Innovation & Technology Transfer

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Electronic Commerce

The European dot.com Mission

Plus

- Lisbon Summit boosts Europe's innovation policy
- Transnational SME technology networks
- Innovation policy in central and eastern Europe
- Innovation Relay Centre support for technology transfer

... and more

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Towards a European Information Society

Electronic commerce, not just in its present form but embodied in devices and services that we can hardly imagine, presents Europe with tremendous opportunities – for prosperity and competitiveness, for employment, for education, and for social cohesion and strengthened cultural identity.

But innovation is essential, if Europe is to realise this potential. It is needed in the software, information technology and telecommunications industries, which together will develop tomorrow's e-commerce infrastructures and systems. It is needed in the wider community of enterprises, both large and small, where these systems must be applied to reduce costs, to improve quality and efficiency and to add value. It is needed in the public administrations of the European Union and its Member States, both to create a legal framework which supports e-commerce and to open up new electronic channels for their own interactions with businesses and citizens.

There is no doubt that the United States has had the advantage in the first phase of the transition to the digital economy. But today there are signs that Europe is innovating with the speed necessary to catch up. It is building a clear lead in technologies such as mobile telephony, digital TV and natural language interfaces, which will be fundamental in the second phase. And at the political level, the recent adoption of the *e*Europe initiative and the E-Commerce Directive will make the rapid take-up of these technologies far easier.

Innovation & Technology Transfer

Innovation

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Radical Response to a Quantum Shift

The Lisbon Summit marked a turning point for EU enterprise and innovation policy, for it saw the high-level integration of social and economic policy with practical initiatives to strengthen Europe's research capacity, promote entrepreneurship and facilitate take-up of information society technologies.

At the special meeting held in Lisbon on 23-24 March, the European Council established a new strategic goal for the coming decade – for the European Union "to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion".

Speaking in London just one week later, Erkki Liikanen, European Enterprise and Information Society Commissioner, stressed the strategic significance of the Council's decisions. "European heads of state and government have given their strong commitment to ensure that Europe catches up in the digital economy and becomes a competitive and entrepreneurial economy," he said. "The powerful message from Lisbon is that delay is not an option. We must move fast to accelerate Europe's transformation."

Window of opportunity

The Council was responding, said the Portuguese Presidency in its conclusions, to "a quantum shift resulting from globalisation and the challenges of a new knowledge-driven economy". Europe's employment rate is still too low, its service sector remains underdeveloped, and there are growing skills shortages in the key sector of information technology. At the same time, the most positive macro-economic outlook for a generation offers Europe an opportunity to address these weaknesses through a co-ordinated package of economic and social reforms.

First and foremost, the strategy outlined by the Council aims to "prepare the transition to a knowledge-based economy and society":

- by creating an information society for all(1)
- by establishing a European area of research and innovation
- by creating a friendly environment for starting up and developing innovative businesses, especially small and medium-sized enterprises (SMEs)
- through economic reforms for a complete and fully operational internal market
- by ensuring efficient and integrated financial markets
- through improved co-ordination of macro-economic policies – fiscal consolidation, and quality and the sustainability of public finances

Innovation measures

A number of specific decisions are of particular interest to the innovation community:

- the use of tax policies, venture capital and European Investment Bank (EIB) support to **improve the environment for private research investment**, R&D partnerships and high-technology start-ups
- introduction of a **Community Patent** by the end of 2001
- the development of mechanisms to **co-ordinate national and EU research** programmes, and the removal of barriers to the mobility of researchers
- further efforts to lower the costs of doing business and **remove unnecessary red tape**, especially for SMEs, as a stimulus to investment, innovation, and entrepreneurship
- action to **encourage interfaces** between companies and financial markets, R&D and training institutions, advisory services and technological markets

"We cannot legislate for 'entrepreneurial spirit'. But we can put enterprise policy at the centre of our priorities. That, Lisbon has done," concluded Mr Liikanen. ●

Jaime Gama, Portuguese Minister for Foreign Affairs (left), and António Guterres, Portugal's Prime Minister, at the Lisbon Summit – with, behind (left to right) George Papandreou, Greek Minister for Foreign Affairs, and Francisco Seixas Da Costa, State Secretary for European Affairs and Chairman of the Intergovernmental Conference.

(1) The Information Society aspects of the Council's decisions are covered in this edition's dossier on e-commerce, starting on page 8.

Contact

The full text of the Presidency Conclusions is available at http://www.europa.eu.int/council/off/conclu/mar2000/

Quality Time

The Institute for Prospective Technological Studies (IPTS) has completed the first EU-level foresight exercise. It looks forward to a European Union based around high-tech industries, competing on know-how, quality and performance.

Light at the end of the tunnel? The Future's project examined the likely impact of political, economic and social change on technology, competitiveness and employment.

Policy-makers were once content to leave the long-term future alone. Not any more, to judge by the speed with which government after government has recently taken up technology foresight.

The Futures conference, which in February marked the culmination of the first European-level foresight project, is the latest contribution to an expanding foresight culture – and a highly successful one. Hosted by IPTS, one of the eight institutes of the Commission's Joint Research Centre, the conference attracted more than 650 high-level delegates.

Missing dimension

Foresight is the process of characterising contemporary change so that today's policies are informed by developments anticipated in the next ten to 20 years. Normally sponsored by national governments, such exercises draw on a broad community of experts, and also provide a platform for forging new relationships between government, science and industry.

Futures, however, has been cast in a rather special mould. "Essentially, it arose because we at IPTS found that existing foresight exercises overlooked some crucial European issues," says Gustavo Fahrenkrog, its project manager. Futures has therefore focused specifically on issues of Europe development – especially deregulation, the euro and EU enlargement – alongside the big issues, such as globalisation and information society, that traditionally occupy foresight exercises.

The objective was to work out the implications that the combination of these drivers is likely to have for technology, competitiveness and employment over the next ten years. To do so, the project formed a series of expert panels involving nearly 200 representatives from industry, academia and government. After a structured 18-month process involving brainstorming, seminars, workshops and a mid-term conference, they have produced 12 substantial reports.

Competing on quality

At the centre of the picture that emerges stand the high-technology industries, the collective lynchpin of a fledgling European information society. Nurturing innovation potential is viewed as crucial, so pride of place goes to the biotechnology and information-society industries, including notably computing and electronic commerce.

EU strengths are identified in these areas – agro-food and mobile telecoms, for example. But so too are worrying weaknesses, which tend to retard innovation in the same areas. Of great concern is the gap between what the industries propose and what the public appears willing to accept. To close it, Futures advises encouragement for improved social and political mechanisms to build consensus between public, industry and government.

In ICT-reliant industries, there is already a growing labour-market gap between demand for ICT skills and their supply. Policy-makers are aware of the problem, but shortages are likely to grow and to spill out into other technology fields. The implications for education and training are clear.

On the demographic front, the differentiation that social institutions are currently undergoing comes under scrutiny. The total number of households, for example, is growing twice as fast as the population. The Futures reports roundly reject an interpretation

of such trends as social fragmentation. Instead, they talk of a 'mosaic society', allowing for the possibility of social coherence.

Futures reads all these signs as pointers to an imperative – that Europe's competitiveness in the 21st century must be built on a foundation of innovative capabilities. It envisages a Europe that competes first on know-how, quality and performance and only second on price. The capacity to integrate new technologies into high-quality, innovative goods and services and to offer 'mass customisation' will be critical.

Futures' future

In contrast with most national foresight programmes, Futures was not commissioned. In fact, IPTS took something of a gamble in launching it. "We were looking for a flagship project, funded from our own budget, to raise IPTS' profile. We took a calculated risk that it would be of interest," says Ken Ducatel, one of the project leading team members.

The gamble paid off, and the project has already created a great deal of interest. "We have received many requests for follow-up work," says Ducatel. These have come from Commission policy-makers working on early drafts of the next Research Framework Programme, other EU institutions – as well as countries in central and eastern Europe, and even in Latin America, looking for help in designing their own foresight programmes.

To build on this success, the Futures team has already started working on a successor project, due for launch within a year. The aim is to reinforce the European foresight perspective, refining more quantitative estimates of cross-impacts, especially in relation to enlargement, and getting to grips with the socio-economic implications of the emerging *e*Europe. ●

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- **The full texts of the Futures panel's final reports are available at http://futures.jrc.es/**

TRANSNATIONAL TECHNOLOGY NETWORKS

Climbing the Value Chain

National and regional prosperity, according to the principal theorist of industrial clusters, is built around self-reinforcing technology networks. In Europe, regional networks are at an early stage of development, but global competition is already creating pressure to link them transnationally.

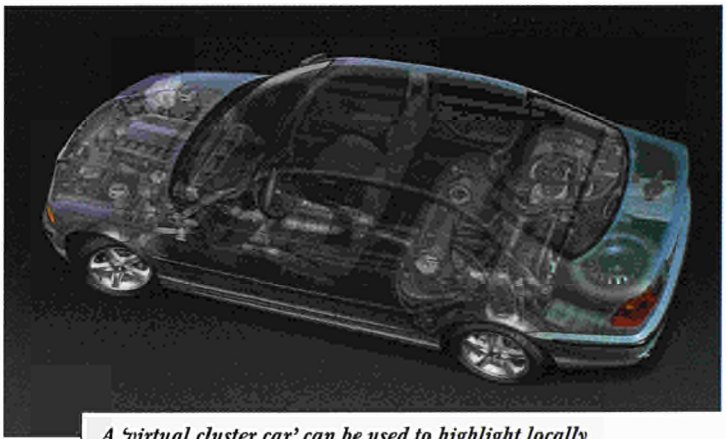
Productivity blossoms, Michael Porter argues[1], where technologies and products are continuously upgraded within geographically and sectorally concentrated groups of firms.

"Regional networks spanning an industry's entire value chain create a new basis for co-operation between companies, and for inputs from research institutes, technology parks and corporate R&D departments," confirms Dr Gerrit Stratmann of the German consultancy Agiplan. "They allow new synergies which improve the competitiveness of the participants and of the region as a whole."

Co-operate to compete

Agiplan has recently completed an analysis of existing networks in the automotive sector[2]. It forms part of a wider study undertaken by the European Commission's Enterprise Directorate-General, to assess the prospects for linking clusters of small and medium-sized enterprises (SMEs) transnationally.

Networking is more advanced in the automotive sector than in other industries, due to the intensity of international competition. "Each company understands that it can no longer survive on its own, and many regional governments ●●●



A 'virtual cluster car' can be used to highlight locally manufactured components – revealing the gaps in a region's competence which must be filled if it is to make the transition from parts supplier to system supplier.

The clip-on dashboard cover developed by three members of the Upper Austria automotive technology network is a world-beater.

●●●

recognise the need to support platforms for collaboration," says Stratmann. "But even individual regions are no longer strong enough to compete with America and Japan. There is now much greater willingness to co-operate at European level."

Agiplan studied automotive networks in Upper Austria and Styria (Austria) and in North Rhine-Westphalia (Germany), and also looked at ones in the Basque Country (Spain), Nord Pas de Calais (France), Piemonte (Italy) and Wales (United Kingdom). The seven are at very different stages, but a consistent picture emerged – both of the necessary development process, and of the benefits.

With one voice

Above all, regional networks must be unified and encompassing. To deliver real economies of scale – in the acquisition of new knowledge through training or research, for example – a network must involve a significant proportion of the region's automotive suppliers. "The more elements of the supply chain are integrated in a network, the greater the benefits," explains Stratmann.

Central to each network is a database of firms and institutions involved in the automotive industry in the region. Details of their products and capacity provide each member with an accurate overview of relevant regional competence. In addition, networks need to support communication between members, through newsletters and regular meetings.

The numerous success stories identified by the study include not only technological but organisational co-operation – for example, to reduce the cost and enhance the value of the ISO9000 certification process through joint qualification. "A network also gives small suppliers a much stronger voice when talking to large car manufacturers," Stratmann adds.

Three members of the Upper Austrian network recently collaborated to develop an innovative product with huge market potential. "On the basis of its regular discussions with car-makers, the network foresaw future demand for clip-on dashboard covers. These will enable drivers to alter or improve the appearance of a car's cabin as easily as you can that of a mobile phone," explains Stratmann's colleague Dr Ralph Hantschel. "In an intensive six-month joint project, a dashboard supplier, a milling-machine manufacturer and a plastics supplier developed a new machine to produce these complex 3D parts. They have already won contracts with several car-makers, and will be first to market with an extremely promising technology."

