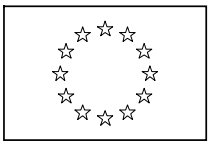

COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMUNICATION FROM THE COMMISSION

The role of the universities in the Europe of knowledge

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1. SUMMARY

This Communication seeks to start a debate on the role of Universities[1] within the knowledge society and economy in Europe and on the conditions under which they will be able to effectively play that role. The knowledge society depends for its growth on the production of new knowledge, its transmission through education and training, its dissemination through information and communication technologies, and on its use through new industrial processes or services. Universities are unique, in that they take part in all these processes, at their core, due to the key role they play in the three fields of research and exploitation of its results, thanks to industrial cooperation and spin-off; education and training, in particular training of researchers; and regional and local development, to which they can contribute significantly.

The European Union therefore needs a healthy and flourishing university world. Europe needs excellence in its universities, to optimise the processes which underpin the knowledge society and meet the target, set out by the European Council in Lisbon, of becoming *the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*. The European Council in Barcelona recognised this need for excellence, in its call for European systems of education to become a "world reference" by 2010[2].

However, the European university world is not trouble-free, and the European universities are not at present globally competitive with those of our major partners, even though they produce high quality scientific publications. The Communication notes a number of areas within which reflection, and often also action, is needed, and raises a series of questions such as:

– how to achieve adequate and sustainable incomes for universities, and to ensure that funds are spent most efficiently;

– how to ensure autonomy and professionalism in academic as well as managerial affairs;

– how to concentrate enough resources on excellence, and create the conditions within which universities can attain and develop excellence;

– how to make universities contribute better to local and regional needs and strategies;

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1 In this Communication, the term "universities" is taken to mean all higher education establishments, including, for example, the "Fachhochschulen", the "polytechnics" and the "Grandes Ecoles".

2 Barcelona European Council - Presidency Conclusions.

– How to establish closer co-operation between universities and enterprises to ensure better dissemination and exploitation of new knowledge in the economy and society at large

– how to foster, through all of these areas, the coherent, compatible and competitive European higher education area called for by the Bologna Declaration, as well as the European research area set out as an objective for the Union by the Lisbon European Council, in March 2000.

This Communication, which has been prepared in the context of the 2003 Spring European Council, invites responses to these questions from all those concerned with higher education, research and innovation. The Commission will review the state of the debate in the summer of 2003 and identify suitable initiatives, possibly in a further Communication for examination by the Education Ministers in the Education Council and the Research Ministers in the Competitiveness Council, as well as by the European Summit of Higher Education Ministers scheduled for 18-19 September 2003 in Berlin.

2. INTRODUCTION

The creation of a Europe of knowledge has been a prime objective for the European Union since the Lisbon European Council of March 2000. Subsequent European Councils, particularly Stockholm in March 2001 and Barcelona in March 2002, have taken the Lisbon objective further forward.

The Lisbon agenda calls for efforts from a wide range of players. These include the universities, which have a particularly important role to play. This is because of their twofold traditional vocation of research and teaching, their increasing role in the complex process of innovation, along with their other contributions to economic competitiveness and social cohesion, e.g. their role in the life of the community and in regional development.

Given their central role, the creation of a Europe of knowledge is for the universities a source of opportunity, but also of major challenges. Indeed universities go about their business in an increasingly globalised environment which is constantly changing and is characterised by increasing competition to attract and retain outstanding talent, and by the emergence of new requirements for which they have to cater. Yet European universities generally have less to offer and lower financial resources than their equivalents in the other developed countries, particularly the USA. Are they in a position to compete with the best universities in the world and provide a sustainable level of excellence? This question is particularly topical as enlargement draws nearer, considering the frequently difficult circumstances of universities in the accession countries as regards human and financial resources.

To implement the Lisbon agenda, the European Union has embarked upon a series of actions and initiatives in the areas of research and education. One example is the European area of research and innovation, to achieve which fresh perspectives have

just been opened up[3] and, in this context, the objective to increase the European research and development drive to 3% of the Union's GDP by 2010[4].

In the area of education and training, we can mention the achievement of a European area of lifelong learning[5], the implementation of the detailed work programme on the objectives of education and training systems[6], work to strengthen the convergence of higher education systems, in line with the Bologna process, and vocational training systems, in line with the Copenhagen declaration.

