# Innovation & Technology Transfer

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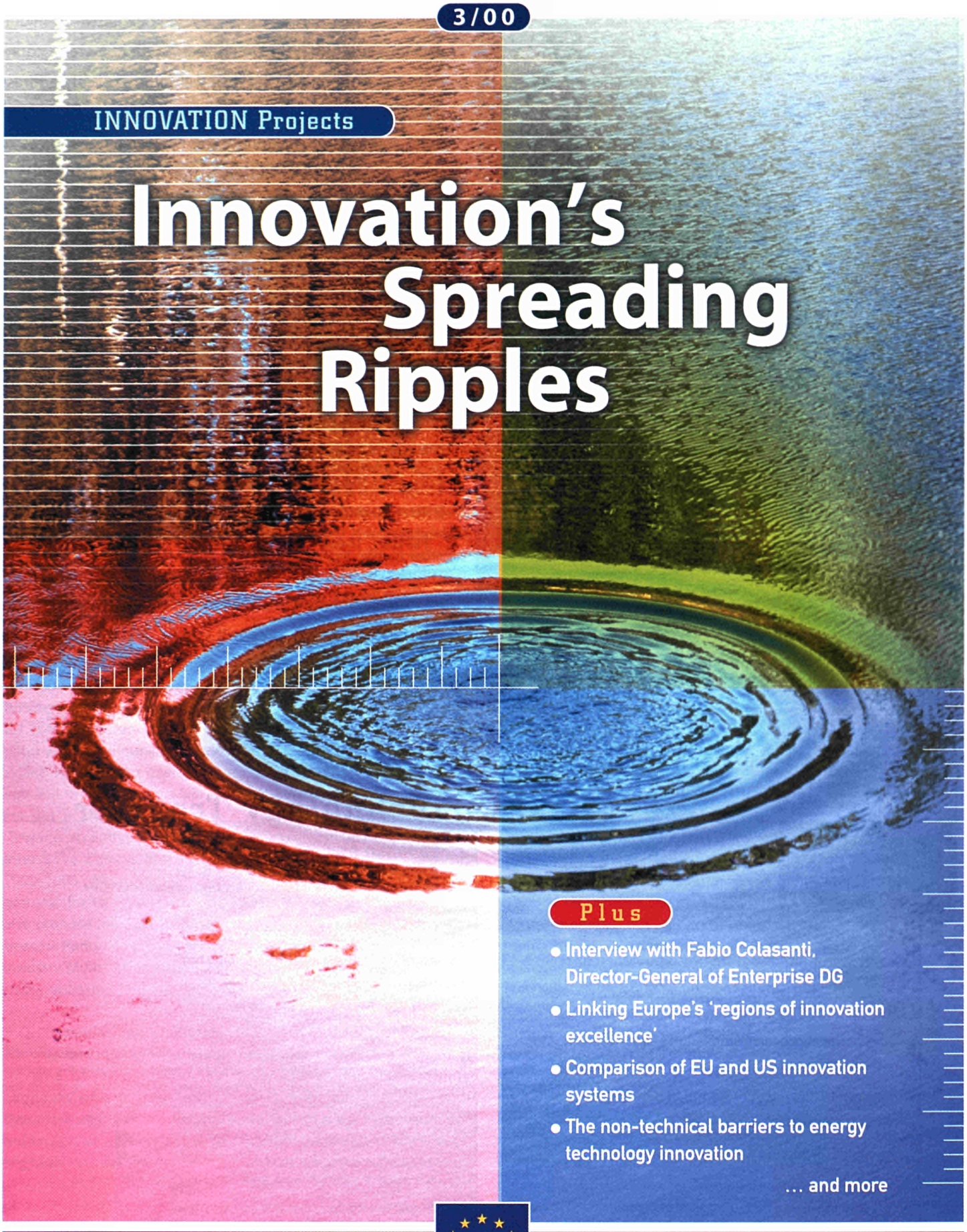
INNOVATION Projects

# Innovation's Spreading Ripples



Plus

- Interview with Fabio Colasanti, Director-General of Enterprise DG
- Linking Europe's 'regions of innovation excellence'
- Comparison of EU and US innovation systems
- The non-technical barriers to energy technology innovation

... and more

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INNOVATION/SMEs PROGRAMME • MAY 2000

CONTENTS



# Towards Sustainable Innovation

Like ripples in a pond, the effects of the new generation of Innovation projects will persist and spread long after the funded projects themselves have ended.

Most of these projects will involve practical, hands-on transfers of technology, knowledge or know-how – from universities to industry, between sectors, and between countries. But at the same time they will, quite explicitly, address the process of innovation itself. The partners will be encouraged and assisted to identify the non-technical sources of technology transfer 'friction' – the cultural, institutional, organisational and regulatory barriers which prevent or slow the spread and adoption of new technologies, especially by small and medium-sized enterprises.

Projects which face shared problems are likely to be clustered, and will be helped to develop common solutions by intermediary experts with extensive cross-sectoral experience, such as science parks, business schools and chambers of commerce. The aim is to develop procedures, tools and linkages which the companies involved can apply repeatedly, after the project is over – in other words, to strengthen their innovative capacity.

Further, these solutions will, by their very nature, be sufficiently generic to be of use to other SMEs. Through the intermediary partners, as well as through newly established European platforms, they will rapidly become available to wider networks of companies, strengthening the innovative capacity of Europe as a whole.


Innovation & Technology Transfer

Innovation

*Innovation & Technology Transfer* is published six times a year, simultaneously in English, French, German, Italian and Spanish, by the Innovation and SMEs programme, part of the European Commission's Fifth Research Framework Programme. The Programme promotes innovation and encourages the participation of small and medium-sized enterprises (SMEs) in the framework programme.

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# Strategic Vision

***Fabio Colasanti took up his post as Director-General of the European Commission's Enterprise DG on 1 January. How does he see the future?***

**Q: What will be the central issues for European Union enterprise policy over the next few years?**

FC: The task of EU enterprise policy is to establish conditions which help European firms to improve their competitiveness. This means removing the barriers which hamper start-ups, entrepreneurship and innovation. Macro-economic policy and job-creation schemes alone will not produce sustainable growth and employment. Dynamism, adaptability, self-confidence and know-how are also key factors. Europe's risk-taking entrepreneurs must be properly rewarded.

In comparison with Japan and the USA, Europe's economic dynamism is currently constrained by lack of seed capital, rigidity, inertia, skills shortages and red tape. Our job is to foster a business environment in which EU companies can prosper, expand and hire more and better-skilled workers. Our goals, strategy and practical actions will be set out in the Communication 'Towards an Entrepreneurial and Innovative Europe' and in the 2000-2006 Multi-Annual Programme for Enterprises. We will also propose the '2000 Competitiveness Report' to the Council of Industry Ministers as a basis for policy decisions.

**Q: Commissioner Liikanen has said that innovation should be "one of the main guiding elements" of enterprise policy. Does this apply to traditional industries, as well as to emerging high-tech sectors?**

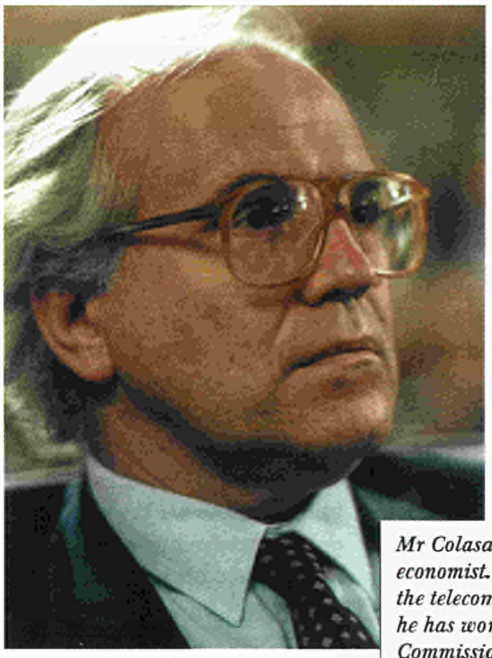
FC: Traditional industries, just as much as high-tech ones, must innovate in order to survive and thrive. 'E-businesses', the new information and communication technology (ICT) companies, are spearheading change, but the 'new economy' will rapidly extend to traditional sectors as they make use of these technologies. Enterprise policy must encourage and foster this process.

Innovation requires not only technological change, however, but also creativity, entrepreneurship, geographical and professional mobility, and a willingness to take risks. It is a question of culture and attitudes as well as of research and development. In Europe, we still distrust entrepreneurial success almost as much as we fear failure. We need to teach managerial skills, inculcate entrepreneurial attitudes among workers, and network one-stop shop support services for entrepreneurs and SMEs.

To lift unnecessary administrative burdens on SMEs, we will adopt a 'think small first' approach – regulation should be tailored to the needs of enterprises, not vice versa. Of course, measures to support SMEs need to be adapted to national and local needs. Our task is to co-ordinate these measures, and tools such as the Trend Chart on Innovation[1] will help us to enhance efficiency at the interface between national and EU policies.

**Q: Can regulation and standardisation contribute to innovation in Europe? How can innovation concerns be integrated into these policy areas?**

FC: Europe's public authorities should regulate less, but better. Lightening the administrative burden on entrepreneurial talent is increasingly a necessity – for example, a 'command and control' regulatory approach to the Internet would be disastrous. Where we have to regulate, we should do so by consent. I foresee a growing role for voluntary agreements, designed to release entrepreneurial potential whilst safeguarding the public interest.



*Mr Colasanti was trained as an economist. Following six years in the telecommunications industry, he has worked for the European Commission since 1977 – from 1988-95 as head of the economic forecasting and macro-economic policy analysis units of the Economic and Financial Affairs DG. During the second half of 1999, he was deputy head of Romano Prodi's office.*

Standardisation in Europe has always been demand-driven, and achieved by consent. Standards should function not as constraints on competition, but as tools enabling entrepreneurs to create and compete – as an input to the process of innovation and a means to create new markets. The Commission is taking action to ensure that conditions are right for the effective use of ICT and e-commerce, for example.

**Q: How significant as an engine of European competitiveness is Europe's leadership in the field of third-generation**

●●●

*(1) For information about the Trend Chart, see this edition, page 9.*

© Ericsson

*EU-coordinated market liberalisation and technical standards created favourable conditions for successful innovation by European companies in the field of mobile telephony.*

●●●

**mobile telecommunications – and are there opportunities to replicate this success in other technological areas?**

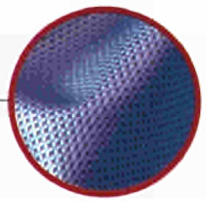
FC: Even quite recently, there was general pessimism in Europe about a widening technology gap in the area of ICT. This is no longer the case. The full liberalisation of EU telecommunications markets, combined with the development and implementation of pan-European standards in the framework of EU research programmes, has enabled European industry to press home an important advantage in mobile communications and digital TV.

Europe is now the fastest growing ICT market in the world, and has secured a leading position in the key areas of business software, mobile applications and security services. Internet connectivity and electronic commerce are developing fast. The European telecoms market, worth €160 billion annually, is now the single biggest contributor to economic growth.

