

Innovation: The Demand Side

New ways to create markets and jobs in Europe



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The SciencelBusiness Roundtable

Innovation: The Demand Side

On 8 December 2006 in Paris, the SciencelBusiness news service organised a unique debate among a dozen leaders in European industry, policy and academia.

The Roundtable discussion, hosted by Microsoft, focused on an important new trend in Europe Demand-side innovation policy, to foster the growth of high-tech markets and thereby create more jobs and prosperity. This report explores the trend, and draws upon the views of the Roundtable participants.

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SciencelBusiness

A news service connecting buyers and sellers of emerging technologies

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→ Executive Summary



A fundamental shift in European innovation policy is under discussion in Brussels – a shift that could, in the long run, improve the climate for technology businesses and enhance the continent’s economic performance. It is to examine that potential change, and to encourage it, that Science!Business presents this special report.

The theory is simple. In the past, most innovation policy in Europe focused on the supply of researchers and innovations: so much money got pumped into so many labs to produce a desired effect – for instance, a stronger telecoms industry, more technology jobs, or greater R&D collaboration across Europe.

But the new approach turns that thinking on its head. Government initiatives, rather than focused solely on the money, looking at a broader set of instruments – regulations, laws and policy directions – that could help spur more demand for high-technology products. For instance, revoke regulations that fragment markets and suppress demand. Coordinate government policies to drag new products and services from suppliers, small and large, restructure universities so academics think more about what industry and consumers want. In short, do less spending and more generating of wealth.

That’s the theory. The practice is complicated – and it’s far from certain that this tentative new course in policy will survive. It began with the publication in January 2006 of an expert report on innovation policy to the European Commission. It’s now cropping up in various Commission statements and background papers, under various names: lead markets, technology pull, and (our own favourite) demand-side policy.

It’s against this backdrop that Science!Business organised a unique roundtable discussion, hosted by Microsoft, to explore these policies further. A dozen leaders in European business, policy and academia gathered in Paris on 8 December 2006 to debate innovation policy.

Recommendations

- **Create lead markets.** Europe’s great successes came where it applied public and private energies to create new markets: GSM mobile phones and fuel-efficient automobiles come to mind. Adopt the same approach now, in a few sectors where Europe has special opportunities, including low-carbon technologies, patient data-systems, and healthcare for the aged. Coordinate public procurement, standards-setting, deregulation and financial incentives to spur innovation in these sectors.
- **Launch a “new 1992” programme** to open fragmented markets. Somewhere along the road to enlargement, the European Union faced strong barriers to trade and growth. The market for intellectual property is splintered by language and court jurisdiction; unify. The market for professionals – doctors, lawyers, engineers, and others at the heart of the so-called Knowledge Economy – is fragmented by national employment, pension and professional-standards rules; unify. The market for seed and venture capital, the lifeblood of new tech and bio companies, is fractured by contradictory tax regimes and regulatory requirements; unify.
- **Invent the market-friendly university.** Europe’s university system is struggling and needs reform. Concentrate resources on a few great institutions, rather than many mediocre ones. Reform tenure rules that discourage risky industrial work. Find new ways to connect business buyers to academic researchers – to integrate market demand into the research agenda.
- **Create Free Innovation Zones.** If Europe can’t agree on economy-wide reforms, start with a few specific sectors and projects. In hot new areas like low-carbon research, create a new legal status for qualifying ventures that grants them exemptions from growth-hobbling rules. Grant them tax breaks to attract investors, flexible employment contracts to lower their costs, access to a special EU fund to defray their IP-protection costs.

There are many other recommendations in this report. Some are the suggestions of our Roundtable guests, and we credit them accordingly. Some are our own ideas at Science!Business; and we do not wish to imply that our guests necessarily endorse them. As in any debate, the Paris Roundtable aired many conflicting views. The purpose of this report is to explore this exciting new trend in policy, and we wish to thank our guests for their creativity and help in preparing it. We also welcome comment from you. Email us at innovation@sciencebusiness.net.

→ Creating markets for innovation

What is innovation? Quite often, when people talk about innovation they mean research and development. But innovation is broader than that: research is transforming money into knowledge, while innovation is transforming knowledge into money and well-being. Innovation is about producing, not only economic prosperity, but also well-being in society.



What can we do in Europe to promote innovation? We have the ability and resources; Europe is roughly at the same level as the US in knowledge creation. We need four elements: better financial markets, more risk-takers and entrepreneurs, mobility of resources, and market creation – an early market for innovation. Twenty years ago roughly half of pharmaceutical R&D was conducted in Europe; today it's a third or less. The reason isn't lack of knowledge in Europe. The reason is in the market.

We have to have market creation. Look at what happened with the GSM mobile-phone standard: if Europeans are able to operate together, we can reach a world-class result. The next step should be the healthcare sector: we need a common architecture for electronic patient records across Europe. The impact on the economy and society would be great. When you have electronic records you have facts on the basis of which governments and individuals can decide what pharmaceuticals they will buy and what they will not buy. We have started in Finland by passing a law giving authority to a single institution to create an architecture for patient records – but it has to be Europe-wide, as soon as possible. There are other examples of sectors in which we can create markets: for instance, in environmental technologies, renewable energy, digital security and logistics.

We also have to promote mobility of resources. We have to move our human resources from the old to the new, from the resource-based economy to the knowledge-based economy. That is extremely difficult in democratic societies. We have countries where the pension system, for instance, makes it impossible to move from a declining sector to a growth sector, because you risk your pension scheme. But we must create incentives for mobility of people. We also need mobility of capital. We need rapid efforts to create European-wide venture capital markets – because without them, you cannot really finance innovation.

These are among the issues we raised in our report. At first, when we published it in the beginning of January 2006 the reaction was rather mild. But since then the situation has changed. Innovation is on the agenda for the EU presidencies – starting with the Finnish presidency in 2006, and continuing with the German and Portuguese presidencies in 2007. It has been agreed to revisit the issue of innovation regularly.

But it's easy to produce papers and make recommendations. Now we need practical results.

Mr. Aho is president of Finnish innovation fund Sitra, and former prime minister.

→ Needed: A sense of urgency

Europe has the DNA for innovation and I disagree with anyone who says Europe is not an innovative place. Compared with Asia and the United States, Europe has a lot to offer, but to me there are some clear gaps.



The first gap is in the funding of R&D. The Lisbon Agenda's 3 per cent target is important, but so also are the incentives that encourage more public and private funding. In particular, we need more early-stage investment into innovative companies. Microsoft works with a multitude of great entrepreneurs and great companies in Europe. But few of them have the ability to raise early-stage capital to develop the critical mass to really go global. We need programmes in Europe where we try to bring entrepreneurs and capital funding together.

The second gap relates to the public-private partnership in education. According to the OECD, China now already has the third-highest number of researchers in the world, 926,000, just ahead of Japan and behind the US and EU. However when you look at growth rates you can see that it is going to be No.1 very soon. In Europe, the growth rates are flat or declining. We need to close this talent gap so that development of entrepreneurial thinking and skills complement Europe's great engineers and technology researchers. We have dedicated research, innovation and incubation centres across Europe. We also learn and innovate with our university relationships.

The third gap – and a critical one for innovators – flows from the first two: the intellectual property system. Skype is a European success story because of their innovation and ability to protect some valuable IP that was saleable. Europe has a long and good tradition in intellectual property. But over the past five or seven years the direction on IP has not been as decisive as what is happening in Asia or the US.

