Stimulating Creativity and Innovation in Europe

The UNICE Benchmarking Report 2000

UNICE gratefully acknowledges the financial help of the following companies which allowed the publication of this report :

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Foreword

This is the third UNICE Benchmarking Report. It follows 'The Competitiveness Report' and 'The Entrepreneurship Report', and focuses on ways of stimulating creativity and innovation in Europe.

It builds on the results of the Lisbon European Summit by addressing a wider range of issues related to innovation to ALL European stakeholders. It also provides additional benchmarks and new targets, in a number of key areas.

The report tells a story of inadequate levels of innovation in Europe. It suggests causes and identifies possible solutions.

It uses the United States as one benchmark. However, it also refers to other countries outside Europe and it identifies individual European countries as benchmarks in a number of areas.

The report demonstrates that Europe has many innovative companies, including SMEs, and some good government practices that support innovation. But there are not enough of them, particularly in the wealth-creating industries of the future.

The report was prepared by a Task Force of UNICE member federations, chaired by Mr Herbert Steinwender of VA Technologie from Austria. The Task Force was supported by a project team from Business Decisions Limited led by Mr Bruce Ballantine. I would like to thank them all for their help. I would also like to thank our partners for their support in this important project.

In conclusion, I would urge all stakeholders throughout Europe to take action, without delay, on the issues raised in this report.

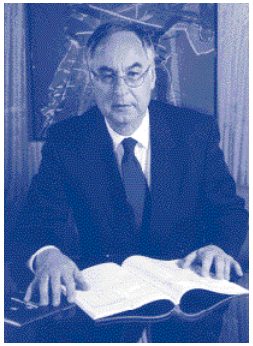
Georges Jacobs
President

'Innovation is the key to sustainable competitive advantage for companies of all sizes in all sectors'.

Innovation is a comprehensive approach to doing business. It includes the creation and introduction of new products and services and the use of new processes and operating methods. It includes revolutionary changes and changes resulting from continuous improvement. It is important for companies of all sizes, in traditional low-tech sectors as well as fast-growth high-tech sectors.

Companies play the leading role in the process: generating change, and creating and responding to new opportunities. However, all stakeholders must be involved if an economy is to maximise its potential for innovation. Governments, in particular, have a major role to play in creating a business environment that is supportive of innovation.

Although there are many European success stories, taken overall, companies based in Europe have failed to match the performance of innovative companies based in the USA.



Herbert Steinwender
Secretary General
VA Technologie

This innovation deficit can be attributed to many factors; some are internal to the companies themselves but many are external:

- European society is less supportive of risk-taking, entrepreneurship and the adoption of new technologies - key requirements for successful innovation.
- Europe's markets for products and services do not offer the appropriate balance of opportunities, pressures and incentives for innovation.
- Europe allocates too few of its resources to the creation and diffusion of knowledge, particularly Research and Development.
- European education systems are less successful than those in many other countries in equipping its citizens with key skills, in areas such as mathematics, science, technology, ICT (Information and Communications Technologies) and management.
- Europe's burden of taxation is too high, particularly on innovators, entrepreneurs, managers, employees and their companies.
- Europe's regulatory and fiscal frameworks inhibit the development of modern high-performance workplaces.

UNICE's recommendations for priority action by European governments and companies to increase the level of innovation in Europe are :

	Action… Improving attitudes towards creativity and innovation.	Action… Releasing the full potential of new products and markets.	Action… Facilitating the creation and exploitation of knowledge and new ideas.	Action… Improving the knowledge and competence of people.	Action… Improving the financing of innovation.
Governments should…	❑ Raise awareness of the importance of creativity and innovation for the economic and social well-being of Europe. ✎ *Bring European attitudes towards innovation and new technologies up to the same level as in the USA, by 2005.* ❑ Demonstrate support for individuals and companies who take risks and innovate. ✎ *Introduce new bankruptcy laws by the end of 2002.*	❑ Complete the European single market. ✎ *Complete the liberalisation of financial services by 2003, instead of 2005.* ❑ Remove obstacles to innovation and market entry, particularly through market liberalisation. ✎ *Complete this by 2003.* ❑ Reform regulations that slow down time-to-market, create regulatory uncertainty or increase development costs. ✎ *Complete this by 2003.*	❑ Increase the level of competition for public research contracts. ✎ *Open all contracts to suitable public and private institutions by 2004.* ❑ Promote collaboration between the public and the private sector. ✎ *Remove obstacles to collaboration by 2004.* ❑ Improve the system for obtaining intellectual property rights. ✎ *Achieve a comprehensive community patent by 2001.*	❑ Improve education in mathematics, science, technology (including ICT) and management. ✎ *Reduce the ICT "skills shortage" to 5% by 2005 and eliminate it by 2010.* ❑ Assist all members of society to participate in continuous learning programmes. ✎ *Establish, by 2001, a target for the number of individuals with access to continuous learning programmes.*	❑ Encourage an increase in the supply of seed-corn finance for new innovative companies. ✎ *Develop plans, by 2002, to assist venture capital funds to reduce the "up-front" costs of investigating investments in new enterprises.* ❑ Reduce the overall burden of taxes on the corporate sector and on investors. ✎ *Establish a benchmark by 2001, and then cut the gap with the benchmark country by half by 2005.*
Companies should…	❑ Assist governments to raise awareness of the importance of creativity and innovation for Europe. ❑ Improve the climate for creativity in companies.	❑ Intensify efforts to identify and exploit opportunities for developing new processes, customers, products and markets. ❑ Allocate more resources for innovation in new fast-growth sectors based on knowledge and in the continuous improvement of traditional products. ❑ Upgrade their ICT infrastructures.	❑ Continuously upgrade their innovation systems by adopting global best practices. ❑ Integrate technology strategies into their overall business strategy.	❑ Improve contacts with local schools and relevant universities. ❑ Increase the level of investment in continuing education and training. ❑ Introduce new organisation structures.	❑ Increase the use of corporate venturing. ❑ Assist SMEs in local clusters to develop more effective financing plans.

BACKGROUND

Innovation is the long-term driver of economic growth. It flourishes when societies create the conditions in which managers and entrepreneurs are encouraged to take risks and hence create new sources of wealth and work.

It includes the creation and introduction of new products, processes, and services in all sectors - manufacturing and services, high-tech and low-tech. It encompasses revolutionary and incremental change. It includes intangibles as well as tangibles - investment in R&D and marketing as well as investment in new production equipment.

Innovative companies gain more market share, add more value and create more new jobs than other companies. They are to be found in traditional, low-tech sectors as well as in new high-tech sectors.

Moreover, major changes are taking place in the business environment that will increase the rewards for successful innovation and raise the penalties for poor innovation performance in the future:

- Rapid scientific change and speedy diffusion of new technologies : It took around fifty years for inventions before 1900 to penetrate 25% of households in the USA. Inventions since 1975 have achieved this level of penetration in around twenty years, and many new products have a 'half-life' of less than one year.
- Increased globalisation : Progressive liberalisation of international product and capital markets means that, in an increasing number of sectors, national companies face new, innovative foreign competitors.
- New customer preferences : New markets are emerging, many of them in service sectors. The ageing population, for example, not only poses threats to the European social welfare system, it also offers opportunities to satisfy new customer needs.
- An emerging information society : Major advances in ICT and rising levels of education have increased access to information throughout the world and reduced its costs. This is facilitating the development of the New Economy with its new markets, new ways of distributing goods and new ways of doing business.

This benchmarking report focuses on the extent to which the European business environment supports innovation by companies in Europe, and proposes actions for improvement.

EUROPE'S INNOVATION PERFORMANCE

There is no single or simple measure of the level of innovation in an economy. This report features three different benchmarks: overall economic performance; company-level innovation performance; and economy-wide innovation performance.

The report shows that there are many examples of successful companies in Europe. However, taken overall, Europe's economic performance and particularly its innovation performance lags behind that of the USA, the global leader[1].

This "innovation deficit" is a major contributory factor in Europe's inability to compete successfully with the most competitive economies in the world. Compared to their US counterparts, companies in Europe have been slower to enter new markets and to introduce new processes, products and services.

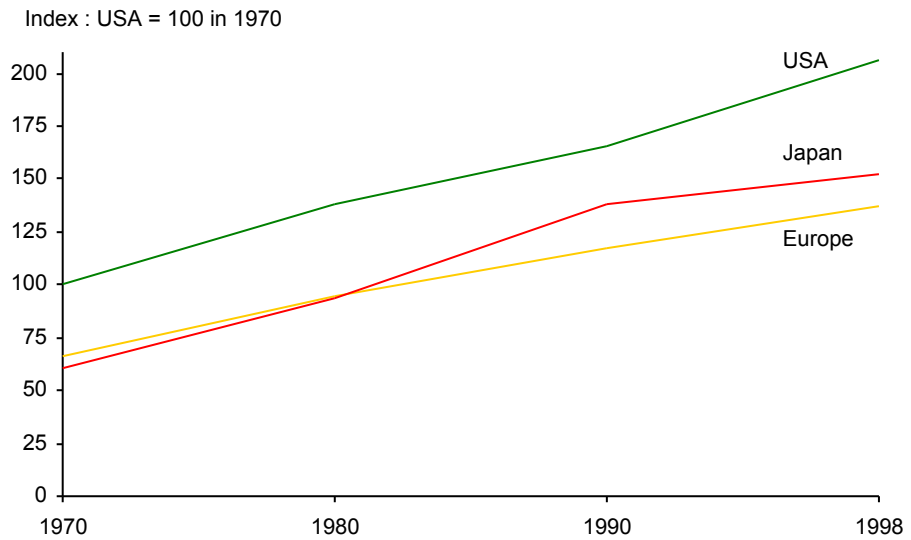
OVERALL ECONOMIC PERFORMANCE

The most obvious manifestation of differences in economic performance is the relative ability of an economy to generate improvements in wealth and work for its citizens.

Although the real living standards of Europeans have more than doubled since 1970, they are still less than two-thirds of the level in the USA. This gap has been unchanged in relative terms for nearly 30 years, and has widened significantly in absolute terms, particularly since 1990.

Lower Living Standards

Chart 1: Real growth in GDP per capita (PPP) (1970-1998)



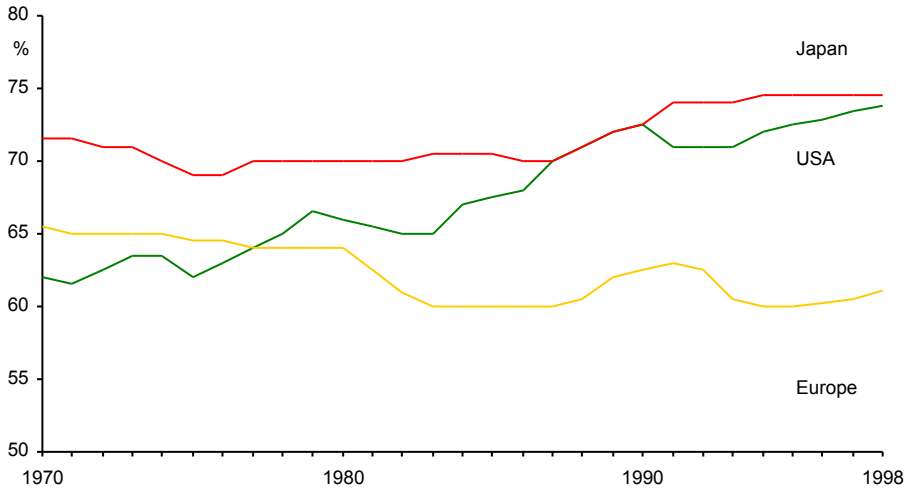
Source: European Commission (DGII) 1998.

1 This is consistent with recent work by Porter and Stern, on behalf of the US Council on Competitiveness ('The New Challenge to America's Prosperity - Findings from the Innovation Index', 1999), which assesses the ability of national infrastructures to support innovation.

Since 1970, the number of Europeans in work has declined from 65% of the working age population to 60% today. By comparison the employment rate has risen from 62% to 74% in the USA in the same period.

Fewer People Work

Chart 2: Employed as a percentage of working age population (1970-1998)



Source: European Commission 'Employment Rates Report' (1998).

Europe's unemployment rate is also worse than that of the USA. Since 1970, unemployment in the EU has risen from 3% of the labour force to over 9%. In the USA, unemployment has fallen from over 5% in 1970 to 4%.

The structure of unemployment in Europe also differs from that in the USA. Levels of long-term unemployment are 10 times higher in Europe than in the USA and twice as many young people are unemployed in Europe compared to the USA.

COMPANY-LEVEL INNOVATION PERFORMANCE

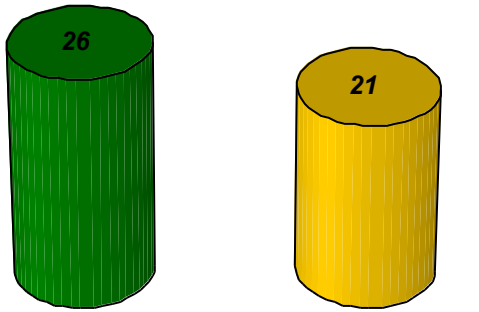
Activities of companies and their employees determine the level of innovation in the economies in which they operate.

An important indicator of the level of innovation by individual companies is the extent to which they "upgrade" their products, services and their operating processes.

Evidence from the PIMS[2] database shows that more American enterprises generate a significant proportion of their turnover from new products.

Fewer New Products

Chart 3: % of companies with more than 10% of total sales coming from new products



Source : PIMS
Note : New products are defined as products introduced to the market no more than three years earlier, designed to meet new needs or to make a significant difference to the way in which existing needs are met.

2 PIMS (Profit Impact of Market Strategy) is a unique database that covers more than 3,000 businesses in the USA and Europe.

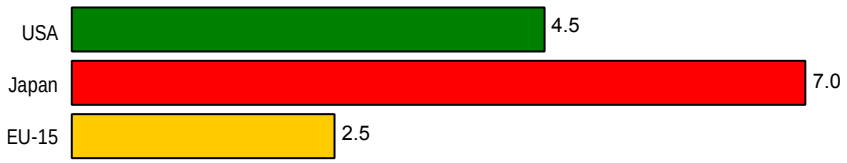
An important pre-condition for the introduction of new products, services and processes is the development of new knowledge. One measure of this is the scale of patenting activity within a society.

Patenting activity differs widely between sectors and is, in part, influenced by national business cultures and practices, as well as the cost and the time needed to obtain a patent. However, it is an indicator of the extent to which companies have a positive culture towards innovation and first access to "leading-edge" technologies.

Measured in terms of patent applications by domestic residents, patenting activity in the EU is only one-third of the level in Japan and half the level in the USA.

Less Patenting

Chart 4: Applications for patents by domestic residents, per 10,000 population (1997)



Source: OECD Main Science and Technology Indicators (1999).

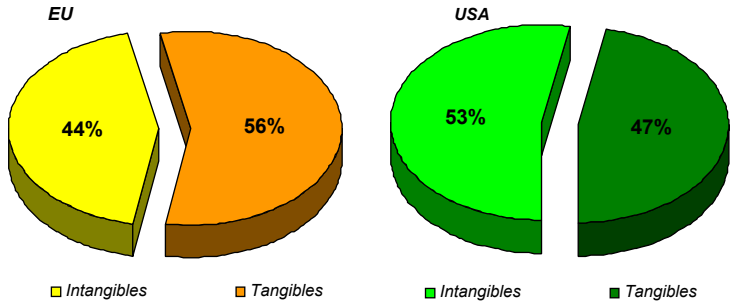
ECONOMY-WIDE INNOVATION PERFORMANCE

The use of resources in different sectors of the economy is another important indicator of innovation performance.

