

Lecture by Mrs Edith Cresson

Towards a knowledge-based Europe

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Mr Chairman, ladies and gentlemen,

The subject I have chosen for my lecture is “Towards a knowledge-based Europe”

Under this title, I would like to present two ideas to you:

- Firstly, Europe will make a success of entering the 21st century if it transforms itself into a “knowledge-based Europe”;
- Secondly, the European Union can and must play a fundamental role in this process.

I will divide my presentation into three parts:

- First of all, I shall sketch out the characteristics of a knowledge-based society and economy;
- Then, I shall demonstrate the European dimension of this question by showing why problems linked to the development of a knowledge-based society are helped by being tackled on a European scale;
- Finally, I shall describe the role that the European Union could and should play, by setting out the activities and initiatives which have been launched or which are planned by the Union in this area.

A knowledge-based society and economy

- The world has entered into a “knowledge-based society.” Today, true wealth, economic development, general wellbeing and personal development are linked to knowledge : to its production through research; to its distribution and transmission through education and training; and to its exploitation through innovation.
- This development occurs within the broader context of the setting up of a society and economy of the “intangible”. Under this heading an author such as Charles Goldfinger in France has grouped activities connected with research and education but also the financial economy, information and communication and the industries of culture.
- Within this apparently heterogeneous collection, but united by clear links, knowledge and, more generally, the sequence of “data - information - knowledge - and know-how” plays a particularly important role.
- Knowledge is the key to industrial competitiveness. As many studies have shown, the most competitive companies and nations are also those which invest the most in research and technological development.

- They are also the ones which devote the most sustained effort to education and training. The most strongly placed countries in terms of competitive advantage are generally those which have devoted the most means to the development of human resources.

- Knowledge is also the key to employment. In an area where the best experts have great difficulty in agreeing with each other, there are at least two issues on which there is a large degree of consensus:

- First, the sector in which most jobs will be created in the years to come is that of services. According to various forecasts, by 2005 in developed countries, there should be almost four times as many jobs in the service sector than in the various industrial sectors.

- In point of fact, a considerable proportion of tomorrow's jobs are connected with the development of different categories of services: services to companies, but also services to individuals such as in health; as well as culture and tourism;

- Secondly, a considerable proportion of tomorrow's jobs are more or less closely connected to knowledge and information. In the words of Bill Clinton's former Labour Secretary, Robert Reich, the "jobs of the future" are those of "symbolic analysts" - those persons who, far from having anything to do with material things, devote most of their activities to the handling of knowledge and images.

Knowledge is thus linked to employment in two ways:

- first, employment depends on the raising of the general level of knowledge and skills;

- second, there is a direct or indirect impact of the production of knowledge on employment : a direct impact in the form of creating jobs for researchers, engineers, and technicians; and an indirect impact (which is much more important) through the creation of new markets.

- To illustrate this first aspect, I would like to mention the case of the small companies created by researchers in France. A recent survey found that on average, three years after their creation, these companies had around a dozen employees and, after six years, around twenty. 10% of them have between 150 and 250 employees today. These figures are significantly higher than the average.

- For the second aspect, I would point out that, according to certain economists, one third of the growth of American GNP in 1996 should be attributed to high technology industries. Employment in this sector went up during that year by 4.9% compared with only 2% in the rest of the economy.

- Developments such as these go hand in hand with far reaching changes in both scientific knowledge and education and training:

- In research, we are witnessing the appearance today of what a certain school of thought has called a “second mode of knowledge production”. Far from being developed in a limited number of places such as universities or research centres and with the sole aim of pushing back the frontiers of knowledge, knowledge is today essentially produced in a distributed way, often within networks, and in the context of its application;

- Regarding education and training, today they are no longer linked to a well-defined part of a person’s life and this will be ever more the case in the future.

The European Commission, the Round Table of European Industrialists and Unesco (with the “Delors” report) have helped to demonstrate that the development of a knowledge-based society is indissolubly linked to lifelong education and training.

Knowledge and skills become obsolete and must be continually refreshed. The only skill which should remain unchanged is the capacity to acquire new skills.

- Overall, knowledge stands out as the common reference point and the unifier of the three major spheres of activity and investment that are constituted by research, education and training and innovation.