One step at a time

Such collaboration does not occur immediately. "It takes about a year to establish the necessary trust, once a network's information and communication platform is in place," says Hantschel. "Competition between members remains an issue. But the network provides the means to realise the potential benefits, and a framework for safeguarding the interests of each partner."

The difficulty of building relationships across national borders is the biggest barrier to the scale-up of technology networks to the European level, Hantschel believes. "The distances involved just make it harder to meet face-to-face," he says.

Agiplan's report describes an optimised model for creating regional technology networks, which it is keen to transfer to other sectors. "There has to be enough flexibility to accommodate regional and sectoral differences," says Hantschel. "But a common approach will make it much easier to link these networks transnationally at a later stage."

The next step, he believes, is to pilot the scheme in the automotive sector. "We want to realise a transnational network on a European scale, at least for one sector," he says. "All seven regions involved in the study are keen to take part, but the initiative needs EU support to kick-start it." ●

(1) In 'The Competitive Advantage of Nations', Macmillan Press, 1998.

(2) 'Analysis of transnational technology networking between existing clusters of SMEs and one or more technology poles (automotive sector)'.

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Extended Incubation

Privately financed business parks can extend the traditional science park model by offering a property ladder to technology-led start-ups as they move out of prototyping and into production. This innovative approach increases survival rates and benefits both investors and start-ups.

"Science Parks and university-based incubators are often heavily restricted by planning laws," says David Phillips of the Oxford Trust. "They may be ideal for R&D and prototyping, but offer little help to a promising start-up as it moves into the critical production phase, where ideas are turned into real products. At the time when managers need to focus on controlling rapid growth, they have to find new premises while simultaneously losing the basic support offered by the incubator environment."

Milton Park – a privately owned mixed-use business park in rural Oxfordshire, in the United Kingdom – demonstrates one successful response to these limitations. In 1989, its owners foresaw the opportunities presented by extending the science park model right through to commercial maturity. They teamed up with the Oxford Trust, which already had strong regional expertise in innovation and technology transfer, to create a mechanism to turn the park into a choice location for high-value technology-led enterprises.

Out of the shell

The core of the park is the Innovation Centre incubator, opened in 1991. It nurtures technology start-ups, helps them grow within the incubator, and moves them on to the business park as they mature into successful companies. This low-pain upgrade path, supported by hands-on involvement from park management, allows start-ups to concentrate on innovation and growth through their formative years.

Another key factor is that Milton Park's owners view the incubator as an investment in the future. Space is initially leased at very favourable rates, and requirements can be renegotiated monthly. This flexibility reflects an approach to rapidly growing technology-led enterprises based on 'total-cost-of-tenancy' – a vital component in the park management's vision.

Business mentoring support is provided by the Oxford Trust. A significant element for all companies, particularly those in the incubator, is the extensive network access to regional R&D, business and investment communities provided by the Trust. This access was identified as a critical success factor when the Innovation Centre was conceived, and has been successfully provided without formal links to a university.

Startling success

Thirty-nine start-ups have entered the incubator in the last decade. Of 21 'graduates', 14 are now in larger premises in the business park. Together, they occupy over 7,000m^2 of space, enabling the park to recoup its initial investment many times over.

Success rates are exceptional – 85% of the incubator's start-ups are still in business after three years, compared with a UK average of only 40%. Significantly, not one of the incubator's graduates has failed, clearly demonstrating the benefits of helping a company through the critical early years of rapid growth and the transition to production.

Milton Park's Innovation Centre is the first step on an innovative property ladder for high growth start-up companies.

To David Phillips, the lessons are clear. "The success of the Milton Park vision has been an eye-opener. It shows that private sector partnerships can go beyond the university science park model in offering win-win propositions to technology-led start-ups." ●

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The European dot.com

Riding the roller coaster – despite recent set-backs for dot.com stock prices, e-commerce will fundamentally transform the way goods, services and information are traded.

Electronic commerce presents the greatest test yet of Europe's The challenges – to develop world-beating technologies, to widespread take-up, and to regulate their use efficiently and But the potential economic and social rewards of success are price of failure is unthinkable.

Regardless of internet stocks' recent roller coaster ride, the pace of the e-commerce revolution itself will not slacken. Worth $33 billion in 1999, the United States on-line consumer market accounted for 1.4% of total retail sales, and is expected to nearly double again this year. Meanwhile, revenues from on-line advertising rose to $4.6 billion. Serious money is at last being made – if not by the hundreds of 'dot.com' start-up companies, then at least by established electronic retailers such as bookseller Amazon.

> *"If it can learn from the mistakes of the first generation, Europe may find that there is also an advantage to being the second mover."*

Everybody's gone surfing

Valued at €3.5 billion in 1999, Europe's business-to-consumer (B2C) market is much smaller. But it is growing more quickly, and is predicted to reach €45 billion by 2002. With more EU citizens connecting to the internet via mobile telephones and digital TV sets, 34.4 million will make web purchases that year, according to EITO(1).

But B2C represents only 15-20% of overall on-line sales. The Boston Consulting Group forecasts that worldwide business-to-business (B2B) e-commerce will reach $4.8 *trillion* by 2003 – 24% of total business-to-business trade in the US, and 11% in western Europe.

For firms as well as individuals, on-line purchasing offers convenience, choice, price-transparency and significant reductions in costs. As Erkki Liikanen, European Commissioner for Enterprise and the Information Society puts it: "What company can afford to forego savings of 10% in purchasing and procurement? E-commerce is no longer about 'hype'. It is of strategic importance for *all* businesses, old and new."

But maximising the benefits to Europe – both economic and social – will also mean ensuring that European companies secure dominant positions in the domestic market for e-commerce technologies and services, as well as a substantial share of global sales. The role of the European Union is critical – in co-ordinating strategic research, in shaping a regulatory framework which favours e-commerce, and in ensuring that all regions, all types of enterprise and all social groups are equally able to benefit.

1. Making Relationships Work

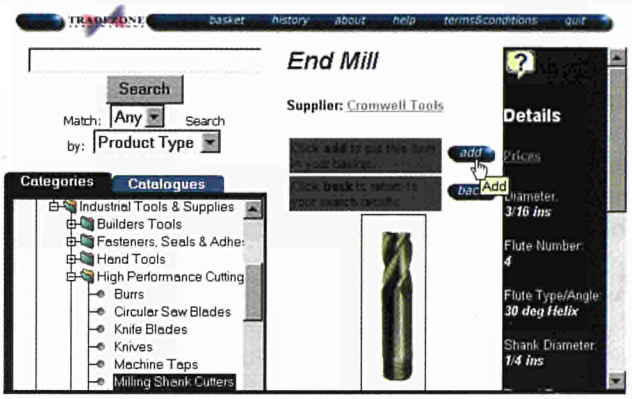
FP5's Key Action 'New methods of work and electronic commerce' is looking beyond transaction-oriented, PC-based models of e-commerce.

"EU Framework Programme funding is a very small fraction of what industry is spending, but it has a specific function," says Bror Salmelin, Head of the Electronic Commerce Unit at the European Commission's Information Society Directorate-General. "Our research is designed to support EU policy development, to open pathways to next-generation technologies, and to stimulate the emergence of new business paradigms."

(1) The European Information Technology Observatory is an annual yearbook of market analysis and statistics, whose 2000 edition for the first time includes a specific section on e-commerce. It can be ordered, price €60, from http://www.fvit-eurobit.de/def-eito.htm

Mission

innovative capacity.
ensure their rapid and
fairly – are enormous.
also colossal, while the



Tradezone's third-party market place, based on technology developed in an Esprit project, gives purchasers access to a repository of catalogues from hundreds of different suppliers.

Transaction-plus

In Salmelin's view, e-commerce has the potential not just to reduce costs, but to transform the way companies interact, especially within industrial supply chains. "Intangible components, service elements and relationships will account for an ever greater proportion of a product's value," he explains. "Especially in B2B, e-commerce technology is making possible new, individualised value creation."

This is certainly the experience of the Netherlands-based global financial services group, ABN Amro. "As financial products have progressively been digitised, they have become commodities," says Tony de Bree, the bank's Vice-President of Corporate IT Strategy. "When the processing, clearing and administration of standard products went digital, costs fell dramatically, and new players entered the market. Since the early 1990s, our wholesale business has been repositioning itself as a provider of tailored information about different financial products across an increasingly virtual supply-chain."

Today, internet technology is accelerating this trend, lowering transaction costs for individuals and small and medium-sized enterprises, too, driving banks like ABN Amro to extend high-value integrated financial management services to these markets. "In the Netherlands and elsewhere, customers value personal financial advice," says de Bree. "The challenge is to use electronic means to gather and compare information about all the available products relevant to a particular customer, in order to improve the quality of the advice delivered face-to-face in the branch office."

"Electronic commerce will bring purchasers and suppliers closer," agrees Michael Jeffries of the British third party e-commerce service provider Tradezone. "It will be increasingly purchaser-driven, but this is not just about lowering prices. It's about building stable business relationships, with significant cost savings on both sides. At the moment, suppliers take telephone orders through call centres. E-commerce automates order-processing, freeing staff for active telesales and customer support, and generating purchasing data which allows better profiling and management of the customer base. Everybody wins."

Multi-local approach

"The US is still six to nine months ahead of Europe," Jeffries says. "Commercial exploitation of this technology started earlier there, and US suppliers have already established large domestic markets." But growing demand for customisation and localisation of e-commerce applications offers European technology and service providers a real opportunity to catch up with their transatlantic rivals.

"American B2B companies have first-mover advantage," Salmelin admits. "But they gained it in the US business environment. Their 'one size fits all' approach will not be as successful in the more diverse markets of Europe, Asia and Latin America, either in the B2B or B2C worlds."

B2B platforms for collaboration have tremendous potential in the construction sector, for example, where different firms often work together on a project basis. But to accommodate contractual, behavioural and linguistic differences between regions, adaptation is essential. The same is true in the banking sector. "Translating user interfaces is not enough," de Bree confirms. "A British mortgage is quite unlike a Dutch one. What is needed is a multi-local approach, incorporating a high level of customisation."

"To be competitive in this new market place, it will be necessary to diversify into networked and personalised business models, where European companies have a real advantage," Salmelin concludes. "Many US companies are surprised by the extent of Europe's regional differences," adds his colleague Paul Timmers. "People here are more used to negotiating in a variety of business circumstances. We are optimistic about the future, but both governments and companies will have to move fast."

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2. Regulation and Self-Regulation

The E-commerce Directive, approved by the European Parliament in May, opens the way for accelerated take-up of the new technology.

In developing the regulatory framework for electronic commerce in Europe, EU policy-makers have had to strike a delicate balance. They were keen to remove barriers to the rapid exploitation of internet technologies. At the same time, they wanted to protect the rights of consumers and users – not least, as a means of building public confidence in e-commerce.

A single digital market

"Our main aim has been to ensure the free movement of electronic services across national borders, extending the single market into the digital world," says Timothy Fenoulhet of the Information Society DG's Policy Planning Unit.

This has meant adapting existing EU and Member State legal frameworks to safeguard the sometimes opposed interests of consumers and the business community. EU Directives on the protection and use of personal data, and on legal recognition for electronic signatures, have already been adopted. A Directive proposal on the protection of copyright is currently being negotiated in the Council of Ministers. But while a Directive provides guidance to the Member States, it must be translated into national law before it has effect.

The pace of adoption and implementation is often slow. European companies have frequently complained that the resulting delays place them at a disadvantage compared with competitors in the more ruthlessly free market US environment. "The EU's institutional process makes it hard to keep pace with technological change," admits Fenoulhet.

The new E-commerce Directive offers a way out of this dilemma. The Directive itself was adopted with unprecedented speed thanks to a new, streamlined decision-making process introduced in the Amsterdam Treaty, and will be written into the national law of each Member State before the end of 2001. And its provisions embody an innovative and uniquely European approach to the problem of regulation.

The Directive extends a fundamental principle of the Single European Market to the realm of electronic commerce – if a service is legal in its country of origin, then it is also permitted in every other Member State. It defines the successive steps which must be taken to conclude a binding electronic contract. It also sets limits on the liability of telecoms carriers and internet service providers for illegal or defamatory content passing through their networks.

Self-regulation with teeth

Most significant of all, in key areas the Directive encourages businesses and consumer groups to develop codes of conduct as alternatives to legislation. "There has to be a legal safety net," says Fenoulhet. "But in many cases we think that in practice self-regulation will be more effective."