Europe has been less successful than the USA in concentrating resources into manufacturing sectors that make most use of new, intangible sources of competitive advantage, such as R&D, high-level skills, marketing and branding.

Less Use of Intangibles

Chart 5: % of manufacturing Value-added (1997)

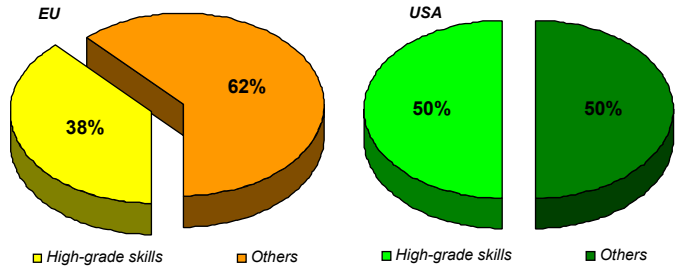


Source: WIFO.

The European Union has also been less successful than the USA in developing service sectors that make greater use of high-grade skills such as finance, insurance, business services, real estate and communications services.

Less Use of High-Grade Skills

Chart 6: % of service sector Value-added (1997)



Source: OECD.

EUROPEAN CORPORATE SUCCESS STORIES

However, there are many success stories where European companies are leaders in innovative process technologies, growth markets and mature markets.

- Brisa (Portugal) introduced a motorway toll system, based on an electronic tag technology, in its home market in the early 1990s. With continuous product improvements, Brisa is now exporting successfully.
- Michelin (France) is a world leader in tyres largely as a result of its innovative capacity in all areas, both in its products (e.g. radial technology and the "green" low-resistance tyre) and in its production processes, which ensure a high level of performance and quality.
- Nokia (Finland) is a world leader in the mobile-phone market. It has succeeded through a process of continuous innovation and it is, at present, doubling in size every two years.
- Ossur, an Icelandic SME, is now a world-leader in prosthetics and orthotics, based on an innovative product range.
- Through successive innovations, SAP (Germany) has become one of the world's leaders in the supply of "accounting packages" for business.
- More than 40% of the turnover of SmithKline Beecham (UK), a world leader in pharmaceuticals, comes from products launched in the last five years.
- Swatch (Switzerland) has revolutionised the global watch industry with a new product breakthrough, followed by a programme of continuous product improvements.
- Tetra Pak (Sweden) is able to offer its customers a range of solutions to problems associated with processing, packaging and distributing fluids The integration of process technology throughout its business has helped to achieve and sustain competitive advantage.

INNOVATION - THE ENABLING CONDITIONS

It is the activities of individual companies and clusters of companies that determine the level of innovation in any economy.

A number of factors influence the ability of companies to innovate. Governments and public institutions affect most of them.

Through their actions, governments play a major role in constructing an environment that can encourage innovation by companies. This includes the establishment of a stable macro-economic framework that provides managers, entrepreneurs and employees with the predictability needed to support long-term investments in innovation.

This report focuses on the five key factors that help to determine the ability of companies to innovate. Many of these factors are beyond the control of single companies, but government activity affects them all. They are the "enabling conditions" for innovation:

- Positive attitudes towards risk, enterprise and new technologies;
- Favourable market conditions;
- Broad development and widespread dissemination of new knowledge and ideas;
- Ready availability of well-qualified people; and
- Easy access to risk capital.

These factors recognise the importance of demanding customers and competition as critical incentives for high levels of innovation in companies. They take account of the role of supportive attitudes in shaping individual risk-taking behaviour, government policy and the actions of public institutions. They also recognise the importance of critical inputs (people, knowledge and finance) on the capacity of companies, managers and entrepreneurs to innovate successfully.

SUMMARY

Culture and attitudes influence the willingness of managers and entrepreneurs to take risks, the level of demand for new products and services, technology choices for production processes, and career choices by potential employees.

Moreover, social attitudes influence government policies, regulatory frameworks, the effectiveness of collaboration between industry and universities, and the availability of risk capital.

This report shows that, compared to the situation in the USA, Europe's citizens are less supportive of risk-taking, entrepreneurship, and the adoption of new technologies. It also shows that, unless there are changes in these attitudes, it will be difficult to achieve significant improvements in the levels of innovation in Europe and hence improvements in its competitiveness, growth, and employment.

IMPROVING ATTITUDES TO ENTERPRISE AND RISK-TAKING

Over the long term it is the cultural values of society and the attitudes of citizens towards risk-taking, enterprise and new technologies that are the most powerful influences on the ability of companies to innovate.

There are three attributes that are most supportive of enterprise, risk-taking and innovation in any company or society: willingness to cope with uncertainty in an unstructured way ("to think the unthinkable"), to compete ("the will to win") and to take an individualistic approach to problem-solving ("the desire to be different").

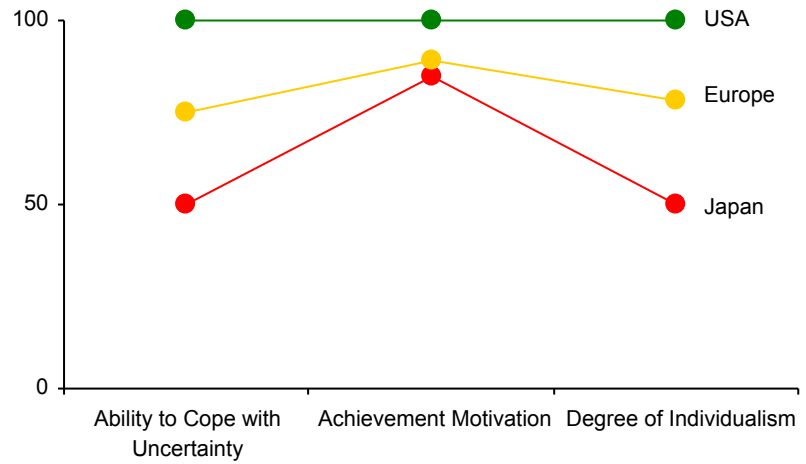
There is no simple correlation between these attributes and the level of innovation in any country, but, in general terms, the greater the prevalence of these attributes, the more supportive the cultural environment towards risk-taking, enterprise and innovation.

There are major differences in attitudes in individual European countries. However, it is possible to draw some broad conclusions at a European level; most European societies are less able to cope with uncertainty, in an unstructured way than Americans; have a lower competitive instinct; and are less individualistic.

Taken overall, the results suggest that the attitudes of individuals in Europe, as a whole, are less supportive of risk-taking, enterprise and innovation than the attitudes of individuals in the USA.

Less Supportive Attitudes

Chart 7: Attitudes towards innovation, Index : USA = 100

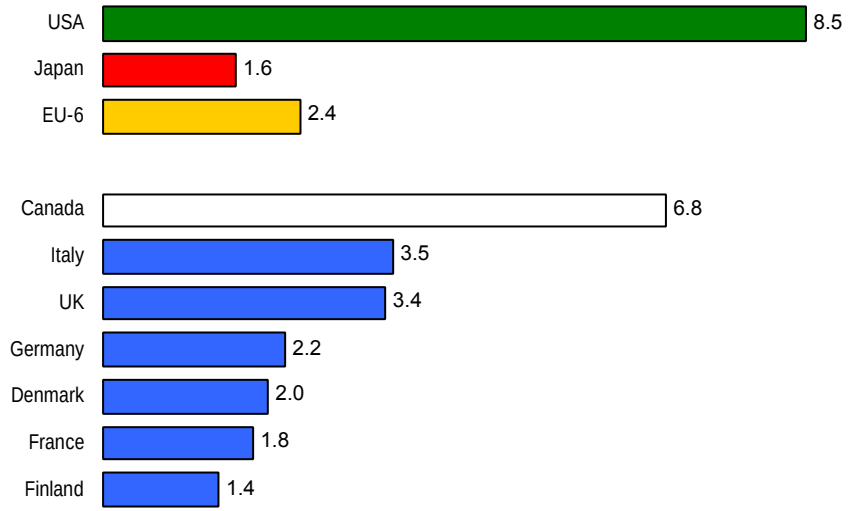


Source : UNICE, based on G. Hostede "Cultural Consequences : International Differences in Work-related Attitudes" (1994).

The differences in attitudes are reflected in different levels of participation in high-risk business activities. More than three times as many US citizens have been involved in a business start-up than is the case in the EU.

Fewer Risk-Takers

Chart 8: % of adults who have participated in business start-ups (1999)



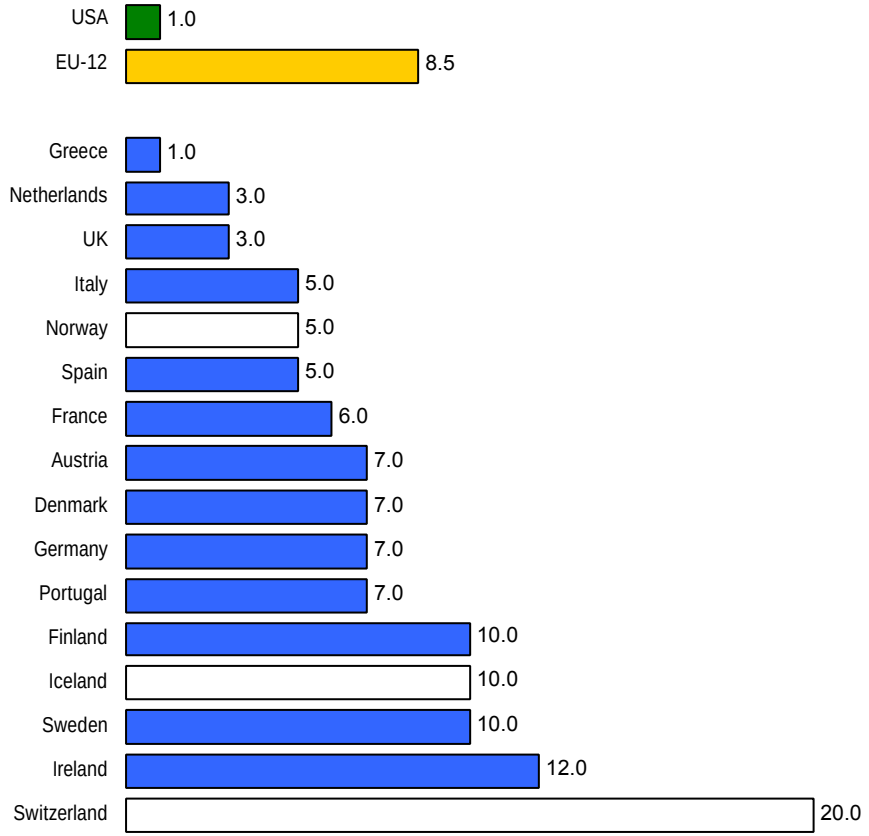
Source: Global Entrepreneurship Monitor, The Kauffman Centre for Entrepreneurial Leadership (1999).

Governments influence attitudes to risk-taking through the way in which they regulate bankruptcy. Innovators, entrepreneurs and investors are discouraged if bankruptcy legislation fails to achieve the appropriate balance between providing adequate creditor protection and encouraging a climate of risk-taking.

Tough bankruptcy rules apply in the USA. However, discharge is immediate and individuals are free to start a new business again without restriction (when the probability of success is greater). In many EU countries discharge from bankruptcy, without full and final settlement of all outstanding liabilities, takes longer. This stigmatises failure and creates unnecessary exit barriers.

Tougher Bankruptcy Laws

Chart 9: Length of time that creditors still have claims on a bankrupt's assets (2000)



Source: UNICE.

CHANGING ATTITUDES TO NEW TECHNOLOGIES AND PRODUCTS

Innovation can create markets but most innovation is demand-led. Companies respond to the pressures and incentives provided by markets. The willingness of customers to endorse new technologies and accept new products and services is, therefore, decisive. A lack of will slows down the pace of innovation and focuses innovation on exploiting existing technologies rather than new ones.

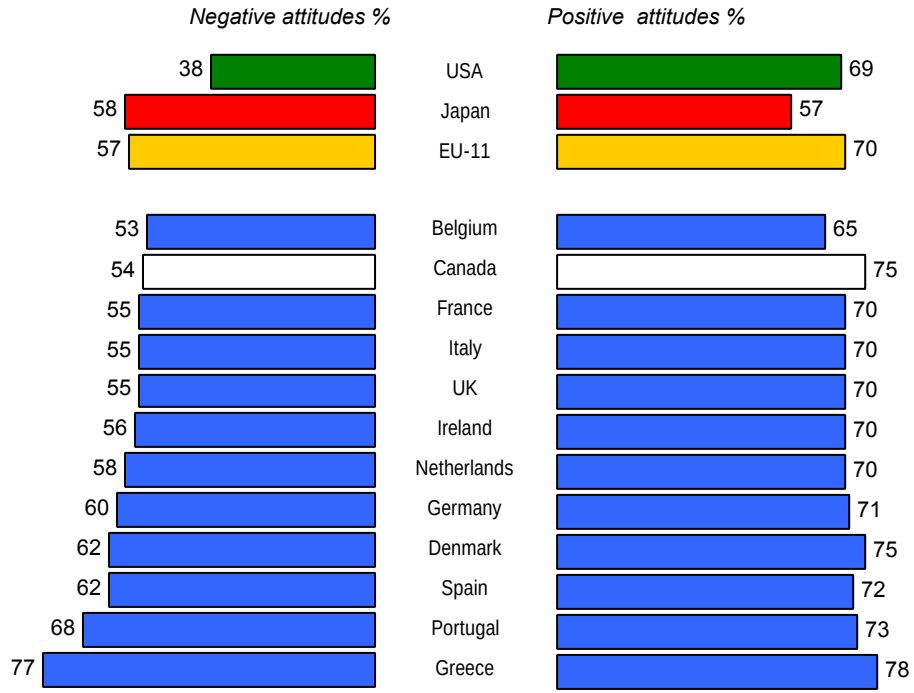
Europeans and Americans are equally positive about the 'promise' of new technologies; 70% of all adult Europeans consider that new technologies will bring benefits to society compared with 69% of Americans.

However, Europeans have many more reservations about the potential 'threats'; 57% of all Europeans consider that some new technologies pose a significant potential threat to health, safety or the environment compared with only 38% of Americans.

This means that, in general, Americans are more likely to be "early adopters" of new technologies, and new products based on these technologies, than Europeans.

Greater Fear of New Technologies

Chart 10: Positive and negative attitudes, % of adults (1996)



Source: OECD, based on Prof. Miller.
Note : Because negative opinions are, in general, much more strongly held than positive opinions, it is not possible to subtract one from the other.