The European dimension

- Why should we tackle questions linked to the production, distribution and exploitation of knowledge at the European level? I will set out these reasons under three main headings.

- The first is a question of scale. Europe, in the broad sense, is made up of around 30 countries. The European Union has 15 Member States - small countries, intermediate-sized states and real technological powers. No country, though, which could be compared individually with the industrial and technological giants such as the United States or even Japan.

- In demographic terms, Europe represents around one tenth of the world’s population. In 2050, given the demographic growth of developing countries, it will represent barely 5 per cent.

And Europe is a territory whose population is ageing : from 2010, the European Union should have more citizens over 60 years of age than under 20.

In economic terms, the largest European companies, even those which operate as multinationals, are of limited size compared with the American giants. In aeronautics, the Boeing/McDonnell-Douglas group today has 70% of the market for civil aircraft. In information technology, Microsoft and Intel have near monopoly positions in software and microprocessors, respectively.

- In such a context, Europeans have no choice. If they wish to survive they must pool their strengths and turn their backs on the limited strategy of protecting national interests. In other words, they have to think in global terms preferably with a European home base. This phenomenon globalisation and its roots, but above all its consequences, have been well analysed by Anthony Giddens. It affects all sectors of activity and has to be taken into account by Europeans in everything that they do in the many-faceted area of knowledge.

- The second set of reasons for tackling problems of knowledge at the European level is that this allows us to correct more easily certain weaknesses that Europe suffers from.

- Generally, Europe does not yet invest sufficiently in intangibles. The need for a more sustained effort in this area is however one of the leitmotivs in the recommendation of the various groups which have pondered on the future of Europe.

- In recent years, overall spending on research in Europe has continued to fall, so that today this stands at 1.9% of GDP for the European Union, compared with 2.7% for the US and nearly 3% for Japan. If the share of industry in this investment has gone up slightly, this is because public research spending has fallen faster than that of the private sector.

- Here I would particularly like to mention what Japan has done. According to a decision taken in 1996, it should double its public expenditure on research in the years to come. Most of this investment should go to reinforcing the fundamental research base. Indeed, the Japanese have understood perfectly that their competitiveness could not rely for ever on just acquiring technologies and exploiting knowledge developed abroad.

As a consequence much of their effort has been put into developing basic research. The fruits of this investment obtained so far in areas like nanotechnology, new materials or biotechnology lead us to expect other important developments in the years to come.

As the scale of its investment in education over many years also shows, if there is one country which has put knowledge at the heart of its reflections and activity, it is Japan.

- But it is not just a question of the other members of the Triad. The countries with dynamic economies in South East Asia are, of course, currently having serious economic and financial problems which will no doubt leave some scars. In the long term, though, recent developments will probably not have a lasting impact on their industrial and technological power.

This will probably even increase, thanks to higher investment in research and development. Several of these countries either now or in the near future will devote a higher proportion of their GDP to research than most European Union countries.

- We should also add the new actors on the international scene who are already very powerful. For example, India in the field of software, China in biotechnology, and Brazil in aeronautics.

- Apart from this relative weakness which will only be corrected by a sustained and simultaneous effort from the different countries, Europe suffers from a series of difficulties linked to:

- Its division into many different countries:

- And by the fact that it is ancient territory that has sometimes been trodden down by the weight of its own history.

- The effects of the fragmentation of Europe into different countries are numerous: the lack of harmonisation of approaches and objectives; the heterogeneity of systems and initiatives; restrictive technical, administrative and regulatory barriers.

- In industrial research, the policy of supporting “national champions” still makes its presence felt. Even in areas where Europeans have been able to assert themselves and demonstrate their know-how, such as high-speed trains, problems still arise today which could be avoided.

For example, the engines of the high-speed trains which run on trans-European networks have to be adapted to four different electrical supply systems. And on the commercial front, we have seen an unedifying struggle in foreign markets between different national products which is hardly good for the image of Europe. Some competition is necessary and indeed indispensable for stimulating innovation. Too much competition is damaging and paralysing.

- However, wherever Europeans have had the wisdom to pool their efforts into common strategies, such as in space, the results have been spectacular. Arianespace, I would remind you, today has more than half of the world market for commercial satellite launches.