The Commission is working hard to promote alternative dispute resolution (ADR) systems. "It is not easy for consumers to obtain redress from an on-line supplier in another Member State, even if they obtain a court judgement in their favour," Fenoulhet explains. "We are encouraging companies to adopt, as a source of competitive advantage, after-sales procedures which incorporate best practice in settling complaints. We are also developing on-line third party mediation for the speedy resolution of cross-border disputes. Finally, we plan to establish binding arbitration procedures – though businesses are more likely than consumers to use these."

*e*Europe and the Lisbon Summit

*e*Europe is a political initiative designed to accelerate Europe's transition to the information society. Launched in December 1999, it is intended to make an immediate and significant impact. The initiative was adopted at the Lisbon Summit in March, where European heads of state and government committed themselves to ensuring that Europe embraces the digital economy as the basis of future economic growth and job creation.

The key objectives of *e*Europe are:

- to bring every home, school, business and public administration on-line
- to create a digitally literate Europe, supported by an entrepreneurial culture ready to develop and finance new ideas
- to ensure that the transition to the digital age is socially inclusive, building consumer trust and strengthening social cohesion

In a speech at CeBIT 2000 in February, European Commissioner Erkki Liikanen highlighted specific targets in two of *e*Europe's ten priority areas.

First, the cost of high-speed internet access must be reduced – the 'local loops' installed by incumbent telephone operators should be opened to competition by the end of 2000, and the allocation of frequencies for multimedia wireless systems should be completed by the end of 2001. Second, to accelerate take-up of e-commerce, by the end of 2000 a comprehensive legislative framework should be in place, and the Commission and Member State governments should have plans to put all public procurement on-line.

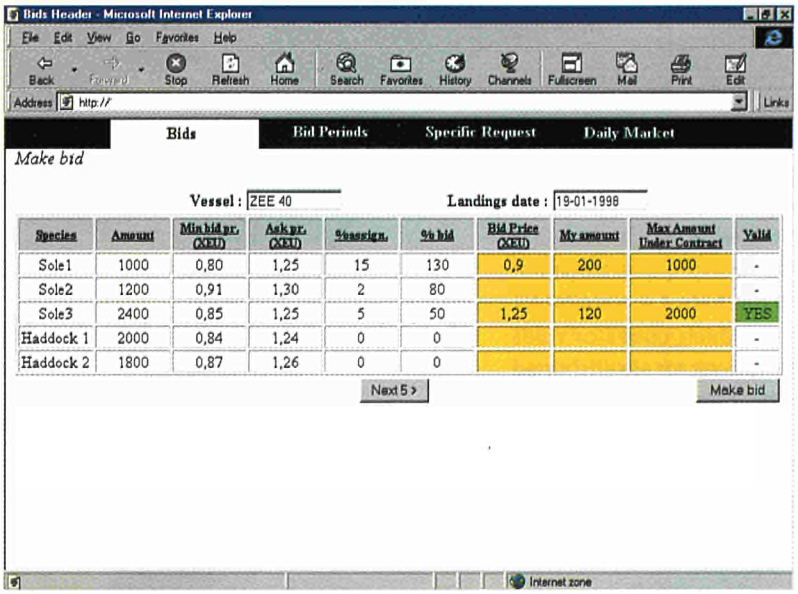
With the adoption of *e*Europe in Lisbon, and of the E-commerce Directive by the European Parliament (see main text), these targets have already been nearly reached.

Fishing Nets

Infomar has applied modern information and communications technologies (ICTs) to stabilise a jittery traditional market.

Fish are an unusual commodity. Until catches are landed, the markets where they will be sold know little about them – the species in the catches and their quality, for example. Highly perishable, they cannot be stored for long. As a result, sudden shortages and gluts are common, and prices move up and down rapidly – causing frustration for fishermen, buyers and their customers.

An innovative solution to this problem has come from Infomar, a 34-month Esprit project(1) completed in March 1999. The basic idea is simple – an electronic market created alongside the traditional fish market. Trading in an electronic market can free buyers and sellers from the constraints of a conventional market place. In the Infomar system, it frees them from the uncertainty imposed by their physical separation while the trawler is at sea.



Infomar enables traders to bid electronically for fish already caught but still to be landed.

Information flow

"The key users", explains Luc Schelfhout, managing director of SCS, the main technology supplier in the project, "are the auction houses and the buyers, who between them determine market prices. Not forgetting the fishermen, of course." Infomar connects all these actors on a computer network, where fish can be traded before they are landed. "Splitting the product flow from the information flow allows trading to be done on the basis of the information flow," Schelfhout says.

To the end-user, the Infomar system is a suite of three e-commerce applications, which can be used independently or together. As they catch fish during a fishing trip, the fishermen use the FishCATCH application to communicate information about the catch to their agents and to their local markets over a ship-to-shore satellite network link. FishTRADE is an electronic trading system with which fish traders can agree prices with their suppliers and buy the fish they want. Finally, FishCAST is an information system giving fish marketers access to information about prices and supplies available.

Adding value

The attraction for fishermen is financial. Trading electronically before landing their catches is fast and efficient, enabling them to realise higher prices for their catches. Fish sold the traditional way at auctions are graded, packed and transported twice – once by the auction house and once more by the buyers. Handling costs money and reduces product quality. With Infomar, the buyer can specify grading and packaging requirements to the fishermen while they are still at sea. Handling is reduced, so the quality and thus the value of the product is enhanced.

Infomar was successfully piloted at three European ports during the Esprit project. "Now it is taking off in a lot of other ports," says Schelfhout. New refinements are also being added continuously – the integration of online financial services is turning out to be necessary, for example. As Schelfhout explains, "When you start to use the internet to advertise your goods, the buyer who offers the best price may be one that you do not know. To address this problem the pilots are now focusing very strongly on ensuring the reliability of transactions."

(1) Project 22201 – An information network for the fishing industry (Infomar).

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E-commerce promises greater convenience, choice and price-transparency – but on-line shoppers need the same legal protection as those in traditional market places.

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Co-regulation – in which codes or rules developed by the private sector are enshrined in law – may be the best way forward, Fenoulhet believes. "Policy-makers need industry's help to understand and anticipate technological trends. Co-regulation has the advantage of speed and flexibility, while protecting consumer interests."

Of course, the internet does not stop at the EU's external borders, and a similar approach is being pursued at international level through the industry-led Global Business Dialogue on e-commerce (GBD), which the Commission helped to initiate, and in which major European players like ABN Amro are represented.

3. Thinking Outside the Box

The future of e-commerce will be unlike anything we have seen so far, say the experts. Even so, it is essential that Europe prepares for it.

The transforming effects of e-commerce will be pervasive. Already, the boundaries dividing it from the rest of life are blurring.

The distinction between old economy bricks-and-mortar retailers and new economy virtual stores is breaking down, as high-street brands capitalise on their reputations to transform themselves into 'bricks-and-clicks' hybrids. The distinction between technology providers and technology users is also disappearing, as groups of large manufacturers establish e-procurement systems to take control of their own supply chains.

Similarly, e-commerce is having a fundamental impact on all areas of information and communications technologies. "You cannot keep it in a box," says Bror Salmelin. "Topics like mobility, user interfaces and the delivery of public services demand multi-disciplinary integration with other parts of FP5's Information Society Technologies programme."

A clear European lead – multi-functional mobile devices like this concept design from Nokia will provide the basis for a range of entirely new services.

New paradigm

Imagine being able to dial a single number to call the nearest taxi, wherever you are in Europe. "The next generation of phones will have easy voice control and embedded intelligence offering 'context sensitive' electronic services based on awareness of the user's location," Salmelin predicts. "In a few years, no one will use the term e-commerce. Mobile, digital interactions of every kind will be taken for granted as part of everyday life."

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Competing by Numbers

The Esprit project, VIVE, shows how SMEs can boost their competitiveness by collaborating in web-based virtual enterprises.

In the mid-1990s, three Italian small and medium-sized enterprises (SMEs) lost their contracts as suppliers to a manufacturer of earth-moving machinery. The components they had supplied were parts of a subsystem. They were ousted by a larger Japanese firm which offered their customer all the components at a competitive price, ready-assembled into a complete subsystem.

However, before long the trio not only re-established themselves as the suppliers of choice, but broke into new overseas markets. The secret of their success? They formed themselves into a virtual enterprise (VE), using information and communication technologies (ICTs) to work co-operatively.

Plug and play

This success was the inspiration for the 26-month Esprit project(1), which set out in 1998 to capitalise on the business solution which had set the Italian SMEs on the road to recovery.

When a business opportunity arises that is beyond the capabilities of a single SME, how can a group of SMEs be rapidly assembled with a minimum of red tape and sustained through the life of the project? In essence, this was the question which VIVE addressed. Its method centred on two real-time real-life pilot cases – VEs created, nurtured and monitored within the project.

The solution it developed has three ingredients. The first is a set of business templates. "These are the key to our methodology, because they provide what SMEs need – concrete, simple steps to follow one at a time through the life cycle of the VE," says Roberto Santoro, managing director of CE Consulting, the engineering consultancy which led the project.

Cartridge valves designed by one of the VIVE VEs are now being commercialised by Oil Control, another VE partner.

Second comes the business integrator. The consortium included two would-be business integrators – organisations which learned to apply the VIVE methodology under supervision from CE Consulting. "The business integrator really coaches the SMEs," Santoro explains. "It does not just provide a one-shot training course and then leave them to sink or swim. The coaching is a continuous hands-on process."

The third ingredient is the technological infrastructure, provided for VIVE by Siemens Informatica. ICT solutions are used to simulate the VE, allowing its partners to identify and assign the tasks each must perform for the grouping to work efficiently. They also provide integrated communication, document-management and management systems from a central server. As a turnkey set-up, the necessary hardware calls for surprisingly little investment. "Individual partners can plug and play," says Santoro. "The next day they are ready to start. All they need is a browser and an internet connection."

Avalanche effect

The Esprit project ended earlier this year, but VIVE continues to gather momentum. Currently 136 members strong, and growing rapidly, a VIVE Interest Group has been formed, and held its fourth special workshop in June. VIVE's test-case VEs have put down strong roots and new VEs have been born outside the Esprit project.

As Santoro puts it, "What we are witnessing is an avalanche effect."

(1) Project 26854 – VIrtual vertical enterprise (VIVE).

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This is good news for Europe, since natural language interfaces and mobile telephony are fields in which it has a clear technological lead. Entirely new classes of value-added services will be developed around multi-functional portable devices by new intermediary companies, while charges for basic telephony and e-mail approach zero. "The societal advantages will be huge," says Salmelin. "But we have to ensure that the Information Society is all-inclusive."

Ensuring that no 'digital divide' opens up between information-rich and information-poor social groups, classes of firms, regions or countries is a central theme of the *e*Europe initiative (see box on page 10). As Erkki Liikanen has pointed out, "Access for all is not only an important social objective – it is also an economic imperative." Competitiveness and prosperity will increasingly depend on knowledge generation and knowledge management, and the greater the number connected to any network, the greater its value to all.

Fortunately, mobile telephony and digital TV – another area in which Europe is especially strong – are likely to bring e-commerce to a far wider audience than the personal computer ever could. ●

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Links

Below are the web addresses of some of the most useful sources of on-line information on European electronic commerce. The list is available in clickable, hypertext form on *Innovation & Technology Transfer's* own webpages at http://www.cordis.lu/itt/

European Commission:

- Electronic Commerce and the European Union
  http://www.ispo.cec.be/Ecommerce/
- The *e*Europe Initiative
  http://www.europa.eu.int/comm/information_society/eeurope/index_en.htm
- Information Society
  http://www.ispo.cec.be/
- Information Society Directorate-General
  http://www.europa.eu.int/comm/information_society/index_en.htm
- Information Society Technologies research programme
  http://www.cordis.lu/ist/
- G8 Global Marketplace for SMEs
  http://www.ispo.cec.be/ecommerce/g8/g8pp.html

Business and technology:

- Global Business Dialogue on Electronic Commerce
  http://www.gbd.org/
- European Information and Communications Technology Industry Association
  http://www.eicta.org/Eicta/
- Identrus
  http://www.identrus.com/
- WIPO Electronic Commerce
  http://ecommerce.wipo.int/
- Electronic Commerce section of the WTO website
  http://www.wto.org/wto/ecom/ecom.htm
- W3C Electronic Commerce Interest Group
  http://www.w3.org/ECommerce/

General:

- OECD Electronic Commerce web pages
  http://www.oecd.org/dsti/sti/it/ec/index.htm
- Overview of OECD work on e-commerce
  http://www.oecd.org/subject/electronic_commerce/documents/emergence.htm
- Electronic Commerce Knowledge Center
  http://www.commerce.org/
- internet.com's Electronic Commerce Guide
  http://ecommerce.internet.com/
- Financial Times European e-business review
  http://www.ft.com/ebr/

Scenarios and Ripple Effects

From Europe to the United States and India, scenario workshops have spread. Soon they may become valuable tools for companies and research networks – wherever people aim to shape the future, plan strategy, resolve conflicts, and create a common language.