European universities as such have not recently[7] been the focus of reflection and debate at European Union level. The Commission seeks to contribute to such a debate, and this Communication accordingly examines the place and role of European universities in society and in the knowledge economy (Section 3), offers some ideas on universities in a European perspective (Section 4) and sets out the main challenges facing the European universities, along with some issues for consideration (Section 5).

The Commission calls upon all players concerned (universities themselves, the rectors' conferences, national and regional public authorities, the research community, students, business and the people of Europe) to make known their comments, suggestions and points of view on the various aspects addressed by this Communication[8]. In the light of the contributions the Commission receives from this consultation, it will determine future action and whether to submit a follow-up communication for the Education Ministers (in the Education Council) and the Research Ministers (in the Competitiveness Council), as well as to the European Summit of Higher Education Ministers scheduled for 18-19 September 2003 in Berlin as part of the Bologna process.

3. THE EUROPEAN UNIVERSITIES TODAY

3.1. The universities at the heart of the Europe of knowledge

The knowledge economy and society stem from the combination of four interdependent elements: the production of knowledge, mainly through scientific research; its transmission through education and training; its dissemination through the information and communication technologies; its use in technological innovation. At the same time, new configurations of production, transmission and application of knowledge are emerging, and their effect is to involve a greater number of players, typically in an increasingly internationalised network-driven context.

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3 European Commission, Communications "Towards a European research area", COM (2000) 6 of 18.1.2000 and "The European research area: providing new momentum", COM (2002) 565 of 16.10.2002.

4 European Commission, Communication "More research for Europe/towards 3% of GDP", COM (2002) 499 of 11.9.2002.

5 European Commission, Communication "Making a European area of lifelong learning a reality", COM (2001) 678 of 21.10.2001.

6 Detailed work programme on the follow-up of the objectives of education and training systems in Europe, OJ C 142 of 14.06.2002, p. 1.

7 European Commission, Memorandum on higher education in the European Community, COM (1991) 349 of 5.11.1991.

8 See Section 7 "How to make a contribution".

Given that they are situated at the crossroads of research, education and innovation, universities in many respects hold the key to the knowledge economy and society. Indeed, universities employ 34% of the total number of researchers in Europe, although national figures vary in the ratio of one to three between Member States (26% in Germany, 55% in Spain and over 70% in Greece). They are also responsible for 80% of the fundamental research pursued in Europe.

In addition, universities train an ever increasing number of students with increasingly higher qualifications, and thus contribute to strengthening the competitiveness of the European economy: one third of Europeans today work in highly knowledge-intensive sectors (over 40% in countries like Denmark and Sweden), which have on their own accounted for half the new jobs created between 1999 and 2000).

Universities also contribute to the other objectives of the Lisbon strategy, particularly employment and social cohesion, and to the improvement of the general level of education in Europe. Many more young Europeans have a higher education qualification today than in previous generations. While some 20% of Europeans aged between 35 and 39 hold such qualifications, this figure is a mere 12.5% for the 55-59 age group. If we look at the total population aged 25-64, the rate of employment of persons holding higher education qualifications (ISCED 5 and 6) stood at 84% in 2001, i.e. almost 15 points above the average taking all education levels together, and nearly 30 points more than people having completed only lower secondary level (ISCED 0 to 2). Finally, the rate of unemployment amongst those holding higher education qualifications stood at 3.9% in 2001, one third of that of persons with a low level of qualifications.

3.2. The European university landscape

There are some 3 300 higher education establishments in the European Union, approximately 4 000 in Europe as a whole, including the other countries of Western Europe and the candidate countries[9]. They take in an increasing number of students, over 12.5 million in 2000, compared with fewer than 9 million ten years previously.

The European university landscape is primarily organised at national and regional levels and is characterised by a high degree of heterogeneity which is reflected in organisation, governance and operating conditions, including the status and conditions of employment and recruitment of teaching staff and researchers. This heterogeneity can be seen between countries, because of cultural and legislative differences, but also within each country, as not all universities have the same vocation and do not react in the same way and at the same pace to the changes which affect them. The structural reforms inspired by the Bologna process constitute an effort to organise that diversity within a more coherent and compatible European framework, which is a condition for the readability, and hence the competitiveness, of European universities both within Europe itself and in the whole world.