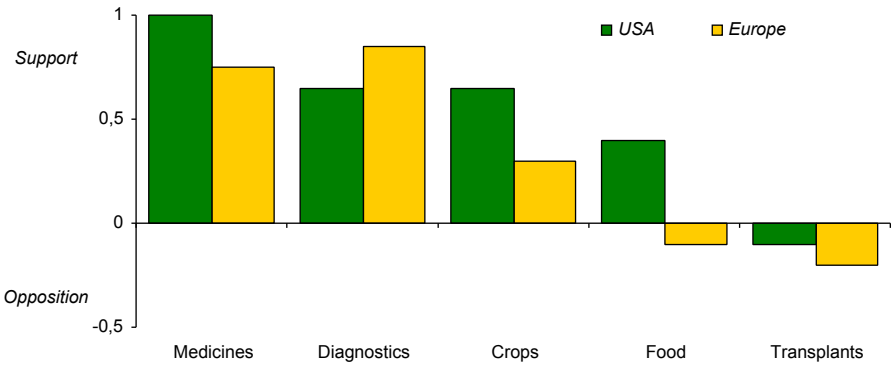
Such reservations are clearly revealed in the different attitudes of Europeans and Americans towards the use of biotechnology, the most important new enabling technology for the first part of the 21st century.

Such differences in attitudes are important because they determine the extent to which European agriculture and industry will be able to compete (in Europe and in export markets) with companies based in other parts of the world using the results of biotechnology.

With the exception of diagnostic testing, Europeans are less supportive of the use of biotechnology, in all its applications, than Americans. Differences are most pronounced in the areas of food and agriculture. Some of these differences are the result of deep-rooted cultural factors; others are the result of imperfect information.

Less Support for Biotechnology

Chart 11: Support for use of biotechnology in different applications (mean scores) (1996/97)



Source: Gaskell, Bayer, Durant and Allum, based on Eurobarometer data and survey by Prof. Miller in USA.
Notes : Where +1 = moderate support and -1 = moderate opposition.

EUROPEAN CORPORATE SUCCESS STORIES

There are already many examples of local, regional, national and pan-European programmes, developed by companies that are helping to change attitudes towards innovation.

- BP invested in training and provided management support following the partial closure of oil and chemical plants in South Wales (UK). This succeeded in changing attitudes to innovation and entrepreneurship in an area of high unemployment.
- COTEC, a Spanish Foundation, which is supported by many national and multi-national companies, seeks to encourage technological innovation in business and in Spanish society in general.
- In more than 10 European countries, Ernst & Young offers its prestigious Entrepreneur Of The Year award to those companies who are the most successful in their growth. Through this initiative, Ernst&Young has become a major player in promoting entrepreneurship.
- Growth Plus - Europe, which brings together Europe's most dynamic job-creating entrepreneurs, aims to promote entrepreneurship in Europe through education, training and the use of role models.
- The Swedish Jobs and Society Foundation, which is supported by 30 of Sweden's largest companies, runs a programme to promote risk-taking and entrepreneurial activity throughout Sweden.
- There are now 18 national members of Young Enterprise Europe, which is funded principally by business. It seeks to help young people to develop attitudes and skills for personal success.

GOOD GOVERNMENT PRACTICES

A number of European governments have introduced programmes to recognise success, and encourage students and SMEs to become more innovative.

- The Government of Upper Austria funds an Innovation Assistant Programme, encouraging SMEs to transform their ideas into new products. Young graduates get specific training and coaching, and remain with their enterprises, for up to two years at the cost of the Government.
- The President of Finland presents an Annual Innovation Award, which helps to raise awareness of the importance of entrepreneurship, creativity and innovation.
- The Federal President of Germany annually recognises exceptional technical, engineering or scientific achievement by awarding "Technology and Innovation Awards".
- The Annual Elementary School Innovation Awards in Iceland promote innovation in schools.
- The BUNT Programme (Business development Using New Technology) was established to improve the competitive position of Norwegian SMEs exposed to international competition, by changing attitudes towards innovation.

RECOMMENDATIONS

To improve European attitudes towards creativity and innovation:

1. *Political and business leaders must raise awareness of the importance of creativity and innovation for the economic and social development of Europe, Their messages should be addressed to all citizens.*
   - Take every opportunity publicly to support creativity and innovation.
   - Develop suitable case studies, including examples of best practice, for use in education and the media.
2. *Political and business leaders must demonstrate support for individuals and companies who take risks and innovate:*
   - Introduce bankruptcy laws that allow all who have failed for economic reasons to try again, whilst protecting consumers and creditors from fraudulent practices.
   - Award prizes for innovation to role models.
3. *Business leaders must improve the climate for creativity and innovation within companies:*
   - Establish corporate cultures, structures and processes that promote creativity and innovation throughout their own organisations.
   - Mentor other companies, particularly in benchmarking and in the adoption of good practices.

This will help to improve the level of innovation in Europe, by changing the attitudes of its citizens towards risk-taking and new technologies, and by encouraging the development of new products and services.

SUMMARY

The incentives and the opportunities available to companies and entrepreneurs, and the obstacles they face in markets are the most important drivers of innovation.

Companies respond to high levels of competition, demanding customers and the presence of new market opportunities in a large single market.

This report shows that too many of Europe's product markets fail to provide companies and entrepreneurs with the right balance of opportunities, incentives and pressures to innovate. Negative consumer attitudes, regulatory barriers, and inadequate infrastructure dilute competitive intensity, create barriers to entry, fragment the European market, increase costs and slow down the growth of new products and new markets.

DEVELOPING NEW MARKET OPPORTUNITIES

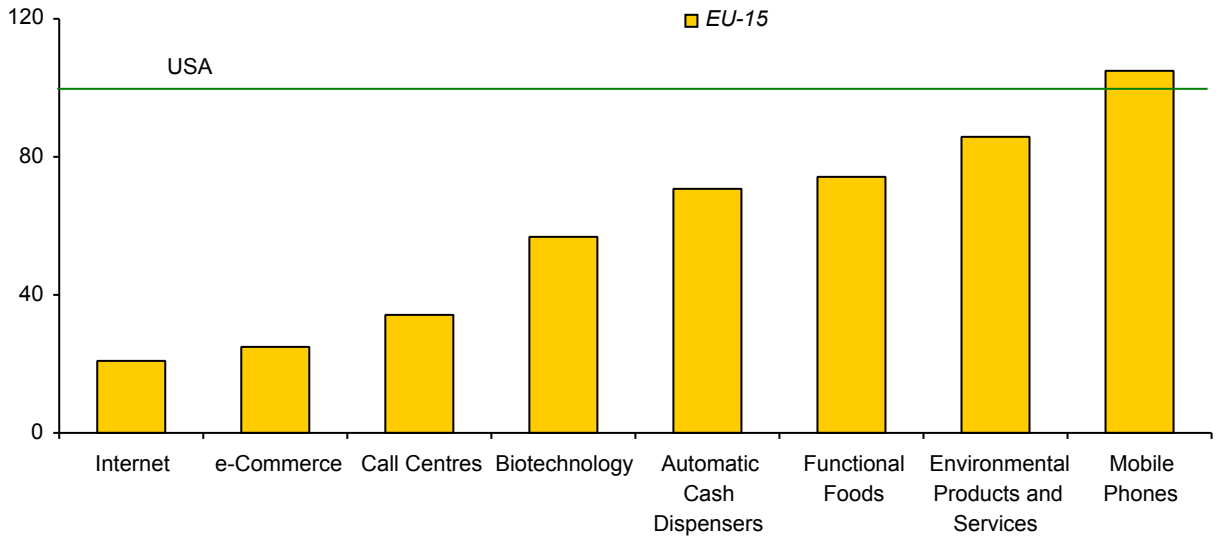
One of the most important enabling conditions for innovation is the presence of demanding customers, particularly in new markets. Proxy measures of this are the rates of growth of new markets and new ways of serving customers.

Customers in the EU have, in general, been slower to adopt new products and services than American customers. Markets for electronic commerce, for example, are four times larger in the USA than in Europe.

However, in some sectors, European consumers have adopted new products and services much more quickly than in the USA. There are, for example, 300 mobile phones per 1,000 population in the EU compared with 280 in the USA.

Slower to Develop New Markets

Chart 12: Relative penetration of new products and services, index: USA=100

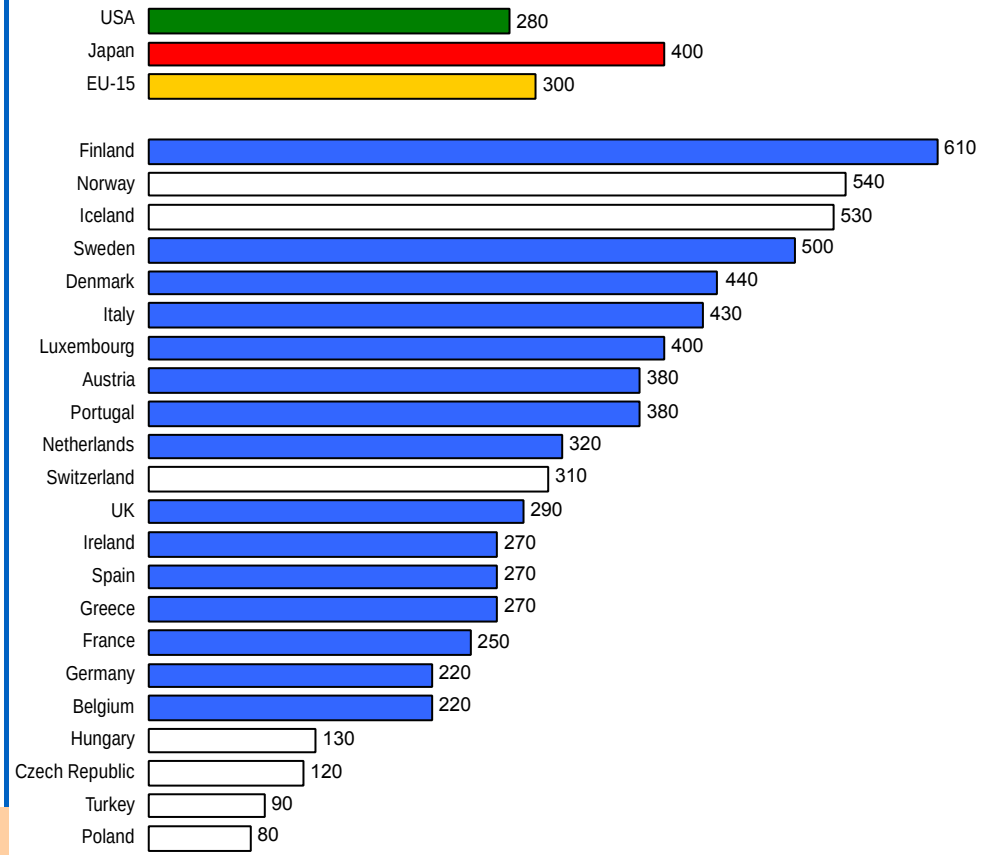


Sources: Internet: OECD (as at July 1999).
e-Commerce: Forrester Research (1999).
Call Centres: Dataquest (1999).
Biotechnology: Europabio (1997).
Automatic Cash Dispensers: Bank of International settlements (BIS) (1998).
Functional Foods : UNICE (2000).
Environmental products and Services: Ecotec/DG-Environment (1999).
Mobile Phones: OECD (as at June 1999).

The Nordic countries are even more advanced. They have achieved global leadership in mobile phones partly because national governments liberalised markets and created product standards at an early stage in the development of the market. This stimulated competitive intensity, reduced costs, and structured the development of key enabling technologies, such as GSM. Further standardisation provided by the Single Market has helped these companies to improve their global competitiveness.

Nordic Countries' Lead in Mobile Phones

Chart 13: Number of mobile phones per 1,000 population (1999)



Source: OECD "Indicators on Mobile Communications" (based on June 1999 data).

REMOVING BARRIERS TO MARKET DEVELOPMENT

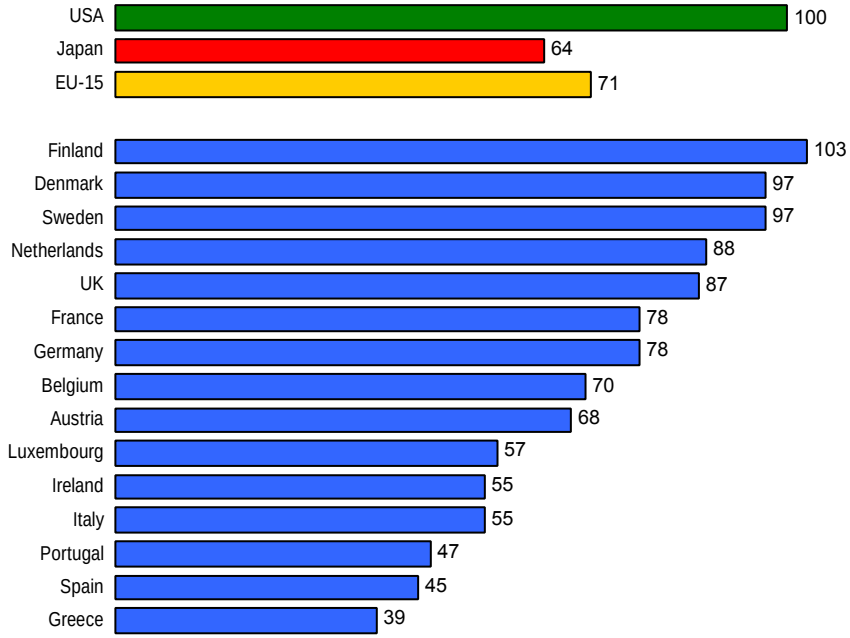
Intense competition and the creation of new market opportunities depend on the presence of a regulatory framework and a physical infrastructure that facilitate technical change and the entry of new domestic and international competitors.

Many of today's fastest growing new markets for goods and services are based on the exploitation of modern Information and Communication Technologies. Electronic commerce, fast parcels delivery, off-site maintenance of production machinery, and distance learning are all examples of fast-growth markets based on high quality ICT infrastructure and low-cost telecommunications.

Market liberalisation has improved the quality of the ICT infrastructure in Europe, but it still lags behind the quality and range of services available in the USA. Only the Scandinavian countries have infrastructures that are equivalent in quality to that in the USA.

Poorer Quality ICT Infrastructure

Chart 14: Quality of ICT infrastructure, Index : USA= 100

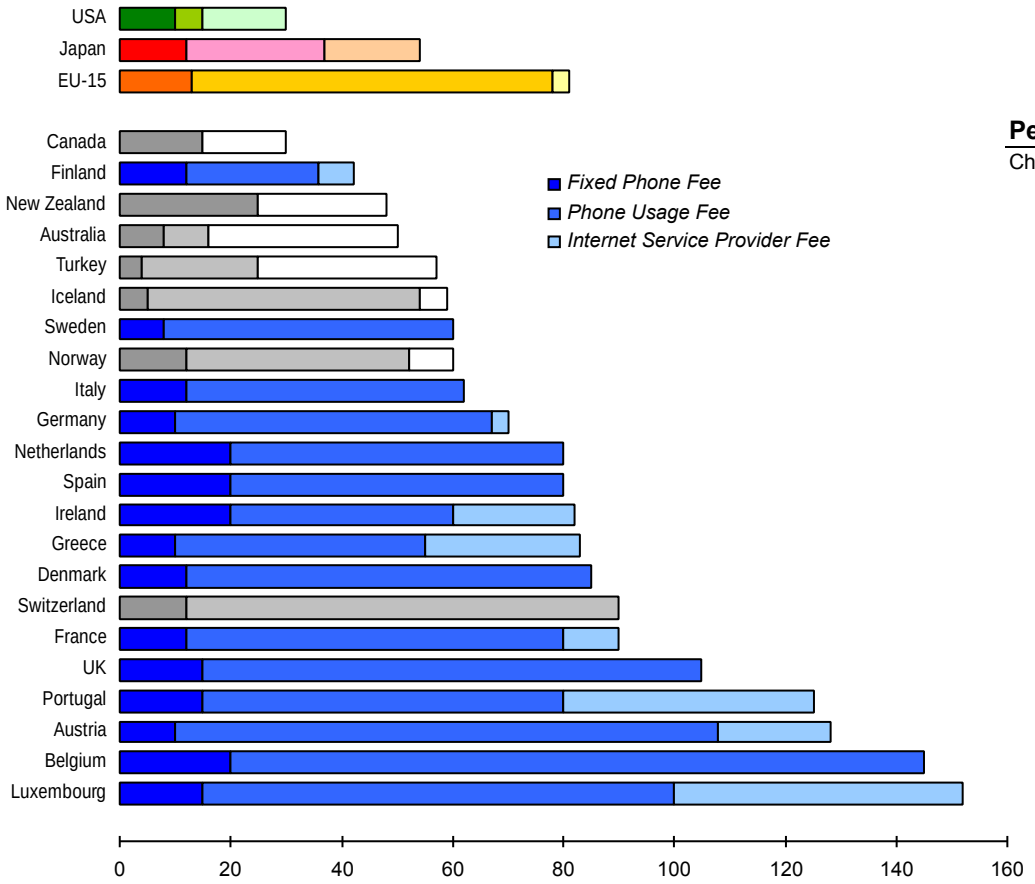


Source: European Commission. Benchmarking Diffusion and Utilisation of ICT Pilot Study 1998).