As investments start to flow, and telecoms, IT and media industries converge, Europe is transforming research into large-scale market success. Mobile Internet and digital broadcasting, for example, could enable Europe to lead the world in e-commerce, with a considerable multiplier effect for the creation of new firms and new employment. ●



# Weaving Webs of Knowledge



***The European Technology Transfer Network (ETTN) is an experiment exploring how the transborder flow of technologies within and between Europe's industrial sectors can be improved. Using ICTs to give SMEs access to knowledge and technology is proving to be key.***

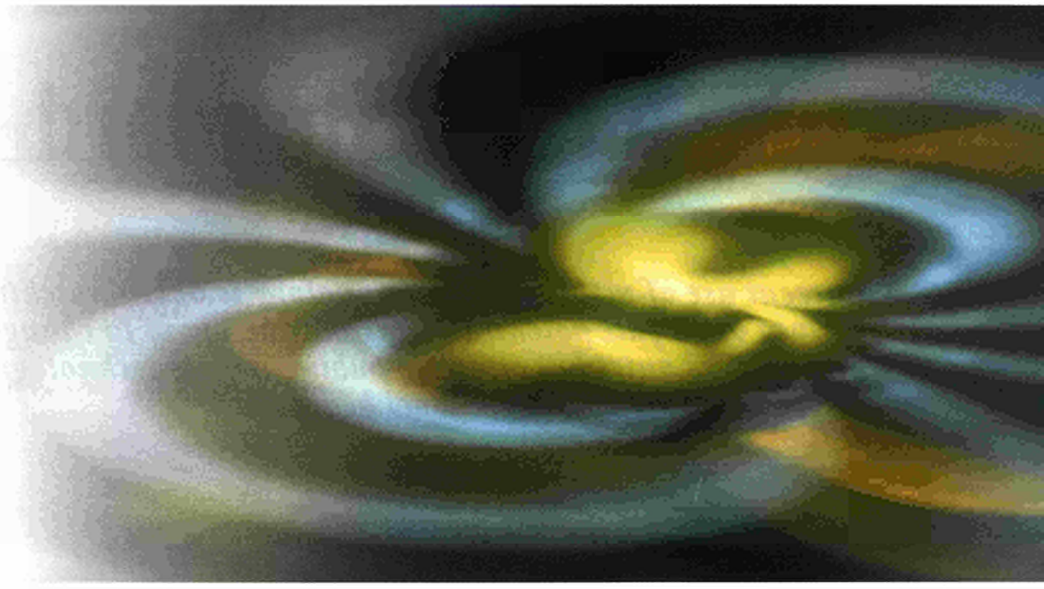
When the European Commission approved the European Technology Transfer Initiative (ETTI) in January 1998[1], a virtual technology park (VTP) was among its five recommended elements. ETTN, the eventual outcome of that recommendation, was set up to test the appropriateness of new information and communications technologies (ICTs) for fostering technology transfer and overcoming some of the intrinsic difficulties SMEs have in gaining access to such tools.

ETTN comprises support and user components. The support side provides market analysis as well as secure telecommunications and applications software which give SME users access to tools ranging from standard web browsers to advanced multimedia services.

## Twin hubs

On the user side, twin hubs are being developed at the centre of ETTN's user communities. The first adopts a multi-sectoral approach to technology transfer.

*(1) See also 'Catalytic Conversion', edition 3/98.*



The idea, according to the Commission's Directorate-General for Enterprise, was to identify and satisfy the technology needs of SMEs through a technology-request approach. The multi-sectoral hub is structured as a consortium of 15 SME platforms, set up at existing business-support institutions with established client bases. Physically, it has at its core the ETTN website, with which each platform communicates securely over the Internet.

The second hub, by contrast, is a sectoral initiative modelled on the virtual technology park recommended in the ETTI feasibility study. In essence, it aims to replicate the services of an ordinary technology park but without the bricks and mortar. The long-term ambition is to create value-added on-line services with the potential for commercialisation.

## Done deals

The multi-sectoral hub is making good progress. Before it is placed on the ETTN website, each technology request is audited to ensure it cannot be met by a local business. Eleven platforms have each posted 25 fully audited requests or more already, and the others are not far behind.

Lately, the balance of attention has shifted towards finding the partners to answer the requests. Twenty success stories – contractual agreements between transnational partners which 'met' through the ETTN hub – are already in prospect.

Take the case of Scottish manufacturer, Xantac Chemicals. It produces a permanent puncture sealant for pneumatic tyres. In May 1999, the company submitted two requests to ETTN in the hope of identifying new delivery systems for its 'Tyresafe' product. Seven SME platforms proposed solutions and now, thanks to ETTN, two companies have been selected as suppliers. Confidentiality agreements have been exchanged and negotiations are currently under way for the supply of two new delivery systems. An essential part of its business strategy, Xantac forecasts that the new delivery systems will increase turnover from €14 million to €114 million over three years.

## E-business model

The sectoral hub is also enjoying success. Platforms have been established for the construction, food-production and software sectors, each with its own character. Connet is a portal to technical information for the whole of the European construction industry. Nice-Food brings together five food technology research centres in a relationship similar to that between the multi-sectoral SME platforms. And Viking is a network of IT industry associations in six countries which see great benefit in pooling information about their members' technical products and capabilities.

Connet shows special promise. The partners have developed five powerful services. An on-line technical information centre gives access to scientific and professional information for the construction industry, such as best practice guides and standards. A highly structured manufactured product index enables users to identify products matching specific requirements, and appropriate suppliers. A calculation and software centre gives access to the offerings of around 1,000 software vendors with expertise in the construction sector, which can be downloaded, used on-line or bought in the normal way. In line with EU environmental policy, an innovative telematic waste exchange centre acts as a market place for the selling and buying of waste and demolition material. And finally, there is an electronic news service.

Connet is currently expanding. As the project enters its second phase, the partners are looking to bring other countries on board and to develop further their suite of on-line services. They are also keen to secure the network's future. In parallel with its services, Connet has developed an electronic commerce business model. The network receives a small fee from each sale made by the publishers who provide the information accessed by users through the technical information centre.

The project is unique. The Enterprise DG is not aware of anything similar, anywhere in the world, and strong interest in joining the project has been voiced in the US and Australia. ●

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# Setting a High Standard

***Current use of mobile phone technology is only scratching the surface of its full potential. This may be about to change, however, as quiet but effective public-private technological co-operation at European level bears fruit.***


*A concept design by Nokia for a future 3G mobile terminal incorporating voice, e-mail, web and video communication.*

"Convergence of information and telecommunications technologies has had little impact on mobile telecommunications – until now. For 2000 is the year when the would-be successor to today's mobile technologies will be launched on a rapid trajectory towards commercial reality. The third generation (3G) is about to overtake the second (2G).

In Europe, 2G is virtually synonymous with GSM (Global System for Mobile Communications) technology, which emerged from European research. Rolled out commercially in 1992, GSM has become the *de facto* standard across the continent, giving users the benefit of international roaming. In the US, by contrast, competition between incompatible technologies prevails – a Bostonian's mobile may not work in Chicago.

But talk, for which GSM was designed and is predominantly used, is not the whole picture, and data transmission on 2G is slow. Enter UMTS (Universal Mobile Telecommunications System), a 3G system permitting data-transmission rates now found only on desktops. The UMTS vision is of a communications environment where the PC is a thing of the past, and all types of networks – fixed, mobile or satellite – are interoperable, irrespective of the user's terminal, network or geographical location.

## UMTS' European advantages

UMTS is only one among several contending 3G technologies, but in Europe at least it enjoys distinct advantages. First, it is the fruit of Community research. Mooted in the Third Research Framework Programme (FP3) in 1989, it matured under FP4 into a standard adopted by the European Telecommunications Standards Institute (ETSI).

Secondly, it has strong support from network operators, manufacturers, regulators, and service providers in Europe and beyond. Together, 170 of them formed the UMTS Forum in 1996 under the guidance of the European Commission, which was instrumental in its launch. "The European sector needed to reach consensus on the technological and business opportunities for 3G," says Dr João Da Silva, current Head of Mobile and Personal Communications in the Commission's Directorate-General for Information Society.

Thirdly, UMTS has the ear of European Union regulators. The European Commission's recommendations to the Council of Ministers took account of the UMTS Forum's work, and were the result of a broad consultative process. The resulting Council Decision calls for commercial introduction of UMTS services in 2002 and the preparatory adoption of national 3G licensing systems in 2000. National regulatory authorities in the Member States must make UMTS licences available this year, requiring successful licensees to begin commercial roll-out of UMTS in 2002. Finland has already awarded four national 3G licences, and other Member States will follow in the coming months.

So pity those in other parts of the world, who must change phones when travelling between cities. In Europe, by contrast, national 3G licensing regimes designed to stimulate competition among service providers allow Europeans to look forward to affordable access to any information at any time anywhere in the EU – all from a single handset. ●

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# An Underused Resource

***In academic and industrial research, women are still at a clear career disadvantage compared to men. Not only do individuals suffer – innovation and productivity are also hindered. New EU initiatives will recommend policy changes to ensure that women scientists get a fair deal.***

"There are not enough women in research in Europe," says Philippe Busquin, Member of the European Commission responsible for Research(1). Although women account for 50% of university graduates, higher up the career ladder the proportion falls – to well below 10% at the top. Women make slower progress, have to publish more to get the same recognition, are poorer paid and are less likely to win grants or venture capital backing.

Some private companies are more 'family-friendly' than others, but in 57 large companies studied in Germany in 1995 only 1.2% of top managers were women. Life science industries employ more women scientists than physical sciences or engineering, but still far fewer than men.

## Need for action

The European Union's 1999 Women and Science initiative(2) includes EU and national measures to increase the participation of women in research. Women scientists' networks will promote participation in the Fifth Research Framework Programme (FP5) by raising awareness, and by increasing the number of women on its evaluation and monitoring panels. National policies promoting women in science will also be reviewed.

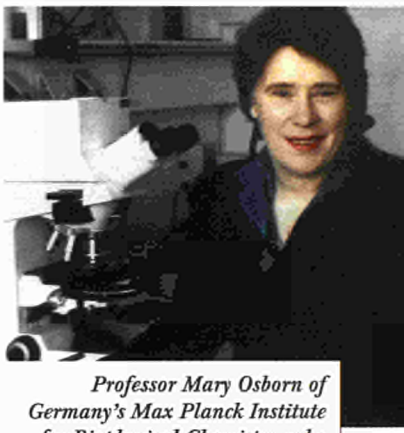
One of the topic groups of the European Technology Assessment Network (ETAN) is addressing the gender balance in research policy(3). The group identified an urgent need for data on employment in public and private sector research, segregated by gender and level of achievement. Nicole Dewandre of the European Commission's Directorate-General for Research says: "This is something we are discussing with Eurostat, within the Commission, with Member States and on an international level with the OECD." Only when comparable data exist can progress be monitored.

The ETAN group also looked at the scope for women scientists to combine professional and family roles, and at ways of increasing their chances to take leading positions. Its proposals have teeth – unlike previous well-intentioned Council resolutions on equal opportunities. "We cannot afford to sit back and wait for change," says Professor Mary Osborn, the group's Chair. "Instead, progress should be ensured by redistribution of funding."

The ETAN report recommends an EU Directive requiring employers of 50 or more people to keep gender-separated statistics on employment and pay. This will oblige the Member States to develop laws on gender monitoring. New national laws are recommended on gender balance in public bodies and on access to public records, to prevent nepotism. Discriminatory regulations – for example, time limits on research contracts which make career breaks impossible – should also be removed.