In 1992, the Danish Board of Technology launched 'Barriers to Urban Ecology'. In workshops held in four cities, politicians, technological experts, business people, and residents were invited to brainstorm together. Scenarios of the future were used to stimulate creative thinking and promote a constructive dialogue. The aims were to form visions of urban ecology, to identify barriers to their realisation, and to propose solutions. The experiment resulted in a National Urban Ecology Action Plan.

The same year, the Earth Summit in Rio de Janeiro adopted Agenda 21, containing actions and priorities to make the world more sustainable in the 21st century. A suggestion was that cities and towns should establish a Local Agenda 21, based on a process of consultation and dialogue.

The European Commission, meanwhile, was scouting for methods likely to promote a social environment favouring innovation in Europe. "The hypothesis", says Francisco Fernandez of the Commission's Enterprise Directorate-General, "was that good practices must exist, enabling people with different social roles, perspectives, interests, expertise, and preconceptions to tackle problems and resolve conflicts effectively."

EASW scenarios stimulate creative thinking about sustainable cities.

These ideas – national, global, and European – were soon to coalesce. In 1994, the first European Awareness Scenario Workshops (EASW) were run within a pilot project(1) aimed at testing the transferability of the scenario method to the broader European scene.

Self-seeded spread...

Urban ecology was the focus of the first pilot action. Then Flexi-modo(2) extended the scope to mobility, information and communication, and urban regeneration. The general objective was to find combinations of technology, public policy, and private and societal actions favouring a sustainable urban life. 'Learning by doing' was the approach used to adapt the methodology.

Many cities have now run EASW, notably within Commission-sponsored initiatives. In addition to enthusiasm and a positive dialogue, the process often yields tangible results. In Lavrion (Greece), for example, a workshop made the residents aware that soil pollution was a major obstacle to sustainability. The excitement surrounding the event prompted universities to seek ways to decontaminate the soil.

Today the Commission no longer funds these 'urban sustainability' workshops. Yet they are multiplying independently thanks to two instruments created by the initial projects. One is a multilingual set of tools, downloadable from the EASW and

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(1) The European Awareness Scenario Workshops Initiative of FP4's Innovation programme. EASW is a registered trademark of the European Commission.

(2) Developing and Disseminating a modularised scenario-workshop method on urban ecology, mobility, local information provision and urban regeneration – part of the Training and Dissemination Schemes Initiative of FP4's Innovation programme.

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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http://www.cordis.lu/innovation-smes/home.html

Fleximodo websites. Manuals, adaptable scenarios and programmes, posters, transparencies, promotional brochures and two CD-ROMs are available. The second is a network of EASW-trained National Monitors. With the guidance of a National Monitor, policy-makers or active groups run workshops on their own at minimal cost and with minimal organisational hassle.

... to new countries

Once adapted, the Danish method found very fertile ground for replication in southern Europe. Italy and Spain now account for half of the EASW organised. "The reason is a recent shift of emphasis, there, to regions and communities." says Fernandez. "In the new context, different groups and levels of authority strive to occupy their natural space. Conflicts arise, and scenario workshops represent a constructive, democratic way to resolve them."

Outside Europe, people are also interested. EASW have been held in India, and there is even an accredited National Monitor in the USA. There, a new feature has been added – democratic criteria such as "Do the technologies in your vision hinder or assist the participation of socially disadvantaged individuals and groups in social or economic life?"

Workshop content has also diversified. One EASW, for instance, was devoted to women and the internet. The Commission's Dew project[3], meanwhile, gave the workshops an economic emphasis – the aim was to create a local climate where SMEs could flourish, with an improved environmental performance.

New projects

Now two new Innovation projects, Basis[4] and Strategist[5], have been launched by the Fifth Research Framework Programme's Innovation and SMEs programme. Both will create EASW tools for new uses. The Basis tools are designed to help companies plan their innovation strategy. In Strategist, EASW will be an optional accompanying measure for transnational research projects, aiming to increase the chances of success and beneficial impact. Early in a project, scenario-based vision building should help the partners overcome cultural differences and establish co-operation. Later, EASW in the partners' respective communities could promote local synergies, making the project more fruitful and socially meaningful.

It will be interesting to see how widely this original approach will spread. ●

(3) Developing the Economy from Within, a project of the Third System and Employment programme of the European Commission's Employment Directorate-General.

(4) Project IPS-1999-00013 – Business awareness on sustainable innovation strategies.

(5) Project IPS-1999-00016 – Strategies to assess S&T impact in industrial clusters.

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MEDICINE AND HEALTH

Source: Luke Marshall, H. pylori Research Laboratory

A 10,000x computer-aided design image of H. pylori *showing the curved shape and flagella which enable the bacteria to propel themselves into the mucus lining of the stomach.*

Testing Tell-tale Breath

The IRIS infra-red isotope analyser performs quick, safe, cheap tests for non-invasive diagnosis in gastroenterology, hepatology and nutrition. It allows easy detection of* Helicobacter pylori, *the main cause of peptic ulcers and major risk factor for stomach cancer.

Helicobacter pylori (H. pylori) bacteria, present in 50% of the world population, cause chronic gastritis, peptic ulcers and stomach cancer. When symptoms develop, elimination of the bacteria is often the key to a permanent cure. Endoscopy, a biopsy and culturing are crucial to diagnosis and follow-up of ulcers or cancer, but just for monitoring the success of antibacterial treatment, this procedure is unsuitable – it is expensive, time-consuming, invasive, and there is some risk of transmitting infections.

Breath testing is simpler. It exploits the ability of *H. pylori* to produce carbon dioxide (CO_2) from urea. After swallowing 'labelled' urea, an infected patient exhales 'labelled' CO_2. The label may be either the carbon-14 (^{14}C) or carbon-13 (^{13}C) isotope, but ^{13}C is safer because unlike ^{14}C it is not radioactive. Until recently, however, its detection required an expensive mass spectrometer and a qualified operator.

Today a cheaper, simpler solution is fully validated, thanks to a Competitive Support Action (CSA)[1] project involving a small German company and the Institute of Reference Materials and Measurements (IRMM) of the European Commission's Joint Research Centre[2].

IRIS Mark I

"Years ago," says Dr Günter Wagner of Wagner Analysen Technik (WAT), "the company Hartmann & Braun invented the non-dispersive infrared technique (NDIR) to detect methane in coal mines. The technique actually measures a pressure rise occurring when a 'greenhouse gas' absorbs infrared light, heats, and tries to expand. Later, Professor Peter Hering of the Max Planck Institute of Quantum Optics near Munich used this cheap and simple technology to produce a prototype $^{13}CO_2/^{12}CO_2$ detector. My company, meanwhile, was trying to sell mass spectrometers for *H. pylori* breath tests. When I saw Professor Hering's prototype, I knew this was the answer."

Dr Wagner's vision led to IRIS Mark I, an NDIR-based analyser for measuring $^{13}CO_2$ enrichment in breath samples.

Child's play – the patient just blows into the bag. Diagnosis takes less than two hours using the IRIS tabletop analyser, PC and Windows software.

Improving IRIS

With IRIS, all the patient has to do is drink a liquid enriched with ^{13}C-urea, then blow into a bag. A tabletop analyser, a PC and dedicated software do the rest. The major innovation is a simple calibration system for which WAT holds a patent. Yet despite its simplicity and reasonable cost, IRIS Mark I received a cool welcome. This led Dr Wagner to contact the IRMM.

"Our job is to develop and transfer expertise in measurement," says Dr Philip Taylor of IRMM. "We supply measurements for fundamental constants with the highest accuracy attainable. With the same methodology and rigour, we test the performance of new technologies. We provide reference materials for quality control, food authentication, test validation, and so on. We try to understand and solve people's measurement problems."

IRMM validated IRIS measurements against mass spectrometry, the best technique available for measuring ^{13}C. Taking a critical look at IRIS, the Institute determined boundary conditions for the analyser's reliable use. It recommended several improvements. The aims were to make the system more reliable and durable in a hospital setting, to increase its user-friendliness, and to make it a more useful tool for doctors. WAT implemented the recommended changes and recruited many hospitals to validate specific IRIS breath tests.

New applications

The result is IRIS Mark II, a second-generation analyser with an improved sampling device, a new housing, and 16 ports for air-sample bags. Its database, a new feature, enables users to define and organise breath tests, store patient data, and collect individual test results.

With an hour of training, any nurse can operate IRIS, calibrating it with her own breath. Patients are diagnosed on-site in less than two hours. The IRIS *H. pylori* test, with 98% specificity and 98% sensitivity, is now the gold standard for *H. pylori* detection.

New applications have also emerged, using different labelled substrates – tests of liver function, pancreatic function, gastric motility, amino acid metabolism, fat absorption, and more.

Removing obstacles

"Today, IRIS is widely accepted," says Wagner. "In some countries it is very popular both for detecting *H. pylori* and for replacing invasive or radioactivity-based organ function tests. A few private practitioners have even adopted it, and for this group we hope to make a smaller, cheaper version. Obstacles to wider distribution include a patent impasse in the US, the need to await certification of ^{13}C-labelled substrates in some countries, and low or zero reimbursement of breath tests by some national health services. Yet at international conferences, I have seen doctors pound the table, demanding access to this new tool. We are working hard to remove the obstacles."

IRIS is already used in *H. pylori* eradication campaigns and even for preventive screening. This could mean solving a widespread and costly public health problem. ●

(1) For a description of the CSA activity, see 'I Can See Clearly Now', edition 5/99.

(2) CSA96 106 – Validation of sampling, calibration, and measurement procedures for the Non-Dispersive InfraRed (NDIR)-carbon-13 isotopic measurement technique applied to biomedicine.

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Stars Rising in the East

With a strong research base, but lacking a business culture oriented towards innovation, how quickly can central and eastern Europe transcend its role as the EU's poor relation? A forthcoming study will examine the challenges to innovation policy-makers in applicant countries.

The Czech Republic is one of the central and eastern European accession countries that will increasingly benefit from technology transfer links with the EU.

"Co-ordinated innovation policy is going to be critical for these economies, if they are to compete effectively in the single market," says Alasdair Reid of Aide à la Decision Economique (ADE), the Belgium-based consultancy which is leading the study. "Since the collapse of communism in the early 1990s, the restructuring of large, state-run industries has been led by investment from major European Union companies. The resulting gains in productivity and profitability have been dramatic. But the countries themselves have benefited little from the value added, or from opportunities to develop their own capacity to run modern enterprises."

Now, they need to move out of this phase, capitalising on the strength of their high-tech R&D skills to build new companies, and to develop home-grown technologies with real international sales potential. Subcontracts secured on the strength of low wages do not form a sustainable basis for a modern economy.

Role models

ADE's 18-month study is one of a new series of Innovation Studies[1] launched in May by the Innovation Directorate of the European Commission's Directorate-General for Enterprise. It will identify the key policy actors in six applicant countries – the Czech Republic, Estonia, Hungary, Poland and Slovenia, as well as Cyprus – and assess the current status of entrepreneurship and innovation management, co-operation and mobility between public research and industry, and the fiscal and administrative environment.

The Commission hopes that the study will also highlight examples of good practice in stimulating the development of technology-based firms oriented towards export markets. "We will not just be looking for infrastructure projects," Reid says. "Business parks are important, but their impact is determined by the people who use them. We want to find concrete examples of successful business innovation, and to show how it can transform the prospects of regions and sectors."

Innovation is primarily driven not by technology but by market demand and competitive pressure. One of the study's key messages is likely to be that escape from dependence on foreign investment and foreign contracts requires exposure to foreign competition – and as rapidly as possible.

Closing the gap

"What the central and eastern European countries have, in many cases to a much greater extent than some EU Member States, is a large, skilled research community," Reid explains. "But as public funding for research has dwindled, these skills have not so far been exploited to their fullest advantage." Throughout the 1990s, many scientific personnel migrated abroad.

As in the EU, the challenge for policy-makers is to mobilise these resources by offering real opportunities for qualified people to apply their scientific or research skills in new ways – creating or working within new companies. "The main issues are similar to those faced in the rest of Europe," Reid says. "First, access to appropriate forms of capital and adequate management skills. And second, the right mix of incentives and safeguards to persuade academics to take the risk of leaving relatively secure positions and starting their own companies."