The last gap is skills, not just at the high end, but also in the society at large. Many companies are actively trying to do something about this. At Microsoft we have created a partnership program called the Alliance for Skills for Employability, to retrain people who are unemployed or who work in declining sectors. In Portugal, for example, in collaboration with the textile confederation, we recently retrained 600 women textile workers so that they can be employed in the ICT area. Our goal is to give access to technology and training to 20 million Europeans by 2010.

To conclude, the marketplace of the future is more competitive now than in the past decade with new players such as China and India coming on board. We are in a new 'race for the top' and one Europe can run fast in!

A handwritten signature in blue ink, consisting of a stylized, overlapping loop and a vertical stroke.

Mr. Courtois is president of Microsoft International, and host of the Paris Roundtable discussion on which this report is partly based.

→ What is Demand-Side Innovation?

Europe isn't innovating enough.

Its share of international patents has dropped in five years just under 30 per cent from 35 per cent, losing ground especially to Asia.¹ European companies earn half as much from intellectual property as American competitors.² Europe's long-standing trade deficit in technology is widening. And its scientists are punching below their weight: while Europeans publish more research than anyone else, their papers are cited less often – a measure of their low scientific impact.³

So what is to be done? So far, the European political reflex has been to focus on the money: for instance, the dispiriting fact that the European Union spends only 1.9 per cent of its gross domestic product on research and development, compared with 2.7 per cent for the US and 3.1 per cent in Japan. The natural response: spend more. Thus it is that EU leaders set a target of raising their R&D spending to 3 per cent, as part of the so-Lisbon Agenda “to make Europe the most dynamic, competitive knowledge-based economy in the world” by the end of this decade. Thus it is, likewise, that the European Parliament in November 2006 approved a 40 per cent jump in EU spending on R&D subsidies, as part of its €54 billion, seven-year Framework Programme.

The implicit focus of such policies is supply – of money, labs, researchers, discoveries and patents. More money buys more ideas. Somehow, they will translate into more

sales, jobs and economic growth. Such has been the guiding principle of EU – and most European national – policy for a generation.

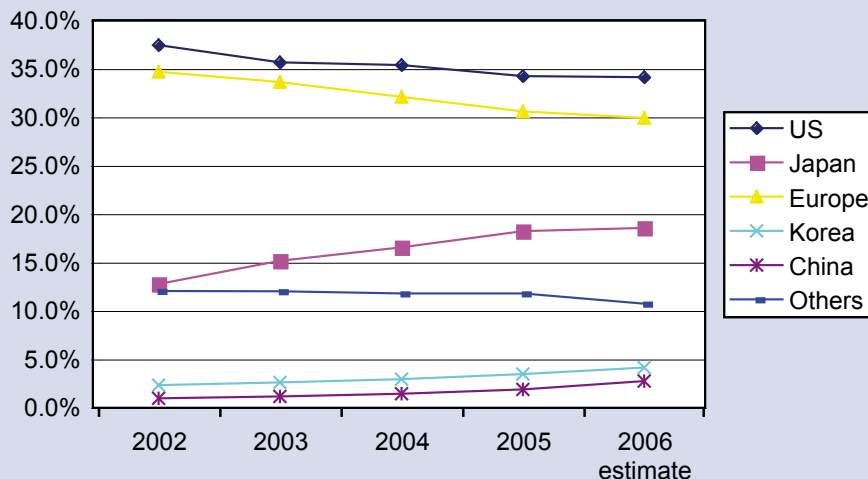
But a growing number of policy thinkers, in Brussels and beyond, say it's time for a change. “People quite often equate innovation with R&D; but while R&D is an important element, it is not the same thing,” says Esko Aho, president of Finland's state innovation fund, Sitra, and former prime minister. “That's why the 3 per cent [Lisbon target for R&D spending] is misleading. I don't think Lisbon will work. We need something similar to the Single Market project in the field of innovation.”

The groundwork is now starting to be laid for that kind of grand, transformative programme (the Single Market Act set the EU on a frenzy of productive deregulation from 1987 to 1992). But the new policy approach, rather than working on the start of the innovation chain, acts at the end – in the marketplace. Rather than supplying raw materials and hoping they will spontaneously react, the new policy instruments aim to activate the *right* supply of new products and services through creating market demand.

The specific means are varied. One is the “lead markets” concept advanced by Aho and three other experts in a special report to the Commission in January 2006.⁴ Under this approach, European leaders would coordinate regulation, government procurement, standards and other instruments to spur market demand in strategic sectors. That could mean “zero-emission”

The global patent race

Share of international patent applications, among leading countries



technologies to make public and private buildings carbon-neutral and energy-efficient. It could mean, for healthcare and social services, new medical devices and services to maintain the quality of life of Europe's aging population. The aim: to replicate the stunning success a decade or two ago of Europe's mobile phone industry, with its now-ubiquitous GSM system.

Another means: remove regulatory or fiscal barriers that keep Europe's tech markets fragmented, small or slow to adapt. This includes reforming intellectual property law, so that European inventors no longer have to spend three to 20 times as much for patent protection as do Americans. It includes increasing mobility of workers, pensions and professional certifications, so that a pan-European market for doctors, lawyers and other knowledge workers can emerge. And it includes harmonising tax and financial-market regulation, to enable deeper, broader markets for early-stage investment in tech companies – particularly young start-ups.

There are other ideas on the table. Broaden the policy focus beyond “hard” bio and tech industries, and look to ways to spur demand for technology in Europe's vibrant creative, financial and retail industries. Reform university management and tenure systems, so that academic researchers think more about what industry and consumers need. All these ideas have the same theme: focus on the buyers of innovation, rather than the sellers.

Of course, it's easy to talk, difficult to act. Since the Aho report, the European Commission has said it will incorporate “lead market” pilots in its new Framework Programme in 2007. It is trying once again to reform patent law. In late 2006, it renewed its advocacy of broad changes in regulation and taxation to improve the overall environment for innovation. Academic reform has become very real in a few countries: notably, Germany's decision to improve research by designating its three best universities as “Centres of Excellence” with greater funding and prestige. And industry is taking up the cry: the EU ICT Task Force, a tech-industry committee set up to advise the Commission, recently urged several reforms that incorporate demand-side ideas.⁵

It's too early to know whether lasting change will follow. Certainly, the signs in early 2007 aren't auspicious: after the spotlight that the Finns put on innovation policy during their presidency of the EU, the Germans in early 2007 presented an agenda that relegates the topic to the back burner. And the Commission, with Framework Programme 7 now approved, will doubtless be tempted

to devote most of its time in 2007 to spending the money rather than reforming the markets.

Still, Europe has many strengths to build on,; and innovation policy is generally a hot political issue these days. “Innovation is a sexy topic,” says Pavel Telička, co-founder of BXL Consulting and a former Czech commissioner to the European Union. “Everyone is talking about it. But is the thinking about it sexy? We will move much more rapidly if we can make the politicians understand what will come out of innovation.”



“Innovation is a sexy topic. Everyone is talking about it. But is the thinking about it sexy? We will move much more rapidly if we can make the politicians understand what will come out of innovation.” - Pavel Telička

→ Demand-side innovation – role models from around the world

Matching consumer demand with R&D may seem like an obvious starting point to create a new product or service. After all, innovation works and happens if there is a demand for it. But it has proven a transient goal for many countries and companies.

In the 1980s, for example, Japan couldn't seem to go wrong with its automobiles, electronics and consumer products. But it lost that edge in the 1990s, missing opportunities with customers. Now, it is trying to figure out how to implement policies that will promote a match between consumer demand and laboratory research.

