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BRITE-EURAM

a measurable impact

A synthesis of
the 1995 evaluation study
of completed BRITE-EURAM
projects

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PREFACE

EUROPEAN COMMISSION

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Directorate General XII - Science, Research and Development

As the third millennium approaches, European industry is facing ever greater challenges. Markets are becoming increasingly global in nature, new competitors are emerging, and the cost of developing the complex technology required to stay abreast of consumer demand is rising relentlessly.

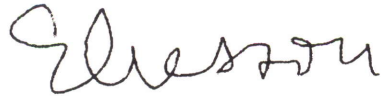
Increasingly, the research required to develop technology to the point where it is marketable is beyond the financial scope of single companies. Strategic alliances are needed and risks must be shared. Conscious of this need for European industry to pool research resources, the European Commission has developed a strategy designed to help manufacturers survive and prosper into the twenty-first century.

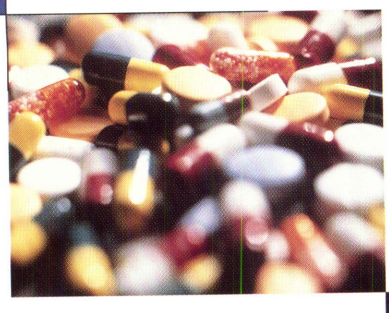
In such a competitive world, it is vital to provide an appraisal of the value of the research which is funded by the European Commission. This brochure summarises the results of an independent Evaluation, carried out in 1995, of Industrial and Materials Technologies projects. This is the fifth such study in a continuous assessment process started in 1991. It aims to illustrate not only the achievements of the projects, but also to highlight ways in which European researchers and companies can work together across national boundaries.

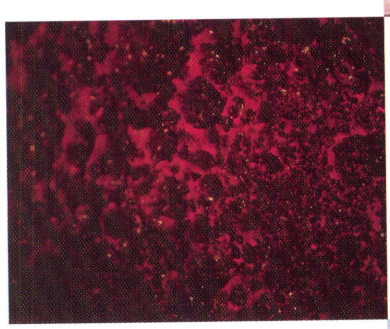
Figures contained in the report identify general trends. The overall conclusion is that every ECU invested in BRITE-EURAM research produces a potential economic benefit of over four times that value within five years of the completion of the project. To add substance to these estimates, the Commission is currently undertaking the first evaluation of the actual economic impact generated by 800 organisations involved in projects which were completed five years ago. This will provide another concrete assessment of the 'added value' of Community-funded research.

The data presented should be of value to potential participants in the programme and should also help European industry and research institutes to maximise the results of their RTD activities.

Edith CRESSON, Member of the Commission responsible for Research, Innovation, Education, Training and Youth







Contents

The BRITE-EURAM Programmes

Initiated in 1985, the BRITE Programme aimed to develop applications for new technologies and materials in traditional manufacturing industries. It was followed, in 1986, by the EURAM Programme, which had the complementary goal of stimulating the development of new materials.

The BRITE-EURAM programme (1989-1992) continued these two programmes, but in a more industrially-relevant and integrated way. Market surveys had pointed to a need for selected projects to be more oriented towards market needs. Over 350 projects were selected for inclusion in the programme. All the projects met four basic requirements, namely that they:

- were of high scientific and technical quality
- were innovative
- resulted in positive economic and industrial impact
- were precompetitive (needing further R&D before reaching the market) in nature.

Following the success of BRITE-EURAM, the September 1991 Council of Ministers approved the BRITE-EURAM II Programme on Industrial and Materials Technologies, to run from 1990 to 1994. Working with a budget of 760 MECU, BRITE-EURAM II has funded over 500 projects. As part of the new programme, the CRAFT (cooperative research) initiative was set up to encourage wider participation of SMEs (small and medium-sized enterprises) with limited R&D capabilities.

Refining the criteria used in BRITE-EURAM, BRITE-EURAM II has placed greater emphasis on:

- a systematic approach, with multidisciplinary teams
- impact on the environment and quality of life
- social and economic cohesion
- vertical integration (cooperation between developers, suppliers, producers and users)
- participation of specific third countries.

The Brite-Euram III programme is continuing the Community effort to improve industrial competitiveness and quality of life with a budget of 1,772 MECU for the period 1994-1998.

Constant Evaluation and Improvement

The Commission systematically monitors its programmes - using external experts - to ensure that resources are allocated and administered efficiently. Almost 550 projects have now been reviewed.

The 5th BRITE-EURAM Evaluation

This brochure is a summary of the fifth BRITE-EURAM Evaluation, carried out on all the projects completed during 1994. The report analyses the 131 projects started in 1990, which were carried out under the banner of BRITE-EURAM. Where possible, the results are directly compared with those from the Evaluation carried out in 1993, which assessed 84 BRITE and BRITE-EURAM projects completed in 1992.

The survey itself was conducted in the first half of 1995 and was published in July of that year. Carried out by industrial consultants from seven external organisations, the Evaluation was based on information obtained from interviews with project leaders, where each project was assessed in terms of 30 predefined indices.

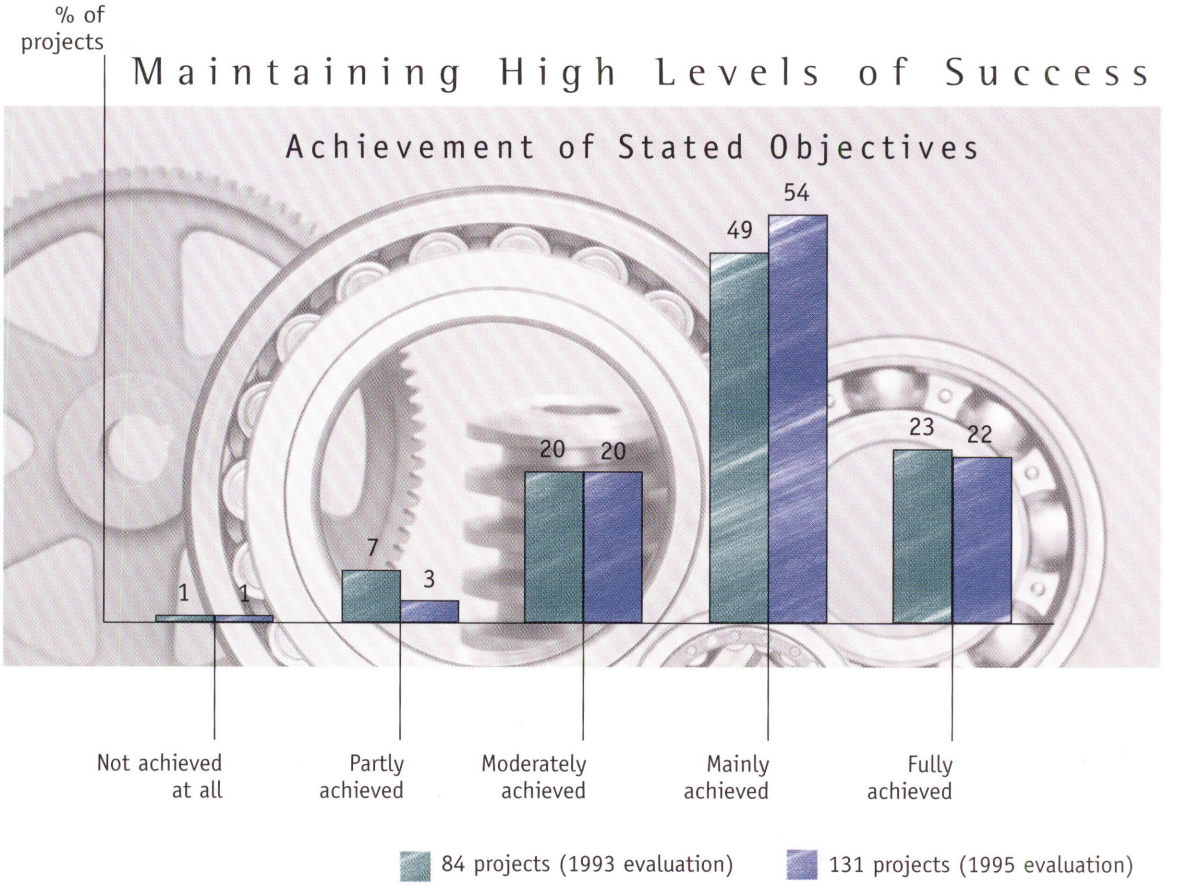
These indices cover such aspects as the projects' scientific achievements, economic effects, influence on partnerships, impact on the environment and remaining obstacles to market exploitation. Finally, the Evaluation attempted to determine the future actions required to enable successful exploitation of project results.