A further legacy of the communist era is the widespread lack of a 'whole company' ethos. In the past many business functions, including R&D, were commonly performed by the public sector.

Today, enterprises need to integrate a wider range of functions or find new sources of specialised technologies and skills from new service organisations. As they do so, inter-company activity is increasing rapidly, and needs to be supported.

In the telecoms sector, the technology gap was too great, and national operators were quickly wiped out by major foreign players with the resources to replace the outdated infrastructure. But in sectors such as food processing, the gap is smaller, less investment is needed, and the diversity of these countries' products gives them an advantage. "They can apply incremental innovation to introduce the improvements in quality control and packaging necessary to sell into international markets," says Reid.

Mutual learning

Reid does not expect the lessons in innovation policy to flow entirely from west to east. "Unlike agriculture and some of the other policy areas in which the EU has been assisting the accession countries, innovation policy is still largely experimental even in the EU," he points out. "In this area, learning will probably not be solely one-way. When the Mediterranean countries first took part in transnational research and innovation projects, people tended to assume that there would be an exclusively north-to-south transfer of knowledge. Very quickly we found that Sweden could also learn from Greece. Similarly, I am confident that we will learn from Slovenia and Poland in certain sectors and in certain areas of innovation policy." ●

(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 Policy Unit Launches Call for Network Proposals

Enterprise DG's Innovation Policy Unit has merged two calls for proposals previously planned for publication on 15 June ('Access to private innovation financing') and 15 September, respectively ('Patent Academia'), into a single call of potentially high interest to the innovation community – **'Access to private innovation financing and tools for better knowledge exploitation'**, due to be published on 17 July. The call is for four thematic networks – I-TEC venture capital network; incubator forum; university industrial liaison offices; and expertise in entrepreneurship and innovation finance – supported by three accompanying measures. Call documents are available on http://www.cordis.lu

Expressions of interest to become a member in any of these networks may be e-mailed to: entr-network2000@cec.eu.int

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PAINT MANUFACTURE

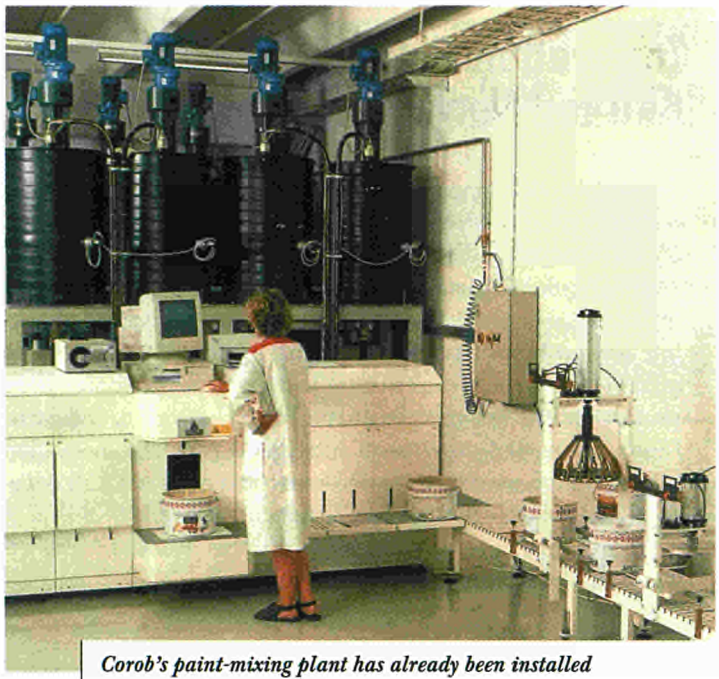
Any Kind of Paint You Like

New technology for mixing paint on demand promises great flexibility in the choice of paint properties, as well as lower manufacturing and stockholding costs. The system developed in a CRAFT project by Italian and French SMEs could even be appearing in your local store soon.

Imagine being able to design your own paint. You can specify not just the colour, but also drying time, coverage, durability and finish – gloss, matt or anywhere between. What's your budget? Brush or roller? What size container? Choose your options and a machine will make up your order in just a few minutes.

Consumers would not be the only people to benefit from 'while-you-wait' paint blending. Paint manufacturers and stockists handle thousands of paint types, colours and can sizes. They spend a lot of money on stock management, yet still find it hard to guarantee that any particular paint will be available in the shops. Custom manufacture would save money all down the supply chain.

Shoppers at large stores already use special blending machines to make paint in colours that are not available from stock. Could this flexibility be extended to cover different paint types as well? In October 1994, two SMEs – Corob SpA, an ●●●



Corob's paint-mixing plant has already been installed at a paint factory in Finland.

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Italian supplier of paint-making machinery, and Jefco, a French paint manufacturer – decided to try. The result was a CRAFT project(1), which has successfully developed the technology to make paint on demand.

What's in a paint?

Modern paints are complex mixtures, explains Leopoldo Mazzalveri of Corob. They contain resins, pigments, fillers, additives such as anti-UV agents and fungicides, and water or organic solvents.

"Making paint to given standards of performance and cost, and ensuring consistent quality and colour, is hard enough in a large-scale manufacturing plant," says Mazzalveri. "Scaling the process down to a batch size of just one litre, and showing the customer how to choose the right formulation for the job, is even trickier."

To simplify the task, the project partners decided to work with a maximum of 48 standardised components – solvent, resin, pigment dispersion and so on – known as 'modules'. They believed it would be possible to design formulations to assemble thousands of different paint types and colours from this relatively small number of modules.

"As well as the paint formulations, we knew we would have to design the equipment to dose and mix the modules to produce the final paint," says Mazzalveri. On top of that, the partners planned to develop software to advise customers about the choices involved in paint blending, and to show them as accurately as possible what the finished paint would look like.

Pumps, valves and software

Machinery supplier Corob was mainly responsible for designing the blending equipment and control software. According to Mazzalveri, technical challenges included the design of new dosing valves and a non-intrusive method of mixing. "We decided we could not use an intrusive mixer because of the difficulty of cleaning it afterwards," he explains. "So we developed a way to mix the paint by shaking the can."

Jefco, with its expertise in paint manufacture, looked after the paint formulations and designed the raw material modules to give the necessary versatility. Two other Italian SMEs, OMG and Offmec, joined the project to help with equipment and software design.

Most of the research was done by the Italian universities of Bologna, Modena and Ferrara. From Italy, research centre Cemoter-CNR and consultants SRMP also contributed to the control software, while two French SMEs, Itech and Soft 16, provided specialist research to aid JEFCO in developing paint formulations.

Key to the project, notes Mazzalveri, was the development of formulation models that allow the system to build a recipe for a paint that meets the customer's performance specifications. Conversely, the software can predict the properties of paint made to any given recipe.

Ahead of its time?

Mazzalveri reports that there was excellent co-operation between the project's partners. Critical to this success was a clear framework which allowed the SMEs to exploit the results commercially while protecting the intellectual property rights of the researchers. Corob and Jefco have a patent cross-licensing deal, for instance, and other bilateral agreements are in place between SMEs and researchers.

The project ended in 1996, but so far the ambitious goal of getting machines into retail stores has not succeeded. "The market was not really ready for this technology," Mazzalveri admits. "But I am still confident that it will be accepted in the future." Corob has, however, managed to incorporate much of the technology developed during the project into its own paint-making machinery.

Today, a demonstration system is installed at a paint factory in Finland, where it is used to make small batches of paint and to test production recipes for larger batches. The technology is fully proven, say the project partners, and is available to any company wanting to use it in the retail sector. It is not just limited to paint – other possible areas of application include plastics, ceramics and cosmetics. ●

(1) Project CR133191/BRE21417 – Paint manufacturing process optimisation for the building industry, using original bases and pigments formulation.

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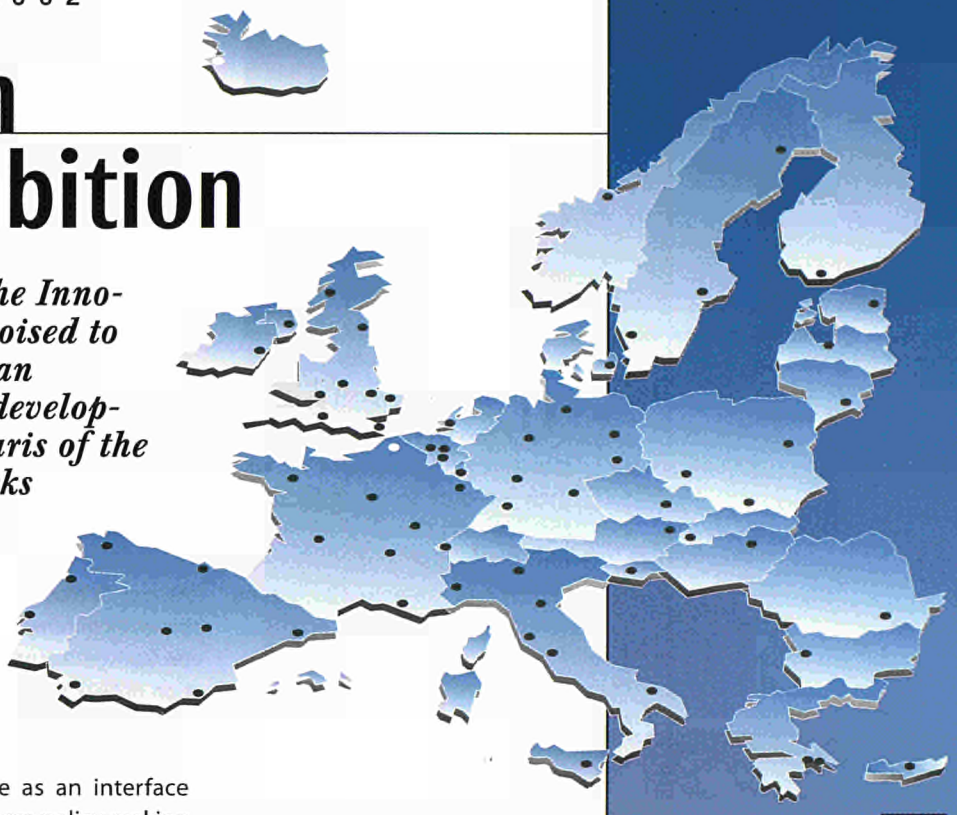
Innovation Relay Centre
Newsletter

NETWORK GOALS 2000–2002

Consolidation and Ambition

Exploiting its unique expertise, the Innovation Relay Centre network is poised to play a pivotal role in the European Union's enterprise and regional development policies, says Yannis Tsilibaris of the Innovation Directorate's Networks and Services Unit.



"Over the next few years, there will be rationalisation of the increasingly crowded business support market," Tsilibaris predicts. "However, only the IRC network offers dedicated assistance for transnational technology transfer and partnership. The challenge it faces is to exploit the substantial human potential of its approximately 1,500 innovation professionals to position and promote this specialised role within the broader system of European business support."

On target

First and foremost, this means continuation of the IRCs' core task of helping small and medium-sized enterprises in particular to acquire and market technology and know-how at European level. For the first two-year phase of the Fifth Research Framework Programme's IRC project, the network plans to commit itself and its individual regional nodes to quantified performance targets – in particular, for the conclusion of technology transfer deals.

But Tsilibaris also expects the network to fulfil a more strategic function. "The Enterprise DG is in the process of developing a new, more integrated Commission enterprise policy," he says. "Within this, the IRCs have the competence to serve as an interface between business policy-making and the practical delivery of business support and assistance."

He also points out that between 2000 and 2006, around €1 billion (1999 prices) of Community Structural Funds assistance is earmarked for actions in support of regional innovation capacity-building. These measures will promote new forms of financing, encourage the creation of start-up companies, provide specialised business services, support technology transfer, and establish new interfaces between firms and academia.

"In relation to innovation, the parallel Innovating Regions in Europe (IRE)(1) and Innovation Relay Centre networks are ideally placed to contribute to regional policy formulation and regional service delivery respectively," Tsilibaris explains. "And there is real potential for synergy between them."

Up to speed

Lastly, the IRC network – which now has 13 new members from the ten central and eastern European countries and Cyprus, each with staff new to the innovation support profession – will be devoting considerable effort to training these new colleagues. "For the Commission, ensuring that the whole network moves at the same speed is a very high priority," Tsilibaris says.