European universities have for long modelled themselves along the lines of some major models, particularly the ideal model of university envisaged nearly two

[9] By way of comparison, there are over 4 000 higher education establishments in the USA, 550 of them issuing doctorates, and 125 identified as "research universities". Of these, some 50 account for the lion's share of American academic research capacity, public funding in support of university research and the country's Nobel prizes for science.

centuries ago by Wilhelm von Humboldt in his reform of the German university, which sets research at the heart of university activity and indeed makes it the basis of teaching. Today the trend is away from these models, and towards greater differentiation. This results in the emergence of more specialised institutions concentrating on a core of specific competences when it comes to research and teaching and/or on certain dimensions of their activities, e.g. their integration within a strategy of regional development through adult education/training.

3.3. The new challenges facing European universities

All over the world, but particularly in Europe, universities face an imperative need to adapt and adjust to a whole series of profound changes. These changes fall into five major categories.

Increased demand for higher education

This will continue in the years ahead[10], spurred on simultaneously by the objective of certain countries of increasing the number of students in higher education[11] and by new needs stemming from lifelong learning. This increase, which Europe's low birth rates are not expected to slow down in any great measure, will further intensify capacity saturation in the universities.

How can this increasing demand be met, considering the limited human resources (which can be expected to become a deficit, both as regards teaching staff and as regards researchers, in the years ahead) and the limited financial capacity (which does not keep in step with requirements)? How can sustainable funding of universities, constantly beleaguered as they are by fresh challenges, be ensured? It is crucially important to maintain and strengthen the excellence of teaching and research, without compromising the level of quality offered, while still ensuring broad, fair and democratic access.

The internationalisation of education and research

The momentum of internationalisation is considerably speeded up by the new information and communication technologies. The result is increased competition. Competition between universities and between countries, but also between universities and other institutions, particularly public research laboratories (where research staff are not expected to meet simultaneous teaching commitments), or private teaching institutions, often specialised and sometimes run on a profit-making basis. An increasing share of the funds allocated to the universities is distributed on a competitive basis and this means ever keener competition to attract and keep the best talent.

Be that as it may, European universities are attracting fewer students and in particular fewer researchers from other countries than their American counterparts. The former in 2000 attracted some 450 000 students from other countries, while the

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[10] European Commission, Joint Research Centre, Report on "The future of education between now and 2010", June 1999.

[11] Countries such as the United Kingdom and Denmark have set a target of training 50% of a given age group at university level between now and 2010.

latter attracted over 540 000[12], mostly from Asia[13]. More significantly, the USA in proportion attracts many more students from other countries at advanced levels in engineering, mathematics and informatics, and are successful in keeping more persons with doctorate qualifications: some 50% of Europeans who obtained their qualifications in the USA stay there for several years, and many of them remain permanently.

European universities in fact offer researchers and students a less attractive environment. This is partly due to the fact that they often do not have the necessary critical mass, which prompts them to opt for collaborative approaches, e.g. creation of networks, joint courses or diplomas. But other factors, outside the university, play also an important role, e.g. the rigidities of the labour market or lower entrepreneurship entailing fewer employment opportunities in innovative sectors. This is reflected in lower performances in e.g. research funding, links to industry, patenting rates and spin-off creating rates than in the USA and Japan[14].

To develop effective and close co-operation between universities and industry

Co-operation between universities and industry needs to be intensified at national and regional level, as well as geared more effectively towards innovation, the start-up of new companies and, more generally, the transfer and dissemination of knowledge. From a competitiveness perspective it is vital that knowledge flows from universities into business and society. The two main mechanisms through which the knowledge and expertise possessed and developed by universities can flow directly to industry are the licensing of university intellectual property, and spin-off and start-up companies .

Although little data is currently available in Member States on the extent to which universities are commercialising their research, so that it is difficult to say how well universities across the European Union are exploiting research results with the enterprise sector, some data are available through the "Community Innovation Survey" (CIS). The CIS asks enterprises, inter alia, about the most important sources of information for innovation. The results[15] show that education-related and public research sources are ranked very low. Less than 5% of innovative companies considered information from government or private non-profit research institutes, and from universities or other higher education establishments, as being a very important source of information.

It would facilitate the dissemination of knowledge into the EU industrial fabric, including SMEs in traditional sectors, if universities were actively to pursue the promotion of effective university-industry relationships, and better to exploit the results of their knowledge in relationships with industry. Evaluation criteria for the performance of universities' could take account of this challenge.

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12 European Commission, DG RTD, Key Figures 2002 (based on OECD and Eurostat data)

13 Students from four Asian countries (China, India, Japan and South Korea) on their own accounted for nearly 40% of the total of foreign students in the USA (Open Doors 2001, IIE, New York).

14 European Commission, Communications "Towards a European research area", COM (2000) 6 of 18.1.2000 and "The European research area: providing new momentum", COM (2002) 565 of 16.10.2002.