## Measurable improvement

Equal opportunities for women were specified for the first time in FP5, which also has a Gender and Science Watch system to monitor gender balance. The ETAN group calls for gender equality to be 'mainstreamed' in FP6, with a minimum of 30% women on policy, grant and monitoring committees by 2002 and 40% by 2005. Other practical proposals include support for independent scientists ('Eurogroups'), one-time grants to support occasional costs, and support for networking. ●



*Professor Mary Osborn of Germany's Max Planck Institute for Biophysical Chemistry, who chaired the expert working group on gender balance in research policy.*

*(1) Towards a European Research Area, COM(2000)6. The full document can be downloaded from http://www.europa.eu.int/comm/research/area.html*

*(2) The Women and Science Sector homepage is at http://www.cordis.lu/improving/src/hp_women.htm*

*(3) The ETAN Report can be downloaded from the Women and Science sector homepage.*

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# Sharing Start-Up Know-How

***Innovative start-up companies in Finland quickly come up against a problem – the small size of their home market. With only 5 million inhabitants, Finland is a good place to test new products – but to achieve sustained growth companies must enter larger markets abroad.***

*Otaniemi Science Park's main building, Innopoli, houses 140 research- and knowledge-based businesses. It serves as a springboard for the internationalisation of many of the 20-30 high-tech companies created each year by the incubation activities of the nearby Otaniemi Technology Park.*

Otaniemi Science Park, on the campus of Helsinki University of Technology, sees helping start-ups to access international markets as a key service, and is always looking for ways to identify international contacts, potential partners or customers for its tenant companies.

These efforts are currently being supported by a pilot action of the Innovation and SMEs programme which addresses the creation of new firms. The action will establish a 'club of excellence' for regions across Europe with a proven track record in encouraging start-ups. Regions, represented by public or semi-public organisations, will describe and evaluate their methodologies and share their results with the other members of the club to spread best practice.

## Building links abroad

"The main benefit we hope to gain from the project is to find partners in other science parks, offering the means to open access to a bigger market for our tenants. To help them establish networks in key export markets, we have to develop such partnerships with organisations in other Member States," says Lauri Ylostalo, managing director of Otaniemi Science Park.

"Marketing is a key area where we have to help companies a lot – especially for Internet start-ups which target a global market. Finland is a small country, so although companies may test the viability of a business idea in the home market they quickly have to look abroad if they are to achieve long-term success."

In return, Ylostalo expects the Otaniemi Science Park to contribute to the club by sharing innovative methods of tracking down the entrepreneurs needed for successful start-ups. Its staff actively seek out projects with commercial potential, and approach research students in laboratories and university departments.

A number of tools and methodologies have been developed to support this activity. Under the InnoTULI programme, for example, 100 research ideas a year are evaluated by a multi-disciplinary taskforce of business and technology experts, which identifies the most suitable route for commercialising the best ideas. Sometimes this leads to the creation of a start-up, sometimes to the sale of a patent to a larger company.

The Spin-off programme (Spinno) provides a second, deeper evaluation of ideas that lend themselves to the creation of a new company. Since 1990, 700 business ideas have been evaluated, of which 300 were accepted into the programme. For just €538, entrepreneurs attend a 12-18 month workshop programme which takes them through every stage of business plan development. They also have access to consultancy, legal and financing services. The process has created 220 new companies and 1,000 new jobs.

## Hot region of Finland

The Science Park is part of the Otaniemi cluster – a high-tech area centred around Helsinki University of Technology. It forms one of northern Europe's largest concentrations of technology-related businesses, research labs and education institutes. In 1999, *Business Week* magazine ranked the Otaniemi area in its list of the top ten 'hot' regions worldwide. It

Innovation

## The Innovation/ SMEs Programme In Brief

**Part of the EU's Fifth Research Framework Programme, the 'Innovation and participation of SMEs' programme promotes innovation and encourages the participation of small and medium-sized enterprises (SMEs) in the framework programme. The Programme Director is Mr G.C. Grata (Innovation Directorate, Enterprise DG).**

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is the home base of established companies such as Nokia, and young start-ups like DataFellows which specialises in virus protection systems.

The park was established in 1987 and is operated by a private company with 60 main shareholders including academic institutions, the local authority and local companies representing a range of industries from information technology to banking. It has 250 tenants with between 40 and 50 new companies entering incubator units each year. They stay between two to four years before moving into the main business generator unit.

## Cross-fertilisation

In the framework of the European Commission's pilot action, Otaniemi Science Park represents southern Finland's Uusimaa region. Fifteen selected economic areas of excellence have been grouped into four networks, according to thematic priorities and previous links.

Uusimaa is part of the *Highest* network – which also includes Alpes-Maritimes in France, Torino in Italy and Malmö in Sweden. The partners have a common interest in the field of information and communication technologies. Otaniemi already has established links with the Sophia Antipolis Science Park in the Alpes-Maritime region, which took the lead in bringing the group together.

The *Kreo* network brings together the regions of Oxford, Karlsruhe, Lyon-Grenoble and Emilia-Romagna. *Spring* links Stockholm, Cambridge, Stuttgart and Madrid, and *Panel* Munich, Milan and Barcelona.

The pilot action, launched in May 2000, aims to create a framework for regions to communicate with each other and exchange ideas. This cross-fertilisation of ideas is intended to create a 'best of breed' model for the development of start-up companies, and to establish links between the participating organisations which will continue in the future. ●

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TREND CHART ON INNOVATION

# Charting the Innovation Landscape

***In June the Commission will publish for the first time an overview of the measures being taken by Member States to encourage innovation. The report produced under the 'Trend Chart on Innovation in Europe' highlights major trends and provides a benchmark for future analysis.***

With the Innovation Trend Chart the European Commission is building up a detailed picture of the measures undertaken across Europe to promote innovation and technology diffusion. It identifies how Member States are addressing the three priority areas set out in the First Action Plan for Innovation in Europe – fostering an innovation culture, establishing a framework conducive to innovation, and gearing research to innovation[1]. Future reports will employ this overview as a baseline for evaluating the success of the different approaches and schemes identified.

The Trend Chart report is compiled twice a year by a network of experts in each Member State, led by the Institute for Policy Research in Engineering, Science and Technology (PREST) at Manchester University. Using the priority areas and sub-themes of the Innovation Action Plan as a reference framework the correspondents in each country have analysed its policy and practice, assessing the priority given to the sub-themes and identifying changes in the relative importance accorded to each.

## Emerging themes

The analysis of the country reports reveals that the policy area currently gaining most ●●●

*(1) See 'Gathering Momentum – Innovation in Europe', edition 4/99*

## Esp@cenet Tutorial

The IPR-Helpdesk has recently launched a multimedia on-line tutorial which will help EC research contractors and other non-specialists to make full use of the patent information contained within the *esp@cenet* databases of the European Patent Organisation. The tutorial is available from **http://www.ipr-helpdesk.org/espacenet**

attention is 'gearing research to innovation'. Policy measures directed at converting knowledge produced in universities and public research establishments into commercial ventures feature strongly in countries such as Ireland, France, Austria and the Netherlands, for example. The development of a strategic vision of research and development is a growing priority for Greece, Ireland, Italy and Sweden – but a lesser one for Spain, France and Portugal. Strengthening research carried out within industry is a major but stable priority area for eight Member States. France's new 'innovation law' is a good example of how complementary measures can be packaged.

### Clustering and co-operation

PREST concluded that many policy measures across the Member States contribute to fostering an innovation culture, but in a number of countries, including Greece and Denmark, it is not a high priority. In France it is gaining in importance. In Spain, strengthening public sector research is a primary goal, in order to address the perceived weakness of the innovation culture. The sub-theme of education and further training appears to be a growing priority – one strongly emphasised in Greece, Germany and Luxembourg. The promotion of clustering and co-operation for innovation is the most clearly emerging priority across almost all Member States.

In relation to the establishment of a framework conducive to innovation, continuous attention is being directed at increasing the volume of, and access to, risk finance. Ireland, Austria and France are developing a mixture of public, private and public-private financing initiatives. In Italy and Portugal the mobilisation of financing focuses on direct state support to companies. The sub-theme of taxation stands out as an emerging area for innovation policy support, with eight Member States viewing it as a growing priority. ●

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VENTURE CAPITAL

# Taking a Risk for Start-Up Capital

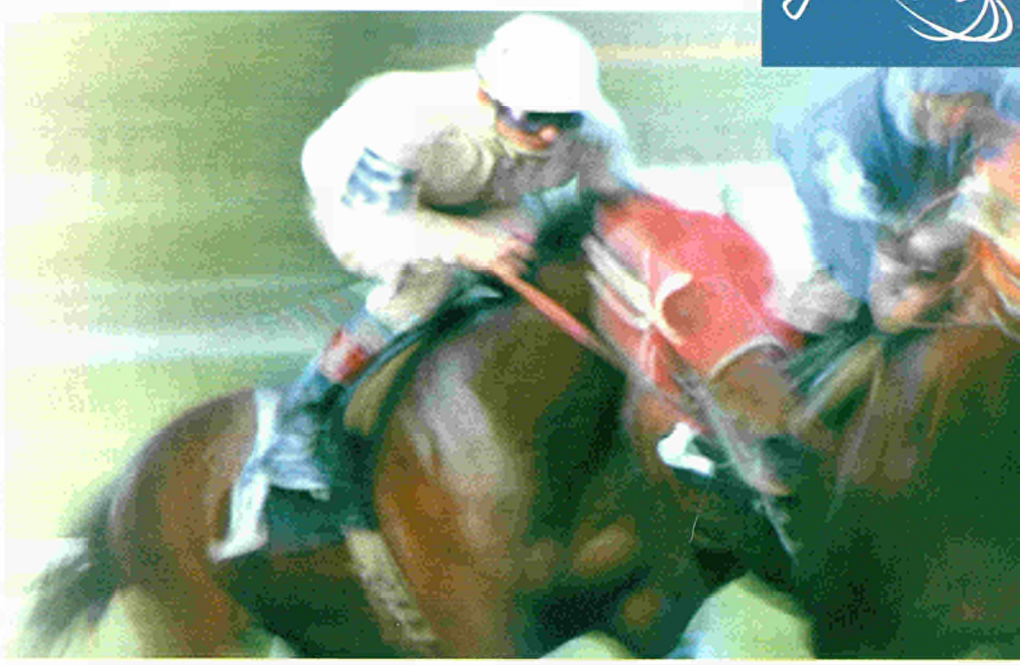
***Improving access to finance is vital to promote the creation of innovative companies, but capital can still be hard to come by in the early days. To increase the availability of early-stage funding the Commission has established ETF Startup to invest in high-risk venture capital funds.***

The ETF Startup Facility was created under the Growth and Employment initiative launched in 1998, and is run on the Commission's behalf by the European Investment Fund (EIF). Rather than investing directly in individual companies the EIF uses the facility to finance specialised venture capital funds, established specifically to provide risk capital to SMEs. It will not invest in funds which focus on management buy-outs or buy-ins.

"There is a market gap. There is a lot of work to be done building new companies up in their first three years, but these are riskier investments. Larger venture capital funds often come into a project only in the later rounds of funding," says the European Commission's Marc Verlinden, who manages the Innovation and SMEs Programme's I-TEC scheme[1]. "This initiative is to tackle the early-stage technology gap, as most growth opportunities are to be found in the high-tech markets."