At the same time, the US seems to be in a heyday of demand-side innovation. Nations around the world are looking studiously and with envy at the innovation pods in California's Silicon Valley and Massachusetts' Boston area, where scientists, companies, consumers, universities and financiers flow together in a synergistic mix that promotes innovation and a frontier spirit in forming new ideas, companies and products.

But can that special formula be replicated in Europe, Asia and elsewhere? And how closely should they follow the US model?



SBIR, Bayh–Dole spur innovation

Two US initiatives begun in the 1980s are under particular study outside the US because of their apparent successes. One, the Small Business Innovation Research (SBIR) programme, started in 1982. It allocates about 2.5 per cent of federal research funding to small businesses, particularly start-ups and has been credited with giving failure-prone small businesses a better chance of success. The second is the 1980 Bayh–Dole Act, which gives US universities, small businesses and non-profit organisations intellectual property control over many inventions that result from research funded by the federal government. That act has been seen as a boon for US university technology licensing offices seeking to partner with those who want to develop and commercialise the research.

“The SBIR has been very effective,” says David Audretsch, director of the Institute for Development Strategies at Indiana University in Bloomington, Indiana. “Studies show that firms that get the grants perform better.” And even though most start-ups do fail, what is important is that some succeed, enough to form an entrepreneurial cluster. “That is why the SBIR is very positive. It creates an entrepreneurial culture where there was a deficiency.”

Audretsch points to a colleague at his university who started a company only because he received SBIR funding. “His colleagues saw what he was doing, so they're starting companies, too.”

While some European nations have been studying the SBIR model and suggesting versions of their own, others are moving to mimic the Bayh–Dole Act. Japan and France already have versions of the act to stimulate technology transfer out of universities. But Richard Lester, founding director of the Industrial Performance Center at the Massachusetts Institute of Technology, cautions that the Bayh–Dole Act remains a subject of debate in the scholarly community. “Its authors and supporters say this has had a huge impact on spin-outs and licensing. But some argue that this would have happened anyway because the rate of university patenting and licensing was on the uptake anyway.”

Europe in the rear-view mirror

So how soon will the US have to check its rear-view mirror for competition in demand-side innovation? Some US analysts fear Europe, especially the UK and Germany, may be first to try to pull into the passing lane. But those countries will need a system of innovation that goes beyond allocating more government funds: it has to include government regulations that foster entrepreneurship and collaboration. "Innovation is a system with many components," says Audretsch. "If there is a deficiency, you have to address it to get a balance."

"It's not enough to have technology or capital," says Howard Anderson, senior lecturer at MIT's Sloan School of Management, and a venture capitalist. "You need a breed of samurai who are entrepreneurial to pull it together."

Audretsch sees innovation as three main concentric circles, each of which must interact with the others. At the core are universities conducting fundamental research. The next ring is applied research such as business schools and bioinformatics. The third ring is what he calls the "spillover mechanisms", such as technology licensing offices and research parks that get science out of the university and commercialised. There's also a more recent outside ring, the "absorptive capacity mechanisms" that actively pull research and knowledge out of the university. This involves companies such as Intel and other large corporations locating sites near universities to tap into the innovations they believe their customers will want. These centres of innovation excellence, starting with basic university research at their heart, have drawn in government, venture capital and corporate money.

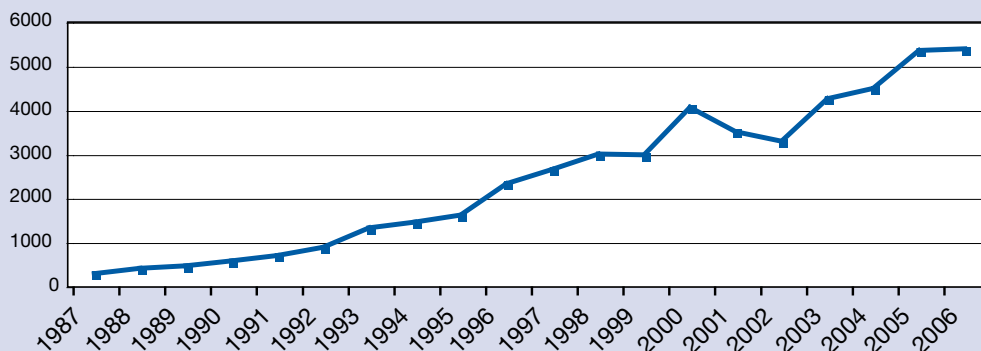
By any other name...

Innovation is hot. In business, everybody claims to have it. In policy, everybody wants it. And absolutely everybody is talking about it.

In fact, media archives show that, over the past 20 years, use of the term has soared 20-fold in the major English-language business media. Indeed, as the accompanying chart shows, the frequency of usage is a remarkably faithful proxy for the ups and downs of the Nasdaq tech-stock index.

The Innovation Index

Number of articles in major, English-language business media containing the word "innovation"



But what is innovation? For some, it is the cutting edge of research, rare and valuable. For others, it just means "new": an innovative new hair dye, a shade different from what went before. At this end of the spectrum, innovation is merely a branch of marketing. One oft-quoted definition: research is turning money into knowledge, while innovation is turning knowledge into money.

One example of linkages across all the circles is Stanford University's Biodesign Network, which focuses on technology transfer by providing education, advocacy and mentoring to students and faculty who want to commercialise their healthcare innovations. The network also provides connections to biomedical professionals such as investors, equipment makers and attorneys who specialise in new venture formation.

Lester agrees with Audretsch in saying innovation is part of a system. "Money is a necessary condition, but you can't do it all with money," he says. "The government is funding one-third of the total R&D in the United States, but the rest is from the private sector. So this [innovation] is not a problem to be solved by government funding alone."

He adds, "There is an effort to include within government resource-allocation decisions more consideration of demand-side factors that may affect the rate and direction of innovation. Probably the first thing to be said when it comes to government policy is the Hippocratic Oath – first, 'Do no harm.'"

Japan – when money isn't enough

In the 1970s and 1980s Japan was synonymous with innovation. Then followed the catastrophic property crash and the collapse of the banking system in the early 1990s; and overnight Japan lost its technology edge, too.

Today, Japan is still the third-highest spender on R&D in the OECD area. But the benefits do not appear to be commensurate with the level of investment, according to an OECD report.⁶

At the height of its technological prowess Japan was often criticised for being imitative rather innovative. Back then this seemed like irrelevant sour grapes, given the commercial success of the country's leading companies. But now the OECD report says the fact that Japan's innovation system remains largely input-driven and focused on incremental innovation based on closed and stable corporate and employment systems puts it at a disadvantage.

The authors argue this approach is less appropriate in the current global environment that favours risk-taking and a more open system relying on external links. To improve the system, a broad-based strategy is needed, including a reform of product and labour markets to strengthen competition and mobility, enhance international R&D links and improve the environment for new business. The prescription sounds ready-made for Europe, too.

Rx: Think globally

Nick Butler, director of the Centre for Energy Policy Studies, University of Cambridge:

"The most important thing about innovation in Europe would be to drop the word Europe. The scale of innovation that is needed in most sectors is not bounded by Europe, either in the sources of the innovation or its application. Do it through business working globally – the role of government is to provide the background and framework in which business can do it."



→ Solution 1 Lead markets: Creating demand for new technologies

The latest buzzword among Brussels technocrats is “lead markets”. And it’s going to be put into action, on an experimental basis, in 2007.