Being predefined - although subject to updating and revision - the indices generally allow direct comparison with previous Evaluations, permitting trends to be identified and firm conclusions and recommendations to be made. The process of continuous assessment allows constant revision and improvement of the programmes.

This process of project review continues: the 6th Evaluation - covering 500 projects completed in 1995 and 1996 - is currently underway and results will be published in 1998.

Have the projects achieved the scientific and technological goals?

As in previous BRITE-EURAM Evaluations, external experts have analysed the scientific and technological success of projects, grading them on a scale ranging from "Not achieved at all" to "Fully achieved" (see graph).



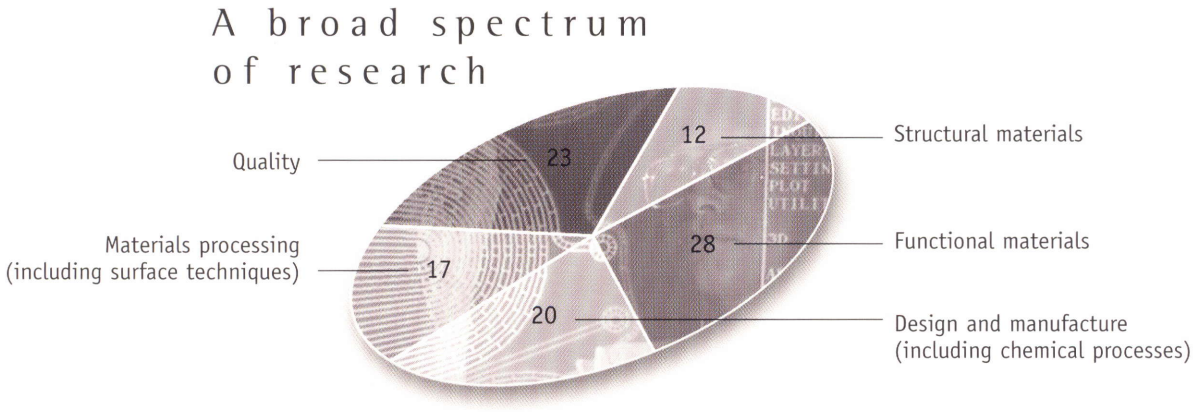
Three out of four projects mainly or fully achieve their scientific and technological objectives

Over three-quarters of the participants in this latest Evaluation have been mainly or fully successful in reaching their stated objectives. Major factors in these successes included the quality of the objectives themselves, efficient management by the project leader, strong commitment from the participants and research which is highly relevant to business.

In addition, the survey showed that 71% of participants considered their project results to be beyond (51%), or strongly beyond (20%) the current state of the art in their field. This profile is broadly similar to those seen in previous Evaluations.

In which Technical Areas?

The projects surveyed covered one or more of the technical areas shown below.



Delivering Drugs Right on Target

Nobody likes having injections - particularly people suffering from long-term illnesses which require repeated medication. It's much less distressing to take a pill. But the acids and enzymes found in the stomach and intestines will attack pills just as they attack the food we eat, and if a drug is not released in the right place at the right dosage, great harm can result. Advanced polymer chemistry could hold the answer.

The pharmaceutical industry has therefore long been searching for the right sort of coating for pills which can survive the passage through the digestive system all the way to the colon, because it is often in the colon that drugs can most easily be absorbed. Hence, this project, which is coordinated by a UK specialist SME.

They were primarily interested in finding better ways of treating bowel diseases and in developing new ways of delivering peptide and protein drugs by mouth. A growing list of such drugs being discovered by the biotechnology industry is driving demand for this technology.

The UK company, together with Belgian and Italian partners, is developing a new type of pill based on a newly-synthesised polymer which can survive the journey through the digestive tract, breaking down only once it reaches the colon. The addition of an absorption enhancer, which causes the cell wall in the colon to let the drug pass through more easily, could allow vital drugs such as insulin to be delivered by mouth instead of injection.

It is a big undertaking to bring this type of new technology to market, requiring a considerable amount of capital in order to scale up production, do larger-scale safety tests and go into volume production. The project is now looking for a partner able to make the necessary investment. If and when it does, commercialisation will probably take about five years.

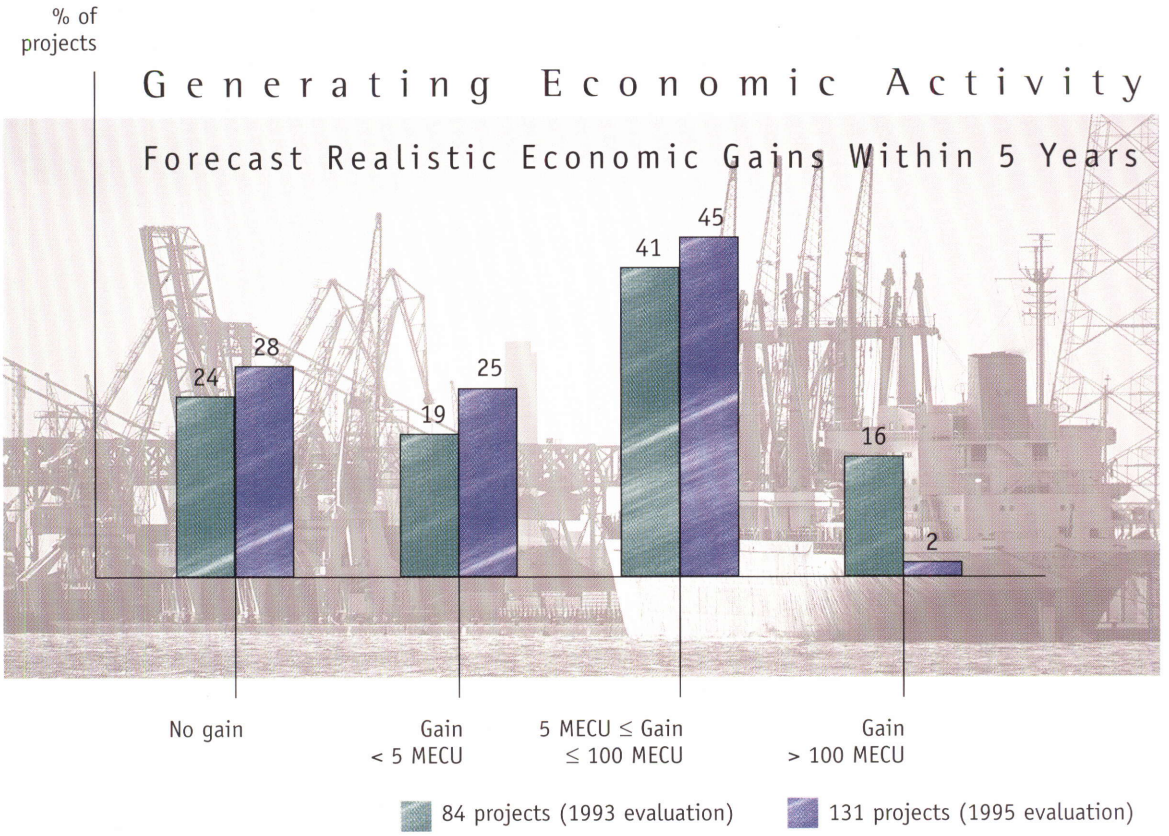
The further development of spin offs from the project, in contrast, looks likely to take place more rapidly. The partners are already exploring the possibilities of the absorption enhancer with new partners. The project has also led to the development of other drug-delivery technologies with good market potential, including a coating based on more conventional polymers and a pellet formulation for treating colon diseases.