15 " *Statistics on Innovation in Europe" Data 1996-97, EUROSTAT*

The European Commission will continue to analyse the existing barriers and factors conducive to this co-operation and will disseminate the results widely to interested circles.

The proliferation of places where knowledge is produced

This development and the increasing tendency of the business sector to subcontract their research activities to the best universities mean that universities have to operate in an increasingly competitive environment. The result that is on top of the traditional links between the universities of a given region and the businesses in the surrounding area new relations have appeared in the picture. Geographical proximity is no longer the main basis for selecting a partner. High-tech businesses, for their part, tend to set up near the best-performing universities. The shortening of the time lag between discoveries and their application and marketing raises the question of the role and the contribution of universities to the process of technological innovation and the links between them and the business sector.

The reorganisation of knowledge

This is to be seen in particular in two trends which pull in opposite directions. On the one hand, we have the increasing diversification and specialisation of knowledge, and the emergence of research and teaching specialities which are increasingly specific and at the cutting edge. On the other, we see the academic world having an urgent need to adapt to the interdisciplinary character of the fields opened up by society's major problems such as sustainable development, the new medical scourges, risk management, etc. Yet the activities of the universities, particularly when it comes to teaching, tend to remain organised, and more often than not compartmentalised, within the traditional disciplinary framework.

The reorganisation of knowledge can also be seen in a certain blurring of the borders between fundamental research and applied research. This does not go so far as totally to remove the meaning of the difference between, on the one hand, the pursuit of knowledge essentially for its own sake, and on the other its development with a view to specific objectives, particularly the conversion of existing knowledge into products, processes and technologies.

Fundamental research therefore remains a major area for university research activity. It is this capacity in the big American research universities that makes them attractive partners for industry, which in turn provides them with substantial funding for it. Fundamental research in this context is therefore conducted with its application very much in mind, but at the same time without losing its fundamental character. In Europe, universities tend to undertake directly applied research for the business sector, extending even to the provision of scientific services, which if taken to excess could endanger their capacity to contribute to the progress of knowledge.

The emergence of new expectations

Alongside its fundamental mission of initial training, universities must cater for new needs in education and training stemming from the knowledge-based economy and society. These include an increasing need for scientific and technical education, horizontal skills, and opportunities for lifelong learning, which require greater permeability between the components and the levels of the education and training

systems. European universities are directly concerned by scientific education, in particular because they train science teachers for secondary education. In addition, the contribution expected of universities to lifelong learning strategies leads them gradually to widen the conditions of access to this area of tuition (in particular to allow access to those not coming through the route of upper secondary education, through better recognition of skills acquired outside university and outside formal education); to open up more to industry; to improve student services; and to diversify their range of training provision in terms of target groups, content and methods[16].

The growth of the knowledge economy and society also leaves universities to become more closely involved in community life. Alongside and as a natural result of the exercise of its fundamental missions to produce and transmit knowledge, the university today functions particularly as a major source of expertise in numerous areas. It can and must increasingly become a forum of reflection on knowledge, as well as of debate and dialogue between scientists and people.

Given that they live thanks to substantial public and private funding, and that the knowledge they produce and transmit has a major impact on the economy and society, universities are also accountable for the way they operate and manage their activities and budgets to their sponsors and to the public. This leads to increasing pressure to incorporate representatives of the non-academic world within universities' management and governance structures.

4. WHAT IS AT STAKE FOR EUROPE

4.1. Universities and the European dimension

Responsibilities for universities lie essentially in the Member States at national or regional level. The most important challenges facing the universities, by contrast, are European, and even international or global. Excellence today is no longer produced or measured at the national level, even in the biggest European countries, but at the level of the European or world community of teachers and researchers.

The question arises in this context as to the compatibility and the transparency of the systems whereby qualifications are recognised (which lies at the core of the Bologna process of convergence), and that of the obstacles to the mobility of teachers and researchers[17] in Europe. Student mobility, for instance, is still marginal in Europe. In 2000, a mere 2.3% of European students were pursuing their studies in another European country[18] and while the mobility of researchers is higher than that of the average of the population concerned, it is still lower than it is in the USA. The divergence between the organisation of universities at Member State level and the emergence of challenges which go beyond national frontiers has grown over the past few years and will continue to do so, as a result of a combination of factors:

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16 European Commission, Communication "Making a European area of lifelong learning a reality", COM (2001) 678 of 21.10.2001.