The phrase comes from a report, chaired by former Finnish Prime Minister Esko Aho, to the European Commission. The idea is simple. Aho believes Europe keeps up with the US in creating knowledge; but it lags in nurturing early markets for the products of this knowledge. An example: the pharmaceutical industry, where the European market is fragmented by borders and rules. Not long ago about half of pharmaceutical R&D was carried out in Europe; now the figure is below a third, with the prospect that more and more research will shift to the US and Asia. The reason isn’t lack of knowledge; it’s in the differences between the US and European pharmaceutical markets.

But it needn’t be this way. In fact, Europe has in the past beaten the US at market-creation: its GSM standard for interoperability of mobile phone networks, established first at home in the 1980s, has spread across most of the world – and in its wake, Europe’s mobile-phone industry has thrived. The lead market concept would apply many of the old GSM tricks to new fields. These include coordinating common technical “architectures” or standards, removing unnecessary regulatory barriers to expansion, using

government procurement to jump-start the market, and fostering a consumer culture that more highly prizes new technologies and ideas.

It’s an attractive idea, but there are many questions still to be answered. How will the lead markets projects be selected? How do you avoid specifying a particular, and possibly wrong, technology? How do you maintain market freedom, and diversity? On the last point, the problem isn’t just allowing free access for very small companies – though that’s important, too. There’s a vast middle ground. “Most of the growth happens beyond SMEs,” says Martin Schoeller, chairman of German engineering firm Schoeller Industries and president of Europe’s 500, a growth-company organisation. “The young entrepreneur who is multiplying his own concept is the real job creator.”

“Is the lead market something we want to be doing?” asks Soumitra Dutta, dean of external relations at French business school INSEAD. “The history of governments picking winners is not really something to be proud of.” He suggests what you might call a “lite” version: “It might be better to think of lead markets as areas where we think we can be globally competitive, and can make life easier for current players in industry by removing obstacles.”

A market opportunity: The rising cost of healthcare

As the European population ages, healthcare expenditures will climb

Country	Spending on healthcare as a percentage of GDP	
	2000	2050
BE	5.3	6.6
DK	5.1	5.8
DE	5.7	7.1
EL	4.8	6.5
ES	5	6.7
FR	6.2	7.4
IE	5.9	8.2
IT	4.9	6.4
NL	4.7	5.7
AT	5.1	6.8
PT	5.4	6.2
FI	4.6	5.8
SE	6	7
UK	4.6	5.6
EU	5.3	6.6

Source: European Policy Centre, 2001



“I propose a bet on climate change. Drive market creation through pushing forward a global agenda; and drive R&D, venture funds and business funds around that one single area.” – Simon Zadek

Herewith, some of the concrete possibilities:

Lead Market: Healthcare

Europe is aging. By 2050, the EU forecasts, there will be just two workers per pensioner, compared with four workers today. It's a frightening prospect, for the elderly who must survive it as well as for the young who must pay for it.

But every cloud has a silver (haired) lining. Looked at from the perspective of demand-led innovation, the medical and social needs of older people present a huge market and opportunity to pull through new products and services in a range of different sectors. But how to capture this market to drive innovation? Because they are publicly funded and risk-averse, many of Europe's healthcare agencies are notoriously slow to innovate.

A key example is in the failure to adopt information and communication technology. Our experience of, and interactions with, every private-sector company – from banks and insurance companies to retailers and hoteliers – has been transformed over the past 10 years by the movement of information technology from the back to the front office, and from there onto the Internet. But most healthcare systems barely have their property management or catering computerised, let alone their front-end interactions with patients.

As a start, one lead-markets project could be creating a single, European-wide framework for electronic patient records. While many national systems are under development, they won't at present interconnect. Imagine if they could, through a common, continent-wide architecture and harmonised regulation. National health authorities would save money, through economies of scale. Suppliers would prosper, through rising sales volumes. Healthcare would improve, with hospital emergency rooms able to access patient records more quickly, and health researchers more easily able to conduct demographic studies.

Lead Market: Climate control

One of the first pilot projects in lead markets, the European Commission has said, will be what it calls "zero-emission buildings".

By this, it means using tax policy, public procurement and regulation to pull through a range of new technologies to save energy and cut carbon emissions from buildings. It's a daunting task, requiring new materials, heating systems, renewable energy sources and environmental controls. Already, the UK government has taken an early step by decreeing that houses meeting its low-carbon standards can be sold without stamp duty – the tax usually levied on home sales in Britain.

But that's just one example of the opportunities for Europe to lead in climate-control markets, as a warming world is forced to think greener.

"I propose a bet on climate change," says Simon Zadek, CEO of the Institute for AccountAbility, a corporate-responsibility think-tank in London. "Drive market creation through pushing forward a global agenda; and drive R&D, venture funds and business funds around that one single area.

"Every product, every business, every sector will be affected by climate change and the reconfiguration of energy systems. Whether we talk about Kyoto or many other possible standards, Europe is in a position to advance standards globally, in a way that it has done in other areas, in ways that advantage business communities that are energy-efficient."

Nick Butler, director of the Centre for Energy Policy Studies at the University of Cambridge (and former strategy chief for British Petroleum), agrees. "An area where Europe should be leading and not just watching is the combination of climate change and the transition to a new, more local, more green form of energy base. What would be necessary for Europe to be a leader in that area, with all the benefits?"

A European success story: biosimilars

In normal circumstances, pharmaceutical and biotech companies in Europe find themselves at a disadvantage compared with the US. Despite the lofty ideals and practical efforts of EMEA, the European drugs regulator, the market remains fragmented both in terms of the rules and conditions that govern drug development and the post-registration hurdles that must be jumped to agree reimbursement.

But in one shining area of healthcare, Europe has outpaced the US in creating a new sector: biosimilars. These are bio-engineered copies of original biological (protein) drugs that are coming off patent. EMEA has poured great effort into devising a pan-European framework for approving them.

The framework recognises that, unlike small-molecule drugs (what's mostly inside your medicine cabinet), the properties of high-tech biologicals are as intimately tied to their manufacturing process as they are to their chemical composition. This is acknowledged by substituting the term biosimilar for biogeneric.

This did not happen overnight – but after a five-year consultation period Europe opened the floodgates to generic biopharmaceuticals in January 2006, agreeing that the human growth hormone Omnitrope, manufactured by Germany's Sandoz GmbH, is equivalent in quality, safety and efficacy, to the original registered product. Following on

from this decision EMEA was expecting eight applications to register biogenerics in 2006. Biopharmaceuticals with global sales of more than \$10 billion per annum will come off patent by 2007, and the move is also expected to contribute to cost savings in health care.

The move by EMEA left its US counterpart, the Food and Drug Administration, trailing, though following the Democrats' electoral successes in November 2006, there is renewed pressure for an approval route for biogenerics..

The US pioneers of the biotech industry have fought hard against the approval of biogenerics both in the US and Europe, claiming biopharmaceuticals cannot be copied in the same way as chemical drugs.

It was only by conceding exact copies are impossible and making this explicit by ditching the term biogeneric in favour of biosimilar that EMEA was able to make progress.

While the requirements for registering a biosimilar are more complex and costly than for conventional generic medicines, they are not as exacting as the route to market for the original product.

Having taken a lead over the US in framing the regulatory framework and granting the first approvals, it is now open to the EU to capitalise on the market – thus cutting its own healthcare costs, and giving European firms a competitive edge.

Web. 2.0: The essence of demand-driven innovation

YouTube, MySpace – those are some of the hottest properties on the Internet these days. They're second-generation Web services, often called Web. 2.0, that the users themselves define: uploading their videos, news, opinions or anything else they feel compelled to share with the wider world.