Project Ref: BE-4055

What effects have the projects had on industrial activity?

Generating Economic Activity and a Return on Investment

Consistent with previous Evaluations, most projects showed a positive economic impact, either directly (e.g. increased market share) or indirectly (e.g. improved productivity or quality), associated to applications resulting from the projects.

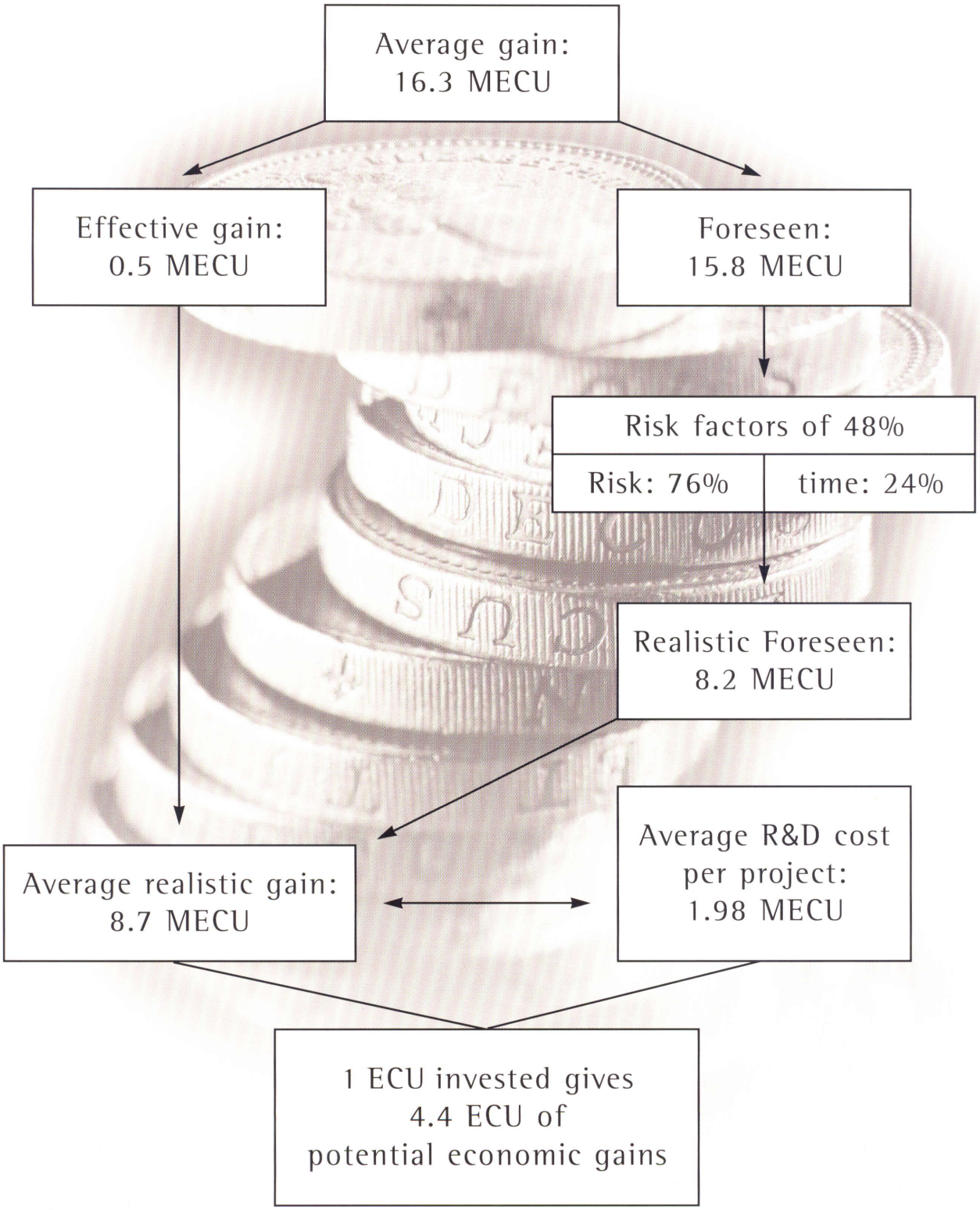


Almost half of the projects generate a potential economic activity of more than 5 MECU within 5 years of their completion

Most of the completed projects should generate a positive economic effect in the 5 subsequent years, with almost half generating 5 MECU or more. The Evaluation highlighted short time to market, low commercial risk and exploitation capability as major factors in the existence and size of gains.

The Evaluation estimated the average 5 year economic gain per project to be 16.3 MECU. Risk factors and estimates of the effects of inflation were then applied to give a true value of 8.7 MECU, compared to 12 MECU for the 1993 Evaluation.

Realistic estimation of Gains per Project



The figure of 4.4 ECU of economic gain within 5 years for each ECU invested in research is lower than that shown in the previous Evaluation (around 7 ECU) - although this latter figure considered the gain over a 7 year period. It is thought that this drop is due - in part at least - to the fact that the projects surveyed for this Evaluation were completed at a time of severe European economic downturn, causing participants to be more pessimistic about future projections than in previous Evaluations. There are also many fewer very high Economic gains projects (2% more than 100 MECU vs 16% in 1993).

Paradoxically, this dip is an indicator of the success of initiatives such as CRAFT, which are designed to encourage greater numbers of SMEs to participate in BRITE-EURAM projects (see "Commercial Exploitation III: SMEs"): a higher number of projects are generating smaller gains, spreading the benefits more widely.

The increasing technical complexity of projects is reflected in an increase of project cost (up 15% vs the 1993 report) and lower average economic gain per project (down 27%).