Moreover, market liberalisation has not yet made a major improvement in the cost of access to the Internet; average costs in the EU are substantially higher than in the USA and other leading third countries.

Higher Internet Costs

Chart 15 : Cost of Internet access (1999)

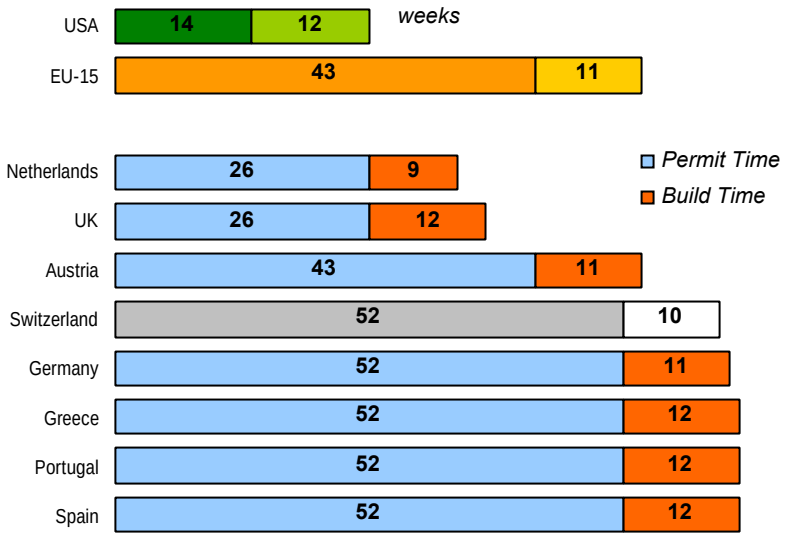


Source :OECD "Internet Access Price Comparison" (October 1999).
Note : Based on internet Access 'Basket' for 40 hours at peak times, in US$, including VAT.

Competition and the development of new market opportunities are also affected by regulations that control the approval of new products and services. In many of Europe's service sectors, some of the greatest regulatory problems surround the granting of licences and permits to new service providers. This includes the extensive range of regulations that must be satisfied before new retail outlets can be opened. For example, it takes less time to build a new petrol station in the EU than in the USA, but it takes three times longer to obtain regulatory approval in the EU than in the USA.

Permits Take Longer

Chart 16: Time needed to obtain permits and build a new petrol station (weeks)



Source : UNICE.

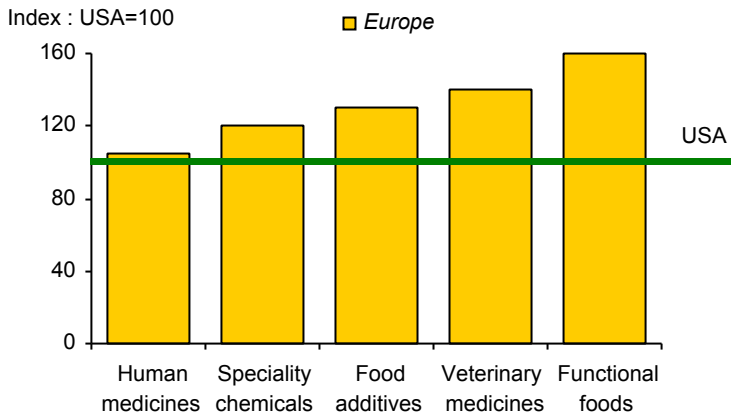
In the EU, over-regulation and inefficient decision-making processes also serve to increase time-to-market, raise development costs, and create regulatory uncertainty for new science-based products in a wide range of sectors, without any marked increase in the level of protection provided to consumers and the environment.

Although there have been major improvements, in recent years, in areas such as human medicines, it still takes longer to bring most new science-based products to market in Europe than in the USA.

The development and approval of innovative veterinary medicines, for example, can take 40% longer in the EU than in the USA. Europe's approval procedures also make the cost of new product development higher than in the USA.

Slower Time to Market

Chart 17: Total time taken to develop and achieve regulatory approval for new innovative products



Source : UNICE.

EUROPEAN CORPORATE SUCCESS STORIES

There are many examples of European companies that have become global leaders in major market sectors and in niche markets.

- Barilla Mulino Bianco[3] is Italy's market leader in pasta and biscuits. Their innovation activity is organised in "innovation funnels", involving continuous feedback between the market research, R&D, production, logistics and administration functions.
- Innovation has helped Heineken[4] (The Netherlands) to maintain its position as a world leader in brewing. Its innovations include improvements in the quality of packaging and in logistics systems.
- iSi (Austria) is the world leader in pressurised gas container technology. Their success is based on world-class research and close partnerships with customers.
- Multiples is a leader in the French retail market for "fashionable" working women. It achieves its success by satisfying the whole range of fashion needs at a single specialist shop.
- Scanmar, a small Norwegian company, with only 50 employees, is a world leader in producing instruments for fishing trawlers, based on sensor technology.

3 This success story is based on a case study included in the report, *'A Virtuous Cycle: Innovation, Consumer Value and Communication'*, AIM, 2000.
4 AIM, op. cit.

GOOD GOVERNMENT PRACTICES

There are many good examples of ways in which European governments have implemented legislation to liberalise and de-regulate markets for products and services and many examples of ways in which they have simplified procedures for licensing.

- The European Commission published a Communication on "e-Europe: An Information Society for All", in December 1999. Its key objectives are:
  - To bring every citizen, home and school, every business and public administration into the digital age and on-line;
  - To create a digitally literate Europe, supported by an entrepreneurial culture ready to finance and develop new ideas; and
  - To ensure that the whole process is socially inclusive, builds consumer trust and strengthens social cohesion.

- The Portuguese government has recently introduced a new 'one-stop shop' system for registering new companies (CFE) that has significantly reduced the time and cost involved.

- By liberalising the telecommunications market and setting tough standards for mobile phones, Scandinavian governments helped local companies to gain leading positions in the global market for mobile phones.

RECOMMENDATIONS

To release the full potential of new products and markets within Europe, as quickly as possible:

1. *Governments must take action to expose all European markets for goods and services to intense competition by:*
   - Completing the single market programme.
   - Enforcing fully and effectively all existing single market legislation
   - Removing the obstacles to market entry and to innovation that stifle competition.
   - Stimulating the speedy agreement of pan-European and global standards for new products and services.

2. *Governments must reform regulations that slow down time-to-market, create regulatory uncertainty or increase development costs.*
   - Improve the quality of regulations
   - Achieve greater consistency with regulation in other OECD countries.

3. *Companies, particularly SMEs, should consider how best to identify and then exploit opportunities for developing new customers, products and markets.*
   - Use customer-focused market research more effectively.
   - Use new technologies and invest more in new product development and marketing.
   - Introduce new performance measures that are focused on improvements in market position and customer satisfaction.

This will help to improve the level of innovation in Europe, by increasing the incentives for managers and entrepreneurs to innovate and by encouraging the development and commercialisation of new products, particularly in new science-based areas.

SUMMARY

Innovation depends upon the creation and diffusion of intrinsically new knowledge and ideas, and new concepts from the fusion of existing knowledge, particularly in science and technology. Increasingly this depends upon more effective interactions between all parts of the "innovation system".

The creation phase is equivalent to the invention or discovery phase and is an important determinant of the level of innovation. Access to information about new ideas and knowledge is important because it influences the number of companies, in any country, which are potentially able to commercialise new ideas.

This report shows that Europe lags in terms of the creation of knowledge and new ideas and in the breadth and diffusion of these ideas. It also shows that Europe spends too little on research and development, particularly business R&D. European academics and companies have fewer incentives and face greater obstacles to collaboration compared with many other countries. European systems to protect ideas are not sufficiently supportive of innovation.

CREATING KNOWLEDGE

For Western economies the level of investment in research and development is one of the principal determinants of their ability to generate and commercialise new knowledge and ideas.

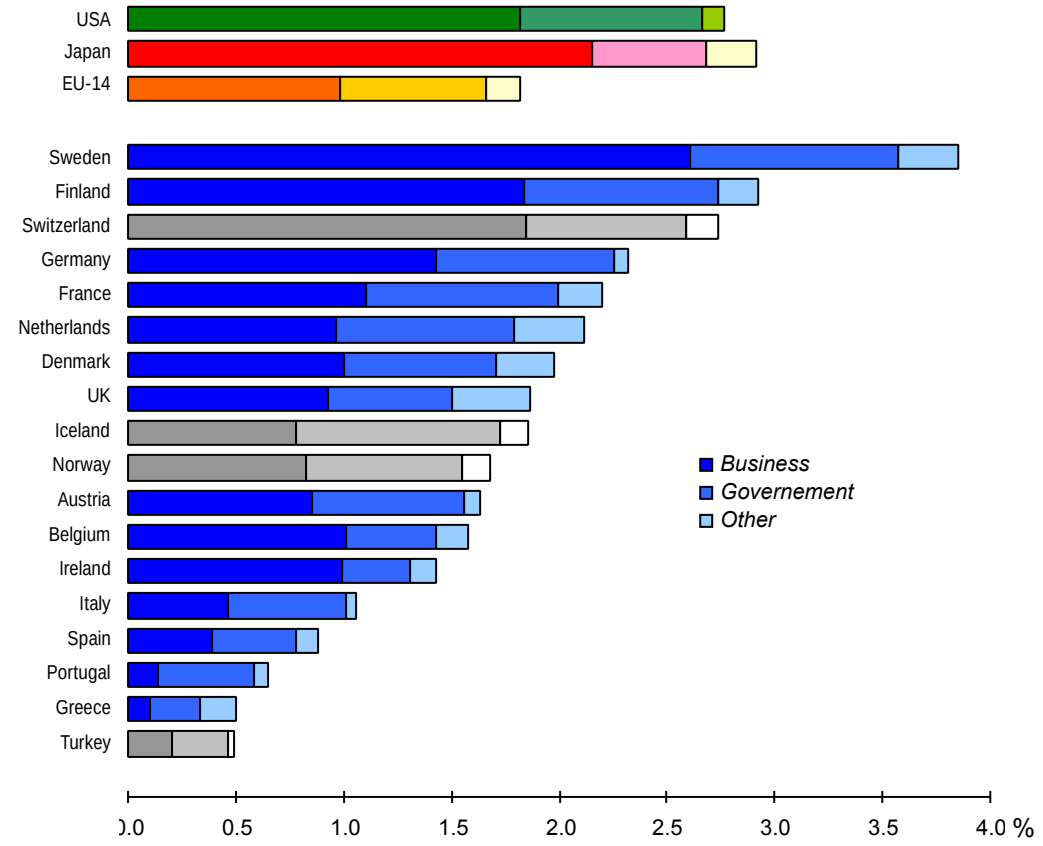
As a proportion of its economic output, the EU invests less of its resources in research and development than the USA: 1.8% of GDP, compared to 2.8% of GDP in the USA.

The principal gap is in expenditure by business. Funding of R&D by business, in the European Union, is only 40% of the level in the USA, expressed in per capita terms.

The principal reasons for this shortfall are that there are fewer incentives for innovators, entrepreneurs and investors, (such as lower levels of demand, lower profitability and higher taxes), as well as more obstacles in the business environment, (such as fewer scientists and researchers, an uncompetitive patenting system and less capital available for investment in high-risk ventures).

Less Business Investment in R&D

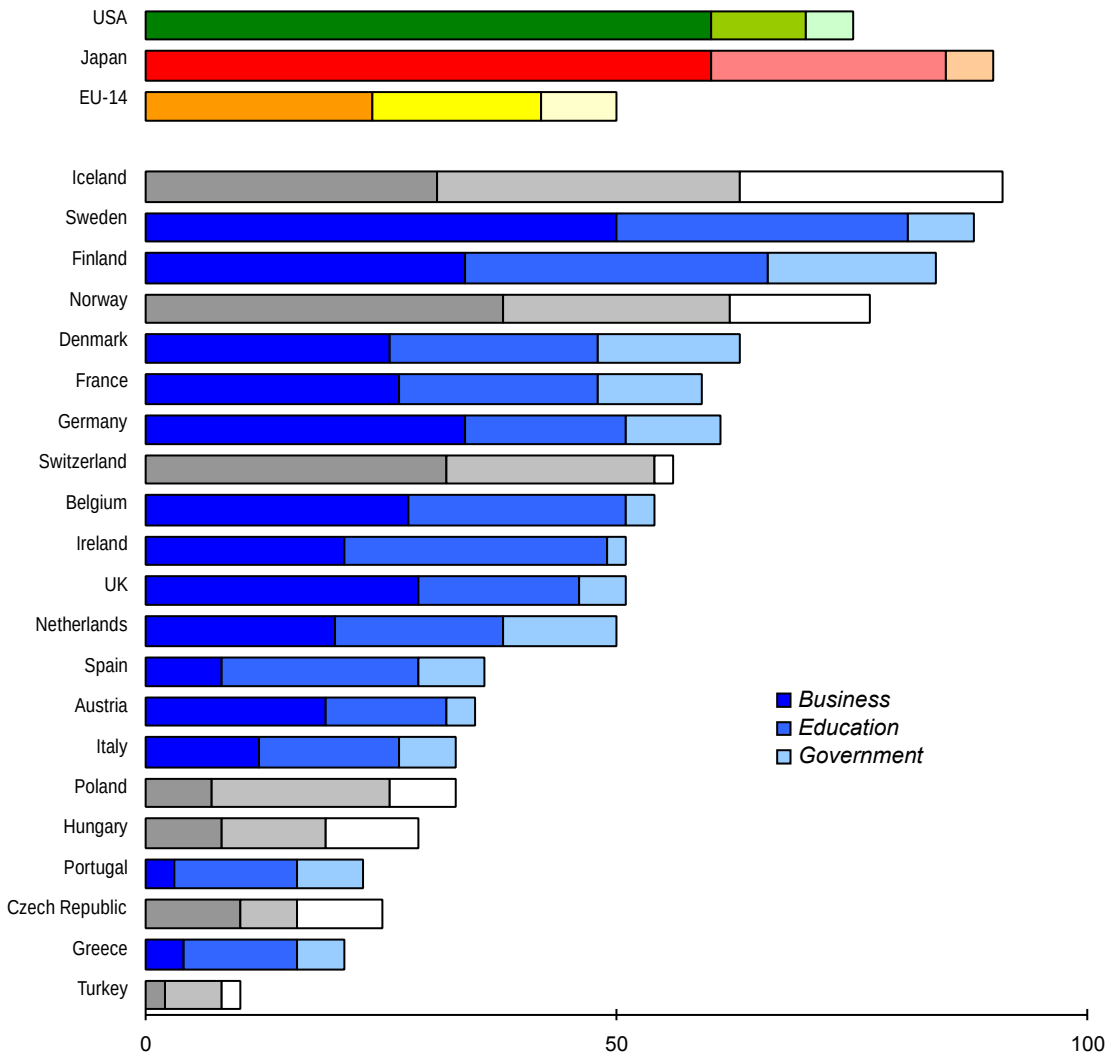
Chart 18: Expenditure on R&D as % of GDP (1998/1999)



Source: OECD, Main Science & Technology Indicators (1999).