It is of course also in the interests of the more experienced IRCs, and their clients, that the network gains full access to the technological needs and capacities of the accession countries as rapidly as possible. ●

(1) Formerly RIS/RITTS (Regional Innovation and Technology Transfer Strategies) projects. See 'Two Sides of the Coin', edition 4/99.

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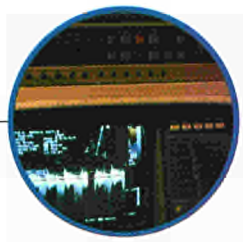
The IRC Network in Brief

The Innovation and SMEs Programme's network of 68 Innovation Relay Centres (IRCs) spans 30 countries, including the EU Member States and the newly associated countries (NAC).
Each IRC is its region's window on European innovation, helping companies and research organisations transfer technologies to and from the rest of Europe. Further information about the IRC network is available on the IRC homepage (http://www.cordis.lu/irc/home.html).

Sounding Out New Markets



The IRC network is ensuring that Europe's small and medium-sized enterprises can play their part in the exploitation of non-destructive testing (NDT) as an indispensable tool across a very wide range of industrial sectors.

Our lives depend in countless ways on the everyday structures around us. Yet we take their integrity so much for granted that only the spectacular failure of a bridge, a building or an airliner has the power to remind us of this fact.

More interaction between industry and universities – the 1999 'Emerging Technologies in NDT' conference has led to practical transfers of technology.

Wide interest

More and more, the reliability of such structures depends on NDT, which is used to test their integrity without destroying them. It differs from more familiar techniques – in which samples of a product from a production line are tested to destruction, for example – in causing no damage whatsoever to the structures tested. This obvious advantage, coupled with advances in computing and electronics, means that the range of NDT applications is constantly expanding.

To keep abreast of developments, researchers and practitioners need to meet regularly to exchange ideas and experience. This was the purpose of 'Emerging Technologies in NDT', held in Athens in May 1999, which combined a conference with a parallel brokerage event and an exhibition of NDT products.

The initiative for combining the conference with a technology transfer event came from two people. "The last time we held the conference, in 1995, it was very scientific," explains Dr Athanasios Anastasopoulos, Director of engineering at Athens-based NDT company, Envirocoustics, who was also one of the conference organisers. "This time we wanted more interaction between industry and universities."

Dr Nikos Melanitis of IRC Help-Forward, Greece, meanwhile, was responding to the significant representation of NDT suppliers and users among the IRC's clients. "In our experience, there is hardly any industry not interested in NDT," he says.

Complementary

Among the participants were delegates from Q-Test, a young Bulgarian NDT service company. In discussions with Envirocoustics, mediated in two languages by IRC Bulgaria's Zoya Damianova, it became clear how well the two companies complement one another.

Envirocoustics specialises in the NDT technique of acoustic emission, which involves detecting sound waves originating from defects in loaded structures. The propagation of cracks is one cause, for example. Q-Test, on the other hand, aims to offer a comprehensive repertoire of NDT services to help win customers at home, but lacks the equipment and know-how to carry out acoustic-emission testing. In fact, with this technique completely unavailable in Bulgaria, the importance of Envirocoustics to their plans was clear.

Envirocoustics' vice-president, Athanasia Tia Vahaviolos, full of praise for the organisation of the brokerage event, is upbeat. "Q-Test is very interested in becoming our agent in Bulgaria, which is good because we have not yet penetrated that market at all. I feel confident that we will see some real results."

The Bulgarian market is not an easy one for an SME like Envirocoustics to break into. Regulatory differences and the mundane logistical problems of transporting bulky equipment long distances are major obstacles – which Q-Test's local presence and local knowledge will minimise. And combining the companies' capacities will give them access to bigger contracts.

"Without Q-Test as a local partner, an end-user interested in our acoustic-emission testing might use our services for just one small job. But by combining our strengths, we will be able to tackle larger jobs such as servicing a refinery," says Vahaviolos.

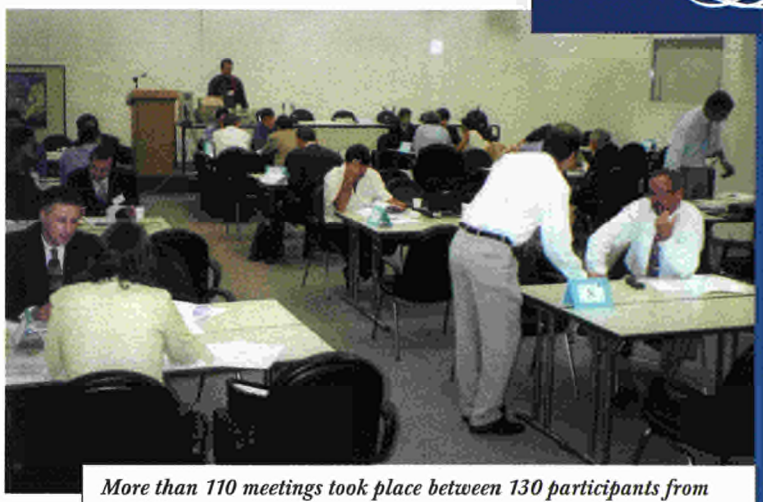
Only connect

For Anastasopoulos, successful tie-ups like this are not the only good reason for attending events where conference presentations go on alongside technology-transfer discussions and practical demonstrations of NDT technologies.

"Simply making contacts is important," he points out. "It does not matter whether or not you come away immediately with a new order or project proposal. You meet people with similar interests. You remember them. They remember you, and when the right moment arises in the future, you are able to start a project together more easily."

At the event, more than 110 meetings took place between the 130 participants who came from 20 countries. In addition, many more companies unable to send their own delegates were represented by the eight IRCs that attended. Another of the event's concrete successes arose in this way, when one such company, Imasonic, a French manufacturer of ultrasonic probes, was introduced in its absence to a small Scottish manufacturer of ultrasound scanners, Diagnostics Sonar Ltd, by IRC Centre-Est. The companies have since signed an agreement under which Diagnostics Sonar will broaden its product range using a family of Imasonic probes.

When they first met in 1995, the NDT conference participants resolved to gather every four years, and the organisers now expect to hold the next conference in 2003. With the participants at last year's parallel technology-transfer brokerage event roundly in favour, they also plan to retain this feature. ●



More than 110 meetings took place between 130 participants from 20 different countries.

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FIRE SAFETY

Ready, Aim, Export

The Export Explorer Mission, a visit by ten United Kingdom companies in the fire, fire safety and security sector, took place in Brussels on 24-26 March 1999. Just over one year on, what impact has the mission had?

"Two technology transfer agreements are pending and several of the companies are still talking to each other," reports Mark Schneider of the Midlands IRC. The organisers had hoped for even more demonstrable signs of success, but the real value of the mission has been in terms of experience. "This first mission was a prototype, designed to lead to others. It taught us several important lessons," says Schneider.

The mission in Brussels, organised with the support of the British Embassy and the IRCs of Brussels, Flanders, Wallonia and North Germany, was combined with a brokerage event. But participants suggested that three days was too long for such a limited event and that future visits should be more precisely targeted. "We decided that more in-depth research on the companies recruited to attend future missions would be necessary to make direct meetings more valuable," says Schneider. IRC Midlands also decided that future missions would either be shorter, or they would be arranged to coincide with a fair-based brokerage event. "And only if the theme of the fair was sufficiently relevant to the sector involved in the mission," Schneider emphasises.

Since the visit, the most positive outcome for the UK companies involved has been increased confidence about trading in Europe. "All the participants felt that the mission allowed them to overcome some of their apprehension about Europe and, although some decided that the Belgian market was not for them, this was actually a relatively safe and cheap way to find that out," says Schneider. Although the Belgian market was not suitable, one company, Dorgard, was able to identify other potential European markets and has been working on its products to achieve European standards in advance of a European launch.

Successful follow-up

The missions that have followed have enjoyed less mixed fortunes. In October 1999, IRC Midlands ran an outward mission to Slovenia with the support of ●●●

British fire sector companies visiting the fire-fighting service at Brussels airport. The collaboration between the IRC network and the UK's Market Explorer scheme added value to the visit for the participating SMEs.

●●●

the Slovenian FEMIRC and the British Embassy, also concentrating on the fire sector, in which seven UK companies visited Ljubljana. A return mission went ahead at the end of February 2000 and three agreements are now pending.

Later in the year, on 6-10 November, IRC Midlands arranged an engineering mission to Elmia in Sweden for subcontractors to the automotive sector. The visit was held as part of a subcontractor's fair at Jon Koping. The companies had a stand at the fair and were included in the fair catalogue. The event also included a presentation from Volvo and a visit to a research institute. Four agreements have been concluded and another engineering visit will take place to Sweden on 6-8 June 2000.

An electronics visit to Munich will go ahead in July 2000, and planning for a mechanical engineering mission to Brussels in September is well under way. This mission is again being arranged in conjunction with the IRC Brussels and the commercial sector of the British Embassy in Brussels. "The target is to take between ten and 15 companies from the UK's Midlands. Technopol is collaborating with us to match and choose companies that will derive maximum benefit from the event," says Schneider. ●

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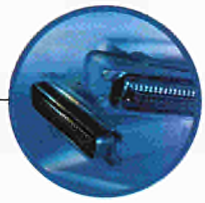
NEW MATERIALS

Technology Transfer in Eastern Europe



The Görlitz Technology Transfer day, a three-country brokerage event on new materials, is providing a much needed boost to the dynamism of the region's industrial SME community.

Eberhard Gärtner, current chair of the Innovation Relay Centre network's Materials Thematic Group, reports that the April event, which again involved participants from Saxony, Poland and the Czech Republic, was even more successful than last year's.

"In 1999, our first technology transfer day attracted 85 participants," he says. "This year, 150 people attended, even though we sent details of the day to the same target group of companies. Interest among SMEs is on the increase."

IRC Saxony's strategy has long been to establish cross-border innovation and co-operation between Saxon firms and institutions and companies in the rest of Europe – especially with their eastern European neighbours. "Saxony, Poland and the Czech Republic make up a distinct region," explains Gärtner.

However, while Saxony is a traditional industrial area, both Poland and the Czech Republic are undergoing a process of industrial growth and there is a real need for transfer of technology and skills to the companies there. "We spend a great deal of effort setting up initiatives to support the development of links between our SMEs and theirs," he adds.

Why materials?

The idea for this brokerage event came from Gärtner himself. "We chose the field of new and composite materials because of the dynamic way this area is developing. The pace of progress worldwide often makes it difficult for small companies to keep up," he says. Although the main aim of the event was to create a forum for the exchange of ideas and technology, Gärtner is also keen to support Polish and Czech progress towards full membership of the European Union.

The three IRCs worked closely

together to organise the event. Companies from all three regions attended, and they were joined by representatives of the German government. "We were pleased that the Secretary of State for Economic Development for the Saxony region was able to make a presentation about government plans for the region," says Gärtner.

The day itself was extremely busy, with a total of 65 meetings organised. There were also product presentations, company profiles and video presentations, with video-conferencing facilities available. The feedback was very positive – all participants said they had had good opportunities to make contacts and that these would be built upon during the coming months.

A good starting point

As well as the links that were forged with Polish and Czech companies, the event demonstrated the increasing level of technology transfer activity between German universities and SMEs. Next year, the IRC plans to extend the meeting to two days to enable this trend to flourish further.

It is also likely that a second annual event will be instigated as part of the same programme, the first of which could take place as early as September this year. "At the moment, we plan a business awareness theme. Meetings and presentations will cover the legal aspects of setting up a company, such as land acquisition, IT and business, joint ventures and financing – as well as technology transfer, particularly in IT," says Gärtner. ●

German, Polish and Czech SMEs exchanged ideas in Görlitz about the application of new materials.

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AGRO-FOOD

From Camembert to Guinness

Earlier this year, IRC Ireland continued its programme of visits to Europe for Irish small and medium-sized enterprises (SMEs). Focusing on the food and drink industries, the visits aim to expose Irish companies to more advanced process technologies.

On 2 February, five Irish farmhouse cheese producers embarked on a three-day visit to manufacturers in the Franche-Comté region of France. The project was a joint initiative between IRC Ireland, IRC France Centr'Est (both ARIST Bourgogne and ARIST Franche-Comté) and ARITT Agro-Alimentaire, an association of agro-food industries in the Franche-Comté region. A key feature of the trip was a visit to ENIL (Ecole Nationale d'Industrie Laitière) at Mamirolle and Poligny.