They may also be the working definition of demand-side innovation, with much of the services and software spurred from the ground up by customers rather than suppliers. It's made for entrepreneurs, says David Audretsch, director of the Institute for Development Strategies at Indiana University in Bloomington, Indiana.

"Generation Y prefers the entrepreneurial lifestyle," he says. "These are people who deal with the entire world, where they see these opportunities and aren't afraid to make them happen."

Some of the technologies under the umbrella of Web 2.0 open up a wide set of possibilities to create "many-to-many" conversations between developers and designers on the one hand and users on the other, says Richard Lester, founding director of the Industrial Performance Center at the Massachusetts Institute of Technology.

"They create the possibility of enhancing the potential for 'interpretative innovation', which is what happens when developers and producers enter into the life of consumers," he says.

→ **Solution 2** Launch a “New 1992” programme: Revitalise efforts to open Europe’s markets

From 1987 to 1992, the European Union pushed through a radical reform programme. Its Single European Act, authorizing the effort, tore down hundreds of regulatory and trade barriers that fragmented the continent’s markets and stunted economic growth. By the end of it all, the legal and regulatory scene had been set for a decade of prosperity and European expansion.

But there was one problem, which persists today: the new free-trade regime applies mainly to products, not services – to things, not people. The Commission tried to remedy that fault with its Services Directive in 2006 – but the result was a watered-down affair. It excluded many knowledge workers, the heart of the service economy. A doctor, lawyer or professor in Germany still can’t easily move across the border to work in France. Does it matter? Indeed it does. The services sector generates almost 70 per cent of Europe’s GDP, but accounts for only 20 per cent of intra-European trade.

To unleash a new cycle of prosperity, what’s needed is a renewed push by the politicians to remove trade barriers in services.

“The Single Market is still not there,” says Aho. “We need to have some kind of new 1992 programme. We have to set new targets and to move on. It is impossible to imagine that we can reach the goals we set ourselves in Lisbon and Barcelona without moving from the old, resource-based economy to the knowledge-based economy.”

What would a “new 1992” campaign look like?

Labour mobility

To understand the political problems, look no further than the recent fuss over allowing workers from the newer EU states to find jobs in the longer-standing member countries. Only the UK and Ireland allowed open access to citizens of the states that joined the EU in May 2004. Satisfyingly, the economies of both countries are now acknowledged to have benefited as a result, providing a potent example of why Europe needs to deregulate its labour markets. But imagine how much greater the economic impact might have been if most of those East-to-West migrants had been biologists, software engineers or family doctors, rather than shop assistants, labourers and other lower-skilled workers. Yet, if you’re a professional today, how do you transfer your pension from one country to another? How does a Polish doctor get certified to practise medicine in Italy? How can a Spanish professor move to a Swedish university, without losing tenure and pay? The answer for now: it’s possible, but difficult. To be economically meaningful, it must become easy.

Financial markets

It’s hard for European tech entrepreneurs to find capital – in fact, per unit of GDP, there is about one-third as much early-stage investment money sloshing around Europe as in the US. One reason is taxation: in most European countries, it’s high – meaning anybody who has a lot of money is tempted to invest it in low-tax places like the US. Another reason is the fragmentation of Europe’s capital markets. Because the rules and expectations are different, a seed investor in one country rarely ventures into another. That means a few countries – chiefly Britain, Ireland, Sweden and Finland – have become islands of vibrant tech investment; entrepreneurs in most other EU nations languish in capital-starved penury. Ending these cross-border differences would increase market efficiency by deepening liquidity, lowering transaction costs, and making it possible to compare financial products from one country to another. All these benefits would be of particular importance to small, high-tech start-ups.

Intellectual property

In Europe, patenting is a luxury of the rich. If you want to protect your intellectual property across the EU, you can start in Munich at the European Patent Office – but then you have to translate the application into as many languages as countries for which you seek protection. You also pay extra for each country added. And what if you run into a legal fight afterwards? You could end up battling it in several courts at once, in several languages, across the continent. It is a system only a lawyer could love – and so far, all efforts by the European Commission to reform it have been blocked by protectionist or nationalistic power plays in one country or another (most often, France). The first step to a borderless technology market should be patent reform.

At present, says Schoeller of Europe's 500, it can cost €150,000 to file a patent across the EU, due to the high translation and administrative costs; that's at least 20 times as high as in the US. "The European patent should work legally and cost-wise like in the US: one patent, one language, one court. All existing patent offices could become branch offices of the European patent organisation and could be scaled down eventually, but the number of patents might grow by factor of three like in the US or Japan."

One idea is for the EU to develop or divert money to a fund that any entrepreneur with a good idea and solid business plan could access to register a patent. The fund should also be used to allow entrepreneurs to defend their patents against the so-called patent trolls or others who infringe their ideas anywhere in the EU.

Other markets

Home heating, fuel supply, healthcare – a range of other markets remain splintered in Europe by border and regulation. In the end, the consumer pays. Says Butler of Cambridge: "Where we are behind in Europe is in simplicity of regulation for consumers, so that there would be a real single market regulated across Europe for new products, rather than national boundaries that create ludicrous complexity and a business for lawyers."

Can a "new 1992" programme gain political steam? Perhaps, but one problem is the common political impulse to compromise away progress whenever opposition arises. As Bernard Damiens, chairman of PostEurop, the European post-office association, says: "You cannot compromise on a vision. If you look at businesses, they are driven by vision, and they are driven by one man, who has his vision, chooses his people and drives his business, and all the rest follows. What do we do with Europe? Absolutely not that. We see governments compromising all the time. Europe as an institution has to function differently. Excellence is what counts."



"The European patent should work legally and cost-wise like in the US: one patent, one language, one court."
– Martin Schoeller.

The problem of venture capital

Over the years, Jean-Bernard Schmidt has built one of the world's most successful technology investment firms. He and colleagues at Sofinnova Partners, with bases in both Paris and San Francisco, did it in part by working both sides of the Atlantic – an intercontinental approach to venture capital now emulated by others. But now he's worried about the future of his industry – in part because of the growth of so-called private equity and “hedge funds”, investment vehicles that take a more opportunistic (and often contrarian) view of global financial markets.

“I am concerned that venture capital activity is in the process of being squeezed out in the private equity environment. Financial institutions are investing primarily into hedge funds and LBOs (leveraged buy-outs) that provide short-term liquidity and returns. Those financial institutions that are normally long term-oriented have been pouring resources into short-term allocations – week to week for hedge funds, by the year for LBOs.

“Venture capital is going down. If we don't address the way our financial institutions invest, if we don't send the right messages, we are not going to salvage the situation.

“First we must recognise the problem. Second, we need a series of (tax and regulatory) measures. Money is not lacking. Money is overabundant, in financial institutions, in pension funds, in stock markets – everywhere except in technological companies, just because it takes too much time to build a technology company.

“I fear that if this trend continues, within the next two years venture capital in Europe and in the US will no longer be an asset class.”



“You cannot compromise on a vision... What do we do with Europe? We see governments compromising all the time. Europe as an institution has to function differently. Excellence is what counts.” – Bernard Damians

→ Solution 3 Invent the market-friendly university

Universities should be the engine rooms of the knowledge economy. But for many in Europe their archaic structures, rigid tenure rules and anti-commercial attitudes make them unsuited to the role.