- The same reasoning applies to education and training. The European University that two eminent academics recently called for in an article in the French newspaper Le Monde is still only a dream. In spite of all the efforts of the European Union, mutual recognition of diplomas is still very limited. At every level, education systems remain watertight and a genuine European educational area is still far from being a reality.

- As for the weaknesses which I presented as being linked to the weight of history, they show up particularly forcefully in the question of innovation.

This is what has been called the “European paradox”. On a world level, Europe remains the second scientific power. Of the 7 scientific Nobel prize winners this year, three were European researchers. And today Europe accounts for more than a third of the world’s scientific publications.

- However, in industrial and technological terms, Europe's performance is much less impressive. To be persuaded of this, one only has to look at the figures for patents filed by American, European and Japanese companies in the US and in Europe.

The share of Europeans in both categories is lower in relative and sometimes also absolute terms than that of its competitors. And it continues to fall. From 1980 to 1993, the share of patents filed by Europeans in the United States went from 25% to less than 18%; those filed in Europe fell from 57% to 46%. In recent years, on average the European Union has had a permanent trade deficit in high technology products - 24 billion ECU for its dealings with the other members of the Triad, 10 to 15 billion ECU with the rest of the world.

- What is there to say other than that Europeans have to learn to transform their scientific discoveries into economic and commercial successes?

What a lot of missed opportunities in recent years! The fundamental work which was the basis for the liquid crystal screens which are now invading the information technology market was carried out in Europe; and the World Wide Web which has made the Internet the astounding network that it is today, was developed in that temple of European learning, CERN.

- Europeans have to build a real "innovation culture". To unveil the secrets of American success in this matter, many observers have looked at Silicon Valley and Route 128, the hotspots of transforming ideas into products. The diagnoses overlap. Of course, there are technical reasons for this success, such as a more favourable regulatory environment and a greater availability of financial instruments.

But the fundamental reasons are cultural in nature - a different attitude towards risk and, above all, the absence of the stigmatisation of failure which inhibits and paralyses researchers and investors in Europe.

- Experience teaches us that such obstacles can be more easily removed when one acts at the European level. Sharing experiences and mutual learning have demonstrated their usefulness. In an area like this, the United Kingdom, which has pioneered research exploitation through science parks, has much to teach its partners.

Generally, it seems that initiatives taken at the European level can have a salutary leverage effect on the obstacles which appear at the national level.

- The third set of reasons for operating at the European level is, on the contrary, linked to the possibility and the need for exploiting Europe's strengths. With a population today of 370 million and near to 450 million in a few years, the European Union is the largest market in the world. Since the internal market was set up, it has become a largely integrated economic area. To crown the internal market, Economic and Monetary Union should reinforce this integration even further and strengthen the position of Europe on the world stage.

· Europe can also lean on a research potential and tradition of the first order and has very strong capabilities in a number of large industrial sectors: aeronautics, chemistry and pharmacy, telecommunications and software. It can also exploit the wealth of a strong tradition in education and training and all the potential of its many higher education institutions. For example, universities with a success over centuries like Cambridge, Oxford, Heidelberg, Louvain, Coimbra and Bologna; higher education establishments such as the Ecole Normale of Paris or the Polytechnics of Zurich and Turin; and more specialised institutions such as INSEAD, the Bocconi University and, of course, the LSE.

· Whilst on the subject of European assets, I should also mention the diversity within a background of unity which is a particular attribute of our continent. Just now I pointed out the inconveniences connected with the division of Europe into different countries. This does not, however, go without some undeniable advantages. The cultural diversity of Europe makes a wide range of approaches, traditions and procedures available to researchers, teachers and trainers which have been developed independently and which can be complementary, and feed off and enrich each other.

Linguistic diversity which is sometimes so irritating when it is a matter of communicating as quickly and efficiently as possible, must also be seen in this light. This is because a language is not just an instrument but a way of viewing the world and the expression of a culture. Also, because the need to tackle linguistic diversity has had a strong stimulating effect on the ingenuity of researchers and educators.

· For all these reasons combined, Europeans have an interest in tackling the different aspects of the production and use of knowledge together and on the continental level.

The role of the European Union

· To do this - and this is the third issue that I wish to raise - the European Union is a particularly favourable framework.