### Higher risk profile

ETF Startup targets funds with a higher risk profile than is considered appropriate for other EIF



venture capital facilities, or by other private or institutional investors. In particular it aims at:

- newly established funds with competent managers lacking a fund management track record
- funds which focus on a particular industry sector or geographical region and lack the risk-spreading capacity normally thought desirable
- funds that finance the exploitation of research results – a notoriously risky area

By investing in a number of different funds which individually might be risky, the EIF spreads its own risk. The criteria set for the selection of funds attempt to address the needs of all EU Member States, whose venture capital markets are at different stages of development.

"The purpose of the initiative is to stimulate growth and employment in Europe. One way to create growth is to provide capital to innovative companies. Supporting new high-tech companies through venture capital funds is far more efficient and practical than attempting to set up some kind of EU-wide body to provide them with capital directly," says Roger Pett, Head of Equity Investment at the EIF. "As an experienced investor, able to do all the due diligence work, it was hoped that the EIF would give other investors confidence."

So far, the ETF Startup Facility has invested a total of €42 million in seven funds, in five countries. By December 2002, Pett expects to invest around €155 million in total, divided between 25-30 funds spread equitably around Europe.

One recipient of EIF investment is Wellington Partners, a newly created fund based in Munich, which specialises in early-stage investments in technology and Internet firms. Wellington established a DM70 million fund, raising approximately half the money from personal investors and half from institutions.

According to Harald Keller of Wellington Partners, having EIF as an investor helped attract others. It is already in a position to pay EIF back, having had a number of successes among its investments.

## Backing winners

As a general rule, venture capitalists expect three out of every ten companies they invest in to go bankrupt and three or four to join the 'living dead' – surviving, but not successful enough to be floated or sold. The remaining three or four become quoted companies or are sold on, providing a ten-fold return on investment. One of them will be the 'home run' – a company that generates a return on investment equivalent to the whole capital of the fund. Wellington's home run has been ACG, a chip card broker, in which it invested DM1.7 million. The company subsequently floated and Wellington sold its stake for DM95 million.

ETF Startup has also invested in the regionally-focused Rhône-Alpes PME fund, based in Lyon, which finances innovative companies in its local area that would previously have had to apply for venture capital funding from Paris-based organisations, and might have been ruled out on grounds of size. Another beneficiary is the Aboa Venture II Fund, which provides venture capital to SMEs growing out of R&D activity in the Turku area of south-west Finland. The other funds to have received investment from the ETF Startup Facility to date are Innkap Fund 2, Quantum Healthcare Fund, SEEFT Ventures and Ventech.

All the funds must be commercially oriented and must satisfy EIF on the quality of their management teams and expected returns. The EIF will also only invest in funds which have raised at least 50% of their venture capital fund from the private sector. "There are a number of countries where various state-run schemes provide venture capital support on preferential terms. ETF Startup complements this by supporting the developing private sector market, so that activity can carry on after end of the scheme," says Pett. ●

*(1) I-TEC, a scheme to help venture capital operators build capacity in early-stage technology investment, was launched in 1997 by the Innovation Programme in co-operation with the EIF. Three ETF Startup funds currently participate in I-TEC. See also 'Innovation = (Technology + People) + Capital', edition 6/99.*

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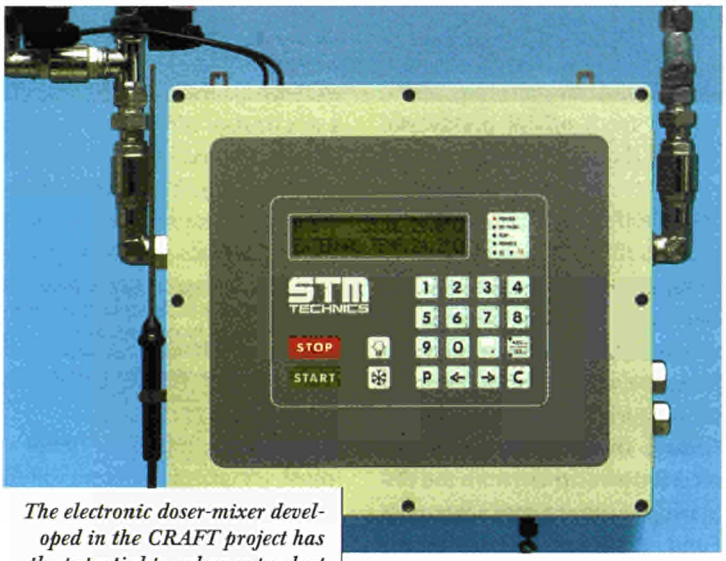
# The Right Degree of Heat

***An Italian-led CRAFT project has developed a sophisticated software-controlled device which achieves the water temperature needed for good bread dough in a tenth of the time of conventional doser-mixers. But the economics of the baking industry make marketing difficult.***




*The electronic doser-mixer developed in the CRAFT project has the potential to enhance product quality and cut water and energy bills in the baking industry.*

Bread dough needs to be made with water at precisely the right temperature, to control the action of the yeast during rising. In order to make bread of consistently high quality regardless of the outside temperature, water must be mixed in a controlled way. Doser-mixers have until now supplied hot and cold water in varying proportions according to the flow rate and temperature, and have often needed as long as 40 seconds to achieve the right balance.

## Rapid response

This mixing and adjusting involves significant wastage both of water and of the energy used to heat and cool water. A co-operative research (CRAFT) project(1), undertaken within the Brite-Euram programme and completed in 1995, developed a fully automatic electronic doser-mixer which delivers water at the right temperature within four seconds. The unit, produced by the project leader STM Products in Verona, Italy, combines a fast and accurate temperature sensor with a motor-driven mixer and flow counter. "In 1993, when the project started, the baking industry was calling for sophisticated solutions to the problem," recalls the project co-ordinator Luca Tommasoli.

The Physics Department at the University of Udine was contracted to research rapid response to change in water temperature, and developed a very small-diameter probe to measure temperature, able to respond in 150 milliseconds. A signal from the probe to an electronically controlled valve in the mixer unit adjusts the flow of cold water and of either refrigerated or warm water, keeping the total water flow virtually constant. The ability to adjust the flow of both water inputs cuts the response time dramatically.

## Fuzzy logic

In the patented mixer unit, a worm screw driven by an electric motor controls the valve, which can assume over 1,100 possible positions, corresponding to a total movement of only 3.5mm. An extremely accurate sensor is therefore used to determine when the mixer valve has reached the correct position, which is determined by the system's software to within four microns.

The mixer is controlled by fuzzy logic developed by the University of Padua in collaboration with STM. Rather than operating to pre-defined targets, the software 'learns from experience'. In this way it can respond to water pressure changes resulting from operation of the valve, and to changes in the temperature of the input water.

To measure the volume of water dispensed, STM used a flow meter body which houses a turbine incorporating a sensor on one vane. One revolution of the turbine corresponds to one-thirtieth of a litre of water, so the rate can be accurately calculated as the turbine spins with the water flow.

## Into production

Twenty-six prototype doser-mixer units were tested in different types of bakery – by project partners Cooperativa Oasi in Italy and Naturbageri in Denmark in their own laboratories, and by Italian process control engineers Thermogel and Kriotec in the facilities of their customers. In tests, the units gave water at the required temperature within an average of four seconds. Following these successful trials, STM aimed to produce up to 80 units per month, starting sales immediately after the project ended. The first was sold to Kalmeijer, a supplier of bakery equipment in the Netherlands.

But the timing was unfortunate – the baking industry was in economic crisis at the time. "Con-

*(1) CR110691 – Electronic doser-mixer.*

straints on investment by baking companies limited the market for our equipment. We were forced to develop cheaper versions and produced the fully automatic model in much smaller quantities than we had planned – in many countries it was simply too sophisticated," Tommasoli explains.

STM sold 80 of the fully automatic model, but two years after the end of the project decided to develop a simpler version. The company is now concentrating on selling a semi-automatic doser-mixer which is almost identical to the original but uses a simpler monitoring system. It has examined various ways to reduce the price, and has also explored the potential of other markets. Sausage-making requires a controlled temperature, but traditionally uses thermostatic baths rather than temperature controlled by flow, so the electronic doser-mixer was not suitable The doser-mixer might have had a use for temperature control in domestic hot-water systems, but again the price was uncompetitive.

However, Tommasoli firmly believes that his product does have a future. Adapted to the realities of the market place, the semi-automatic model derived from the results of the CRAFT project offers the baking industry vastly improved temperature control, enhancing product quality and cutting water and energy bills. ●

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TECHNOLOGY TRANSFER ON-LINE

# Brisk Business in the Technology Marketplace

***The Technology Marketplace web service was launched by CORDIS last year to help industry exploit technological advances generated by European Union research. Though still in its infancy, the service is already attracting huge interest.***

In January the service was accessed over 10,000 times, and preliminary analysis shows that most users browse the site, viewing several pages at each visit. "Those that come to the site are interested by what they find," says Mrs Irja Vounakis, who co-ordinates the web service for the Commission. She predicts that traffic at the Technology Marketplace will increase further as the first results from projects in the Fifth Research Framework Programme (FP5) begin to emerge later this year.

## Direct links

The Technology Marketplace is designed to support all FP5 research programmes, enabling users to find relevant technologies from all areas of research within a single site. It is aimed at three main types of user:

- commercial companies looking for new products and services
- public and other organisations looking for the latest social and environmental technologies
- scientists and researchers who are looking for models, tools and ideas for further research

The information provided is designed to facilitate follow-up research and direct contact with potential joint-venture partners, licensors, know-how providers, or technical facilities.

Hosted by CORDIS (the Community Research and Development Information Service), the Technology Marketplace is just one click away from the CORDIS homepage (**http://www.cordis.lu/**), under Interactive Services – or directly (at **http://www.cordis.lu/marketplace/**). ●●●

## Multimedia

"One of the most exciting features of the Technology Marketplace is the new multimedia format of the technology offers," says Vounakis. This will present the most promising new results of shared-cost research and development projects, and will invite enquiries for collaboration and exploitation. Technology offers cover biotechnology and medicine, energy, the environment, information technology and telecommunications, and industrial research.

In the next couple of years, there are plans to extend the Technology Marketplace as an integrated results service, with information on ongoing and finished projects. Users will be able to access more detailed information than currently available on the CORDIS results pages and information will be updated more frequently. The emphasis in the Technology Marketplace will be on market potential and on the innovation within projects, with links to detailed technical descriptions where necessary.

Information for the site will be taken mainly from the new Technological Implementation Plans (TIPs), submitted by all projects at key points during the research and again as the work is completed(1). "We also plan to contact the owners of results directly for additional updates, to ensure that the service is a dynamic, living resource," says Vounakis.

She also confirms that the current links between the web service and CORDIS' printed publications will be strengthened. Between four and six times each year, *CORDIS focus* produces special Results Supplements, concentrating on technology offers. The November 1999 issue featured exploitable Finnish technologies. The current special issue focuses on Quality of Life technology offers. ●

*(1) See 'A TIP for the Top', edition 2/00.*

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  **http://www.cordis.lu/focus/en/src/results.htm**



# Nothing Succeeds Like Success

***Cohesive and dynamic pan-European innovation is as important for the future prosperity of the EU as the single market and the single currency. But is Europe doing enough to build an innovation system capable of counterbalancing the technological dominance of the US? The evidence is not encouraging.***

"Since the early 1980s, European Union science and technology policy has been directed overwhelmingly at strengthening Europe's innovation networks," says Dr Daniele Archibugi of the Italian National Research Council (CNR).