Fewer Business Researchers

Chart 19: Number of researchers per 10,000 labour force (1997)



Source: OECD, Main Science & Technology Indicators (1999).

Another indicator of investment in research and development by economies is the scale of human resources committed.

One measure of this is the number of researchers in the labour force.

Europe employs less than 50% of its researchers in business, compared with 80% in the USA and 65% in Japan.

This means that there are only 25 researchers in business for every 10,000 people in the labour force in the EU, compared with 60 in Japan and USA.

EXPLOITING NEW IDEAS

Besides the creation of new knowledge and ideas, successful economies diffuse the results extensively. This takes many forms.

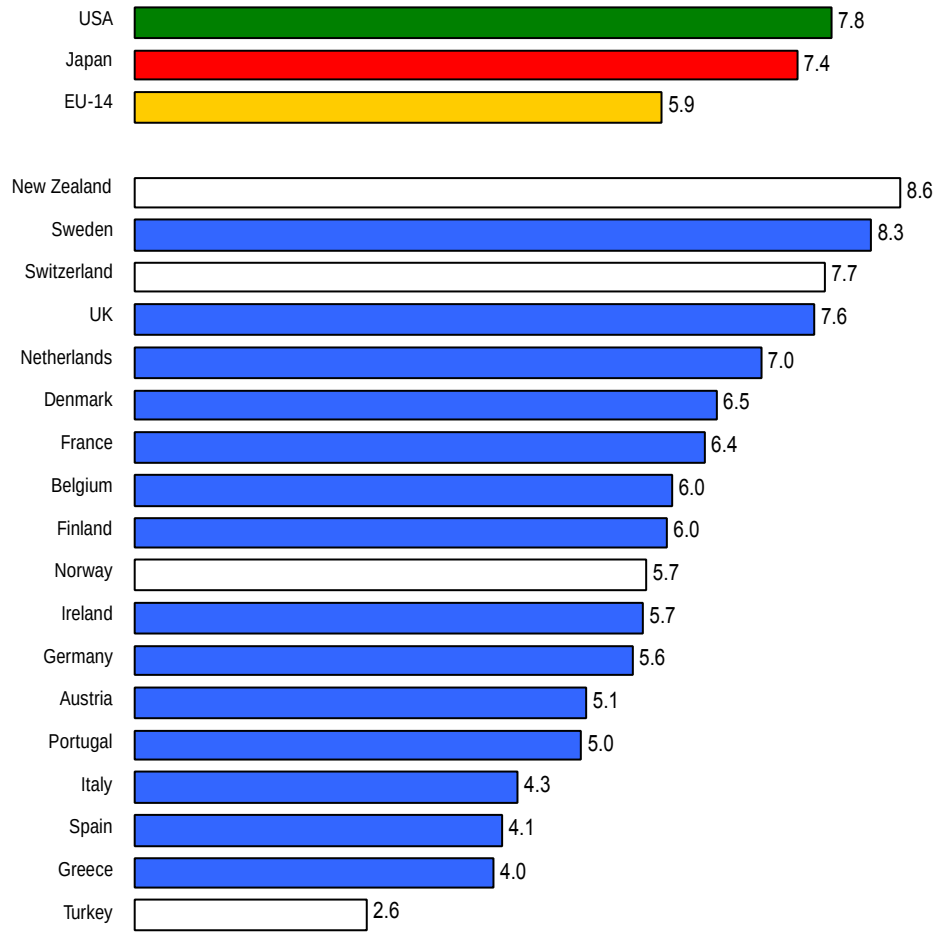
Many companies, including SMEs, make most of their investments in R&D by purchasing new goods and services that contain the results of R&D undertaken by other companies. This is "embedded" R&D.

This comes in many forms, such as Information and Communications Technologies (ICT), advanced materials and biotechnology. It is important because it ensures that the benefits of new technologies are available to a wide range of users. It also acts as a catalyst for further innovations in other parts of the economy.

Overall investment in ICT in the European Union as a share of GDP was lower, in 1997, than in many global competitors. New Zealand is the global leader in this area.

Less Investment in "Embedded" R&D

Chart 20: Investment in ICT as % of GDP (1997)



Source: OECD, Information Technology Outlook (2000).

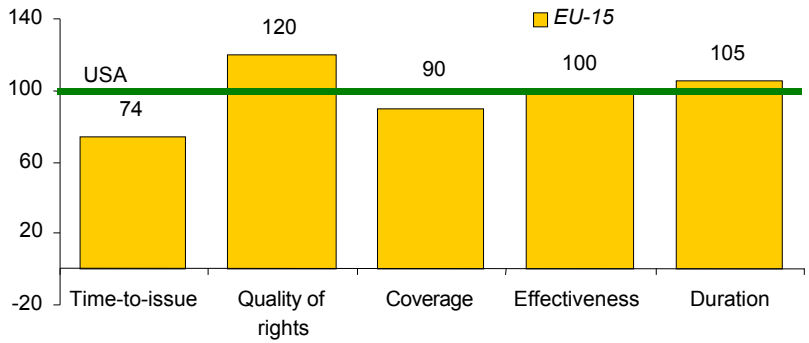
The ability to protect intellectual property is important because it is a source of sustainable competitive advantage in many industries. It is also an important factor in determining the extent to which it is worthwhile investing in R&D in one country rather than another.

The system for obtaining and protecting patents of invention in Europe is less supportive of innovation than that in the USA in terms of the time taken to issue a patent approval.

The "quality" of intellectual property protection is better in Europe than in the USA, but the “time-to-issue” is significantly greater.

Patents : Competitive on Quality, but Slower on Time

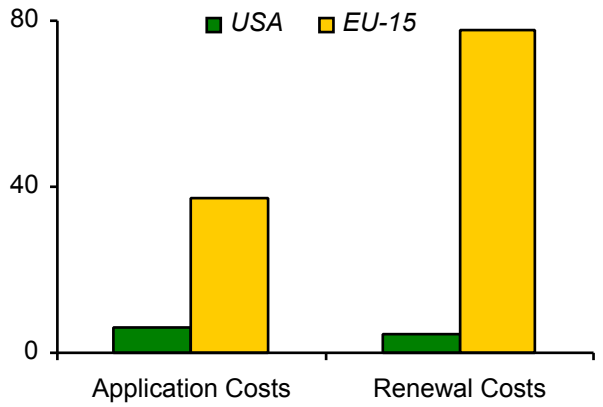
Chart 21: Competitiveness of patents of invention, Index : USA=100 (2000)



Source: UNICE.
Note : US performance is the benchmark for competitiveness. Scores below 100 mean that the European environment for patents is less competitive than that of the USA.

Substantially Higher Cost to Patent

Chart 22: Cost (Euro x1000) of obtaining and renewing patents (1999)

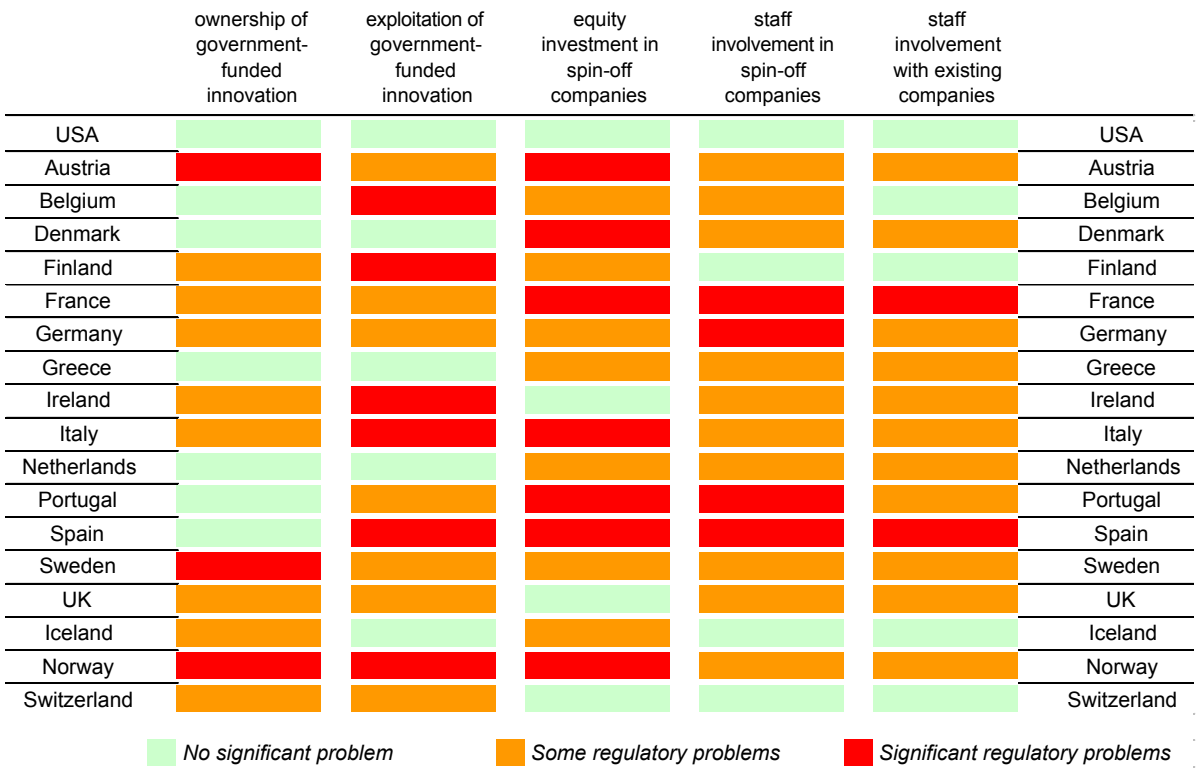


Source: IRDAC.
Notes: Cost of application for 15 EU Countries ; Cost of Renewal for 20-year patent life.

Application costs for patents (for 15 European countries) are six times greater and renewal costs (for a 20-year period) are more than 15 times greater in the EU than in the USA. These additional costs are of particular significance for Europe's SMEs.

Greater Obstacles to Collaboration and Commercialisation

Chart 23: Regulatory obstacles to collaboration and commercialisation by universities and research institutes



Source: UNICE.

The ability of universities and research institutes to collaborate with business in the commercialisation of new ideas is important for both parties. For academics, it may be a source of additional (institutional) funds and personal (financial) rewards. For business, closer collaboration makes it easier, cheaper and quicker to commercialise academic ideas.

However, there are a number of regulatory obstacles in the way of effective collaboration and commercialisation by universities and research institutes, in many European countries. There are fewer such obstacles in the USA.

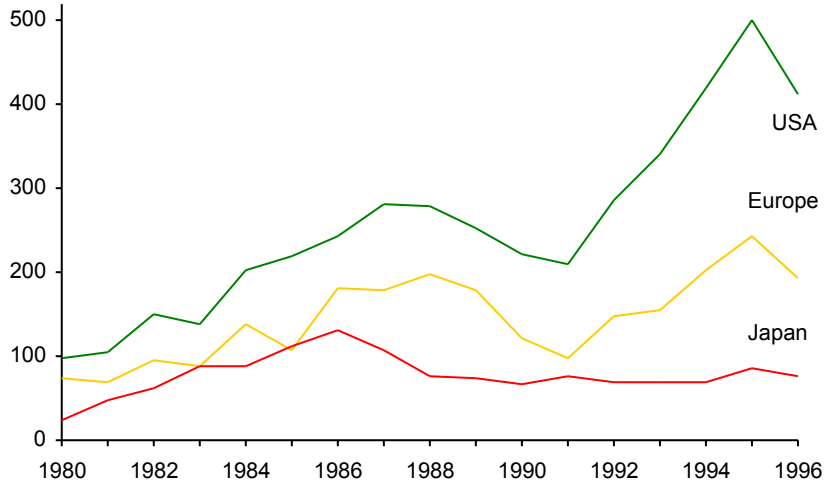
In some European countries, regulations make it difficult to exploit government-funded innovations. In other countries it is difficult for a university to benefit from an equity investment in a spin-off company (and take its reward in the form of capital growth).

Collaboration between companies on R&D is important so that they can benefit fully from new technologies. Collaboration allows companies to share risks, costs and expertise, to obtain economies of scale and to reduce time-to-market. It helps companies to obtain the necessary critical global mass during the development stage of high-cost projects in technologically advanced areas and to achieve early agreement on common standards.

However, there are fewer technology alliances in new industries in the European Union than in the United States. One of the principal reasons for this is the nature of competition law in the EU, where restrictive block exemption regulations limit the scope for co-operation between companies at the pre-competitive R&D stage.

Fewer Technology Alliances in the New Economy

Chart 24: Number of alliances (1980/96)



Source : J Hagedoorn, Maastricht Economic Research Institute (1998).
Notes : Based on all agreements reported for biotechnology, information technologies and new materials.

EUROPEAN CORPORATE SUCCESS STORIES

There are many examples of successful innovations in Europe as a result of investment in R&D, effective collaboration on R&D, and spin-offs from universities, research institutes and large companies.

- Iona Technologies, which started in Trinity College Dublin (Ireland), in 1991, with funding from the ESPRITprogramme, is now one of the world's leading "middleware" ICT companies.
- Ion Beam Applications (Belgium), a spin-off from the Catholic University of Louvain-La-Neuve, is now a world leader in small-scale cyclotrons for medicinal and other uses.
- Lego (Denmark) has been collaborating with MIT in the USA for more than 10 years. One of the results is LEGO MINDSTORMS, which enables children to build and programme robots. It has achieved a huge success since its launch in 1998.
- Through its expertise in the areas of optical recording and sound compression, Philips (The Netherlands) is a leader in the revolution in the consumer electronics and recorded music sectors that was unleashed by the invention of the compact disc (CD). Building on key patents, Philips continues to play a leading role in the development of related standards.
- The SINTEF Research Institute in Norway has long been a catalyst for technology transfer between Trondheim University and companies.
- SOITEC (Silicon-on-Insulator Technologies) was founded in 1992 as a commercial spin-off from the Laboratoire d'Electronique, de Technologie et d'Instrumentation. Based in Grenoble (France), SOITEC is now the world's leading supplier of SoI wafers for use in integrated circuit manufacturing.
- Solvay (Belgium) works closely with a number of universities and research institutes, on its speciality chemicals and pharmaceuticals. Its new range of peptides was developed, initially, in collaboration with the University of Ghent.
- The Styrian cluster (Austria), in the automotive sector was established in 1996. It concentrated on improving mutual understanding of the strengths and weaknesses of each of the participants, including their strengths in R&D and is now expending its activities to other parts of Austria.
- Tungsram (Hungary), acquired by GE in 1990, is now the leading world-wide research centre for GE Lighting, based on the R&D capabilities of their local staff.