· European integration is the largest and most original geopolitical enterprise of the second half of the twentieth century. What role can and should the European Union play, and, indeed, what role does it in fact play in the promotion of a knowledge-based society and economy? Its role is undeniable and has continued to develop over the years. It should be reinforced further in the years to come.

· The Union is today faced with the question of its own future and a series of major challenges. Just now, I mentioned Economic and Monetary Union and its promises. Another major challenge is that of enlarging the Union to the countries of Eastern Europe which history has separated from the rest of the continent for some 50 years. Unless we reduce the Union to a simple free trade area - something which many Member States refuse to contemplate - this enlargement will require us to recast the structures and institutions beforehand.

One cannot act and take decisions in the same way with 25 or 30 members as we did with 6 or 12. The extension of the principle of qualified majority voting to practically all areas is an absolute necessity.

· Another challenge, and by no means the least, is the question of employment which I have mentioned several times. This really is troubling. Europe today has 18 million inhabitants out of work and between 8 and 9 million would be willing to enter a professional life if they were given the opportunity. The stagnation, or even the worsening, of this situation is sapping the confidence of people in the European project, in their future and in the entire political class.

At the end of this week, Ministers of the Member States of employment will meet in Luxembourg for a special summit. The situation in Europe in general and in the different countries will be examined and analysed; recommendations and methods will be compared and a certain number of commitments will be entered into.

· In the face of these developments and these challenges the Union must seek to develop a global vision. To this end, the Commission issued its "Agenda 2000" last July. This general policy document sets out the main trends proposed for the development of the Union in the next ten years. It covers three main subjects:

- the future of the major Union policies, in particular, the agricultural policy and regional policy;
- the question of enlargement;
- the future financial framework of the Union.

· I would like to draw to your attention one aspect of this document - the importance which is attached to what I would call "knowledge policies", that is to say those which are carried out in the areas of research, education and training and innovation. "Agenda 2000" underlines how essential they are for our future.

· In a situation of budgetary restraint and static expenditure, it is very significant that it proposes increasing the means assigned to these policies more than the increase in GNP of the Union.

· For these policies, this is an unambiguous sign of recognition. With such a proposal, knowledge is placed right at the heart of the Union's agenda.

What do these policies consist of? What principles are they based on? And in which direction should they develop?

· The research and technological development policy of the European Union has developed progressively since the early 80s.

Its aim is to complement, sustain and reinforce national investments. As with all other Union policies, research policy is regulated by the "subsidiarity principle". In other words, activities are undertaken at a European level if they are more effective or necessary to carry out at this level for reasons of cost, complementarity of financial and human resources or because of the nature of the problems concerned.

- The basic principle is to support projects bringing together universities, companies and research centres from different European countries. These projects are carried out within programmes that are organised in the form of multiannual Framework Programmes. As set out in the Treaty of Amsterdam, Framework Programmes will, thankfully, be adopted in future by qualified majority and no longer unanimously as has had to be the case up till now.

Four Framework Programmes have been put into operation up to now, the last of which is still running. Their impact on the European scientific community and the fabric of research is undeniable. In a few years, they have contributed to the development of numerous networks of cross-border collaboration and to the setting up of sound practices of cooperation between different European countries. Their quantitative impact has been considerable. Because of the way they are constructed, the research programmes have mobilised thousands of institutions and tens of thousands of researchers in all the Member States.

In Great Britain, for example, the fourth Framework Programme has involved nearly 4500 participations between 1994 and 1997, of which 47% have been higher education establishments.

- On the other hand, the impact in economic and social terms has remained limited. There are several reasons for this, including the undeniable dispersion of means on a number of topics and subjects that is too great.

- In order for European research to exert a stronger impact on the European economic and social fabric and on the life of every individual, I therefore proposed a fifth Framework Programme designed largely as a break from its predecessors. Its major characteristics are:

- First, a clear orientation towards the major political and social objectives of the Union - in particular reinforcing European competitiveness and improving the employment situation;

- Secondly, a concentration of effort on a selected number of priority subjects;

- Thirdly, a reinforced effort on exploiting results and on innovation.

- As proposed by the Commission, the Fifth Framework Programme has been organised into only six programmes, of which three are “thematic” programmes on the topics of “Unlocking the resources of the living world and the ecosystem”, “Creating a user-friendly information society”, and “Promoting competitive and sustainable growth”.