Interactions – between research institutions, between firms, and between industry and the academic knowledge base – are the most important element in the development of new technological expertise, he believes. The goals of public policy have rightly been to create the necessary infrastructures and to stimulate such interactions within Europe. The bulk of the Framework Programme budgets have been devoted to research and demonstration projects based on transnational collaboration.

"To develop specialised strengths in technology-intensive sectors Europe must be able to pool resources of skill and know-how from different Member States," Archibugi argues. "Frequent, on-going collaboration is essential as a means of building European capacity. But despite the EU's efforts it is far from clear that intra-European interactions are growing."

## The message is the medium

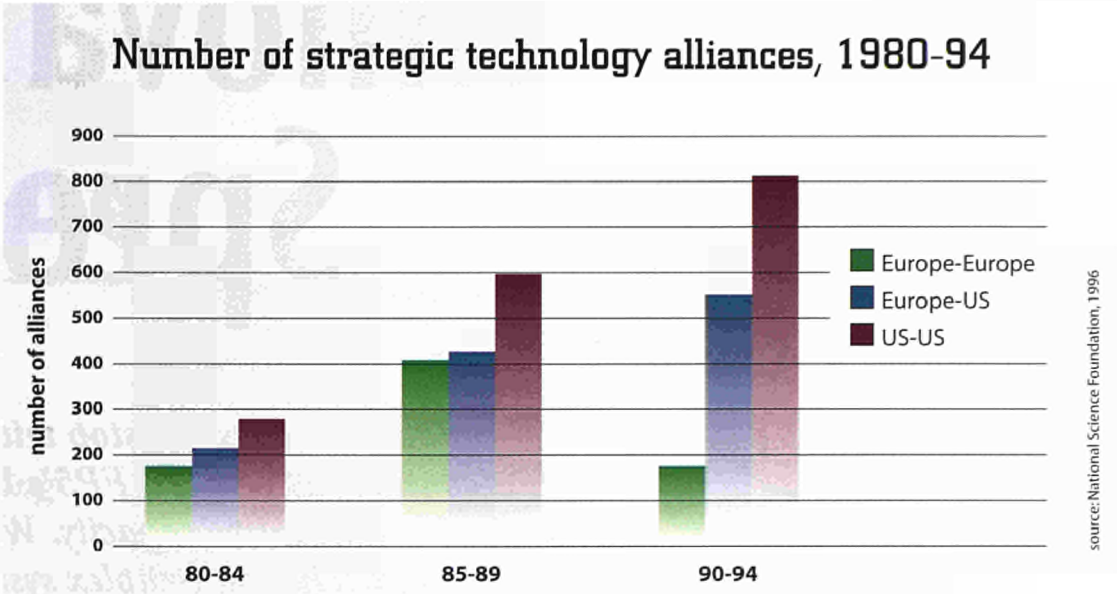
As part of the forthcoming Innovation Study(1) *Innovation policy in a knowledge-based economy*, Archibugi has assembled evidence of a continuing failure to construct a cohesive European 'technological identity'.

His work deals with the globalisation of technology – the processes by which firms' inventions and innovations are diffused around the world. They include investment by companies based in one country in R&D or technology-intensive production capacity in another, exchanges of scientific knowledge and skilled personnel, and the international exploitation of technologies either directly or

through the licensing of intellectual property in foreign markets.

As Archibugi notes, the global spread of technology is accelerating, not least because advanced communications technologies themselves reduce friction in the transmission of 'disembodied' knowledge. But in what directions does technology flow? Who wins and who loses? And how is Europe doing? Archibugi has found answers in data on international patenting activity and R&D expenditure, and on technological collaboration, both industrial and academic.

"It all points in the same direction," he says. "What we see is that when European firms and institutions make technology links outside their own national borders, they still prefer to do so with counterparts in the United States, rather than in other European countries."




*During the 1990s, technology agreements between European and US firms increased at the expense of intra-European ones.*

## Innovation begins at home

Europe still lacks a single market for intellectual property. Although the EU domestic market is bigger than the American one, to protect their technologies throughout it European firms must deal with multiple national patent laws. "The European Patent system offers a means of mitigating the complexity," Archibugi says. "But surprisingly, a larger proportion of US firms take this route than of European ones."

Second, European multinational companies are still oriented primarily towards US markets, and tend to base foreign research activities there rather than in Europe. German multinationals undertake twice as much R&D in the US as they do elsewhere in the EU. In the case of British multinationals, it is three times as much.

"Of course, the US is a key market, and a subsidiary there provides a window on American technology," Archibugi admits. "But Europe as a whole only benefits to the extent that the company participates in European networks. If it is merely connected to a national innovation system, then Europe is likely to be a net loser from the transatlantic technology exchange."

Third, the number of strategic technological agreements between American and European companies grew during the 1990s, while the number of such alliances between European firms actually fell (see Figure). The contrasting dynamism of US innovation networks is reflected in the surge in US-US agreements.

## Power of concentration

"The EU's Framework Programmes have helped," Archibugi concludes. "But they have not been enough to stabilise the net outflow of European technology."

It is not that links with the US are in themselves a bad thing – in any exchange, both sides benefit. At the moment, Europe tends to benefit less because it lacks an effective pan-European innovation system. "But a bad deal is better than no deal at all," Archibugi says.

Controversially, his prescription is to shift significant parts of Member State science and technology policy to the EU level. "We need to forge a single European research and innovation policy to speed up the construction of strong and dynamic pan-European innovation networks," he says. ●

*(1) The Innovation Studies series continues the former European Innovation Monitoring System (EIMS) reports. A list of available reports, which can also be ordered on-line, is at http://www.cordis.lu/eims/src/stud.htm*

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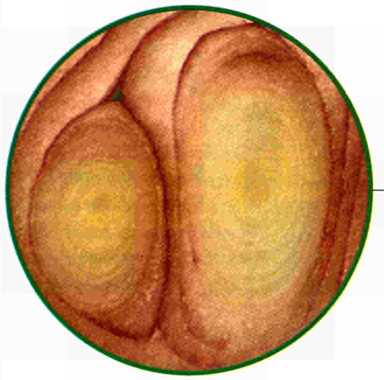

# Innovation's Spreading Ripples

***Real innovation does not stop with the successful adoption of a new technology – it is a continuous process. FP5's Innovation projects are developing models for building sustainable innovative capacity. Whether in firms, in regions or across industrial sectors, such capacity relies on complex systems involving many different players.***

*Gearing up – the Innovation Directorate is hoping for the participation of multipliers such as science parks, business schools and chambers of commerce, which can spread innovation methodologies to many enterprises.*

> *"We are targeting organisations and institutions concerned with the process of innovation in large numbers of enterprises."*

In today's global markets, competitiveness demands continuous innovation. But rapid and efficient absorption and exploitation of new technological solutions is too often hampered by extraneous 'cultural' factors – including management incapacity, conservatism or lack of training in the workforce, inadequate communication between technology suppliers and end-users, or inappropriate regulatory frameworks.

## 1. Growing Sophistication

***Building on past experience, FP5's Innovation projects are testing widely applicable approaches to technology transfer.***

The European Commission has supported demonstration and dissemination projects as a follow-up to research since 1989. These Innovation projects have focused on the industrial scale-up, integration or testing of new technologies, raising awareness among potential users or addressing market perception of technical risks, in preparation for commercial exploitation.

The first few generations of projects not only helped to prepare a large number of important new European technologies for roll-out in industrial and consumer markets. They also contributed a great deal to our understanding of the process of innovation itself. As a result, the design of the projects has become progressively more sophisticated.

In the Fourth Research Framework Programme (FP4), the objectives were broadened from purely technical viability to encompass wider issues of commercial viability and new types of exploitation. End-users were regularly involved alongside industrial developers and academic knowledge suppliers, to ensure that innovative technologies were well-adapted to their intended applications.

In many cases, the success of the planned transfers of technology required the partners in FP4 Innovation projects to deal with unanticipated non-technical issues. Among the issues addressed were information flows within markets, project management in transnational partnerships, the market impact of differences in national regulations, and the role of commercially neutral research institutes in changing user behaviour.

### Perpetual motion

In the Fifth Research Framework Programme (FP5), the role of facilitating subsequent exploitation of Community-funded research has been passed to the specific research programmes themselves. It is now the responsibility of each of the four thematic programmes to ensure that every FP5 research project makes concrete plans for eventual commercialisation, and follows these through. But although these mechanisms are designed to stimulate and track innovation, they do nothing to address generic, non-technical barriers to innovation and successful commercial exploitation.

The first of the new Innovation projects of the Innovation and SMEs programme, launched in March, have a more ambitious goal. They aim to improve understanding of the mechanisms by which innovation is delayed or prevented by organisational, institutional, regulatory or market factors, and to develop generic tools and methods for removing such bottlenecks. The Innovation Directorate expects the projects to facilitate on-going, continuous innovation in firms and, more widely, at the level of sectors and regions – producing models of self-perpetuating innovation which can be reused and replicated again and again, on a larger scale.

Most of the new projects do involve transfers of technology as a vehicle for the study of non-technical issues (see box), but will be clustered to develop solutions to shared problems. Others are led not by enterprises but by 'multipliers' such as science parks, management schools, local authorities or chambers of commerce. They will tackle knowledge distribution failures in order to realise innovative potential by releasing latent network effects.

The targets are not only enterprises but the much wider group of organisations and institutions concerned with the process of innovation. The main focus is on issues that are traditionally regarded as 'soft', but which are just as significant in holding back European innovation as purely technical problems.

The approaches supported by the new Innovation projects are not theoretical. They are intended to have a rapid and highly practical impact.

## 2. Knowledge Networks

***As two examples demonstrate, the new generation of Innovation projects are as wide-reaching and multi-layered as the process of innovation itself.***

Design is increasingly important as a means of differentiating and adding value to products. At the same time, speed to market depends on the ability to integrate design into the production process. Yet many SMEs – including new technology-based firms (NTBFs) in particular – lack specialised design management skills, and frequently pay insufficient attention to these issues.

"The car industry, and large companies like Philips and Braun, already manage and measure the impact of design as an innovative tool," explains João Mena de Matos of the European Design Centre (EDC) in Eindhoven, in the Netherlands. "For SMEs, the management of creativity and design is at the same stage as the use of CAD/CAM technologies was a decade ago. They are only now beginning to appreciate the commercial value of such methods."