Look at the numbers. Europe's universities produce tonnes of paper – 46 per cent of all published scientific research; but they earn only 32 per cent of citations from colleagues around the world. And Europe (including Switzerland) is home to only nine of the top 50 universities in the world. The financial results are worse: compared with US competitors, the tech-transfer offices of European universities file 17 per cent as many patents and earn 5 per cent as much licence income.⁹

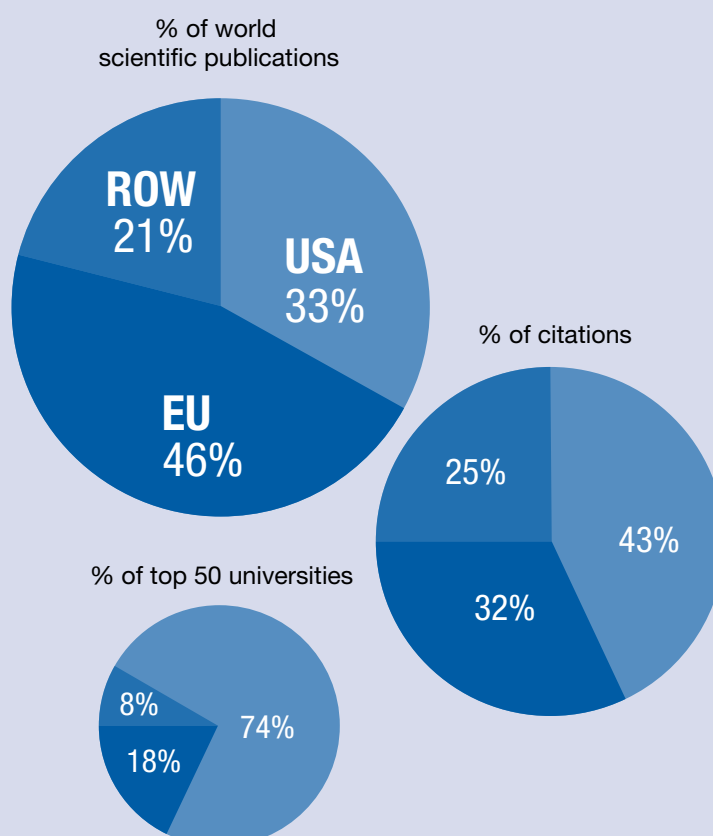
One important problem is academic attitude – which is insulated from the pressures and realities of the greater economy. Says Deborah Leary, founder and director of UK software start-up Forensic Pathways Ltd.: “On the ground, businesses are using universities more for

the research and development part of innovation. But they are becoming increasingly frustrated because the academic institutions do not realise how quickly we have to move. We're not waiting for perfection. We don't need a product to be perfect before it gets out to market. Sometimes we just need to get it out to market.”

Ramon Ollé, CEO and chairman of Epson Europe, agrees: “When I was a telecommunications student 90 per cent of the students wanted to be entrepreneurs. Today, in the same university, just 15 per cent want to be entrepreneurs. The rest want to go to the business school, just because they can get a better salary. In my country, Spain, for many years entrepreneurs were looked on as people who avoid paying tax.”

“We have brilliant people, but brilliant people who are very badly paid. And we will continue to be badly paid until we generate the right social climate.”

EU research: Quantity, not quality



Sources: Unesco, Shanghai JT

Another problem is the ideology of education. For decades, in most European countries the prevailing policy has been to sprinkle funding across all institutions, as an instrument of regional development. The idea that one university is better than another – and thus should get more of the money – was heresy. That has hurt research.

Says INSEAD's Dutta: "The place where we are probably the weakest in education is at the high end, in the graduate schools. It is very difficult to identify European schools that come up to the same standard as MIT and Stanford, for example. We need to focus on building these high-end institutions. Doing this will introduce an element of elitism, because you need some focus on the best."

The good news is that there's a lot of change afoot now. On elitism: Germany in 2006 broke with decades of

policy and designated just three of its universities to get top funding under its new "Excellence" university-funding programme. On enterprise: Imperial College London in 2006 rattled the academic tea cups by seceding from the University of London and floating its tech-transfer office on the stock exchange, raising £26 million.

But more change is needed. In the end, Europe must invent the "market-friendly university", an institution with the management and desire to work with industry. Innovation cannot be a bolt-on to existing structures, driven solely by the technology transfer office; it requires an outward-facing, business-friendly, professional and systematic approach. This calls for root and branch reforms.

And reform starts at the top. Says former Czech commissioner Telicka: "Professors should not be running universities. There should be a manager running the university."

Experiments on campus

Britain has been leading the way in experiments in university reform. It starts from the strongest base in Europe, with four of the world's top-50 universities. But its less-famous universities have been just as innovative.

Keele

The University of Keele, in Staffordshire, has used a reorganisation to make its research more relevant and market-driven.

It reformed all its separate departments – across arts, humanities, science and medicine – into seven multidisciplinary research institutes. Rather than being under the 'ownership' of an individual scientist, all grant money is applied for, and disbursed by, a specialist team of administrators at the core of each institute. Meanwhile, the university's teaching responsibilities have been parcelled into 13 teaching schools.

The approach combines carrot and stick. All staff active in research are members of an institute and get a proportionate reduction in their teaching duties, while those who are not remain in their departments and carry on teaching.

Says the vice chancellor of the university, Janet Finch: "This is about ensuring all research is managed and supported properly. We have dedicated administrative

staff who submit grant applications and manage the funding and dedicated research leadership."

Hertfordshire

At the University of Hertfordshire, Vice Chancellor Tim Wilson believes universities need to become business-facing and develop more effective relationships with industry.

"Research clearly has a role to play in innovation – but it's not the whole story," he says. "We can have the best researchers in the world, but if we do not have an innovation culture, then we will fail to reap the economic benefits from our ideas."

Wilson claims that Hertfordshire has created a revolving door, with business, academics and students constantly exchanging ideas, and constantly moving between the business workplace and the universities. A foundation for this was the merger of the university with one of the county's leading business organisations, Exemplas. This has created new connections between thousands of businesses and the university.

Surveys carried out by the university show an increase in satisfaction from business clients. At the same time there has been increase in applied research carried out by the university; a growth in professional development programmes; more students working in business as part of their studies; and an increase in graduate employment skills.

→ Solution 4 Create 'Free Innovation Zones': a way to foster technology clusters

What does it take to get some action? In Brussels, the technocrats so far are thinking big: big budgets, big directives, big political fights that may, in the end, accomplish nothing. Here's an alternative approach: start small and build on successes.

First, success: despite the macroeconomic problems, there is no shortage of bright spots across Europe. It is very important to “celebrate our successes whilst pinpointing and addressing our weaknesses”, says INSEAD’s Dutta. “I’m sometimes put off by negative sentiment, and I think that is something that has to be changed. A lot is going wrong. But a lot is going right, and we need to focus on that.”

Second, start small. Pick some specialized technology clusters and give them special regulatory status – or, more properly, de-regulatory status. These could be based on the model of Free Trade Zones or Free Economic Zones used elsewhere in the world: ports, cities or regions that have special low tariffs, regulatory fast-tracks and investment incentives. Apply that to the technology world, to nurture specific, narrow sectors of emerging technology across Europe, or clusters of technology centred on specific universities. Call them, in the words of Microsoft’s Courtois, “free innovation zones” – FIZs.



“We have brilliant people, but brilliant people who are very badly paid. And we will continue to be badly paid until we generate the right social climate.”
– Ramon Ollé

Here’s how it would work, according to suggestions from panelists at the roundtable:

Step 1) Designate a specific sector or region for special treatment as a Free Innovation Zone. This could be a particular emerging technology: in the energy field, for instance, hydrogen fuel cell R&D, low-carbon office-building technology or new car-engine designs – a field in which Europe has great technology already in the works, and a strong possibility for global success. Alternatively, it could be a specific region, a cluster of business, investors and researchers centred around a strong university lab.

