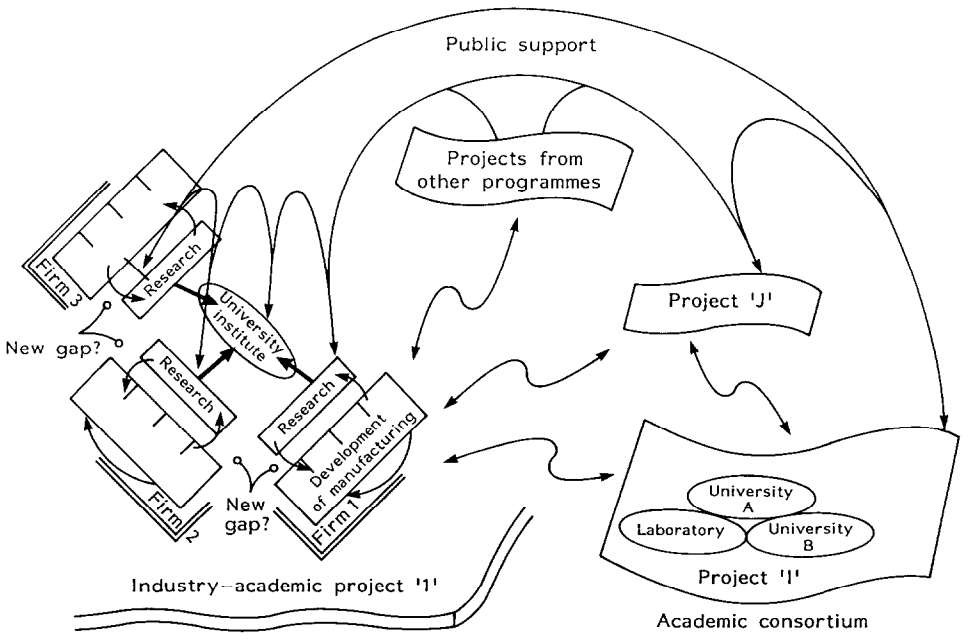

Figure 1. Consortium umbrella model of public support to science and technology: from improved interactions between academe and industry to a possible gap between research activities and the rest of the firm.

focusing on profitability, it would therefore be more accurate to assess indirect economic impacts which have not yet materialized in the trading channels of participating firms[10] and take into account contrasts in structure and motives between firms which have entered such ventures.

Notes and references

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Future generations conference

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What responsibilities do we have to future generations and their environment? In April 1992, 20 scientists and philosophers met in Malta to explore this question. The Future Generations Programme within the Foundation for International Studies organized this international conference, based on the earlier work of three regional conferences.

Two key needs for today's society became evident at the conference. One is the need for widespread understanding of the concept of future generations and our responsibilities to them. This is being accomplished through dissemination of an international declaration of our responsibilities and through education for all ages. The other need is a spokesperson or Guardian as part of the decision-making process within the United Nations, national and local governments, international organizations, and so on. Because the people of future generations have no voice or vote in our

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