An evaluation currently being carried out, which will assess the actual economic impact of projects finished 5 years ago, will give a clearer picture of true commercial gains. This study will be available by yearend 1997.

Implications for Employment

36% of the projects offer the prospect of direct (within the exploiting partners) employment opportunities. Only 10% are believed to have negative potential.

In just over 40% of the projects, industrial use of the results requires an increase in the level of operator skills, bringing with it an implied need for additional training.

What are the projects' wider consequences?

The Evaluation monitored the extent to which the research results may be expected to affect the environment and quality of life, and considered the projects' influence on health in the workplace.

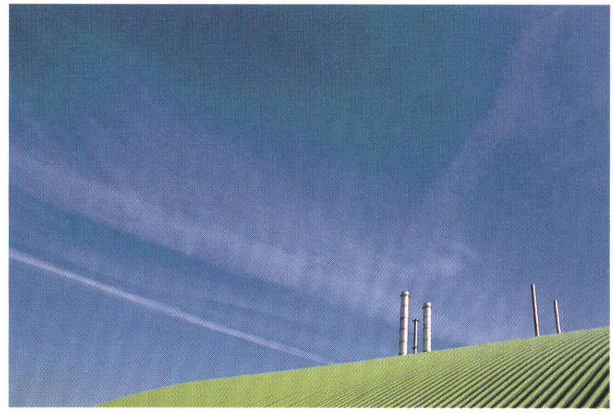
Environmental Impact

Roughly two thirds (as in previous Evaluations) of the projects produced results which could have environmental consequences. The Evaluation identified 177 individual environmental impacts from the 131 projects analysed. Of these, 168 (95%) are positive.

Two-thirds of the projects have one or more impacts on the environment - 95% of them beneficial

The breakdown of the 168 positive effects is:

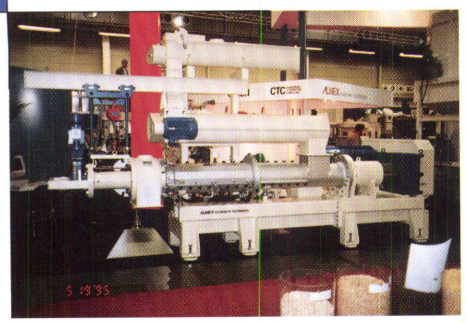
- Energy saving (35%)
- Material saving (33%)
- Lowered release of dangerous products (25%)
- Other (7%).



Health and Working Conditions

Just over half the projects were judged to have possible influences in this area. Of the 120 influences identified, 109 (89%) are favourable. The 109 positive influences can be classified as follows:

- Safety of use (28%)
- Quality of the working environment (27%)
- Biocompatibility or less dangerous products (18%)
- Other (28% - predominantly stress reduction).



Versatile plant for animal feeds

There is increasing concern over the food fed to animals and its effects on human health. Industrially produced animal feeds are mixtures of cereals, molasses, proteins and additives. In a conventional feed mill the ingredients are mixed, ground and heated to 65-85°C. The mixture is then passed through a pellet mill where it is formed into pellets of various sizes, depending on the type of animal.

Because the temperature is not high enough, this traditional manufacturing method fails to eliminate salmonella, an important public health concern. Several types of heat treatment have been devised, as an additional step in the manufacturing process, but they all require producers to invest in new and expensive processing plants.

Craft project CR-1155 began when a Spanish engineering consultancy sought industrial collaborators to address this problem of feed sterilisation. It teamed up with partners in Spain, the Netherlands and Denmark. The project has resulted in a manufacturing process that not only eliminates bacterial contamination, but is able to produce a much wider range of products than conventional feed mills.

It combines two feed manufacturing processes that are normally quite separate - expansion and extrusion - both of which operate at higher temperatures than traditional feed plants.

In an expander, the feed mixture is cooked at around 120°C at up to 20 times atmospheric pressure. The product comes out of the expander in the form of crumbles. Expanders are relatively cheap to run and are useful for feeds intended for farm animals.

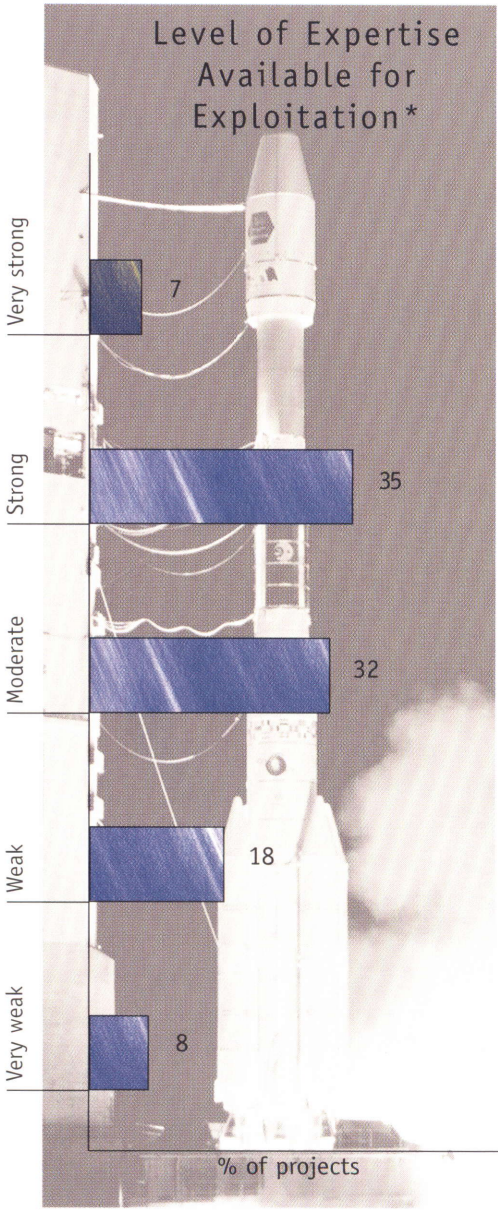
In an extruder, friction heats the mixture to about 165°C. Because of its relatively high energy consumption, extrusion is not economic for bulk animal feeds, and tends to be used mainly for pet foods. The feed is extruded directly into pellets.

Using the new equipment, changing from expansion to extrusion is simply a matter of changing the head of the machine. It allows even modest-sized factories to make both expanded and extruded products, and so cater to a wider range of customers. Other benefits include significant saving in formulation and manufacturing costs, lower maintenance costs (because a separate pellet mill is not required) and a reduction in atmospheric dust emission.

Project Ref. CR-1155

How strong is the commitment to market the results and how quickly does it happen?

Taking BRITE-EURAM to the Market



115 projects with at least 1 partner intending to exploit

** No direct comparison with 1993 results is shown, as the definition of the indicator has been modified.*

Market Orientation

Of the 131 projects covered by the Evaluation, 115 (88%) contain one or more partners who are considering exploiting the results.

The nature of exploitation varies and frequently results are exploited in more than one way. Thus, of those projects where exploitation is planned, four out of five are targeted for commercialisation, whereas around half are the subject of internal exploitation or technology transfer.

The Evaluation analyses the profiles of those projects which are the subject of commercial exploitation and finds that, typically, these projects:

- are vertically integrated (involving the developers, suppliers, producers and users of the results) and involve at least one SME
- relate to applied research
- involve partners with demonstrated exploitation capability.