17 Strategies in favour of Mobility within the European Research Area, Communication from the Commission, COM(2001) 331 final of 26 June 2001.

18 This low average masks substantial disparity across the Member States. For instance, 68% of Luxemburgish students, 10% of Greek students and 9% of Irish students were studying outside their own country. Conversely, only 0.7% of UK students and 1.2% of Spanish students went to study beyond their own borders.

– the emergence of a true European labour market in which the people of Europe must be free to move around as they wish[19] and in which problems concerning the recognition of qualifications become a thing of the past;

– the expectations with regard to recognition which have been created by action taken by the European Union itself to encourage mobility, particularly through the ERASMUS initiative;

– the emergence of a globalised provision of a wide range of university courses, the continuing brain drain leading to the loss of top-level students and researchers, and a continuing comparatively low level of activity by European universities at the international level;

– the worsening of these factors which will come with the enlargement of the Union, owing to the greater level of heterogeneity of the European university landscape which will ensue.

The nature and scale of the challenges linked to the future of the universities mean that these issues have to be addressed at European level. More specifically, they require a joint and coordinated endeavour by the Member States and the candidate countries, backed up and supported by the European Union, in order to help to move towards a genuine Europe of knowledge.

4.2. European Union action for the universities

Support is available to universities from a variety of Community initiatives in the areas of research and education. On the research front, they receive around one third of the funding under the framework programme for technological research and development, and particularly the support actions for research training and mobility (Marie Curie actions).

The advantages of the Framework Programme for the universities should further increase with the Sixth Framework Programme[20] with the stepping up of training and mobility support actions, the introduction of a support structure for the creation of young teams with a potential for excellence, and the increased focus that will be placed on fundamental research within "networks of excellence" or "integrated projects"[21], and particularly as part of action to promote research "at the frontiers of knowledge" (NEST action).

The universities also have a major role to play in initiatives under the "Science and Society" action plan[22], designed to foster the development and improve the coordination of national activities and policies in areas such as scientific opinion and dialogue with the people, ethics, science education, and "women and science".

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19 In this connection, the European Commission has submitted an action plan on skills and mobility, COM(2002)72 of 13.2.2002.

20 Decision of the Council and of the European Parliament 1513/2002 in OJ L 232 of 29.8.2002, p. 1.

21 The "networks of excellence" are an instrument of integration of European research capacity designed to further knowledge, the "integrated projects" a tool for conducting research targeting a specific objective. Both are designed to gather a critical mass of resources and are used in the seven "priority thematic areas" under the sixth Framework Programme.

22 European Commission, Communication "Science and Society Action Plan", COM (2001) 714 of 4.12.2001.

Universities are also involved in certain of the actions pursued by the Union relating to technological innovation, e.g. the support actions for utilising R&D results achieved by science parks, through the Framework Programme or with the support of the Structural Funds or the European Investment Bank (EIB).

As far as education and training are concerned, universities are very much involved in all the actions of the SOCRATES programme, particularly the ERASMUS action. Since it was launched, over a million students have benefited from this action and every year some 12 000 teachers opt for ERASMUS mobility. Many thematic inter-university networks also contribute to strengthen cooperation at European level, acting as a think tank for the future or the development of their subject area. The Community has provided support for the European course credit transfer system (ECTS) for the recognition of periods of study. The LEONARDO programme provides support for mobility projects between universities and the business sector, involving 40 000 people between 1995 and 1999. Universities are also involved in the *e*Europe initiative and its *e*Europe 2005 Action Plan, which encourages all universities to develop on-line access ("virtual campus") for students and researchers[23].

This cooperation also extends to other regions of the world. Most of the Community research Framework Programme is open to every country in the world and in particular provides support for cooperation with the countries with the Mediterranean region, Russia and the Newly Independent States, as well as developing countries. Through the TEMPUS programme the Union supports university cooperation with the countries of the former Soviet Union, southeast Europe and, since its extension in 2002, the Mediterranean region. There are also initiatives covering relations with other geographical areas, e.g. ALFA and Asia-Link. All these activities help to project the European academic universe around the world. It is also worth mentioning the proposal for the “Erasmus World” programme, which will enable the Union to support “European masters” in order to attract to Europe some of the world’s best students for studies pursued in at least two European countries.

Lastly, the Commission supports and helps to foster the Bologna process which is designed to create between now and 2010 a European higher education area which is consistent, compatible and competitive, through reforms which converge around certain defining objectives.