Step 2) Review regulations that get in the way of that sector or region growing faster – or consider rule-changes that could speed its growth (such as, in the field of low-carbon technologies, the UK government’s exemption of carbon-neutral homes from stamp duty).

Step 3) Provide a mechanism for inventors in the zone to get help with patent protection. This could be a special fund to defray the costs of application.

Step 4) Provide tax incentives for investors and businesses to get more deeply involved with researchers in the zone.

Step 5) Set a special regime for labour mobility in the zone. This could mean suspending the normal tenure or pay rules that deter many academics from working with industry. It could mean a special visa system, so bright engineers or scientists from other countries – even from India or China – can participate in the zone, contributing their talents.

The political innovation in Free Innovation Zones is simple: in emerging tech sectors or hot little clusters, there are few entrenched interests and a greater willingness to try new things. Though politicians may deadlock over major, macroeconomic proposals, they're unlikely to encounter much opposition to such narrow, specific pilots. Result: action now, rather than years later – and in sectors or regions that are most important for the future.

The way Pat Cox, former president of the European Parliament, sees it is that if the FIZ is a sector it would get round one of the most common road blocks to European action: the inevitable regional disagreements over where in Europe any new EU institution or project should be based. The FIZ “should not be somewhere in particular. The tax incentive is for the activity, and it will be wherever the ability is there to deliver. It is not a state- or territory-specific break; it's a process-specific break to do with the ecosystem that delivers the outcome.

“You don't turn it into a pork-barrel market for politicians. If you detach it from a specific territory, its political possibility is stronger.”

Of course, the concept of Free Innovation Zones also fits well with the “lead markets” notions of Aho. Both are ways to focus regulatory, fiscal and administrative attention on important new technologies that people need and want now – to connect technology demand with supply. And in the end, both require political will.

Will it take a crisis to change?

The most dramatic technology-based economic development stories in Europe are two small countries: Ireland and Finland. Both went through economic nightmares 15 to 20 years ago – and both emerged with vibrant knowledge-based economies that are role models for the EU and elsewhere.

The tale of the Celtic tiger is well known. But in the case of Finland, it faced crisis at the beginning of the 1990s, when the collapse of the Soviet Union left it with an economy contracting at 7 per cent a year. That provided the political impetus for change, says Aho, the then prime minister.

It raised spending on R&D, from 1 per cent of GDP in 1980 to 3.5 per cent today – second highest in the world, after Israel. It created new, efficient state institutions to channel the money. It let the old pulp and paper industry wither naturally, rather than trying to prop it up. It liberalised its telecommunications market – despite opposition from the then-head of Nokia. Its universities changed gear, to serve the emerging high-tech industry. It joined the EU in 1995, and the euro zone at launch.

Says Cox, an Irishman: “Finland and Ireland shared one big thing in common: a moment of rupture with the past that had such a profound psychological impact that people were willing to risk change because the status quo was not an option. Without rupture the scale and quality of what is needed is in my view not politically possible.”



“Finland and Ireland shared one big thing in common: a moment of rupture with the past that had such a profound psychological impact that people were willing to risk change because the status quo was not an option.”

– Pat Cox



Businesses “are becoming increasingly frustrated because the academic institutions do not realise how quickly we have to move. We’re not waiting for perfection. We don’t need a product to be perfect before it gets out to market. Sometimes we just need to get it out to market.” – Deborah Leary



“The place where we are probably the weakest in education is at the high end, in the graduate schools. . . We need to focus on building these high-end institutions. Doing this will introduce an element of elitism, because you need some focus on the best.” – Soumitra Dutta

→ Delegates to the Roundtable

On 8 December 2006, a dozen leaders in European business, policy, and academia met in Paris to debate innovation policy. Their comments contributed to the preparation of this special report.

Esko Aho

President, Sitra – The Finnish Innovation Fund.

Born in 1954, Esko Aho has had a long and distinguished career serving Finnish society. He held the post of Prime Minister of Finland from 1991 to 1995. He was appointed President of the Finnish National Fund for Research and Development since 1 July 2004. Most recently, he chaired a group of experts on European innovation policy, which submitted its report to the European Commission in January 2006.

Nick Butler

Director, Centre for Energy Policy Studies, University of Cambridge

Nick Butler became head of the Cambridge energy-policy institute in January 2007, after many years at BP PLC. At the company, he was most recently Group Vice President of Strategy and Policy Development. He is also chairman of the Centre for European Reform, and holds a variety of positions with academic and charitable organizations around the world. He has published books and articles on international issues, including most recently a paper, written with CBI Director Richard Lambert, on the future of European universities.

Jean-Philippe Courtois

President, Microsoft International

Jean-Philippe Courtois leads sales, marketing and services for all regions outside the US and Canada, including Europe, the Middle East and Africa (EMEA); Japan; China; the Asia Pacific region; Latin America; and emerging markets. He also shares responsibility for Microsoft Corp.'s worldwide public sector team, directing the company's engagement with governments around the globe.

Pat Cox**President, European Movement International, and Managing Partner, European Integration Solutions**

The recently retired President of the European Parliament, Pat Cox is an active campaigner for the successful enlargement of the European Union, and the European Parliament senior representative on the Intergovernmental Conference that led to the adoption of the proposed Constitutional Treaty of the EU. He is also a Board member of Michelin, the French-based global tire company, Friends of Europe, and the Crisis Group

Bernard Damiens**Chairman, PostEurop, and Director Strategic & Regulatory Affairs, La Poste**

After graduating as a Commercial Engineer from the Catholic University of Louvain in 1975), Bernard Damiens has worked successively for Unilever (Lever SA) in Belgium and Masterfoods (Mars, Inc.) before moving to La Poste. He is Member of the Management board of PostEurop since 2000, and Chairman since 2005, in which capacity he led the repositioning of PostEurop's strategy.

Soumitra Dutta**Dean of External Relations and Roland Berger Professor of Business and Technology, INSEAD**

Prof. Dutta obtained his PhD in computer science and his MS in business administration from the University of California at Berkeley. His research and consulting have focused on the interrelationships between innovation, technology and organisational design. A fellow of the World Economic Forum, he is currently the Chairperson of the European Commission's panel on innovation in the ICT sector in Europe.

Deborah Leary**Founder and Director, Forensic Pathways Ltd**

Forensic Pathways designs and supplies equipment to the forensic market, along with providing training and consultancy and knowledge management services. Deborah Leary has also been appointed to the Board of the Small Business Council, which advises national government about the needs of small businesses. In recognition for her commitment to entrepreneurship she was awarded European Woman of Achievement 2006.

Ramon Ollé**CEO and Chairman, Epson Europe**

Ramon Ollé was born in 1950 in Barcelona, Spain, and graduated as an engineer in telecommunications from the Ramon Llull University of Barcelona. He is a member of the Advisory Board of European Association for International Education, of the International Advisory Board of ESADE Business School, and the board of Ramon Llull University of Barcelona and President of EPSON Foundation.

Jean-Bernard Schmidt**Chairman & Managing Partner, Sofinnova Partners**

Jean-Bernard Schmidt is a past and current board member of many technology companies in the United States and France. Between 1998 and 2001, he was a board member of AFIC, the French Venture Capital Association. He is also a past Chairman and member of the Board of the European Private Equity and Venture Capital Association.