As these titles show, the essential characteristic of these programmes is to approach the problems that they are aimed at as they occur in real life with all the complexity of the interactions between their different dimensions.

To this end, each of these programmes contains a number of “key actions” which tackle in an integrated fashion different aspects of the problems which face European society today. Some examples of the issues covered are “The city of tomorrow”, “The interaction between environment and health”, “Health and food”, etc.

Overall, the fifth Framework Programme should give particular attention to the socio-economic aspects of the problems under consideration and socio-economic research will itself have an important role to play.

- The general setting in which these actions should develop is therefore that of the production of knowledge within the context of application.

- The basic principles of the European Union's activities in the area of education and training are the same. Even more than in the area of research, the aim is to sustain and complement national efforts, due to the importance of national jurisdiction in these areas.

The "classical" means of bringing this about are the promotion of mobility for students, teachers, lecturers, pupils or trainees; setting up networks; carrying out collaborative projects; and exchange of experience and best practice.

Two successive generations of programmes, ERASMUS and COMETT followed by SOCRATES and LEONARDO, have left their mark on the European education and training system. Here too their quantitative impact has been significant. In 1995 and 1996, SOCRATES allowed some 316 000 students to carry out an integrated and recognised period of study in another Member State. More than 26 000 lecturers and course teachers have been able to work in another country. In Great Britain, the programme has involved 187 higher education establishments, 27 000 students and 4 700 lecturers.

- On my initiative, the mechanism set up by the SOCRATES and LEONARDO programmes has been supplemented by a series of other activities. One, of which I have the highest expectations, is the action plan "Learning in the information society".

The knowledge-based society is, in fact, also the information society. Information and communications technologies open up a whole series of new vistas in education and training. They create many possibilities for access to information and knowledge and allow the development of new means of treating knowledge and for personalised, autonomous and decentralised training.

- Information and communications technologies are neither a miracle solution nor a unique instrument for education and training. Many parts of the traditional educational system remain valid and school also has a social function to fulfill. Overall, though, they represent a most powerful tool.

- The action plan is thus aimed at helping their development in Europe and supporting European schools in their entry into the information society. It is based around action in four areas:

- First of all, the interconnection of European schools both between themselves and with electronic information networks. In this area, there is a lot still to do. Whilst two thirds of schools are connected to networks in Finland and Sweden, only 15% are in the United Kingdom and less 2% in France or Germany;

- The second aspect covers the development and distribution of multi-media teaching and learning content;
 - The third element is training of teachers and trainers;
 - The fourth element is raising awareness and training of all those involved.
- Just recently, during the third week of October, various demonstration and awareness-raising activities on the use of information and communications technologies took place in the form of “Netd@ys” organised in all the Member States.

In addition, the Commission is in the process of putting into place a “European Foundation for Educational Multimedia” designed to be a framework for establishing partnerships between the public and private sectors in this area.

- The Commission is also currently preparing for future Union activities in the area of education and training. To do this, it can, or will be able to, use the experience gained in the large cooperation and mobility programmes, the action plan “Learning in the information society” and the 550 projects carried out under the “European Year of Lifelong Learning” set up in 1996.
- It will also have to take account of a considerable amount of reflection and debate.

Under the title “Teaching and learning - towards the learning society”, the Commission published a white paper on education and training in 1995. This white paper set out five general objectives on education and training for the Union : encouraging the acquisition of new knowledge; bringing schools and the business sector closer together; combatting exclusion; mastering three Community languages; and treating material investment and investment in training on an equal basis.

This was widely distributed in European education and training circles and gave rise to a wide-ranging discussion during which the directions proposed could be both confirmed and developed.

- At the same time, a high level think-tank produced a report with the title “Accomplishing Europe through education and training” which made a series of recommendations on actions to carry out in this field.
- On the basis of this stock of experience and ideas, the Commission has just set out the main trends that it proposes for future Union activities in education and training.

In this communication "Towards a Europe of knowledge", we have made a considerable effort to concentrate. The three main objectives are:

- the development of access to educational resources;
- innovation;
- a wide diffusion of good educational practices.