GOOD GOVERNMENT PRACTICES

There are many examples of ways in which European governments have assisted innovation through the development of supportive policies for research and development.

- The "K plus" competence centre programme (Austria) aims to improve strategic co-operation between industry, research centres and university institutes. Funds, equivalent to a maximum of 60% of the total programme costs, are awarded for periods of up to seven years.
- The new French law on "Research and Innovation" (1999) offers more opportunities for co-operation between private companies and public research institutes and universities. In particular, it makes it easier for public researchers and civil servants to transfer to private companies and institutes.
- The use of pilot projects is a new element within the research system of the German government. It aims to focus the resources of the business and scientific community on strategically important innovation objectives.
- The Swiss government, through the Innovation and Technology Commission (ITC), provides support for the new generation of entrepreneurs emerging from Swiss universities. It helps them to bring their projects up to a standard that is more likely to be acceptable to venture capital specialists. Fifty projects have already been passed as "ready for venture capital-type funding".

RECOMMENDATIONS

To facilitate the creation and exploitation of knowledge and new ideas:

1. *Governments must improve the quality and scale of the science base, in order to improve knowledge and create new ideas.*
   - Increase the level of public expenditure on R&D, in areas of strategic importance for business, without any increase in the overall level of public expenditure.
   - Increase the level of competition for public research contracts between scientific bodies (in the private and the public sectors).
   - Create more pan-European "centres of excellence", in co-operation with industry.

2. *Governments must improve the diffusion of the results of public R&D and promote collaboration between universities, research institutes and companies, especially SMEs.*
   - Provide incentives to universities and research institutes to commercialise their work.
   - Remove obstacles to collaboration between universities, research institutes and companies.
   - Remove obstacles to the involvement of universities in spin-off companies.

3. *Governments must further improve the competitiveness of the systems for obtaining, retaining and protecting Intellectual Property Rights in Europe.*
   - Reduce the cost and the time required to obtain and to retain patents, through the introduction of a simple, single language "Euro-patent".
   - Improve the effectiveness of patents, particularly in areas such as software, biotechnology and intangibles.

4. *Companies must increase their level of expenditure on R&D to internationally competitive levels.*
   - Benchmark expenditure on R&D against relevant competitors.
   - Adopt best practices.

5. *Companies must continuously upgrade their innovation systems by adopting global best practices.*
   - Benchmark all aspects of their innovation process, against relevant competitors. SMEs should use trade associations to facilitate this process, where necessary.
   - Adopt best practices.
   - Integrate technology strategies into their overall business strategy.

This will help to improve the level of innovation in Europe, by increasing the level of knowledge and new ideas that are available to companies based in Europe and by improving the level and pace of commercialisation.

SUMMARY

The availability of sufficient numbers of educated and skilled people who are capable of generating new ideas, using new technologies, and adapting to change is a critical input to the innovation process.

Within companies, it is also important that managers and employees can adopt modern flexible work organisations and performance-related reward structures in order to harness fully the creativity of their employees.

This report shows that Europe has been slower than other countries in developing key skills in areas such as mathematics, science, technology (including ICT) and management. It also shows that Europe's regulatory framework and high level of taxation inhibit the development of modern high performance workplaces.

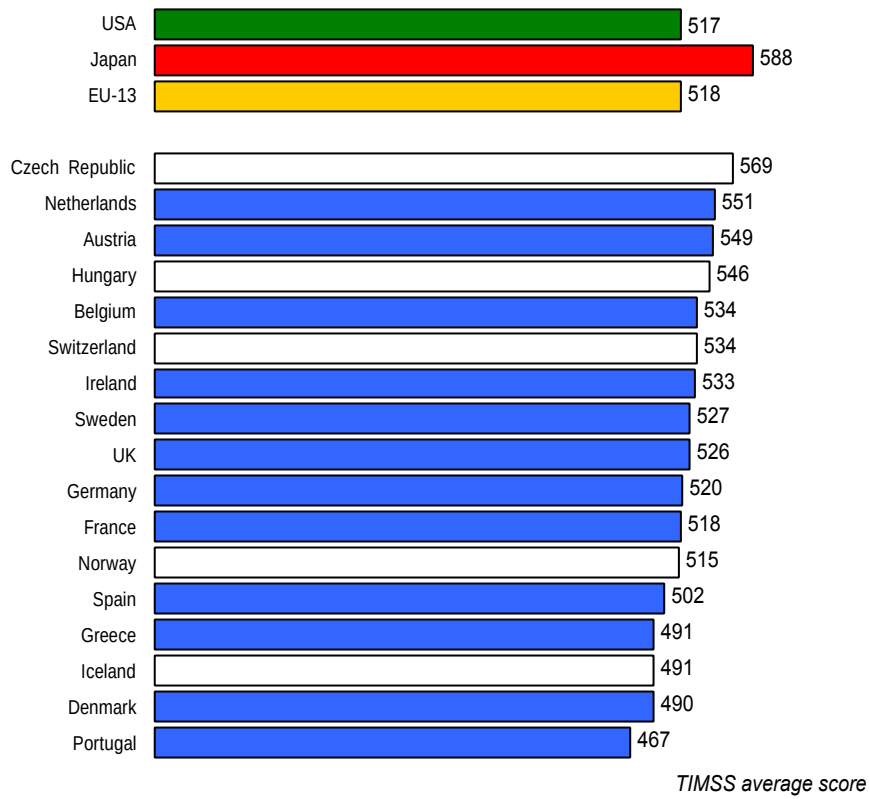
FOCUSING ON EDUCATION

The basic education system is the foundation for the development of high quality human resources in advanced economies. However, people also need more specialist skills to equip them for the future world of work, particularly in mathematics, science and technology.

The majority of European countries match or exceed the performance of the USA in terms of educational achievement in science and mathematics - in maths the European Union does slightly better, in science it does slightly worse. However, students in all European Union countries are significantly behind the levels of students in Japan and the Czech Republic.

Solid Foundation in Science and Maths

Chart 25: Average achievement of pupils (1995)



Source: IEA Third International Mathematics and Science Study (1996)
Notes: Based on achievement at 8th Grade (age 13-14).

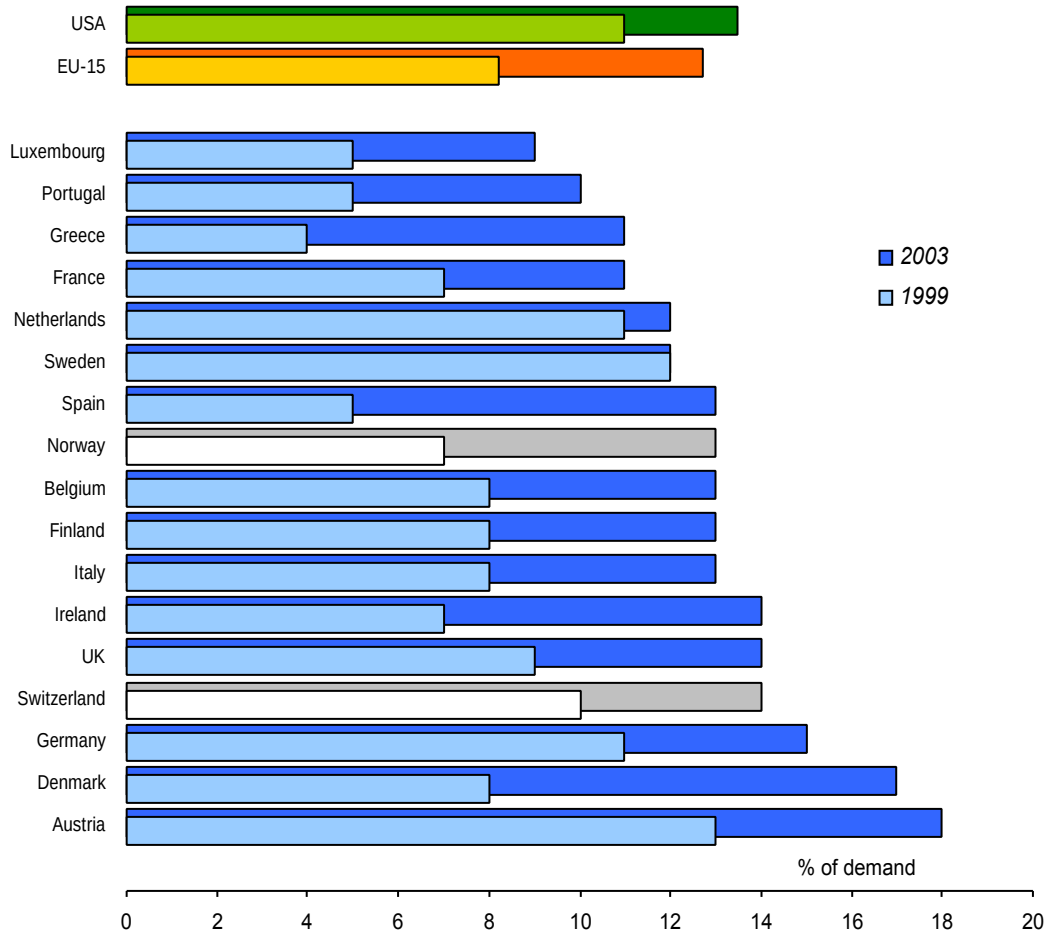
The availability of sufficient people with information technology (IT) skills is another important enabling factor for the development of the New Economy.

There was a smaller deficit in the EU (9%) than in the USA (11%) in 1999. One reason for this is that demand for people with IT skills was lower in Europe than in the USA.

However, demand in the EU is expected to grow by 40% in the next 4 years, and the IT skills shortage is expected to increase to 13% compared to 13.5% in the USA.

Major IT Skills Shortage

Chart 26: Total IT skills shortage as % of demand



Source : Skills Shortage : Special report by IDC compiled for Microsoft "Europe's Growing IT Skills Crisis" (2000), extended by UNICE.

It is increasingly important that large numbers of people acquire advanced scientific, technical, managerial and learning skills through the higher education system.

However, participation in higher education is much lower in Europe than in the USA. In the EU, only 22% of the population aged 25-64 have a 'tertiary level' education. In the USA, the figure is 35%.

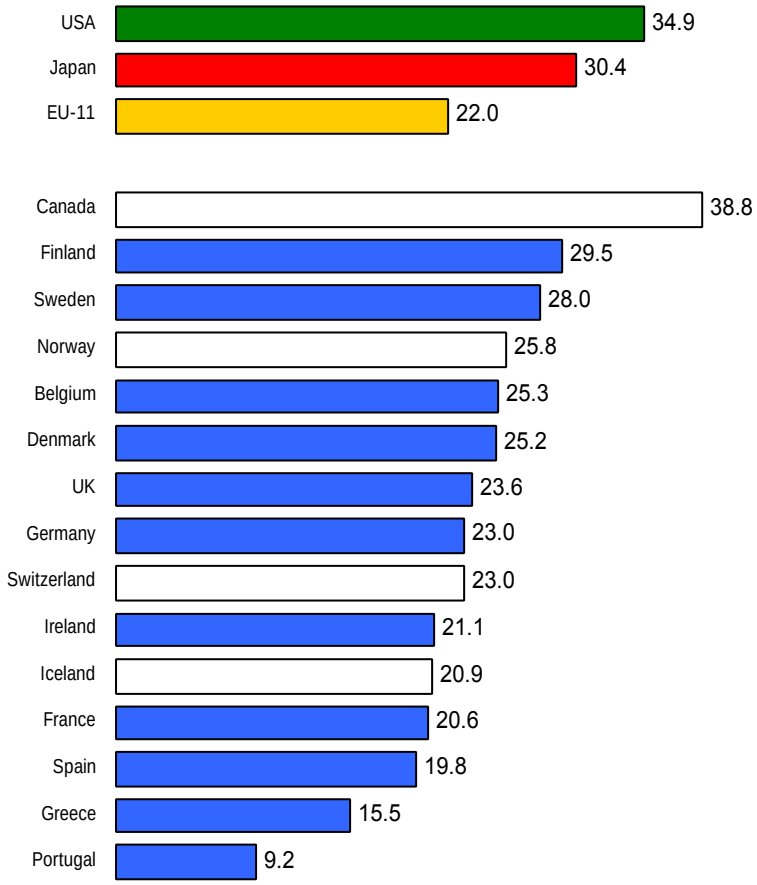
The availability of advanced managerial skills is another important determinant of the ability of companies to innovate effectively.

There are many fewer MBAs in the EU than in the USA. On an annual basis, Europe's business schools produce 25,000 new MBAs, compared to 100,000 in the USA. Seventeen of the world's 20 leading business schools are in the USA[5].

5 FTSurvey, "Business Education", 24 January 2000.

Lower Participation in Tertiary Education

Chart 27: % of population aged 25 to 64 with tertiary level education (1998)



Source: OECD Education at a Glance (2000).
Note: 'Tertiary level' education corresponds to ISCED 97 classification 5A, 5B and 6.

Sufficient numbers of educated and skilled people are important for innovation. On their own, however, they are not enough. Companies and entrepreneurs need to be able to organise these resources effectively.

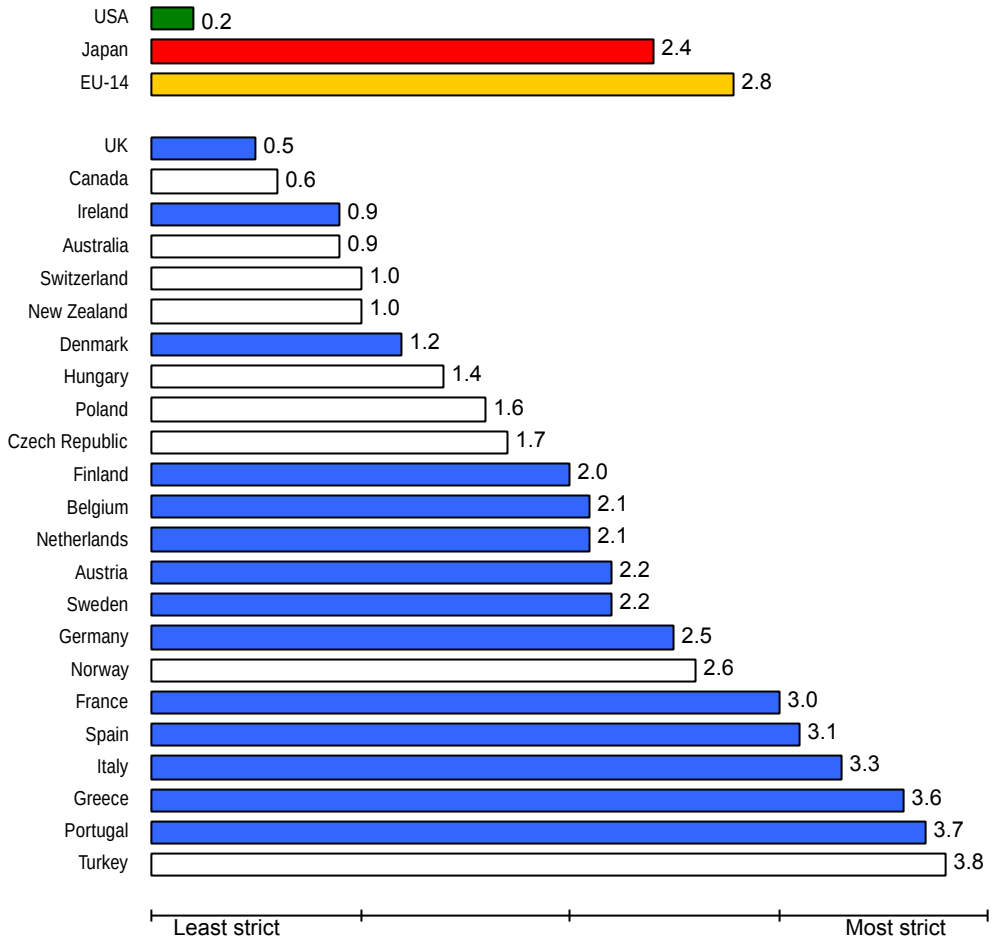
A critical determinant of the ability of companies to use new forms of work organisation (such as team working and multi-skilling) is the strictness of employment protection legislation.