Martin A. Schoeller**Chairman, Schoeller Industries, and President, Europe's 500**

Since 2004 Martin Schoeller has been President of Europe's 500 Entrepreneurs for Growth. In 1982, jointly with his brother, he took over the family-owned engineering office Schoeller International and expanded it into an innovative and growing industries and service group, a market leader in several sectors of packaging and logistics. He also initiated and is Member of the Board of Trustees of "Stiftung Initiative Mehrweg", and holds various Supervisory Board positions.

Pavel Telička**Co-founder and Director, BXL Consulting**

Pavel Telička graduated from the Faculty of Law at the Charles University in Prague. The Chief Negotiator for the Czech accession to the EU, he was later promoted to First Deputy Minister and appointed State Secretary for European Affairs. From February 2004 to November 2004 he was an EU Commissioner co-responsible for the portfolio of health and consumer protection.

Simon Zadek**CEO, the Institute of Social and Ethical AccountAbility**

Simon Zadek is a Senior Fellow at Harvard University's Kennedy School of Government, and a 'Professor Extraordinaire' at the University of South Africa's Centre for Corporate Citizenship. A member of various advisory boards and of the Clinton-Dalberg Task Force programme, he was named one of the World Economic Forum's 'Global Leaders for Tomorrow' in 2003.



About SciencelBusiness

Connecting buyers and sellers of emerging technologies

The marketplace for science and technology is vast, fast-growing and complex. It cuts across borders, industries and scientific disciplines. It demands many skills: corporate R&D managers, academic researchers, technology transfer officers, IP lawyers, venture capitalists and policy-makers. But above all, for success in this marketplace, what really counts is what you know and whom you know.

That's where SciencelBusiness comes in. It is the first independent news service that brings together buyers and sellers of emerging technologies – through its online news coverage, its business-opportunity service, and its exclusive networking events.

It was launched in 2005 by two leading journalists: Richard L. Hudson and Peter Wrobel, former managing editors of the Wall Street Journal Europe and science journal Nature. With them is a top-quality team of science and technology journalists, and a unique network of some of Europe's leading science establishments, including the University of Cambridge, ETH-Zurich, Karolinska Institutet and Imperial College London.

For its audience of more than 70,000 technology professionals across Europe, it provides:

NEWS & INSIGHT – SciencelBusiness covers the first wave of technology - early licensing deals, new spin-off companies, deep research partnerships and corporate R&D and IP management. Its focus is unique: Early-stage R&D investment, across borders and industries. Its value is clear: It fills the gap where smart information and good contacts are hardest to get – early-stage R&D. Its delivery is instant: online and by email bulletin.

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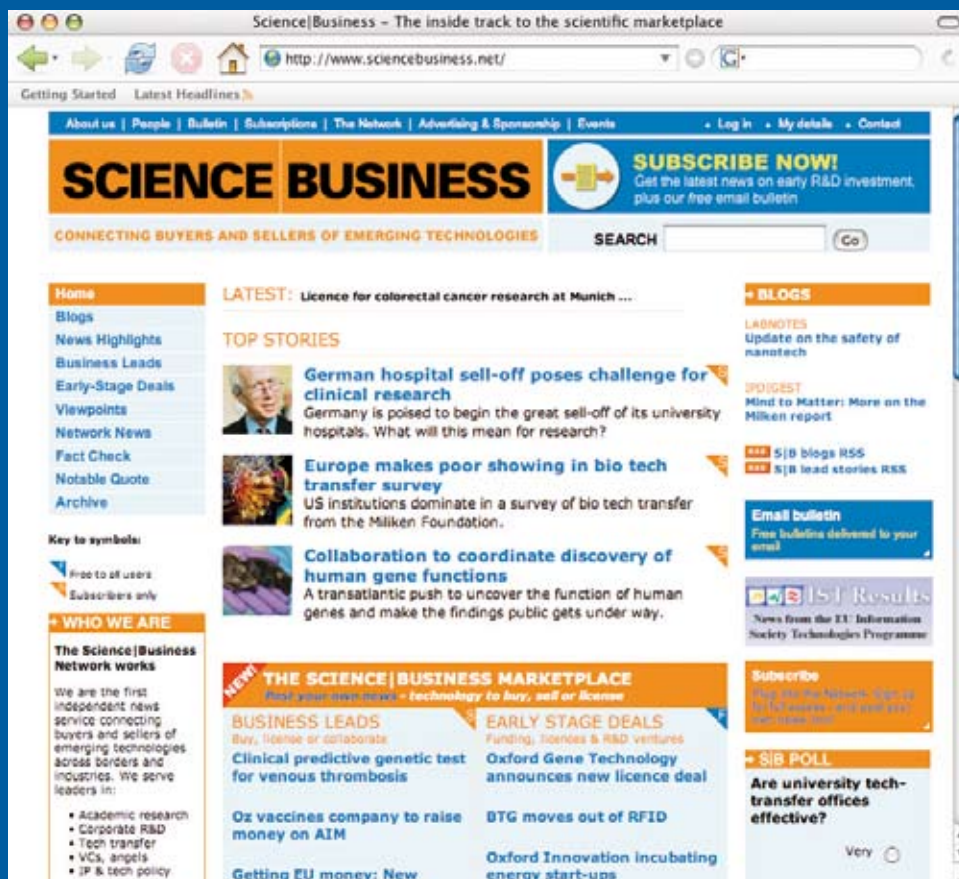
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REFERENCES:

- 1 World Intellectual Property Organization. "Exceptional growth from North East Asia in record year for international patent filings." February 2007. http://www.wipo.int/edocs/prdocs/en2006/wipo_pr_2006_436.html
- 2 European firms earn from patent royalties the equivalent of 3.1 per cent of R&D spending, compared to 6.7 per cent for American companies, according to the "OECD Science, Technology and Industry Outlook 2006."
- 3 "Unesco Science Report 2005." Paris: Unesco Publishing. www.unesco.org/publishing
- 4 Aho, Esko, Jozef Cornu, Luke Georghiu and Antoni Subirá, "Creating an innovative Europe." January 2006. http://ec.europa.eu/invest-in-research/pdf/download_en/aho_report.pdf
- 5 EU ICT Task Force. "Fostering the Competitiveness of Europe's ICT Industry." November 2006. http://ec.europa.eu/enterprise/ict/policy/doc/icttf_report.pdf
- 6 Jones, Randall S. and Tadashi Yokoyama. "Upgrading Japan's innovation system to sustain economic growth". OECD Economics Dept. Working Paper 527. 29 November 2006. [http://www.oalis.oecd.org/olis/2006doc.nsf/43bb6130e5e86e5fc12569fa005d004c/3eb7cd258c561174c125723d00320121/\\$FILE/JT03218797.PDF](http://www.oalis.oecd.org/olis/2006doc.nsf/43bb6130e5e86e5fc12569fa005d004c/3eb7cd258c561174c125723d00320121/$FILE/JT03218797.PDF)
- 7 European Commission. "Five ways to defuse the demographic time bomb." Doc. Ref: IP/06/1359, 12 October 2006. <http://www.europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1359&format=HTML&aged=0&language=EN&guiLanguage=en>
- 8 European Investment Fund. "Technology Transfer Accelerator (TTA), Final Report." September 2005. http://www.eif.org/attachments/pub_corporate/TTA_FinalReport_Sept-Oct2005.pdf
- 9 European Investment Fund. "Technology Transfer Accelerator (TTA), Final Report." September 2005. http://www.eif.org/attachments/pub_corporate/TTA_FinalReport_Sept-Oct2005.pdf

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