Of the 131 projects, 83 are either at, or close to, the prototyping stage. Within these 83 projects, 87% cited one or more potential barriers to exploitation. The barriers cited were:

- Market related (36% - limited market, strong competition, lack of market knowledge)
- Manufacturing related (25% - results not cost effective, unsuccessful testing)
- Funding related (24% - lack of funding for prototyping, manufacturing scale-up or commercialisation costs)
- Partner related (15% - lack of a partner with the necessary industrial or commercial expertise).

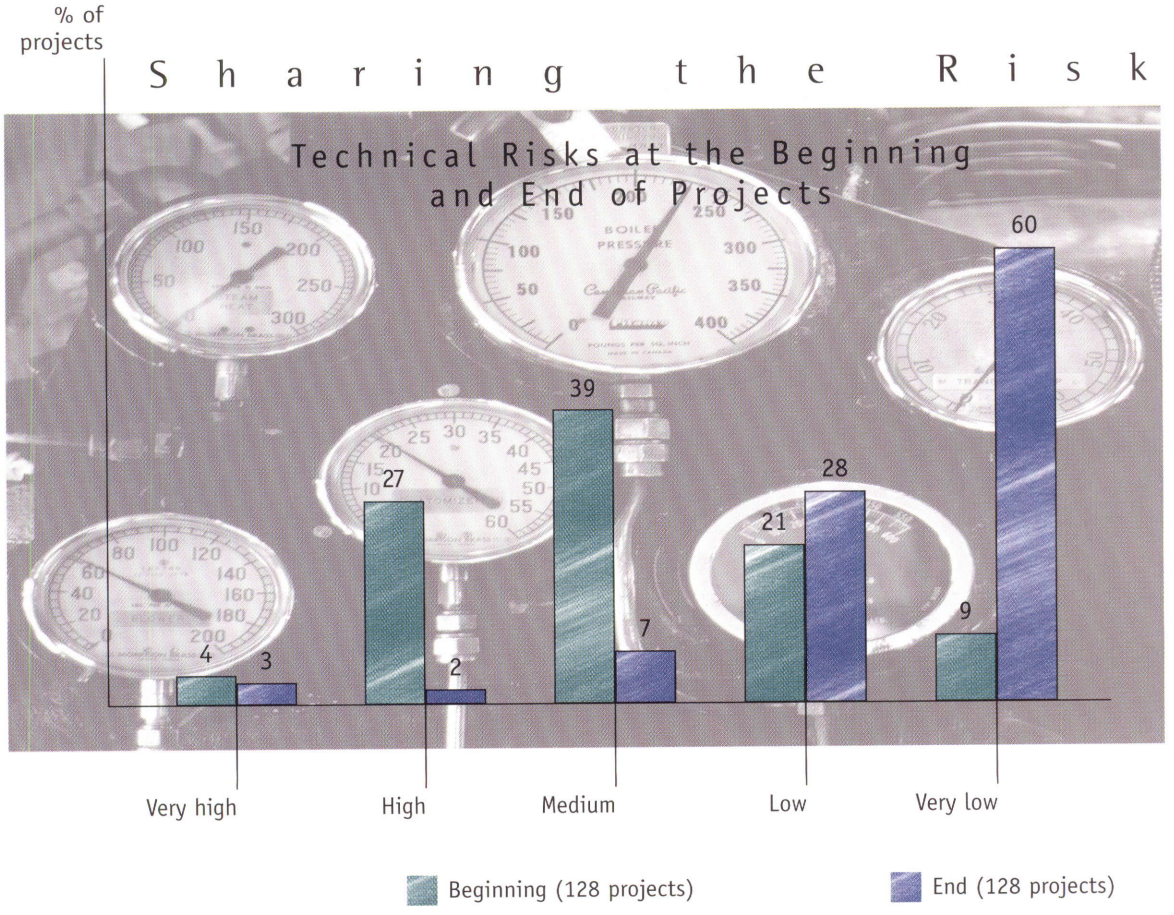
Time to market for technologically successful projects is continuing to fall

Sharing the Risk

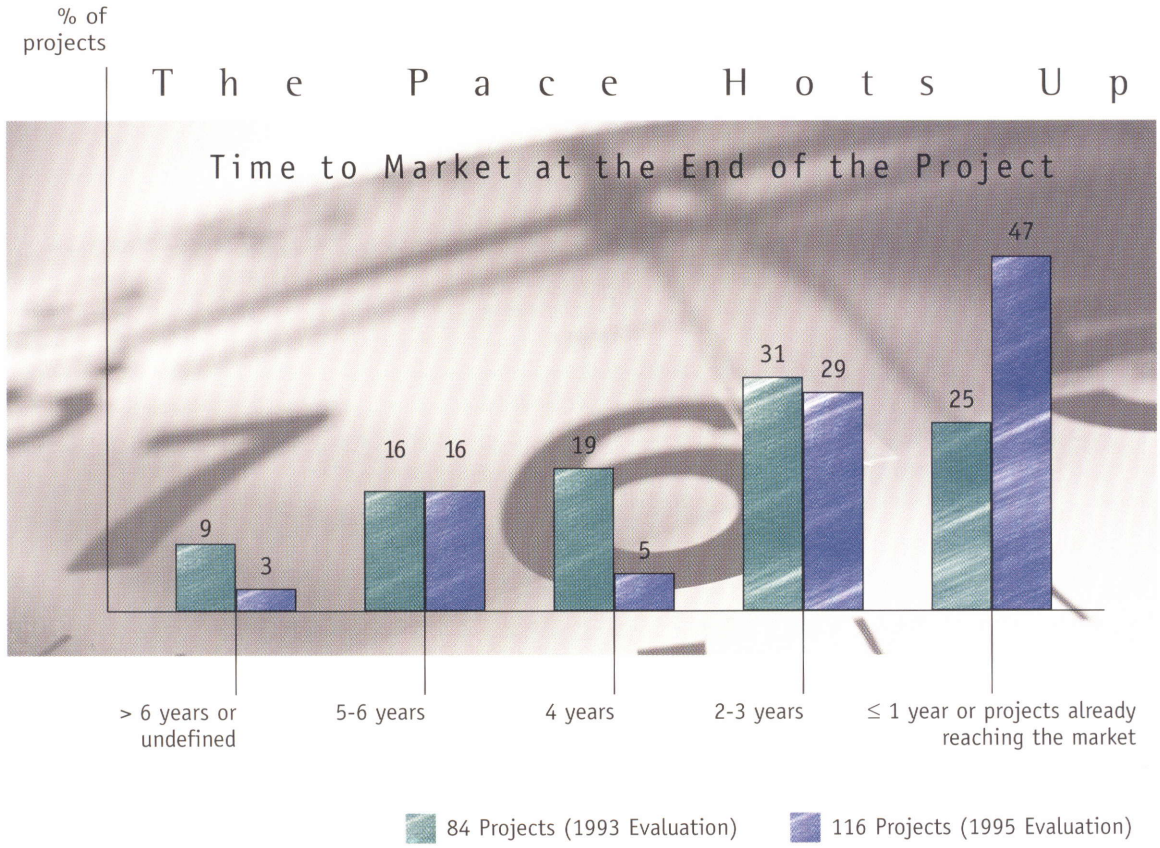
Early EC research programmes (those initiated in the mid 1980s) set scientific and technological goals. Today's programmes, by contrast, are more 'market-driven' and focus on 'application-oriented' research. This does not imply, however, that they are losing their precompetitive nature. Being precompetitive does not prevent a research project developing commercial applications. But it does mean that, at the start of a project, the risk of technical failure is high. High enough, in fact, for research to be required before commercial application of the results can be realistically considered.