5. MAKING EUROPEAN UNIVERSITIES A WORLD REFERENCE

If they are to play their full role in the creation of a Europe of knowledge, European universities must, with the help of the Member States and in a European context, rise to a number of challenges. They can only release their potential by undergoing the radical changes needed to make the European system a genuine world reference. There are three objectives to be pursued simultaneously:

– ensuring that European universities have sufficient and sustainable resources and use them efficiently;

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[23] The *e*Europe Action Plan - Designing tomorrow's education, Communication from the Commission, COM(2001)172 final, 28 March 2001.

– consolidating their excellence in research and in teaching, particularly through networking;

– opening up universities to a greater extent to the outside and increasing their international attractiveness.

5.1. Ensuring that the European universities have sufficient and sustainable resources

Insufficient means

On average the Member States spend 5% of their GDP on public expenditure for education in general. This figure is comparable to that of the USA and higher than Japan's (3.5%). Public expenditure, however, has not increased with GDP in recent years in Europe, and has even dropped in the past decade. Total expenditure on higher education alone has not in any member state increased in proportion to the growth in the number of students. A substantial gap has opened up with the USA: 1.1% of GDP for the Union compared with 2.3%, i.e. more than double, for the USA. This gap stems primarily from the low level of private funding of higher education in Europe. This stands at a meagre 0.2% of European GDP compared with 0.6% in Japan and 1.2% in the USA.

American universities have far more substantial means than those of European universities — on average, two to five times higher per student. The resources brought by the students themselves, including by the many foreign students, partly explain this gap. But American universities benefit both from a high level of public funding, including through research and defence credits, and from substantial private funding, particularly for fundamental research, provided by the business sector and foundations. The big private research universities also often have considerable wealth, built up over time through private donations, particularly those from graduate associations.

The worsening under-funding of European universities jeopardises their capacity to keep and attract the best talent, and to strengthen the excellence of their research and teaching activities[24]. Given that it is highly unlikely that additional public funding can alone make up the growing shortfall, ways have to be found of increasing and diversifying universities' income. The Commission plans to conduct a study on the funding of European universities, in order to examine the main trends in this area and identify examples of best practice.

At the March 2002 Barcelona European Council, the Union set as its target to increase Europe's research effort to 3% of its GDP[25]. This implies a special effort as regards human resources for research.

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[24] The Commission sets out ideas for consideration and discussion on the matter of university funding in its Communications "Investing efficiently in education and training: an imperative for Europe" (COM(2002)779 of 10 January 2003) and "More research for Europe: towards 3% of GDP" (COM(2002) 499 of 11.9.2002).

[25] European Commission, Communication "More research for Europe: towards 3% of GDP", COM (2002) 499 of 11.9.2002.

5.1.1. Increasing and diversifying universities' income

Four main sources of university income can be identified:

– Public funding for research and teaching in general, including research contracts awarded on a competitive basis: this is traditionally the main source of funding for European universities. However, given the budgetary situation in the Member States and the candidate countries, there is a limited margin of manoeuvre for increasing public support. And while the Member States did in Lisbon in March 2000 give a commitment to substantially increase human resource investment, it is highly unlikely that this effort alone can cover the anticipated increase in the number of students or make it possible to catch up with the USA.

– As is the case in the USA, private donations can prove a substantial source of income for universities. However, this solution comes up against a whole range of problems in Europe, particularly the low fiscal attractiveness of private donations, and the status of the universities, which does not always allow them to amass private funds and wealth. These problems also explain, at least in part, the absence of a philanthropic tradition on the scale of that to be found in the USA, where former students often remain linked to their universities long after they have qualified.

– The universities can also generate income by selling services (including research services and flexible lifelong learning possibilities), particularly to the business sector, and from using research results. But these sources do not today contribute in any substantial way to the funding of European universities, partly because of a regulatory framework which does not allow them to really take advantage of their research activities, or does not encourage them to do so, e.g. because the royalties are paid to the state and not to the university or the researchers themselves.

– Lastly, contributions from students, in the form of tuition and enrolment fees. In Europe, these contributions are generally limited or even prohibited, in order to allow democratic access to higher education.

Questions for the debate

– How can adequate public funding of universities be secured, given the budgetary constraints and the need to ensure democratic access?

– How can private donations be made more attractive, particularly from a tax and legal point of view?

– How can universities be given the necessary flexibility to allow them to take greater advantage of the booming market in services?