Of course, firms which undervalue effective design management are unlikely to seek the assistance of a design centre. The recently launched Made-It project(1) aims to develop

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*(1) IPS-1999-00032 – Management of design in Europe using innovative tools.*

# FP5 Innovation Projects

Fifteen Innovation projects and six accompanying measure (AM) projects were launched in March, following the first call for proposals under the Fifth Research Framework Programme.

| ref | acronym | technical aspects | non-technical aspects |
|---|---|---|---|
| 001 | CANCTT | transfer of new cancer diagnostic and therapeutic technologies from research institutes to industry | development of a model of best practice for the protection and exploitation of intellectual property generated by cancer research |
| 005 | LLINCWA | pilot projects to test and demonstrate applications of non-toxic biodegradable lubricants | networking of public authorities, lubricant suppliers and users to improve transparency of the market and acceptance of methods for testing water quality |
| 008 | STARTER | | analysis of concrete examples of company spin-offs, and development of a 'reference toolbox' (adaptable to different national circumstances) to facilitate spin-offs |
| 013 | BASIS | | development and application of new schemes to support the integration of sustainability as a decision-making criterion in the formulation of business strategies |
| 021 | VAL-NET | bilateral transfer of technology between two distilleries in France and one in Spain | development of an innovative methodology for the integration of quality, safety and environmental management procedures in the distillery sector |
| 022 | IT TAKES 2 | pilot projects to upgrade buildings and public spaces in post-war estates in five countries | integration of the improvement schemes in a process of vision-making, action planning and evaluation involving politicians, technologists, residents and businesses |
| 027 | T-SHOE | transfer of rapid prototyping technology to SMEs in the traditional footwear sector | support for ancillary business development through skills analysis and training, implementation of communication systems and integration of design and manufacturing |
| 028 | TQM-NET | adaptation and testing of existing TQM training and support software in four new countries | development of additional training and consulting modules, and establishment of a support network, for SMEs adopting Total Quality Management procedures |
| 029 | FECG | transfer of innovative foetal heart monitoring technology to ten European obstetric teaching centres | adaptation and demonstration of new teaching tools as a means of creating a critical mass of nationally and internationally recognised users |
| 030 | NESTOR | creation and pilot testing of prototype robotic couriers for hospitals and healthcare centres in two countries | investigation, in consultation with a panel of end-users, of issues of acceptance (by staff and patients) and work reorganisation |
| 032 | MADE-IT | development of web-based tools to improve the design management skills of high-tech SMEs in particular | creation of a network of industrial design centres to exchange best practice in the delivery and promotion of design management services for innovative SMEs |
| 037 | MISTRAL-MAR | pilot testing of water recycling technologies to enable the scale-up of land-based fish farming methods | development of associated training materials, operational procedures, quality management and management information systems, and business plans |
| 039 | EVA | | extension of the Value Analysis (VA) methodology to incorporate consideration of environmental impacts into product and process improvement, and pilot testing |
| 042 | ANDIGNET | | networking of technology providers and users, impact assessment and business planning for innovative anaerobic digestion of citrus-processing residues |
| 043 | OENOS | transnational transfer and demonstration of 'flash expansion' winemaking technology | development of a framework for converting winemakers' tacit knowledge into objective analytical methods as the basis for improved commercial decision-making |

| ref | acronym | objectives |
|---|---|---|
| 011 | CLIP (AM) | support and exchange of experience within a cluster of innovation projects in relation to innovation processes and non-technical barriers to innovation |
| 012 | PRIDE1 (AM) | support and exchange of experience within a cluster of innovation projects in relation to innovation processes and non-technical barriers to innovation |
| 014 | LIFESTYLE (AM) | application of participatory change and knowledge management methods within a cluster of innovation projects promoting new sustainable lifestyle technologies |
| 016 | STRATEGI.ST (AM) | assistance for a cluster of innovation projects in addressing the socio-economic and environmental impacts of technological innovation |
| 023 | ECO-INNOVATION (AM) | support for a cluster of innovation projects dealing with environmental technologies in relation to legislation and the application of environment management systems |
| 031 | SHOWCASE (AM) | support for mutual learning across sectoral, cultural and national boundaries among a cluster of innovation projects in relation to the promotion of innovation |

and test new promotional and service-packaging strategies for design centres, in order to open a channel through which much-needed design skills can reach Europe's high-tech SMEs. The project goes beyond the transfer of technology to the broader transfer of knowledge.

## An excellent IDEA

EDC and its partners in Spain and Germany will establish a permanent European network of design centres based on a core group drawn from a total of seven Member States. Others working with SMEs in the field of design will be able to join at a later stage. Each pursues a different sectoral strategy in relation to a different national business community. At the same time, they all face similar challenges in helping their SME clients. The potential for exchanging methods and approaches, and for the joint development of new advice services which can be customised to meet the needs of individual SMEs, is enormous.

As a first step, the two-year project will identify and consolidate existing good practice in the delivery of design-management services to SMEs. This will provide the basis for a set of SME-friendly, web-based multimedia resources, which are to be pilot-tested by around 500 SMEs. The partners plan a straightforward self-evaluation tool to highlight the ways in which design management can improve competitiveness by saving time and costs. The website will also provide a central point through which SMEs can access other design management resources.

Examples of the successful application of good design management are essential. "Most manufacturers focus on incremental improvement. But there are already some wonderful examples of design solutions which completely revolutionise the manufacturing process," says Mena de Matos. The project will also launch an annual Innovative Design European Award (IDEA) to promote design management as an aid to innovation. "As far as we know, this will be the first prize to reward not only excellence in design, but excellence in the business processes which produce it," he says.

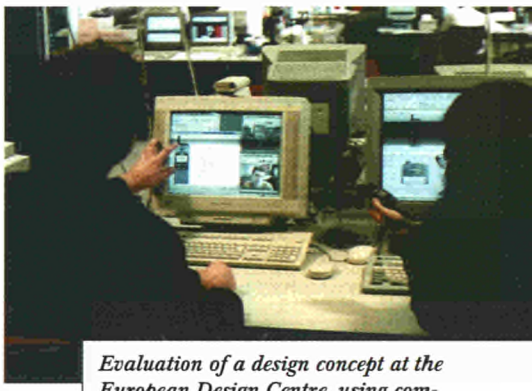
## Rising to the challenge

The It Takes 2 project(2) addresses the problems – both technical and non-technical – which prevent the use of the best available technologies in the refurbishment of post-war residential 'tower' blocks.

Innovation is particularly complex and difficult to manage in this context. "The project will create a channel through which the latest technological solutions can reach the most deprived urban environments, and in ways which respect the needs and aspirations of those who live and work on these estates."

It Takes 2 focuses on five very different high-rise housing estates in the cities of Antwerp, Dublin, Gothenburg, Leipzig and Erculano in southern Italy. It will develop a structured process for the participatory planning of urban regeneration projects by technology experts, politicians, residents, housing managers and local businesses.

"Right across Europe there are many, many high-rise estates now badly in need of



*Evaluation of a design concept at the European Design Centre, using computer supported collaborative working (CSCW) technology.*

*(2) IPS-1999-00022 - Partnerships for societal and technological innovation in post-war high-rise areas.*

CASE STUDY

# The Right Business Model

***A breakthrough technology with real industrial potential is not always enough. Successful commercialisation requires a clear market strategy.***

*IT Concept's 'Tracker' tensiometer analyses images of a drop of one fluid in a cell containing another, under controlled compression or dilation.*

French start-up company IT Concept was established in 1991 to exploit a discovery made in the laboratories of the national research institute, CNRS, by Robert Verger.

Lipases, a group of enzymes which break down oils, are widely used in industry, especially in detergents. Verger found a way to study lipase activity by measuring variations in the interfacial tension at the oil-water boundary caused by the oil's decomposition. The effect was well known, but at the time Verger built and patented a prototype tensiometer no one had produced a commercial instrument.

## Cool tool

"Alain Cagna signed a licence agreement, and IT Concept quickly developed a tool which for the first time allowed enzyme activity to be characterised directly in mediums of different temperatures and acidities," says Cagna's partner, Bernard Delorme. "It soon attracted considerable interest both from manufacturers and industrial users of lipases."

In 1994, an instrument was sold to the Dutch multinational Unilever, but other potential customers were slow to place orders. Cagna and Delorme found that, with minor hardware and software modifications, the tensiometer could be used to study not only lipase activity but also the stability of foams and emulsions, and they began to promote it as a generic device for the measurement of interfacial tension.

"Emulsion stability determines the shelf-life of foodstuffs such as mayonnaise, while foam stability is important for a range of products, from champagne to industrial cleaners," Delorme explains. "Stability in turn depends on interfacial elasticity and viscosity. Our software could measure these factors quickly by analysing the response of a droplet to controlled perturbation of the interface, captured in a sequence of CCTV images."

## Planning for success

Shell Petroleum bought an instrument to study high-temperature bitumen-water emulsions, and contacts with Unilever's food manufacturing division convinced Cagna and Delorme that there was potential in that sector as well. But by this time, IT Concept was running out of money. It had developed a series of terrific instruments, but it had almost no paying customers.

The definition phase of an Innovation project(1) proved a turning point for the company. Thorough analysis of the market potential focused its efforts on the food and drink sector, and identified two representative end-users to test and publicise new applications. Other development work, outside the scope of the project, was to be undertaken only on a commercial basis, as contract research.

"The reference applications for emulsions and foams have helped us to explain the technology to other potential users, and have enabled us to establish partnerships with distributors in Norway, the United Kingdom and the United States," says Delorme.

From a base of profitability, IT Concept is now targeting the chemical industry, and in 1999 recruited a chemical engineer to develop the applied research and test service side of the business.

*(1) IN10381I – Dynamic drop tensiometer for the measurement of dynamic interface properties in emulsions and foams in food industries.*

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upgrading," says the project manager, Tjeerd Deelstra of the International Institute for the Urban Environment (IIUE) in the Netherlands. There are also many new resource-saving technologies which in theory could be applied to reduce running costs and improve living conditions. But it is difficult and expensive to retrofit rainwater storage tanks, heat pumps and co-generation systems to existing buildings.

## More for less

"The technical challenge is to integrate these technologies, combining different measures in the same refurbishment project so as to achieve better results for the same investment," Deelstra explains. "But there are also formidable non-technical problems. First, integration involves technologies which are normally the responsibility of different municipal authorities or departments. We must convince managers that the additional cost-savings make collaboration worthwhile. Second, the solutions proposed by technical experts also need to be acceptable to the owners and users of the buildings. For example, we must find satisfactory ways of sharing the costs and the savings between residents, housing associations and local authorities."

Making use of a number of already proven planning methods, the project will trace the complete urban regeneration trajectory from expert assessment, through vision development and action planning workshops, to implementation. Only one small pilot action will be carried out in each city during the project itself, but the partners expect to apply the participatory approach more widely after it is completed.

Deelstra also anticipates keen interest from other cities, especially in the accession countries of central and eastern Europe. Towards the end of the project, the It Takes 2 approach will be disseminated through an advanced study course for up to 40 city housing managers, and will also be published on CD-ROM and on the web as a toolkit. ●

# Forthcoming Second Call

A second call for proposals for Innovation projects on 'new approaches to technology transfer' will be launched on 15 June.

The objective is to create a portfolio of transnational projects which, through hands-on technology transfer, develop reusable and replicable methods, tools or networks to support the continuous process of technology transfer to enterprises, and which integrate the economic, organisational and social aspects of this process as well as its technological ones. This pilot work will serve as the vehicle for developing wider and more lasting means to address non-technical barriers to innovation within groups of enterprises – ideally, at the level of industrial sectors or regions.

The Commission will invite proposals of two broad types. In the first, **industry-led** transnational partnerships of universities, research institutes and other enterprises will collaborate to transfer existing technologies. The projects will tackle the innovation process, including specific non-technical barriers, in a holistic way.

In the second type, partnerships of **support organisations** such as local authorities, industry associations or trade unions will work with firms to build regional or sectoral networks to support technological innovation, together with widely applicable methods and tools. Where possible these initiatives will be linked to form common European platforms.

In both types of project, organisations such as **business schools, business incubators and science parks** are likely to contribute know-how related to competences in areas such as the management of innovation, financing and intellectual property rights, to support the absorption of technology by the participating enterprises.

Total project duration will be of up to three years. Each selected project will undertake a preliminary **definition phase**, usually of six months, and will proceed to the implementation phase only if its outcomes are assessed positively. In both phases, the Commission will normally fund up to 50% of the actual costs of activities related to non-technical issues (including training, documentation, exchange of good practice and network creation), and 35% of the costs of pilot testing or demonstration of new products, processes or services. Commission funding will be up to €0.2 million for the definition phase, and in the range of €1.5 million for the implementation phase.