"The aim was to give Irish cheese-makers the opportunity to see the more advanced technologies used in France so that they can work towards applying them in their own companies," explains John Shiel of IRC Ireland. The French trip was the third such visit organised by the IRC in the past year – the others being to chocolate-makers in Belgium, and to seaweed processors in Brittany, France. "Like cheese production, these two industries are less well developed in Ireland," Shiel says.

Seaweed

The visit of Irish seaweed processors was organised in conjunction with the IRC Lower Normandy, Brittany, Pays de Loire in Rennes. Representatives from five Irish SMEs, educational institutes and regional development agencies visited six French firms.

"The trip has already had several very positive outcomes," confirms Shiel. The Centre d'Etude et de Valorisation des Algues (CEVA), a centre of excellence for the development of the French seaweed and marine vegetable ●●●

industry, offered to make its expertise available to Irish companies on a fee-paying basis. In response, several Irish firms said that they intended to use CEVA's information service to obtain data not readily available elsewhere.

Other co-operation arrangements, involving the supply of raw materials, collaborative R&D and reciprocal marketing, are in place or under negotiation.

Better chocolates

The visit to the Belgian chocolate industry took place in Brussels last October, and was organised with IRC Flanders in Brussels. "The Irish companies were keen to see how the Belgians managed their bulk production processes without compromising quality," says Shiel. Four Irish companies visited three Belgian chocolate-makers and two manufacturers of specialised chocolate-making machinery. All participants reported that the experience was useful, and the lessons learnt have already been incorporated into development plans.

"The participants also discussed potential improvements in raw material supply. At present, individual buyers order chocolate in granular form. Future delivery of liquid chocolate by the Belgian supplier Callebaut seems likely, with a number of Irish manufacturers buying together in bulk," says Shiel. He also confirms that more visits are planned. The next, a visit to the Belgian brewing industry, with particular emphasis on microbrewery technology, is being organised in association with IRC Brussels and will take place towards the end of the year. ●

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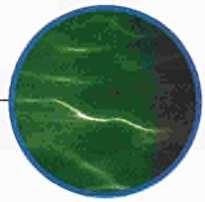
WATER INDUSTRY

Water into Wine



IRC North Rhine-Westphalia has developed a special interest in working with small and medium-sized enterprises (SMEs) in the water sector. Sound knowledge of this specific area is enhancing its ability to catalyse transnational transfers of technology.

Early this year, delegates from three Finnish environmental technology companies – two of them in the water sector – arrived in Germany for meetings with local companies. Their trip was made possible by a subsidy from IRC Finland, while the meetings were arranged by the Innovation Relay Centre North Rhine-Westphalia (IRC NRW). "I think the companies were very satisfied with what we offered them," says Peter Wolfmeyer, its director.

Key Action

One of the Finnish SMEs is now putting together a transnational consortium for a CRAFT project(1) to develop a new waste-water treatment process. The other, Rictor – a manufacturer of flotation purification equipment – is investigating the possibility of using chemicals developed by one of the German SMEs.

These relationships are only the latest fruits of IRC NRW's special interest in the water sector. This is due in part to a high local concentration of water companies, and in part to the opportunities offered by the 'Sustainable management and quality of water' Key Action of the Fifth Research Framework Programme (FP5).

The IRC has organised or attended seminars and lectures on various aspects of water, as well as three partner-mediation events. The first of these it staged at the FP5 launch conference in Essen in February 1999. The second, organised by IRC South Germany in November 1999, incorporated an exhibition with demonstrations of water technologies. The third was organised by IRC Austria at the Aquatherm international fair in Vienna, in March.

Special interest

IRC NRW's work in the water sector is in line with its wider interest in environmental technologies. Wolfmeyer currently chairs the IRC network's environment thematic group. "But environmental technology is such a broad area that at large partner-mediation events the diversity of technology offers and requests can be overwhelming," he says. Specialisation creates focus. It also allows IRC staff to develop detailed understanding which can be extremely useful in carrying out the delicate task of mediating a new transnational partnership.

The virtues of specialisation were exemplified in the Finnish SME visit. Understanding the

(1) For an overview of the CRAFT scheme, see 'Opportunities for SMEs', edition 3/99.

close match between the companies, the IRC scheduled two-hour meetings, some of which continued in the evenings. Compare this with the technology brokerage meetings arranged at large, generic events, which conventionally last only 20 or 30 minutes.

IRC NRW is now capitalising on the knowledge it has gained. It is assembling details of the water-technology project ideas, offers and expressions of interest it has built up since 1998 in a catalogue. With deregulation of the water industry already well advanced in some EU Member States, this is well timed.

As Wolfmeyer says, "In the European water sector right now the most important thing we can do is to raise awareness of the possibilities of cross-border co-operation." ●

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IRC NETWORK TRAINING

IPR Know-How

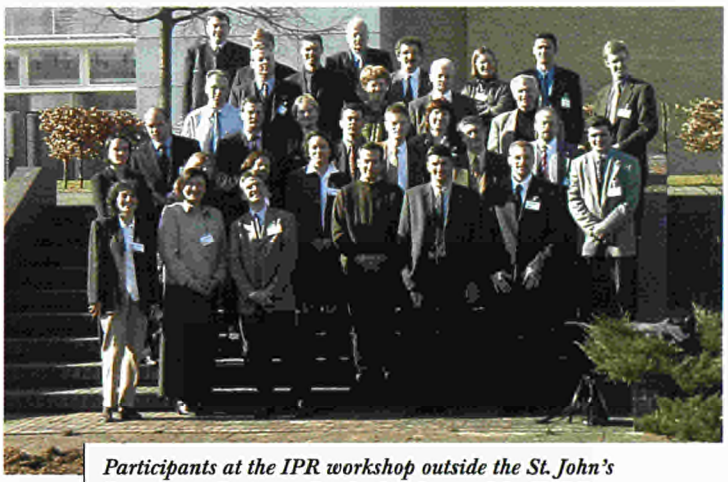
In February, technology transfer professionals from 32 different Innovation Relay Centres gathered in Cambridge, United Kingdom, for the first IRC workshop on intellectual property rights (IPR).

IPR is becoming an increasingly important component of transnational technology transfer, and a number of IRCs are starting to include support in this area explicitly in their service offer to small and medium-sized enterprises (SMEs). The workshop was organised by the IRC Co-ordination Unit (IRC CU) to address the need for reinforcement of the network's IPR know-how identified by earlier research.

Three sessions – on 'IPR issues in FP5 research projects, and consortium agreements', 'International licensing and licensing agreements' and 'IPR strategies for SMEs' – were carefully tailored by the IRC CU and the IPR-Helpdesk(1) to meet IRCs' specific requirements. The other sessions covered IPR case studies from IRC Midlands and IRC Northern Sweden, and a presentation of the European Patent Organisation's *esp@cenet* service(2).

In addition, the workshop provided an opportunity to explore the possibility of collaboration between IRCs and the European Commission's IPR-Helpdesk. In future, the IRC network could offer an effective distribution channel for regional promotion of the IPR-Helpdesk's services to European SMEs.

Evaluation showed that the workshop had been very well received by all the participants. All had found it useful, and over 90% said that they would be more likely to use the IPR-Helpdesk service in future. Most expressed the hope that similar training opportunities will be offered on a regular basis. ●



Participants at the IPR workshop outside the St. John's Innovation Centre in Cambridge, home of the IRC Eastern England, which hosted the event.

(1) See 'A Personal Service', edition 3/99.

(2) esp@cenet is a registered trademark of the European Patent Office. See also 'Hot Commodity of the New Century', edition 1/00.

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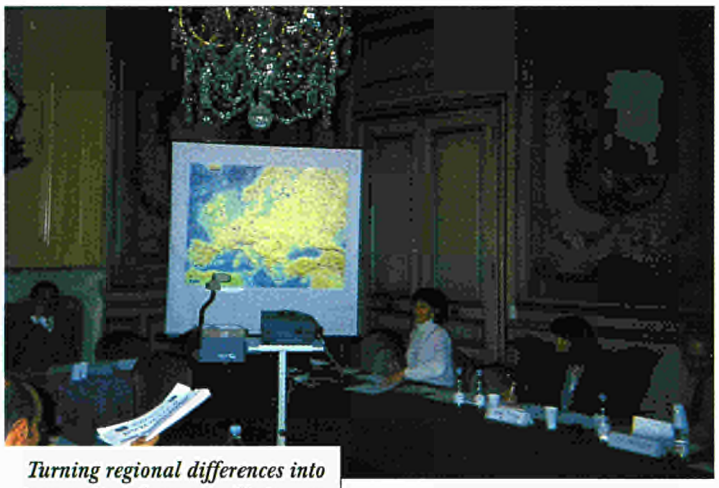
Dismantling the Invisible Barrier

IRC staff have recently had the chance to sharpen their cross-border business skills in a series of intercultural seminars. Business practices vary widely across the European Union, and the key to successful transnational technology partnership is to understand these regional differences.



Turning regional differences into transnational synergy effects – an IRC intercultural seminar in progress.

Werner Pilsner has made intercultural management issues his speciality. Following experience as a business consultant with French, German and American companies, he was appointed project manager of the IRC Rhineland-Palatinate. There, he became convinced that training IRC staff to deal with regional differences would benefit the network as a whole.

His idea was supported both by the European Commission and by French and German IRCs, and the first 'intercultural seminar' was held in September 1999, in Saarbrücken, Germany. It was quickly followed by others in Greece, France and Spain.

Think local, act global

Each seminar begins with the 25 or so participants describing themselves – through the eyes of colleagues from other European countries. Using practical examples, Pilsner then demonstrates how different regional approaches may affect business negotiations.

Attitudes to risk and challenge, speed and quality, and individuality and teamwork vary radically. Overlooking these differences in transnational partners' cultural and business values seriously jeopardises negotiations and joint projects. "Such issues must not be disregarded," Pilsner argues. "Successful cross-border negotiations are hugely simplified if you are able to anticipate the expectations of the other party."

Pilsner also explains regional business tactics by presenting the technology profile of his own region as a continuous thread throughout the session. Including an element of practical technology brokerage allows participants to familiarise themselves with one another's regions and partnership potential. It also gives them practice in dealing successfully with different regional approaches.

Cultural intermediaries

Increasingly, European business needs to develop these intercultural skills – it simply cannot afford the cost of negotiations which fail not for commercial reasons, but because of differing mentalities. "The role of IRCs as an interface between technology players in their region and other parts of Europe is critical," Pilsner says.

In fact, the cultural understanding necessary to promote products and ideas across national borders is one of the IRC network's unique selling points, he believes. Enhancing IRCs' skills in this area should directly increase their clients' chances of concluding successful transnational deals.

The strength of early participation in the seminar series demonstrates IRCs' commitment to improve their performance as business consultants. Feedback from the participating IRCs has been extremely positive, and Pilsner plans to continue the series, possibly opening them to participation by companies and local authorities. "Innovation as a source of European competitiveness requires us to build on our shared strengths instead of trying to exploit our differences," he says. ●

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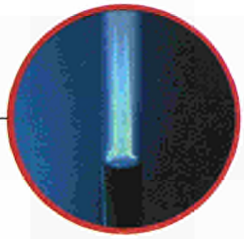
Going Supercritical



Supercritical fluids (SCFs) are non-toxic, energy-saving, environmentally friendly alternatives to organic solvents. A European network of agro-food SMEs and research centres is promoting widespread transfer of SCF technology, with a view to new processes and high added-value products.

When a liquid is heated in a closed container, it evaporates up to a 'critical point' where the density of the vapour formed and that of the remaining liquid are equal. Beyond this point, the system enters a no-man's-land between the liquid and gaseous states – the fluid becomes 'supercritical'. Supercritical fluids (SCFs) make excellent solvents. They are used industrially to clean machine parts and textiles, to decontaminate soils, to extract and purify many compounds, and in the manufacture of polymers, pharmaceuticals, cosmetics and food products. Their selectivity can be modulated by varying the temperature or pressure within the supercritical range.

Many advantages

SCFs are advantageous alternatives to traditional industrial solvents. SCF-based processes usually consume much less energy than those using organic solvents, because they avoid high temperatures and the phase transitions of distillation and condensation. Organic solvents, furthermore, constitute both occupational and environmental hazards, because many of them are volatile, highly inflammable, and toxic. This contrasts with the properties of carbon dioxide (CO_2), widely used in the supercritical state.