This is important because, in many cases, innovation requires substantial changes within an organisation. Re-training can help to achieve some of these changes, others require the recruitment of new people with relevant skills and the re-deployment, or even dismissal, of existing employees whose skills are less relevant (and cannot be improved).

In many European countries, over-strict protection against dismissals and restrictions on temporary and fixed-term contracts, slows down the pace at which individuals find new jobs and the pace of innovation itself. It also makes it more difficult to "re-skill" an organisation.

Obstacles to More Flexible Work Organisation

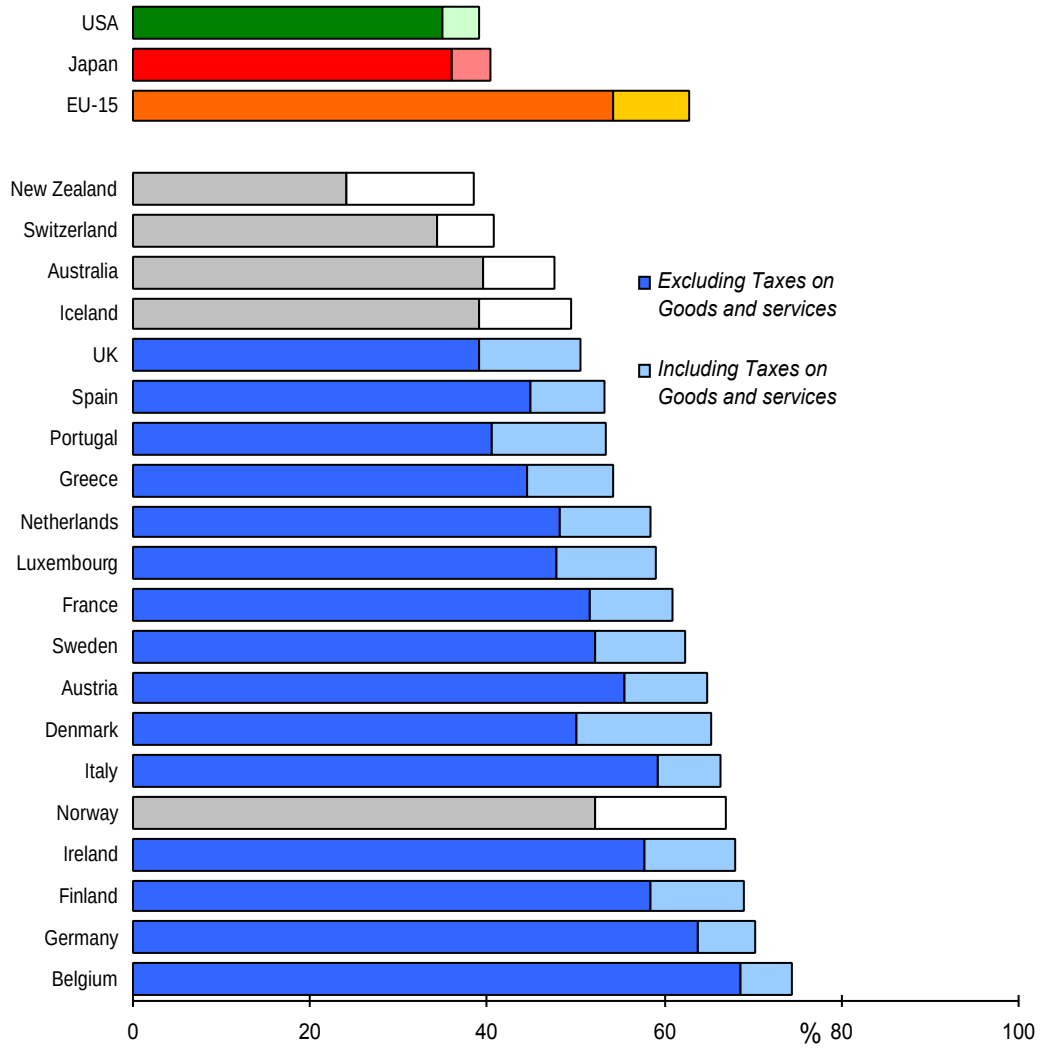
Chart 28: Strictness of employment protection legislation (late 1990s)



Source: OECD, Employment Outlook (1999).

Higher Taxes on Earnings and Spending

Chart 29: % of wage increase paid in taxes, for an average production worker (1998)



Source : SAF, based on national data.
Notes : Taxes include income taxes and social security contributions and taxes on goods and services.

The level of after-tax earnings influences the extent to which companies are able to attract, motivate and retain talented employees. It also influences the incentive for individuals to work, obtain additional skills, change work practices and accept new responsibilities.

The "average" worker in Europe keeps less of any pay rise than his counterpart in other countries.

The marginal tax charges on an average production worker in each of the EU countries are greater than in the USA; in the case of Germany and Belgium, the rates are almost double the rate in the USA.

Companies also need to be able to use reward systems that link individual rewards to the performance of the company overall. Many successful companies use share option schemes as a tool for achieving this.

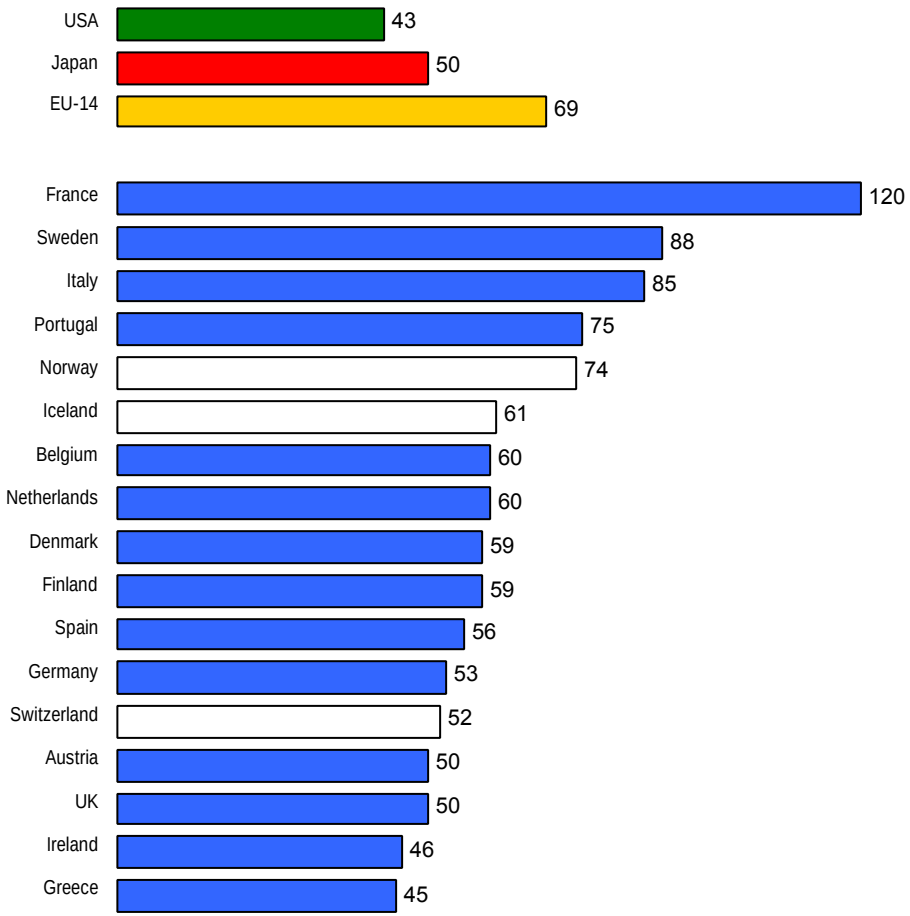
In Europe, however, there are significant fiscal obstacles that limit the availability and effectiveness of these schemes. The share of the 'gain' payable in tax by companies and their employees, for example, is more than one-and-a-half times greater, on average, in Europe than in the USA.

Some European countries tax share options more punitively than others, charging full social costs (for employers and employees) and the highest rates of income tax against any gains. Such policies mean that employers and employees can, together, potentially pay tax and social costs equal to 120% of any gain in France, in some stock option schemes.

This slows down the pace of innovation because it prevents companies from motivating their senior employees most effectively, since they are affected disproportionately by high levels of taxation.

Higher Taxes on Share Options

Chart 30: % of "gain" paid in tax and social charges (by employee and employer)



Source: Ernst and Young (1999).

EUROPEAN CORPORATE SUCCESS STORIES

There are many examples of ways in which European companies and industry groupings have improved the "key skills" of employees and potential employees, and released the full potential of their employees by using new forms of work organisation.

- British Telecommunications sponsors the "Reach Out" programme in the UK, which is designed to help individuals, particularly in deprived areas, to develop appropriate skills for work, including the skills needed for innovation.
- Ericsson (Sweden) has created a separate "Business Innovation" unit to handle more efficiently new ideas that might become tomorrow's core business.
- One of the keys to Michelin's success (France) is the attention paid to “Men and Facts”. It is important to know how to liberate the creative power of Men and, to that end, to encourage transverse mobility across disciplines, because invention is the convergence of varied types of expertise. The radial tyre was invented by an "in-house engineer" who started in the business as a typesetter.
- Nota, a small Greek clothing manufacturer and Grupo Luis Simoes, a Portuguese transport company, have both invested heavily in training their workforces in order to create "learning organisations".
- Permasteelisa (Italy) has used new forms of work organisation to create and grow an innovative company in the traditional (building) sector.
- The Federation of Swedish Industries and the Association of Swedish IT and Telecom Industry (IT-Foretagen) conceived Sweden Information Technology (SwIT-yrkesutbildning) to train 10,000 IT technicians. The government finances the training as part of the programme for educating the unemployed.

GOOD GOVERNMENT PRACTICES

There are many examples of ways in which European governments have taken steps to improve the employability of their citizens.

- The Finnish, Irish and Portuguese governments provide financial and consultancy support to companies through the Finnish "National Workplace Development Programme", the "New Work Programme in Ireland" and the Portuguese "To Innovate and Develop Programme". These aim to help companies introduce innovative "high-performance work organisations".

- Fiscal incentives (tax breaks) have been provided by the Dutch, Portuguese and Swedish governments for the purchase of computers for use in the home, in an effort to improve the IT skills of their citizens.

- The Portuguese government has also launched an Internet Programme for Schools with the aim of installing multi-media computers, connected to the internet in all schools. The daily access to the internet from these schools has increased dramatically in the last two years.

RECOMMENDATIONS

To improve the employability of people within the European innovation system:

1. *Governments must help to create a work force capable of meeting the challenges of the future.*
   - Improve links between schools, universities, research institutes, business schools and business.
   - Adapt national education systems to include the foundation skills needed to develop more creative and innovative employees.
   - Increase the level of graduate and post-graduate education, particularly in mathematics, science, technology (including ICT) and management.
   - Assist all members of society, particularly those with low levels of skills, to undertake life-long learning.

2. *Governments must ensure that individuals have sufficient incentive to work, obtain additional skills, change work practices, and accept new responsibilities.*
   - Reduce personal income tax and reduce the level of social security contributions as part of a strategy for reducing the burden of taxation.
   - Reduce taxes on gains from stock options by employers and employees.

3. *Governments must encourage the expansion of the use of high performance work systems that support innovation.*
   - Develop more flexibility in the labour market, in areas such as working time, recruitment, dismissal, remuneration, and outsourcing.
   - Provide support programmes to help companies to introduce new forms of work organisation and new ways of working.

4. *Companies must improve the skills and abilities of their employees, particularly in the area of innovation.*
   - Express views, to governments and educational institutes on the future skills and abilities needed in their companies, with special emphasis on creativity and innovation.
   - Increase contacts with local schools and relevant universities.
   - Identify the skills and abilities needed for effective innovation, benchmark the skills and abilities of their employees and then adopt best practices to improve them.
   - Increase the level and nature of investments in continuing education and training.
   - Introduce new organisation structures that emphasise multi-functional team working.

This will help to improve the level of innovation in Europe, by developing a more creative and innovative work force and expanding the use of work organisations that support innovation.

SUMMARY

For companies and entrepreneurs, innovation involves two principal financial decisions. An "investment decision" based on an assessment of the costs and benefits of an investment, and a "financing decision" based on obtaining the capital that best matches cash flows and risks.

This report shows that innovators in Europe face more difficulties than innovators in the USA, in justifying and then financing investments.

Compared to the situation in the USA, support from governments for R&D is less generous, fewer people act as "business angels", less private equity is available, and fewer funds are available from retained earnings.

But, perhaps most important of all, the report shows that the overall return on equity is lower in Europe than in the USA, which means that there is less incentive to invest in innovation in Europe.

TARGETING GOVERNMENT SUPPORT

To stimulate innovation, most governments use fiscal policies to reduce the cost of R&D. Such support includes accelerated depreciation allowances and tax credits.

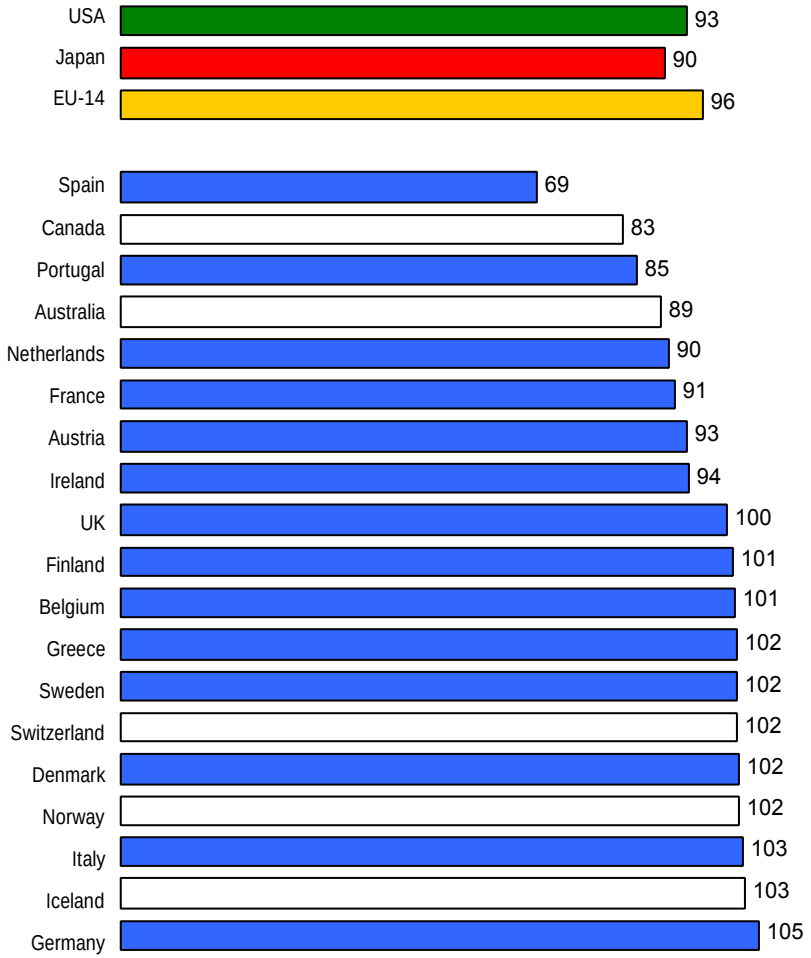
The OECD measures the impact of fiscal support by calculating its effect on the amount of pre-tax income required to remunerate a euro 100 investment in R&D.