The objective of 'application-oriented' EC precompetitive research programmes is to reduce the exposure of industry to this risk by sharing it, but leaving the final development and actual exploitation to the companies themselves.

One way to measure the effectiveness of the projects is, therefore, to compare the technological risks at the start of the projects with the remaining risks upon its completion. If a project is high risk at the start, but low risk on completion, this implies that an ambitious piece of research has produced results which are likely to be exploited. This comparison is shown below.



This continuing trend towards application-oriented research can also be seen in the way the average 'time to market' is dropping significantly. Of those projects that are ultimately technologically successful, the Evaluation found that, in line with previous surveys, the time taken to bring an application to the market is continuing to fall. Average time to market has fallen to 26 months, from 30 months in the 1993 report.



Exploitation Costs and Risks

The Evaluation analysed the risks and exploitation costs faced by projects on their completion. It found that the average cost of exploiting a project can be estimated at 3.2 MECU, compared to 2.7 MECU for the 1993 Evaluation. This rise can be attributed to the increasing technical complexity of the projects, and its consequent effect on the cost of production. These exploitation costs are 1.6 times the average cost of the original R&D (2.0 MECU) and are divided between costs of manufacturing (1.7 MECU), prototyping (1.0 MECU) and marketing (0.5 MECU).

Using AI intelligently

Industrial processes which use natural raw materials can be difficult to control, due to variations in the feedstock quality. Despite this, a mill producing wood pulp for the paper industry must produce a consistent product. Mills using recycled paper rather than virgin pulp have the same problem.

Recent developments in process control technology have included the use of computer-based artificial intelligence (AI) techniques. However, AI is long on academic pedigree, but short on successful application to real-world problems.

CLEAN has brought AI to the pulp and paper industries using a new approach known as case-based learning (CBL). A British SME and a Belgian university, both experts in AI, worked with a large German process control systems manufacturer. Two other partners, a Portuguese pulp mill and a Dutch paper mill, have demonstrated the commercial viability of the new technology.

CBL takes a middle ground between AI techniques, such as neural nets - which need extensive "training" on historical data - and fuzzy logic, which demands an accurate mathematical model of the process. It uses the current state of the process to predict how product quality will change as variations in raw material quality and process conditions occur. It does this by comparing the current set of process data with historical data and looking for the best match to give the highest product quality. If the current case has no precedent, it makes an informed guess about how to optimise the process.

By the time the project ended in January 1996, both the mills had working CLEAN installations: at the Dutch paper mill, energy consumption, starch usage, water consumption and product degradation all fell; the Portuguese pulp mill has seen process yield improvements and a reduction in the amount of reject material produced.

The next development will be a CBL 'toolkit' that will enable operating companies in various industries to add CBL to their processes quickly and simply.

Project Ref. BE-5285: CLEAN

Do partnerships created in the projects continue after they are finished?

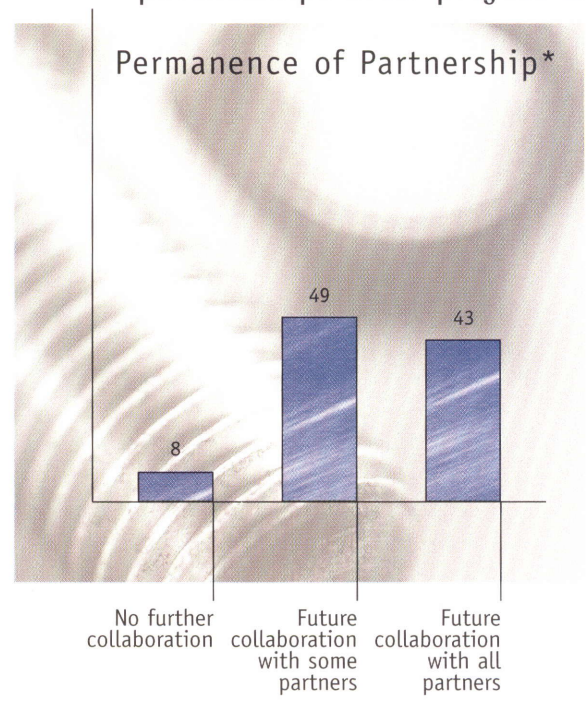
If projects are to be successfully completed and then commercially exploited, the consortium involved must demonstrate sufficient levels of cooperation, the project needs to be structured in a logical way and the collaboration requires strong management.
The Evaluation emphasised the contribution of the projects to the strengthening of European R&D networks, the efficiency of cooperation between the collaborators and the importance of having well structured projects.

Nine out of ten partners continue with some form of technical collaboration after the end of their project

Strengthening European R&D Networks

Part of the European Union's R&D strategy is to promote the formation of strong, long-term links across the European research community. The Evaluation confirmed that the BRITE-EURAM programme supports this policy, with an overwhelming majority of participants intending to continue partnerships after the completion of the project.

(92%) of participants will continue partnerships after project end



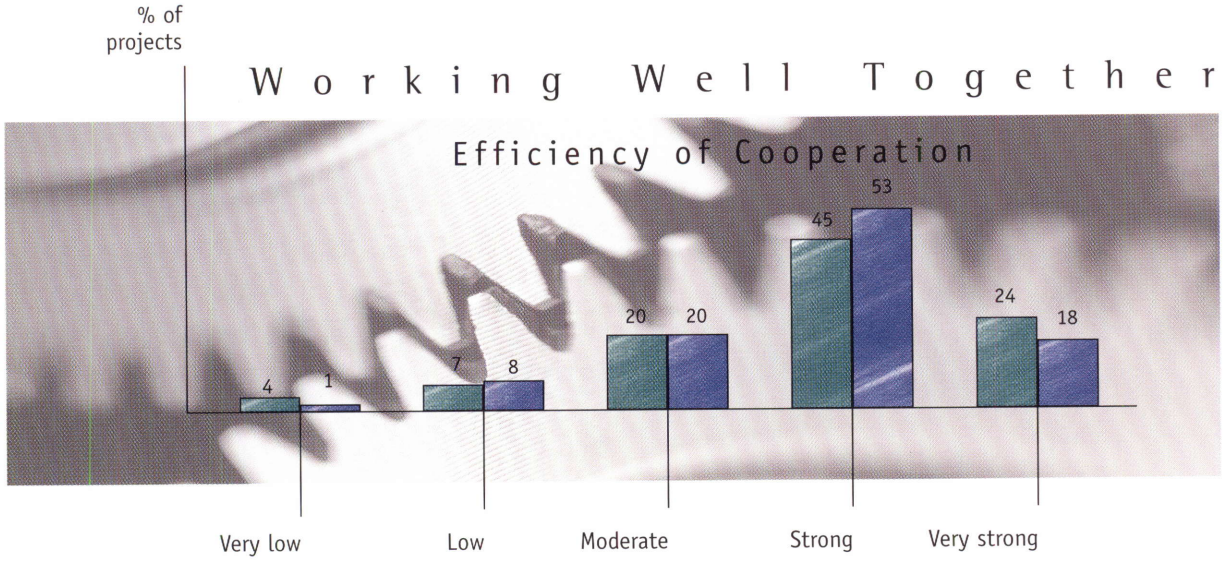
131 Projects (1995 Evaluation)

** No direct comparison with 1993 results is shown, as the definition of the indicator has been modified.*

Vertically integrated projects - where researchers, producers, users and suppliers work together - are the most successful

A second study, carried out by the EC itself, clarifies the types of further collaborations expected, and finds collaborative research related to the projects (in three quarters of cases), commercial development related to the project (60%) and collaborative research not related to the project (half) to be the most common.