**Contact**

**Full documentation on the call, including application forms and a detailed guide for proposers, will be available from 15 June at http://www.cordis.lu/innovation-smes/**

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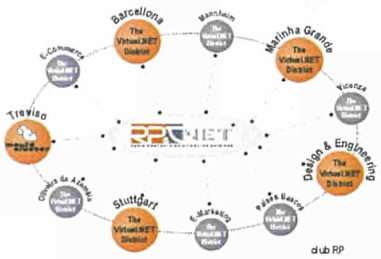
CASE STUDY

# Chain Reaction

***Within individual firms, along supply chains and across districts, successful innovation is self-perpetuating.***

RP&TNET
RAPID PROTOTYPING & TOOLING NETWORK

## Establishing *Virtual* Districts




*The Club RP project has helped to establish a European rapid prototyping and tooling network to market advanced design and engineering services.*

*The adoption of stereolithographic rapid prototyping technology has enabled Treviso's ski boot manufacturers to produce smaller series and introduce new designs more quickly, helping them to retain a 75% share of the world market.*

Innovation is not a one-off event, but a continuing response to changing circumstances. Ideally, it does not just solve a problem but creates new capacity, opening up opportunities for further innovation.

## United we stand

In Treviso, northern Italy, the introduction of advanced rapid prototyping and tooling (RPT) and time compression engineering (TCE) technologies has enabled a group of small and medium-sized enterprises (SMEs) to offer large manufacturers a faster, more flexible and higher-quality service by integrating complementary skills. Designers, mould-makers and injection moulders are learning to work with their customers in an entirely new way, as 'co-designers' and 'co-engineers' rather than as mere subcontractors.

These changes – organisational and methodological as much as technical – are already giving Treviso's 'plastics district' access to new, high-value contracts. Now, Treviso is working with similar districts in Germany, Spain and Portugal to refine and benchmark the RPT and TCE schemes(1).

"Growing demand for highly differentiated, small-series production and continuing pressure to reduce time to market are revolutionising the industrial product design process," explains Donato Bedin, Director of Treviso Tecnologia, which leads the project. "At the same time, production is being globalised. Few SMEs will be able to survive the competitive pressures alone. We want to turn this threat into an opportunity by equipping small companies to maintain their competitiveness as part of a knowledge-intensive, technologically advanced district-wide industrial system."

## Speed to market

The project's technical aspects involve the shared use of three-dimensional modelling data exchanged via the Internet – cutting out many stages of the traditional prototyping process. But according to its co-ordinator, Osvaldo Carlon, it is not the communication technology itself but the way it is used which presents the greatest challenge.

"Linking machines is relatively easy, but the interfaces between the working methods of different companies are much harder to manage," he says. "Efficient procedures for clarifying the business relationships are essential. For transnational collaboration, multi-point video-conferencing will be vital, but it takes time for technical people to learn to communicate effectively this way."

As well as exchanging good practice, the four districts taking part in the project plan to launch a joint marketing initiative based on a 'RP&Tnet' quality mark. "As subcontractors, our districts compete with one another. But they also have different design and engineering know-how," Bedin explains. "We hope to bring together these complementary capacities to undertake large contracts for major manufacturers jointly."

Treviso Tecnologia also plans to transfer the collaborative scheme to the district's furniture-making and electrical good sectors. The project is developing a model of good practice for sustainable regional innovation which is widely applicable.

*(1) Project RSE5137 – Club Rapid Prototyping.*

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# Rags to Riches

***How can Europe's textile and clothing sector exploit information and communications technologies (ICTs)? This question was addressed in comprehensive fashion at an international conference supported by the European Commission's Information Society Promotion Office (ISPO).***

When you purchase a new suit, you form the last link in a very long chain. More steps separate product concept from the point of sale in the textile and clothing industry than in almost any other.

ICTs are an obvious ally in addressing the sector-wide challenge to reduce time to market, with applications and potential applications in such diverse aspects as product design, fibre production, the identification of new market opportunities and partners, stock control, logistics – and, of course, electronic commerce.

## No hard sell

This fact has united a wide range of partners under the banner of Information Technologies in Textile and Clothing (ITIT), a project co-financed by ISPO and the Italian Association of Textile Consortia (Ascontex).

It started in 1999 when Ascontex, the project's initiator, and ARCO, its co-ordinator, began the task of organising the conference. Assistance has come from the Commission's Directorate-General for Industry and the Italian Ministry of Industry. Advice is also on hand from a scientific committee of experts on ICTs and science policy.

Entitled 'Preparing the future for the textile and clothing chain: the impact of new information and communication technologies', the conference took place at Cernobbio, by the side of Lake Como in Italy, at the end of March. In attendance were a broad cross-section of representatives from the textile and clothing sector, as well as a large contingent from the key institutions and agencies which support its firms.

The event had two principal aims. "The first," says Manuel Gigot of ARCO, "was to promote awareness, use and understanding of what ICTs can do for the sector, and especially for small and medium-sized enterprises. The textile and clothing industries consist mainly of SMEs, and retain a traditional structure based on long-standing inter-business relationships."

Some progress has been made in alerting the sector's businesses to the possibilities and issues associated with ICTs. "There is already quite good use made of ICT applications in the business-to-retail functions," says Gigot, "but not yet in business-to-business and sub-contracting relationships." ITIT's objective is therefore to offer them turnkey solutions which will turn concept into reality.

The idea, however, is not simply to 'sell' ICTs to these companies. "On the contrary, it is crucial that SMEs themselves think about the framework in which they can introduce ICTs to their various business functions," Gigot says.

## Every business function

The event's second aim was to put together and disseminate solid best practice recommendations. The most urgent question in this respect is how businesses in the sector, technical partners in the IT and communications industries, and support organisations – research centres, professional associations, chambers of commerce and others – can all work together more effectively.

The conference programme reflected ITIT's resolve to bring all business functions under consideration, no matter how successfully they have adopted ICTs so far. Separate workshops were held on the business functions from concept to finished product, on marketing, sales and distribution, on new qualifications and new forms of work organisation and, finally, on the role of technical and support partners.

The emphasis was practical – companies and experts presented first-hand evidence of successful practice and in some

•••

cases gave 'live' demonstrations of applications in action.

## Completing the circle

In their efforts to attract as broad a range of conference delegates as possible, the organisers advertised the conference widely using traditional and not-so-traditional means. They have had posters displayed at trade exhibitions, still a very important forum in the life of the textile sector. But they have also made good use of an ICT application themselves – a website, whose use demonstrates the level of international interest in the subject. The first three weeks of February saw 16,000 visits to the site, and not just from local Internet users. More than half came from outside Italy and, perhaps surprisingly, many from the United States.

The organisers hope to use the conclusions drawn from the conference as the basis for a European action programme for the textile and clothing sector – and that this in turn will stimulate ongoing dialogue between European textile and clothing firms and their technical and institutional partners.

Two centuries ago, Joseph Jacquard invented a power loom that used punched cards to produce fabrics with exactly repeated patterns. Not only was it a catalyst for the industry at the heart of the industrial revolution, textiles. It also constituted a giant leap towards today's information revolution. The ITIT conference represents an important step on the path leading modern information technologies back to their source. ●

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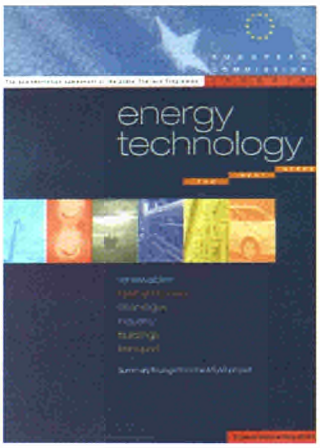
ENERGY TECHNOLOGY

# Barriers to Better Technology

***From power stations to domestic boilers, energy technologies are 'big ticket' items and cleaner, more efficient solutions are inevitably taken up slowly. But with climate change high on the political agenda, removing non-technical barriers to innovation is vital.***




*The Atlas report provides a comprehensive overview of the status of a wide range of close-to-market and prospective energy technologies.*

"At least in the energy supply sector, governments could in the past decide which technologies would be used by the publicly-owned utilities," says George Marsh of the British energy and environmental consultancy ETSU. "Policy-makers seeking to mitigate climate change and regional and urban pollution today face the much greater challenge of influencing liberalised energy markets through regulation, subsidy and taxation."

In 1997, the Thermie programme's Atlas project, which ETSU co-ordinated, undertook a comprehensive study of the status of a wide range of close-to-market and prospective energy technologies.

"The project covered energy-use technologies in industry, buildings and transport, as well as renewables and clean-coal power plants on the supply side," Marsh explains. "The report offers a snapshot of the deployment of each new energy-saving or clean production technology in 1997, and examines the barriers to its wider adoption."

## Win-win

In many cases, the principal barrier is cost. Neither utilities, manufacturers nor home-owners are keen to invest in large, expensive energy technology until existing plant, however inefficient, reaches the end of its useful life. "The benefits of improved technological solutions are normally gained only when the capital stock turns over," says Marsh.

The problem has been made worse by the price of energy – until recently at historic lows in real terms. Even when a new technology can substantially reduce energy consumption, when fuel is cheap the potential savings may be too small to justify its additional capital cost.

"In the industry sector, new energy-saving process technol-

*It's an ill wind – the recent tripling of crude oil prices will make investment in wind turbines and other sources of renewable energy highly attractive.*

ogy has to go hand in hand with quality or productivity benefits," Marsh says. "Freeze crystallisation is a significantly less energy-intensive separation technology than distillation, for example. But Atlas showed that it will only be taken up by industry when it can deliver quality gains or increased throughput as well."

The same is true in the building sector – predominantly private homes – which accounts for 40% of the EU's total energy consumption and 30% of its $CO_2$ emissions. The EU aims to reduce the total energy use of Europe's built environment by 7% between 1996 and 2010, and to double the share of renewable energy in this market. But while energy remains cheap, new products must also offer substantial improvements in functionality, ease of use and appearance. To the customer, energy savings are an additional bonus, not a reason to buy.

## If it ain't broke . . .

Investment decisions are affected as much by perception of risk as by cost. In industry, energy technologies are generally closely involved with core production processes, and managers are understandably reluctant to implement unproven solutions. The costs of plant failure, if it occurred, would far outweigh any competitive advantage gained.

Demonstration projects such as those supported by the Thermie programme have been critical. The European Commission's ability to broker pre-competitive collaboration between technology suppliers and end-users has not only helped to build investor confidence, but has oriented the development of new energy technologies to the real needs of the market.

"When investors assess options for new supply side capacity, they demand higher rates of return from those with perceived technical risks than from ones with which they are already familiar," Marsh explains.

## Price reduction

For more mature technologies, demonstration has now served its purpose, Marsh believes. "Wind turbines and, to a lesser extent, photovoltaics are already commercially competitive in specific applications." However, if they are to play a substantial part in the energy supply structure in the near term, the next step is to support their penetration in the niche markets where they compete most easily. This will drive down production costs through economies of scale, kick-starting a virtuous circle of falling prices and growing demand.

New EU measures will in due course provide pan-European support for the entry of renewable technologies into the market – either through subsidy, or through quotas based on a system of tradable 'green electricity certificates'. But at present the Electricity Directive gives each Member State the power to pursue specific environmental targets by regulating its own fuel mix – and many are already doing so in favour of renewables.