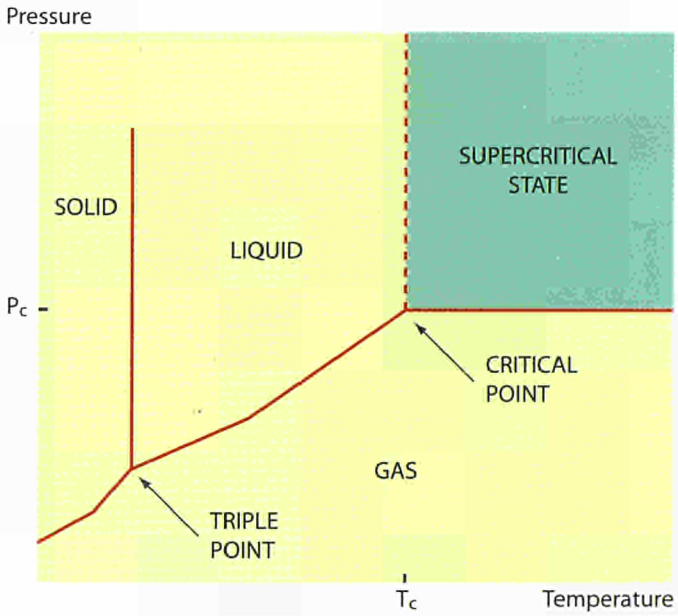
Abundant, inexpensive, and easy to transport, CO_2 is non-flammable. It is also non-toxic, being naturally produced and metabolised by living organisms. This means no dangerous contamination of the workplace or environment and no toxic residues in the end product. Supercritical CO_2 performs well at temperatures that preserve heat-sensitive biological compounds, which makes it particularly interesting to the agro-food industry.

Room for SMEs

A few years ago, SCF technology attracted the interest of AINIA, the Agro-Food Technology Institute in Valencia, Spain. AINIA is a non-profit organisation which aims to support technological R&D, increase product quality, improve competitiveness, and promote diversification and modernisation in the food industry.

The Institute could not fail to see the advantages and profit-generating potential of SCF technology, widely used by large multinationals to make products such as decaffeinated coffee and tea, nicotine-free tobacco, and cholesterol-free foods. AINIA also noticed, however, that SCFs are under-exploited by SMEs. This seemed a pity, because in Europe SMEs are regarded as major instruments of job creation and future economic development.

"Today," says Miguel Blasco, head of R&D at AINIA, "in addition to the need to respect the environment and economise resources, there is a demand for organic-solvent-free pharmaceuticals, colourings, aromas, antioxidants, and so forth. Products with a 'natural' or 'ecological' label are also popular. There is ample room for SMEs in these areas, where new products with high added value and a good quality-to-price ratio are likely to emerge. Supercritical CO_2 should be an ideal solvent for making such products, but there are obstacles to widespread adoption of SCF technology by SMEs."



States of matter – supercritical fluids remain under-exploited, especially by SMEs.

One obstacle, it seems, is lack of awareness about the advantages and possibilities of SCFs in industry. Another is the high initial cost of SCF equipment, combined with the inability to predict the behaviour of SCF-treated substances or mixtures. AINIA therefore set out to make SCFs better known to SMEs throughout Europe, and to promote new applications and the improvement and transfer of SCF technology. This led to the creation of Dasfaf[1], a 'Thematic Network' supported by the Fourth Research Framework Programme's Fair programme.

The Dasfaf network

The Dasfaf network has 27 members in 14 European countries. Sixteen partners are universities or research centres, and 11 SMEs. "The idea is to favour contacts between companies and research teams, and also between users and suppliers of SCF equipment", says Blasco. "We aim to publicise the advantages of the technology, identify its current and potential applications, and define and solve problems related to its use and transfer. This means sharing knowledge and expertise and stimulating the creation of collaborative R&D projects within and beyond the network."

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The network focuses on four major areas – basic principles of supercritical fluids, industrial aspects, extractive applications, and non-extractive applications such as food hygiene and chromatography. It is preparing a book on the state of the art in SCF technology, to be published at the end of 2000. It has created an SCF website, and stages meetings, conferences, one-day technical courses, and workshops.

All these activities enable participants with specific problems or interests to learn, communicate, brainstorm, and form partnerships. New projects and collaborations are already in the making. The hope is for top-level SCF research teams, standardised criteria for SCF processes, and new, high-quality products. ●

(1) FAIR project 98-3464 – Developments and applications in supercritical fluids in agriculture and fisheries (Dasfaf).

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PREPARING RESEARCH PROPOSALS

The Perfect Application

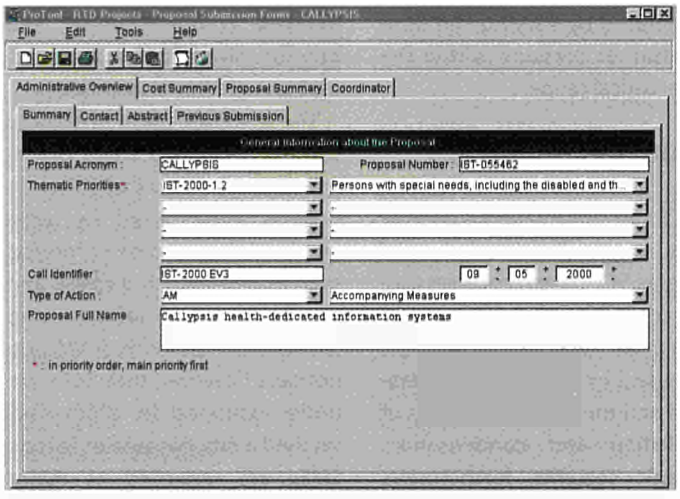
The Fifth Research Framework Programme (FP5) not only supports the development of e-commerce applications, it also uses them. A new version of the electronic proposal preparation system, ProTool, will streamline the process of applying for FP5 funding.

The first version of ProTool was released in the spring of 1999 for use in the first round of FP5 calls. But as the European Commission acknowledges, fewer applicants found it useful than had been hoped - only 600 submitted proposals electronically. Now the package has been overhauled to answer criticisms from early users. In addition, a dedicated website has been launched, from which the software can be downloaded and where an on-line tutorial is now available.

Easier to use

Developed as a platform-independent Java application, the new version of ProTool is quicker to download, more stable, and easier to use. It offers each member of a research consortium a convenient way of completing the administrative and financial forms common to all FP5 programmes. Sent to the co-ordinator by e-mail, ProTool readily collates these contributions in a final proposal. At both stages, it checks the validity and consistency of the data, greatly reducing the risk of ineligibility.

Once a research proposal is complete, it may be printed from ProTool in the correct format – and can be submitted in this form. However, the Commission hopes that the new improvements will encourage many more researchers to submit their proposals electronically in future.



ProTool uses a special system of certification to ensure reliable and secure submission to the Commission's central electronic reception desk. ●

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4th International Conference on Technology Policy and Innovation

28-31 August, Curitiba (Brazil)

Addressing the theme of 'learning and knowledge networks for development', the conference will bring together scientists, engineers, managers, entrepreneurs, and policy-makers to present research results and share good practice. They will also discuss creative and innovative topics of emerging importance for both the public and private sectors.

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EurOCEAN 2000 – European conference on marine science and ocean technology

29 August – 2 September, Hamburg (Germany)

The conference aims to bring research providers together with intermediate and end users in order to improve the mechanisms of research and technology transfer into the field of marine science. The priority areas addressed within FP5 will be discussed in a series of parallel and plenary sessions, as a means of interfacing natural science, socio-economics and policy and of identifying the areas on which European research should concentrate in the next decade.

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E-Comm-Line 2000

4-6 September, Bucharest (Romania)

The first European Conference for e-Commerce and Tele-working will focus on trends, solutions and results related to the integration, proliferation and intensive added-value use of teleco-operation in teleworking, electronic commerce, virtual entities, and on-line services.

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Neodiet

6-9 September, Norwich (United Kingdom)

This is the first European research meeting on the consumer benefits of biotechnology applied to food production. It will focus on the need to enhance a selected range of essential nutrients and beneficial factors in plant foods. The conference is organised in association with FP5's Quality of Life programme.

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VLDB 2000

10-14 September, Cairo (Egypt)

The 26th international conference on very large databases offers an international forum for the exchange of research results in all aspects of database management and related fields. It will include tutorials, panels, research papers, industrial papers, and demonstrations.

Contact
http://www2.aucegypt.edu/vldb2000/

Annual European Forum for Innovative Firms

20-21 November, Lyon (France)

During the French presidency, the European Commission (DG Enterprise), with the support of the Urban Community of Lyon, is organising a forum for innovative enterprises as a 'shop window' for innovation in Europe. The event will enable entrepreneurs to voice their response to local, national and European policies designed to help Europe achieve a knowledge and innovation-based society. Labels of excellence will be awarded by the Commission to the 15 most innovative economic zones in Europe.

The event is aimed at all innovation actors, in business and in research, and especially those involved in the creation of start-up companies.

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Archives of the New Millennium in the Information Society

21-26 September, Seville (Spain)

The 14th international archive congress will address topics such as the management and use of electronic records, the development of archival science, and the role of archives in the leisure society.

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http://www.mcu.es/lab/archivos/se20000.html

Innovation and Enterprise Creation – Statistics and Indicators

23-24 November, Sophia Antipolis (France)

Jointly organised by the European Commission's Innovation Directorate and Eurostat, this event is designed to lead to better measurement of innovation. A similar conference in 1996 helped enhance the methodology for statistical surveys of innovation and to improve the international comparability of the data collected. This event will focus on:

- advances in innovation statistics
- results of studies exploiting recent Community and national innovation surveys
- patent statistics – acquisition and protection of competencies by enterprises
- meeting policy-makers' requirements
- new indicators to benchmark innovation and company creation policies

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EURESCO programmes, 2000 and 2001

The European Research Conferences (EURESCO) are a programme of the European Science Foundation, supported by the European Commission's High Level Scientific Conference activity. Spanning fields from biomedicine to economics, each conference typically holds a meeting on alternate years, and encourages discussion of new and unconventional ideas and approaches.

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Medetec – Energy technology for Mediterranean countries

The Medetec magazine was launched three years ago to promote energy efficiency in the Mediterranean basin. Its main objective is to inform people in the countries of north Africa of developments in European energy technology, but it also includes sections on national energy policies and on the relationships between energy, environment, employment and development. Each issue runs to over 200 pages, with each article appearing both in Arabic and in either English or French. A score of substantial articles is followed by a news round-up from programme offices in the region, and advertisements from suppliers to the energy industry.

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Innovation Policy Review

£123 annual subscription

A new bi-monthly newsletter of innovation, science and technology was launched in February by the British Library. Aimed at industrial decision-makers as well as senior academics and government policy-makers, it aims to provide authoritative information on trends and policy initiatives. The focus is primarily on the United Kingdom and Europe, and developments in the digital economy will receive regular coverage.

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Cross-Border Litigation over European Patents

In cases of infringement, patents are only useful if they are enforced by their owners. Enforcement is generally initiated by a warning letter – followed, if this is not successful, by legal proceedings. At present there is no international jurisdiction for patent disputes whose competence goes beyond the territory of one state. But the situation in Europe may soon change. The whole issue is dealt with clearly and authoritatively in this paper by the IPR-Helpdesk's legal team.

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http://www.ipr-helpdesk.org/updates

The socio-economic dimension in the Fifth Framework Programme, 1999

The annual report concludes that a strong socio-economic element was missing in the response to the first calls for proposals of FP5's thematic programmes, but that the situation should improve with later calls. Few researchers combine socio-economic and technical expertise. Indeed, proposers and evaluators experienced similar problems – many appeared not to understand the term socio-economic.

The report made a series of recommendations, some of which are already in the process of being implemented. These include ensuring that sufficient emphasis is placed on socio-economic elements in work programmes and guides.

Contact
http://www.cordis.lu/improving

Note

Publications are free unless otherwise stated. If specific contact information for obtaining a publication is not supplied, and there is a price listed in euros, then the publication can be purchased from the sales and subscription office in your country of the Office for Official Publications of the European Communities (EUR-OP). Addresses can be found in most EU publications, on the WWW (http://eur-op.eu.int/general/en/s-ad.htm) and by contacting EUR-OP (fax: +352 2929 42759).

Results from Non-Food Agro-Industrial Research Projects

EUR 19307, ISBN 1-872691-22-6; £40 (book), £40 (CD-ROM)

This book contains a selection of the final summary reports from research projects on the production and use of renewable biomaterials derived from agricultural crops, supported by the AIR programme. The reports cover bioproducts aimed at higher value markets, which offer SMEs particular opportunities to enter niche markets while offering the farming community the chance to diversify. The information included in the book is also available on CD-ROM, together with reports on all non-food related projects financed under the ECLAIR, AIR and FAIR programmes.

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