In addition, six main types of measure are proposed: mobility of persons; promotion of virtual mobility; development of cooperation networks; promotion of language skills; promotion of innovation; and the establishment of Community sources of reference.

· In education as in research, the step that has been taken rests on the idea that success is primarily a function of the degree of consensus on aims and means. The same approach has thus been followed in the third area, that of innovation

· Here too, we have followed a triple procedure - analysis, consultation and discussion, and proposals.

At the end of 1995, the Commission published a "Green Paper on Innovation" which analysed in depth the situation in Europe in this area and listed all the factors which have a positive or negative effect on innovation in Europe. On this basis, the Green Paper proposed 13 main lines for measures to be taken and activities to be undertaken at regional, national and European levels.

· In first half of 1996 the Green Paper, which had been widely distributed, was the subject of intense discussion in the various areas concerned.

The conclusions were carefully brought together and allowed us to establish a "First Action Plan for Innovation in Europe". This concentrated on those measures to be undertaken at a truly European level and will be put into action in the form of activities carried out on three main topics:

- fostering an innovation culture;
- establishing a framework conducive to innovation;
- and better articulating research and innovation.

Among these initiatives, the most recent and those which in the long term should have the strongest effect, I will mention in particular those concerning support for access to information on intellectual property rights as well as access to public and private sources of finance for innovation : risk capital and European public funds.

At the initiative of the Amsterdam European Council, activities in support of the development of advanced technologies in SMEs should indeed be undertaken in liaison with the European Investment Bank thanks to the capital of the European Investment Fund.

· I hope you have gained an idea of the wide range of initiatives taken by the European Union in the three major areas of research, education and innovation, which make up facets of the knowledge-based Europe.

Before concluding, I would like to make remarks on three points:

- First, a fundamental aspect of all these activities is support to mobility. The ease with which Americans move about within their vast country is clearly one of the secrets of their performance. In Europe, moving for longer periods is still very limited within each country and even more so between different countries.
- There are several sets of reasons for this, and these are practical administrative and cultural at the same time. In order to identify them and, in particular, eliminate their effects, the Commission published and distributed for discussion a "Green Paper on the Obstacles to Transnational Mobility". It covers the mobility of young research fellows, lecturers, students and trainees;
- Secondly, the knowledge-based Europe which we are looking to set up does not stop at the Union's frontiers. The research and education and training programmes are already open, or should be opened up soon, to the countries of central and eastern Europe which are accession candidates - those in the "first wave" identified in "Agenda 2000", but also those which would join the Union a little later once their economies and institutional structures are prepared;
- Thirdly, I would like to stress the complete unity of the activities undertaken in these three areas. This shows up in several ways. First of all in the coherence of approaches, concepts and methods which I hope can be seen in the description I have given.

Then there is the integration of the different initiatives. The "Action Plan for Innovation", for example, depends to a considerable extent on the implementation of activities on the agenda of the research and education policies. Links between these three areas are also numerous and there are plenty of activities undertaken where two of these overlap. On the border between research and education, for example, one area of particular interest is that of science teaching and technological training.

Conclusion

· In the first lines of the preface to his remarkable "History of the London School of Economics and Political Science", the former director Ralph Dahrendorf underlined the presence throughout history of "the fault line between wanting to know the cause of things and wanting to change things".

I am far from wishing to deny the existence of this fault line - it is quite real. What one finds, though, with the setting up of the knowledge-based society is a new form in relations between knowledge, action and society.

One could try to define this new configuration with the following formula: "there is little or no knowledge today which is not developed with a view to application - or at least possible application; and there are few economic or social developments which do not require the production of knowledge in one way or another, including knowledge of a fundamental nature, in a very large number of areas".

- Moreover, the increasingly close integration of technological, economic and cultural aspects in many fields of activity is tending to mix up the traditional distinction between development of knowledge and competences for useful ends and for personal development. These two dimensions are closely connected in the necessarily continuous effort summed up by the term "lifelong".

- To a degree never seen before and in a way which calls for new forms of public action, knowledge is right at the heart of society.

To make it possible for its production and use to have maximum impact on European society and on the lives of every European citizen, it is largely at the European level where we must tackle questions of research, education and innovation.

- In any case, that is my belief and that is the idea which I have tried to put across and illustrate today.