5.1.2. Using the available financial resources more effectively

Universities must use the limited financial resources they have as efficiently as possible. They have a duty to their "stakeholders": the students they train, the public authorities that provide their funding, the labour market which uses the qualifications

and skills they transmit and society as a whole, for whom they fulfil important functions related to economic and social life. The objective must be to maximise the social return of the investment represented by this funding. There are many signs[26] which show that it is not currently used in the most efficient way.

– A high dropout rate among students, standing at an average of around 40% in the Union. The "education for everybody" approach in higher education has resulted in huge expansion of the student population, with no fundamental change in university structures and living conditions. In most Member States, a successful secondary school career gives automatic right of access to university studies with no additional selection. This right is considered as an essential element of democracy to guarantee equality for all citizens. Many students thus embark upon higher education without any real academic vocation and do not get what they need from university training. In certain Member States, the universities themselves apply selection systems, in particular certain subject areas[27] sometimes apply additional selection criteria.

– A mismatch between the supply of qualifications (which is shaped by a medium-term perspective, as a result of the duration of studies) and the demand (which often reflects very short term needs and is more volatile) for qualified people, which may result in particular lasting deficits in certain broad types of qualifications, especially in the area of science and technology. University training in fact does not only affect the people who benefit from it: society at large must endeavour to optimise the social return on the investment represented by the studies it pays for. A mismatch between the qualifications offered and those requested is thus an illustration of non-optimum use of resources.

– The duration of studies for a specific qualification can vary in the ratio of one to two in Europe. This explains the huge disparities in the total cost of a student calculated on the basis of an average number of years of study. In Germany, for instance, it usually takes five to six years to train a civil engineer and this training is totally funded from the public purse. In the United Kingdom, it takes up only three years of university studies paid for from public funds, followed by three to five years of training in a company, this training attested to by a state-recognised exam — all paid by the employer, and backed up by on-the-job experience. These differences in duration, even between countries which mutually recognise their qualifications, are striking when one considers that there is widespread support for the Bologna process which is designed to create a European area of higher education by 2010. The difference in cost for the public purse prompts scrutiny of what constitutes optimum use of resources.

– In the same line of thinking, the disparity of status and conditions of recruitment and work for researchers at the pre and post-doctoral levels in Europe is not conducive to the best allocation possible of the means granted to them.

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[26] These are analysed in detail in the Communication "Investing efficiently in education and training: an imperative for Europe".

[27] Particularly medicine and veterinary science.

– Europe also suffers from the lack of a transparent system for calculating the cost of research in European universities. This is because of the disparity, the opacity and complexity of the accounting systems used. This prompted the high level group of Commission advisers on research (EURAB, European Research Advisory Board) to suggest the development of a simple and transparent accounting system to calculate the real cost of research and to allow comparisons.

Questions for the debate:

– How can the maintenance of democratic access to higher education be combined with a reduction in failure and dropout rates among students?

– How can a better match be achieved between supply of and demand for university qualifications on the labour market, through better guidance?

– Is there a case for levelling out the duration of courses for identical qualifications?

– How can the transparency of research costs in the universities be enhanced?

5.1.3. Applying scientific research results more effectively

Application of research and insufficient creation of spin-off companies

The universities are one of the primary sources of new knowledge and as such play an ever stronger part in the process of technological innovation. But they do not do so in Europe to the extent they could and should. Since the mid-1990s, the number of young technological ("spin-off") companies created by universities has been on the rise in Europe, particularly around certain of them. Their average density nevertheless is far smaller than it is around the American campuses. Fewer companies are set up in Europe by researchers or in association with them, and those created in Europe tend to grow less quickly and not to last as long.

A major obstacle to better application of university research results is the way intellectual property issues are handled in Europe. In the USA, the "Bayh-Dole" Law has given organisations in which research is conducted using federal funds, particularly the universities, ownership of their results in order to encourage application of academic research results. In recent years, in Europe, several national legislation have converged towards solutions of the Bayh-Dole Act type, and other Member States where provisions of this type have not yet been adopted are about to do so. The actual effect of these measures cannot yet be evaluated. However, the divergences which continue in relation to the provisions enforced in certain Member States, and the national nature of the regulations concerned, have in Europe complicated and limited the transfer of technology and transnational cooperation. More broadly, while the Community patent opens up opportunities for European scale application, it is a matter which is still under discussion.