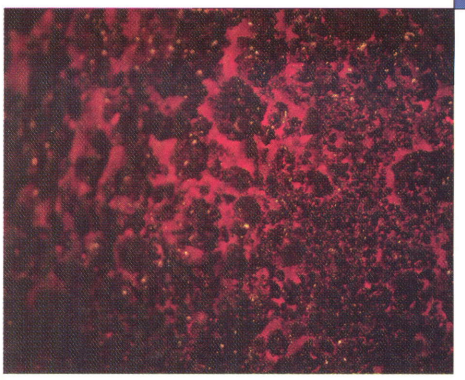
The Evaluation was in line with previous years, in showing a very high level (69%) of efficiency of cooperation between partners.



Structure of Collaboration

The effects of having the full "added value" chain, where at least one partner is a producer or end-user are considerable. Such projects are shown to:

- display higher capacity for exploitation
- acquire more know-how
- be better equipped to exploit their results
- generate greater economic gains
- find market applications in the shortest time.



Cutting the Cost of Recycled Aluminium

The competitiveness of recycled aluminium is set to improve. A new industrial process - developed by a small group of industrial and research partners - has drastically reduced the cost of treatment chemicals. The technology has already been proved on an industrial scale and should demonstrate considerable economic benefits in the coming years.

Industrial companies and research institutions in France, Belgium and Spain have developed a new method which allows aluminium scrap to be re-melted entirely without the use of the expensive chemical salts used to remove oxide layers. These oxides must be removed during the smelting process, but in the case of heavy contamination, larger quantities of salts are required, making recycling expensive. The new method relies on a phase separation technique which allows liquid oxides to be physically drawn off aluminium particles in a rotary furnace. The process was optimised by developing precise control of such factors as furnace temperature and air intake. Having refined the process in the laboratory in vessels of three and ten litre capacities, the partners progressively scaled it up to 20 ton pilot scale, and one of them is now ready to install it in a commercial smelting plant.

Competitors in Europe, the USA and Canada, are known to be working along similar lines, but the BRITE-EURAM partners seem to have beaten them to the draw. A European patent is pending.

Project Ref: PI-20

What can SMEs put into and get out of BRITE-EURAM?

Improving the Impact on SMEs

SME involvement has grown steadily, to the point where today, over half the projects have at least one SME partner

As major providers of employment and growth, SMEs represent a crucial part of Europe's industrial infrastructure, and improving the environment for SMEs has been a keystone European policy for many years. BRITE-EURAM contributes to this effort by endowing Feasibility Awards, which provide support for SMEs wishing to evaluate the feasibility of a research project and demonstrate their capability as project partners.

What Makes a Successful SME Partner?

The SMEs which will most successfully reap technological and commercial benefits usually fit a certain profile.

To make a meaningful contribution to the technological success of the project, these SMEs will:

- be users of, and test sites for, the applications developed
- provide the project with specialist know how
- provide technical input in specialised or niche markets.

The commercial exploitation of a project is most likely to prosper from the inclusion of an SME if the following conditions are met:

- the SME has at least 100 employees
- the project objectives are in line with the business strategy of the SME, and the SME is firmly committed to the commercial exploitation of the project results
- the SME has the financial resources to wait for at least the duration of the project before commercial exploitation
- the SME has access to international niche markets which are sufficiently large to be attractive, but not lucrative enough to attract competition from large companies.

A initiative to support SMEs, CRAFT, was launched in 1990, with the aim of helping even more SMES participate in BRITE-EURAM.

CRAFT projects:

- bring groups of SMEs with common R&D needs, but limited R&D resources, together with third parties who perform the R&D under contract
- are normally worth less than 1 MECU and last less than 2 years
- are aimed towards SMEs which have fewer than 500 employees, an annual turnover of less than 38 MECU and are not more than 1/3 owned by a single large company.

CRAFT is deliberately designed to be 'user-friendly' for SMEs:

- proposals can be submitted at any time
- application procedures have been simplified
- projects can start with an outline proposal, and can be developed with the help of funding through a financial 'expansion award'.

The impact of this strategy is clear: at the start of BRITE-EURAM (1989), the percentage of SME partners stood at 18%. This figure has risen steadily and the 1995 Evaluation showed that SMEs participated in 52% of the projects.

The CRAFT Scheme: an EC initiative to help SMEs participate in EC programmes

SMEs: Benefits and Obstacles

The benefits to SMEs of participating in BRITE-EURAM projects are considerable. The Evaluation found this to be true for both technological and exploitation issues.

Technological benefits include:

- the acquisition of state of the art information and technology
- access to new techniques offering improved products, processes, quality and productivity
- the potential to develop entirely new products.

Exploitation benefits include:

- the widening of the customer base by the introduction of novel products and processes
- the improvement of the SMEs' image in the market place
- increased sales resulting from product or process improvements
- in a minority of cases, access to new markets via successful new product launches.

Letting the Train Take the Strain

Regular rail travellers are aware that, although the train is among the safest forms of travel, when accidents happen the rolling stock does not always offer the best protection. TRAINCOL partners have developed new software packages which allow manufacturers to design safety into railway locomotives and carriages.

One of the major causes of injury and death in rail accidents is the tendency for one train to "ride over" another in the event of a collision. To absorb the huge energies of impact, most rolling stock is designed to crumple in a crash, which is not good news for carriage occupants.

The TRAINCOL project - bringing together partners from Portugal, France, Spain and the United Kingdom - carried out a systematic series of crash tests, which allowed researchers to correlate actual and theoretical damage assessment. Relating this to passenger safety, the project developed a model for simulating likely injuries in the event of a train crash.