The Spanish system is the most generous in the world. Stand-alone companies in Spain need to increase future income by the equivalent of only euro 69 to recover the original investment of euro 100.

However, in many European countries, lengthy write-off periods and a lack of tax credits increase the level of pre-tax income required to recover investments in R&D. In Germany stand-alone companies must increase future income by the equivalent of euro 105 to recover the original investment of euro 100.

Variable Levels of Support for R&D

Chart 31: Future pre-tax income needed to pay for an original investment of euro 100 in R&D (1998)

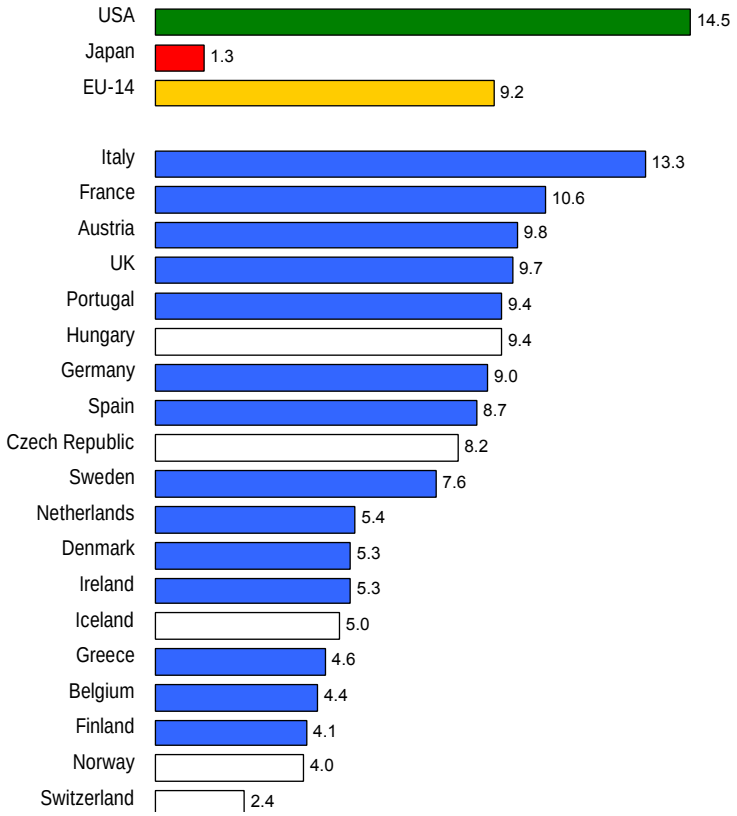


Source: UNICE, based on OECD.
Note : The lower the present value of pre-tax income needed to recover the investment, the more generous the tax relief.

In addition to fiscal support for all companies carrying out R&D, many governments provide direct financial assistance for specific R&D projects. EU governments provide support equal to 9% of business R&D compared to 15% in the USA.

Government Funding of R&D

Chart 32: % of Business R&D financed by Government (1998)



Source: OECD, Main Science Technology Indicators (1999).

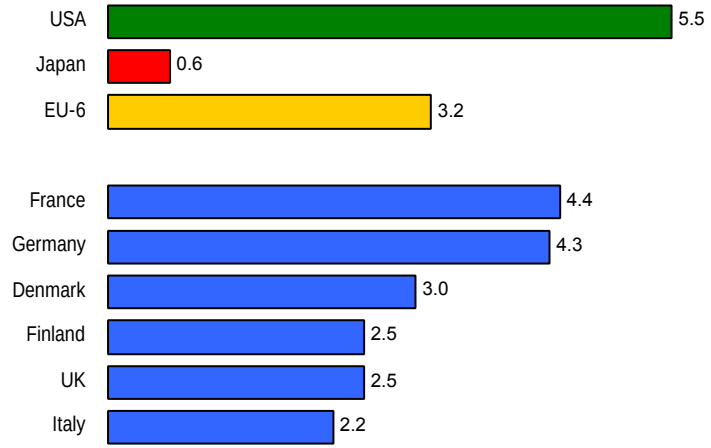
TAPPING NEW SOURCES OF FINANCE

In most cases, innovation involves investment in the creation of intangible assets. These provide little in the way of collateral for loan capital. Hence new innovative ventures are normally financed through equity capital, from the savings of families and friends, and from external investors, such as "business angels".

One measure of the availability of these sources of capital is the extent to which citizens invest personal funds in businesses started-up by someone else. The number of adults who have made such investments in the EU is less than two-thirds of the level in the USA. Moreover, the total sum invested by business angels in new start-up companies is less than 20% of the level invested in the USA[6] .

Fewer Business Angels

Chart 33: % of adults who have invested personally in someone else's start-up business



Source: Global Entrepreneurship Monitor, The Kauffman Centre for Entrepreneurial Leadership (1999).

6 EuropaBio, *'Benchmarking the Competitiveness of Biotechnology in Europe', 1997.*

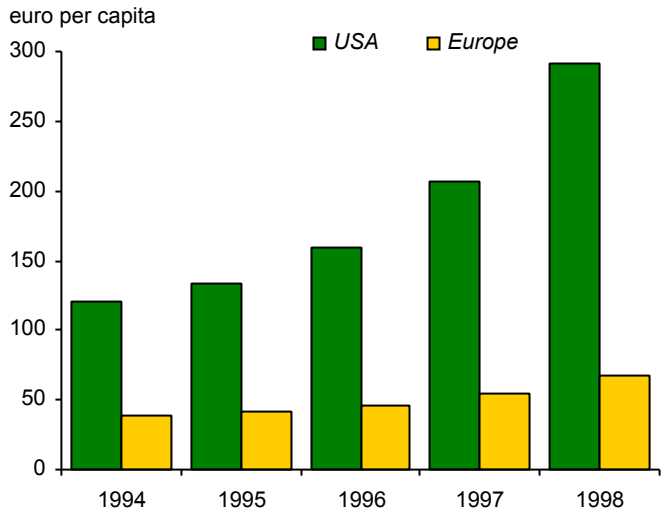
As new innovative ventures grow, they need access to different forms of equity capital, normally on a larger scale. In many countries this is provided through the formal private equity market.

In recent years, there has been a major increase in the quantity of cash committed by investors to European private equity funds. This reflects a renewed interest in the investment opportunities in the EU as a result of the Single Market Programme, the single currency, and market liberalisation. There are, however, still major differences between Europe and the USAin the scale and nature of investment in venture capital.

On a per capita basis and excluding investments in management buy-outs, the stock of venture capital in Europe is less than 20% of the level in the USA. Moreover, European investments are less focused on high-tech sectors and early-stage businesses than is the case in the USA.

Less Investment in Venture Capital

Chart 34: Stock of Venture Capital invested



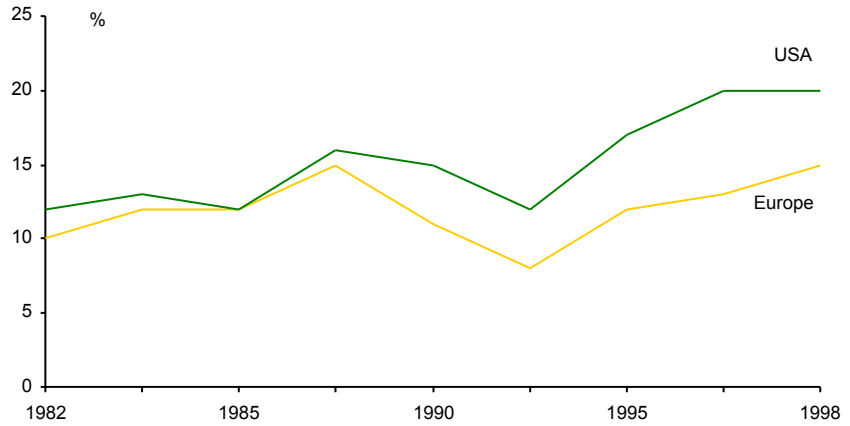
Source: NVCA, EVCA(adjusted to remove 'management Buy-Outs'.

For larger companies, the principal source of finance for innovation is the profitability of their existing activities, but this is lower in Europe than in the USA.

In the 1980s, publicly quoted businesses in the EU made an average annual return on equity of 12% compared to 13% in the USA. However, in the 1990s, the gap between the EU and the USAwidened to 5%. High labour taxes, high input costs, inadequate labour productivity, and poor capital productivity reduce the surpluses available to finance innovation by EU companies. In a number of countries this problem is exacerbated by high taxes on corporate profits and dividends.

Lower Return on Capital

Chart 35: After-tax return on shareholders' funds for publicly quoted companies



Source : Goldman Sachs.

EUROPEAN CORPORATE SUCCESS STORIES

There are many good European examples of creative financing by companies for companies.

- Fedet in Spain provides seed capital for start-ups by high-tech companies.
- Lernout and Hauspie (Belgium) is a European success story in speech technologies, which benefited from access to the right sort of equity capital at the right time. This included finance from business angels, venture capitalists and investors via the stock market.
- The Novartis Venture Fund (Switzerland) supports the start-up phase of innovative ventures in future-oriented fields, particularly in life sciences. The principal beneficiaries are former Novartis employees.
- St Gobain (France) provides funds and management support for new SMEs, in the area of its own plants.
- The Smurfit Job Creation Fund (Ireland) helps Irish companies during the start-up and early development phases.

GOOD GOVERNMENT PRACTICES

There are many good examples of ways in which European governments have provided fiscal incentives and direct financial support to innovative projects. European governments have also helped with the creation of new types of stock market.

- VaekestFonden (Business Development Finance) was established in 1992 by the Danish government. To date it has invested euro 300 million in projects that support research and development in SMEs, and the internationalisation of SMEs.
- The European Commission helped to create EASDAQ, a pan-European stock market. The German government facilitated the start of the Neuer Markt.
- The French government has recently renewed the Research Tax Credit Scheme for companies that increase their effort in technological research. It also improved the scheme in favour of young innovative companies, encouraged the outsourcing of R&D.
- The Spanish government provides fiscal incentives for many aspects of new product development. This includes additional incentives where technology projects are carried out jointly with academic institutions.
- The "Twinning" system is a Dutch government initiative, involving research institutes, companies and private sector financial institutions, that stimulates start-ups in the ICT sector, by sponsoring a seed/start-up fund and an early stage co-investment fund.

RECOMMENDATIONS

To improve the level of funding available in Europe for innovative individuals and companies:

1. *Governments must improve the availability of seed-corn finance for new, innovative companies.*
   - Provide support to Business Angels, particularly for investments in intangibles.
   - Provide support to venture capital funds to reduce the one-off, 'up-front' costs of investigating possible investments in new enterprises.
2. *Governments must increase the ability of companies to invest in R&D from their own resources, by improving the level of profitability.*
   - Reduce the overall burden of taxes on the corporate sector and on investors, including personal and corporate taxes, taxes on dividends and social security charges.
   - Increase the level of accelerated tax depreciation and tax credits on investments in R&D.
3. *Existing companies must increase the supply of equity for new companies.*
   - Increase the use of corporate venturing.
   - Assist SMEs in local clusters to develop more effective financing plans.

This will help to improve the level of innovation in Europe, by increasing the level of funding for innovative individuals and companies, at all stages of the innovation process.

Innovation is essential for companies of every size in all sectors, because it is the principal mechanism by which companies create and sustain competitive advantage. It is also important for economies, because innovation is the single most important driver of economic growth.

This report demonstrates that Europe has many innovative companies, including SMEs. But there are not enough of them, particularly in the wealth-creating industries of the future.

Hence the challenge is for all companies based in Europe to become more innovative.

However, all the stakeholders in the European economy have contributions to make in increasing the rate of innovation in Europe.

Europe's citizens must take more positive attitudes towards risk taking, enterprise and new technology, and adopt innovative products and services more quickly.

Universities and research institutes must create and disseminate new knowledge more effectively. They must ensure that there is an adequate supply of the skills required to support creativity, innovation and entrepreneurship.

Managers and all other employees must improve their skills and abilities continuously, to bring new ideas to enrich the innovative process, and to facilitate new forms of work organisation.

Governments must help to change the attitudes of citizens towards innovation; improve education and training systems - at all levels; and reform the framework conditions that provide the incentives and set the obstacles to innovation and entrepreneurship within companies.

But it is companies based in Europe that have the major role to play in improving the innovative performance of Europe. They must establish corporate cultures that promote creativity and innovation; more effectively exploit opportunities for developing new products and markets; continuously upgrade their innovation systems and improve the innovative skills and abilities of their employees.

The extent to which Europe's companies, supported by all the other stakeholders, are able to close the "innovation deficit", will determine the extent to which Europeans are able to enjoy higher standards of living, more job opportunities and a better quality of life in the future.

LIST OF CHARTS

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LIST OF COMPANIES MENTIONED IN THE REPORT

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UK . . . . . .BT - British Telecommunications
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DK . . . . . .Tetra Pak
HUN . . . . . .Tungsram
A . . . . . .VA Technologie

LIST OF ACRONYMS USED IN THE REPORT

AIM . . . . . European Association of Industries of Branded Products
BUNT . . . . Business development Using New Technology
CFE . . . . . Centres for Enterprise Formalities (in Portugal)
EASDAQ . . European Association of Securities Dealers Automated Quotation
ESPRIT . . . European Strategic Programme of Research in Information Technology
EVCA . . . . European Venture Capital Association
FII . . . . . Federation of Icelandic Industries
GDP . . . . . Gross Domestic Product
GMO . . . . . Genetically Modified Organism
ICT . . . . . Information and Communication Technologies
IEA . . . . . International Education Association
IRDAC . . . . Industrial Research and Development Advisory Committee of the European Commission
IT . . . . . Information Technology
ITC . . . . . Information and Technology Commission
MBA . . . . . Master of Business Administration
MIT . . . . . Massachusetts Institute of Technology
NVCA . . . . National Venture Capital Association
OECD . . . . Organisation for Economic Co-operation and Development
PIMS . . . . . Profit Impact of Market Strategy
PPP . . . . . Purchasing Power Party
R&D . . . . . Research and Development
SAF . . . . . Swedish Employers' Federation
SME . . . . . Small and Medium-sized Enterprise
WIFO . . . . . Austrian Institute of Economic Research

This report will serve as the background document during the **European Business Summit** in Brussels on 9-11 June 2000.

www.ebsummit.org

European Business Summit
BRUSSELS 9-11 JUNE 2000

Stimulating Creativity and Innovation in Europe

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This report has been realised with the support of :

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