"Germany's Electricity Feed Law guaranteed renewable electricity suppliers a premium tariff, enabling the technology to achieve the required rate of return," says Marsh. "It led to an increase in German wind power capacity from 60 MW in 1990 to 3,000 MW in 1998, giving investors considerable experience of operating that type of plant."

The recent leap in the price of crude oil back to $30 a barrel could make many new energy technologies not just viable but essential. ●

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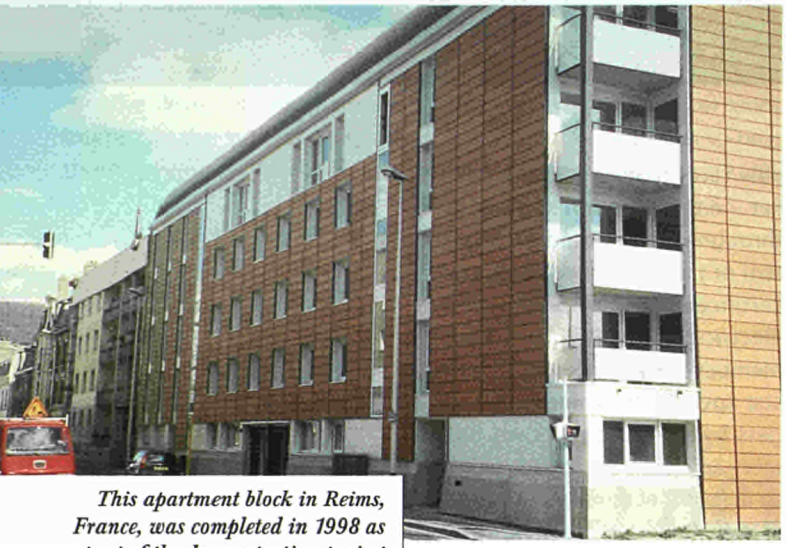
**The Atlas report is available in both browsable and downloadable forms at http://europa.eu.int/en/comm/dg17/atlas/**

# Steel Links to Industry

***Earlier uncertainty about the future of Europe's steel research has been dispelled and a new programme will be launched in July 2002. This will extend Europe's past success in developing new steel products and processes.***



*This apartment block in Reims, France, was completed in 1998 as part of the demonstration project 'Application of steel in the urban habitat'. The façade uses brick panels attached to a steel subframe.*

The Community Steel research programme has been running since the ECSC (European Coal and Steel Community) Treaty was signed in 1951, and has made a major contribution to the development of new steel products and processes in Europe. From the start, research projects have rapidly led to the industrial application of results.

"The programme's strength is that its impact is incremental," says Pierre Meriguet, Head of the Steel Sector of the European Commission's Directorate-General for Research. "On a year-by-year basis, the results may not be very visible, but assessment of progress over five or ten years highlights innovations, modernisation of production processes, and development of novel types of steels." Financial assessment has shown that the benefit of ECSC research is at least 13 times as great as the investment.

## From buildings to cans

One major project just completed[1] developed new methods for the construction of steel housing, including individual houses and collective multi-floor buildings. Flexible structures, using prefabricated components, allow buildings to be altered or expanded according to the changing needs of users.

Another important project will assess and disseminate the results of the earlier demonstration projects by producing reports and video film for wide distribution of information. The French coordinator CTICM is working on collective urban housing, while SAES and 3L-PLAN in Germany are developing high quality, architect-designed individual housing using steel frames. In the United Kingdom, light steel framed individual houses are being developed by SCI, and the Finnish steel producer Rautaruukki Oy is working on individual houses with high levels of thermal insulation.

Another new project, led by Centro Sviluppo Materiali (CSM) in Italy, with partners from Greece and Spain, is examining possible new surface treatments for steel food cans. Tests are being carried out to replace the usual chromium-based treatment, which can lead to environmental pollution, by a new cobalt-titanium or cerium-based coating.

## Two programmes

Until 2002, the Steel research programme will run in parallel with the Fifth Research Framework Programme (FP5). During the planning of FP5, it was assumed that the Steel programme would end with the ECSC Treaty in July 2002. FP5 therefore included provision for steel research, especially on environmental and social aspects and production. However, the Council of Ministers has now decided that there will be a separate research programme for steel after 2002. This will be financed by the interest accruing from the ECSC's residual funds of €1.3 billion.

Projects last for between two and four years, although some demonstration projects are extended for another two years. Of the 330 projects which are currently running, around 70 will be completed at the end of 2000 and a further batch will begin. "The programme is expanding," says Pierre Meriguet. "Two years ago we had only 250 projects." ●

*(1) Application of steel in the urban habitat, co-ordinated by CSM.*

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## Biobiz training workshops

A series of intensive three-day training workshops for biotechnology entrepreneurs is being run until the end of the year. Designed to equip bioscience researchers with the practical tools they need to prepare business plans for new spin-off companies, the cost of attending one of the workshops is only €800, thanks largely to the support of the European Commission's Quality of Life programme.

The remaining workshops will take place:

- 6-8 June, Stockholm (Sweden)
- 20-22 June, Dublin (Ireland)
- 4-6 July, London (United Kingdom)
- 18-20 July, Berlin (Germany)
- 1-3 August, Cambridge (United Kingdom)
- 5-7 September, Tel Aviv (Israel)
- 19-21 September, Eindhoven (Netherlands)
- 3-5 October, Lyon (France)
- 17-19 October, Lisbon (Portugal)
- 21-23 November, Vienna (Austria)

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## Biomass for Energy and Industry

### 5-9 June, Sevilla (Spain)

The most important Biomass sector meeting world-wide during 2000, the first world conference merges the traditional European and American events, offering a unique opportunity for debate and the transfer of knowledge and experience among scientists, policy-makers and technologists. By fostering the emergence of new strategies, projects and good practice rules, the conference aims to make a major contribution to sustainable development.

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## European Business Summit – Innovation and Creativity

### 9-11 June, Brussels (Belgium)

This high-level summit meeting is organised by the European employers confederation (UNICE) and the European Commission. It will bring together around 1,500 senior political and industrial decision-makers to discuss means to accelerate the development within the European Union of a culture of innovation and entrepreneurship, as a source of economic growth.

The opening session will be addressed by, among others, Steve Ballmer, President and CEO of Microsoft, and Erkki Liikanen, Member of the European Commission for Enterprise and the Information Society. Four parallel workshop series will examine the organisational requirements for innovation in companies, methods for opening or reinventing markets, legal and regulatory barriers to innovation, and ways of mobilising the key innovation inputs of people and money. Romano Prodi, President of the European Commission, will address the closing session. In the accompanying exhibition, the Innovation Directorate of the Commission's Directorate-General for Enterprise will present key activities of FP5's Innovation and SMEs programme.

The programme, registration form and list of speakers are on the conference website.

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## Transnational Technology Transfer Days

### 13-14 June, Poznań (Poland)

Designed to facilitate the spread of technology to eastern Europe in particular, this event will run concurrently with the 'Industrial technologies and investment goods' international fair. New technologies, research units and technology transfer will be on show at a special exhibition. The participation of exhibitors and technology recipients in the TTTDays event is free.

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## Innovating Regions in Europe – Second Plenary Meeting

### 15-16 June, Madrid (Spain)

The IRE network links all the RIS/RITTS (Regional Innovation and Technology Transfer Strategies) and transregional innovation projects – which aim to strengthen regional innovation systems through needs assessment, strategic planning and co-operation between firms, public administrations and agencies.

This event will bring together the project managers and representatives of regional authorities of all regions involved, to exchange views on issues such as tools and methods, funding, and project evaluation. Senior European Commission officials will present the Enterprise DG's new regional innovation actions, for which a call will be launched in June, and the new generation of European Regional Development Fund (ERDF) Innovative Actions 2000-2006. A 'Regiopartenariat' partnering event will facilitate bilateral meetings between actors from different regions to explore partnership and co-operation opportunities.

Registration for the event is available online at the IRE website (see contact).

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## Third SME Technology Days

### 29-30 June, Porto (Portugal)

To face increasing European and global competition, small and medium-sized enterprises in all sectors need to innovate – both by developing or acquiring new technologies and by extending into new international markets. Over 14,500 SMEs took part in FP4 research as a means of innovating, and SME participation in FP5 is already 20% higher.

This conference, hosted by the Portuguese Presidency, will bring together policy-makers, intermediaries, research performers and SMEs to review the specific measures for SME participation in EU research – the Exploratory Award and CRAFT schemes – and related initiatives in such areas as intellectual property rights and venture capital. Speakers will include high-level representatives from the business and research communities as well as senior politicians.

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## tti 2000

### 10-12 July, London (United Kingdom)

The 'Technology transfer and innovation' conference aims to stimulate knowledge transfer and skills development for business growth by presenting new thinking from around the world. Speakers include Sir Robert May, Chief Scientific Officer to the UK government, the Vice-Rector of Moscow State Aviation Technology University, and the Vice-Chairman of Motorola.

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## IPTS Futures project reports

Information and communications technologies, life sciences, the single currency, proposed enlargement of the EU, demographic change, globalisation, sustainable development are key drivers of change, representing major challenges for Europe's technology, competitiveness and employment policies.

The Futures project of the Institute for Prospective Technological Studies (IPTS) of the European Commission's Joint Research Centre has analysed these central policy challenges up to 2010, assisted by 195 experts from industry, academia and policy making.

The main results were presented at the IPTS Futures Conference in Brussels on 10-11 February. They are now also available as a series of reports, downloadable in PDF format from the website of the Futures project. Each offers a comprehensive and authoritative overview of the area covered, which will provide a baseline for industrial and political strategic thinking in the coming years.

**Contact**
**http://futures.jrc.es/**

## JRC Publications Bulletin 1999

The bulletin lists the scientific and technical publications produced by the European Commission's Joint Research Centre (JRC) during 1998. It gives full references for reports, journal articles, special publications and conference presentations produced by the JRC's scientific institutes and its JRC central services, distinguishing between refereed and non-refereed publications. A list of patents granted to JRC researchers during the year and some other information, including an index of authors, is also provided.

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## Sustainable workplaces in the Information Society

The Information Society DG has recently published a report on a meeting, jointly organised with the Research DG to consult the wider industrial and research community on actions in the revised work programme which address future research requirements for sustainable workplaces.

The meeting concluded that efforts should not be limited to improving business efficiency and effectiveness and human and social aspects. They should also take into consideration the materials and energy consumption and wider societal and environmental impacts.

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## Qualitative aspects of Swedish participation in EU R&D

This report is now available in print and may also shortly be available in electronic form. It summarises the results of a study of the scientific quality of Swedish participation in the EU's Research Framework Programmes, intended to supplement earlier national studies which focused on quantitative analyses of Swedish EU research and not on its basic scientific quality.

One of the main conclusions is that the EU Framework Programmes are very heterogeneous, and only certain parts can be characterised as constituting basic research. "It is possible to divide Swedish participation in EU research into two separate research cultures", say the authors. The IT and industry-technology community has low basic research relevance and strong links to industry and sectoral bodies, while bioscience, social sciences, environment and human capital have a high degree of basic research relevance as well as great interest from the academic scientific community and links to Swedish Research Council funding. An overwhelming majority of Swedish researchers consider that their EU projects can be classified as targeted basic research or applied research.

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## Note

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