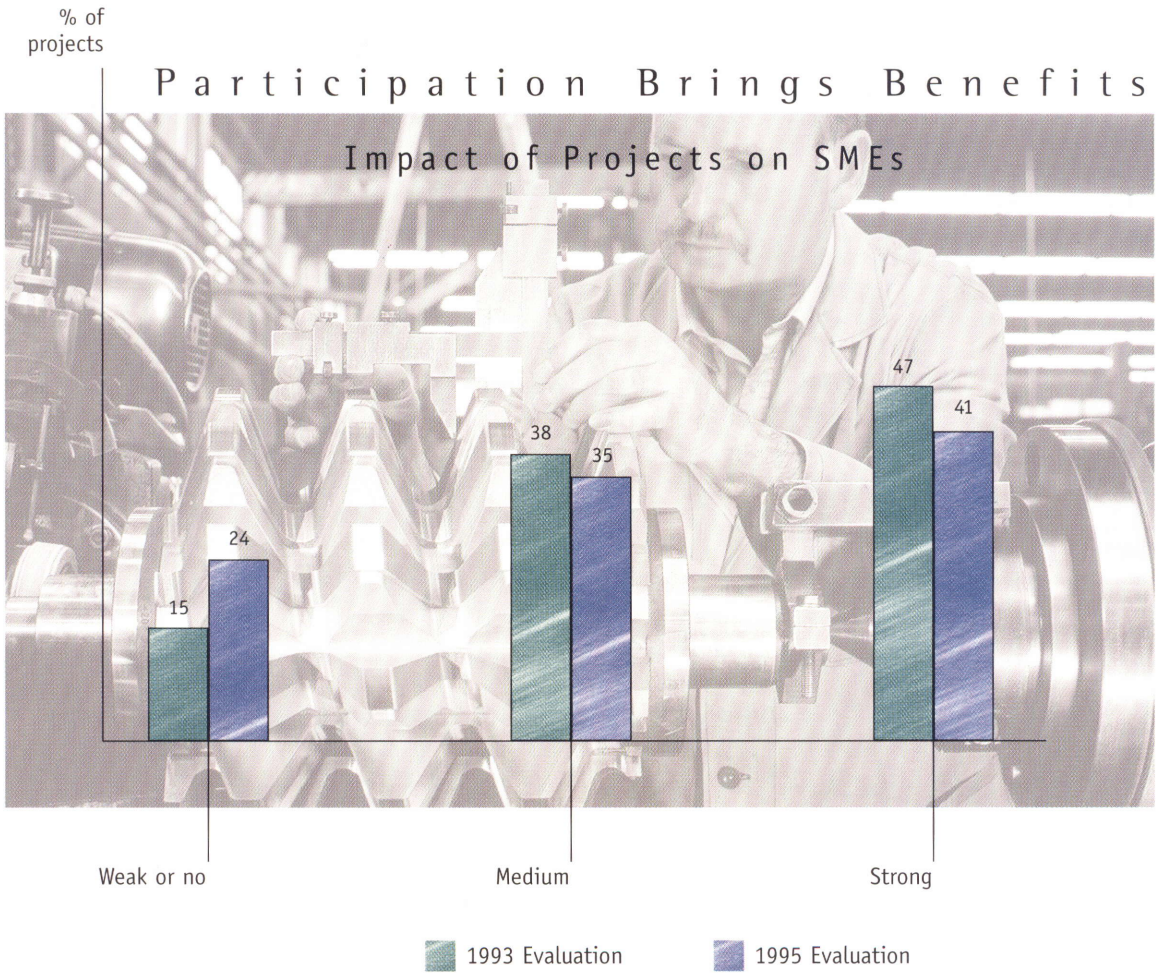
Algorithms developed by the partners led to the production three-dimensional computer modelling packages, which now allow designers to develop safer rolling stock faster. The techniques devised by the partners have already been put to good use - they were used in the design of the new Lisbon Central Line - and a four-year follow-on project, aimed at further developing crash test methods and design approaches, is underway.

Project Ref: BE-3385

SMEs' Performance Evaluated

Of the 131 projects evaluated, half contained at least one SME. Within these, SMEs either coordinated or played a leading role in two-thirds.

The economic impact of the projects on participating SMEs is significant, with three-quarters registering a moderate or strong effect.



What other factors are at work?

The Evaluation also considered such issues as project clustering, long term research and training needs.

Projects Clustering

Recent moves towards clustering projects - grouping two or more projects under a broader technological umbrella - is bringing strong advantages. Clustering helps avoid duplication, promotes synergies in disseminating results and raises awareness of related work in the field. The Evaluation concluded that:

- clustering appears to offer these advantages to half the projects surveyed
- the partners interviewed were broadly positive, but expressed concern over both the extra funding required to administer the clustering, and the safeguarding of confidential information
- to be most effective, clustering should be considered at the beginning (proposal stage) of projects.

Long Term Research

Some 29 projects were identified which offer industrial potential more than five years after the completion of the Evaluation, which concluded that:

- the majority of the projects are fundamental in nature, and offer limited spin-off potential
- these projects need to be particularly flexible in their approach to setting and modifying research targets in response to changing market requirements.

Training Needs

The Evaluation showed that while training is a secondary factor in determining project success or failure, a general need for technology management training is clear. Areas for improvement include:

- the need for researchers to better understand market requirements, and plan research accordingly
- improvement of intellectual property rights protection
- more efficient commercial exploitation of results
- better integration of technology and technological change into strategic planning

Project clustering brings strong advantages

Conclusions and Recommendations

How BRITE-EURAM Projects are Evolving

- the trend towards more industrially oriented projects continues
- more SMEs than ever are participating (now 52% of projects)
- almost 90% the projects contain at least one partner considering commercial exploitation of the results
- 40% of the projects have concluded exploitation agreements.

Real Achievements, Positive Impact

- the projects demonstrate strong technological achievements
- technological cooperation is efficient and, in the majority of cases, continues after the end of the project
- the environmental impact of the projects is positive
- average economic gain per project has dipped since the 1993 Evaluation, probably reflecting difficult economic circumstances at the time of the survey, but also indicating the wider, more even, spread of these gains
- the impact on SMEs is strongest when they play a leading role in projects, and when there is a firm commitment to commercial exploitation.

Keeping BRITE-EURAM Focused on the Future

- assessing exploitation potential is crucial in the selection of projects. Does the project meet clearly identified user or society needs? Will the results offer a cost effective and sustainable product or process?
- continual studies of technology and market feasibility should be carried out through the lifetime of the project. Research objectives should be flexible and tailored to the results of these studies
- clustering should be strengthened by increasing partner confidence and developing common strategic goals
- better analysis of exploitation potential is required for the individual partners, rather than for the project. The real impact evaluation - of projects which were completed 5 years ago - currently being carried out, will produce this analysis.

Conclusions and Recommendations

Optimising the Project

What are the Secrets of Technological and Commercial success?

The Evaluation investigated the factors behind the success or failure of projects at both the technological and exploitation levels.

For a project to be technologically successful, three crucial factors were identified:

- at least one of the senior partners should have a vital economic interest in the outcome of the project
- the technical objectives of the project should meet clearly defined user needs
- there should be strong project leadership and management.

Successful commercial exploitation is likely to occur when:

- the results are economically competitive with existing products or processes
- the project objectives are consistent with the business strategies of the industrial partners
- the project is 'vertically integrated' - the full 'added value' chain (supplier, developer, user, manufacturer) is represented in the consortium
- the market potential for the results is assessed at the outset of the project, and is continuously monitored through the lifetime of the project, with research priorities being set accordingly
- the industrial partners have the appropriate distribution and marketing expertise, and have access to the relevant markets.

Successful projects normally contain 8 key elements

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A comprehensive study was carried out in 1995 to evaluate the impact of the research actions under the Brite-EuRam II programme (1991-94). The study evaluates the impact of projects which came to an end in 1994, and is a continuation of the analysis done in previous years on every finished project (EUR 15276 - ISBN 92-826-6349-3, EUR 16877 - ISBN 92-827-6779-5, EUR 16878 - ISBN 92-827-6780-9).

The major results of the impact of the European Commission RTD action are given in this report. Key parameters for the success or failure of an industrial cross border research project are also indicated.

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