In addition, European universities do not have well-developed structures for managing research results. They are less well developed, for instance, than those of public research bodies. Another contributory factor is the lack of familiarity of many university staff with the economic realities of research, particularly the managerial

aspects and issues regarding intellectual property. The idea of applying research results is moreover still looked upon with distrust by many researchers and university leaders, particularly because of the delicate balance to be struck between the requirements of economic use on the one hand, and on the other the need to preserve, in the common interest, the autonomy of universities and freedom of access to knowledge.

Questions for the debate:

– How could it be made easier for universities and researchers to set up companies to apply the results of their research and to reap the benefits?

– Is there a way of encouraging the universities and researchers to identify, manage and make best use of the commercial potential of their research?

– What are the obstacles which today limit the realisation of this potential, whether legislative in nature or as regards intellectual property rights? How can they be overcome, particularly in countries where the university is funded almost exclusively from the public purse?

5.2. Consolidating the excellence of European universities

5.2.1. Creating the right conditions for achieving excellence

If Europe is to have and to develop real excellence within its universities, a number of conditions need to be in place. Some of these exist already in some Member States; and the list itself does not claim to be all-inclusive. Nonetheless, it sets out a reference for the debate. As with many other areas mentioned in this Communication, these issues need to be tackled within the structures of the universities themselves, as well as within the structure of regulation within which they operate. However, if this is not done in a convergent and coherent manner across Europe these efforts will lose much of their value. The aim must be to bring all universities to the peak of their potential, not to leave some behind; and piecemeal implementation of these issues will reduce the momentum of the university world in Europe generally. Such a convergent process would also, as with the structural reforms that have followed the Bologna Declaration, provide a supporting context within which Member States could achieve such change.

Need for long term planning and financing.

The precondition for the development and support of excellence is a context in which long-term planning is possible. Excellence does not grow overnight. Building up a reputation for excellence in any discipline (or sub-discipline) takes years, and is dependent on the critical attitude of peers, measured not country-wide, but Europe-wide and indeed world-wide. Accumulating the intellectual capital represented by effective and world-class teams of researchers, led by the best combination of vision and doggedness, and operated by individuals whose contributions complement each other in the best way, takes a long time and requires that worldwide recruitment to teams be possible.

And yet governments, which are still the major paymasters of universities, budget on an annual basis, and have difficulties in looking beyond a limited number of years.

Although a number of Member States have moved to multi-annual contracts with universities, the time period involved rarely exceeds 4 years. Equally, at the end of the four-year period elections may have intervened, the position of the government may have changed, the objectives sought previously may have diminished in importance or, in extreme cases, been discarded.

Member States thus need a general consensus within political and civil society as to the contribution which excellence in research and in universities makes, and the need to enable it. Such consensus should seek in part to insulate the research sector from the hazards of changing financial circumstances, insofar as this is possible. The period within which universities should be enabled to plan, to develop their own strategies, and to exercise the autonomy suggested in Section 5.1 above, could rise to 6 or even 8 years where possible.

Need for efficient management structures and practices.

A second condition is that the governing structures of a university must respond both to the varied needs of that institution and to the expectations of society - those who provide its core funding. That implies that they should have an effective decision-making process, a developed administrative and financial management capacity, and the ability to match rewards to performance. Equally, the system should be designed with issues of accountability clearly in mind. Managing a modern university is a complex business, and one which should be open to professionals from outside the purely academic tradition, provided that confidence in the university's management remains strong. It should also be said that freedom of funding will of itself change the financial culture of a university; but it will not by itself increase the quality of that management.

Need to develop interdisciplinary capability.

A third condition needed for excellence is that universities be enabled, and encouraged, to develop more work falling between the disciplines. As has been noted above (Section 3.3), advanced research increasingly falls outside the confines of single disciplines, partly because problems may be more complex, more because our perception of them has advanced, and we are more aware of the different specialisations required to examine different facets of the same problem.

Organising work on an inter-disciplinary basis requires that universities have flexibility in their organisation, so that individuals from different departments can share their knowledge and work together, including through the use of ICT. It also requires flexibility in the way careers are evaluated and rewarded, so that inter-disciplinary work is not penalised for being outside normal departmental frames. Finally, it requires that departments themselves should accept "cross-border" work as contributing to faculty-wide objectives.

Questions for the debate:

– How can the consensus be strengthened around the need to promote excellence in the universities in conditions which make it possible to combine autonomy and management efficiency?

– Is there a way of encouraging the universities to manage themselves as efficiently as possible while taking due account simultaneously of their own requirements and the legitimate expectations of society in their regard?

– What are the steps which would make it possible to encourage an interdisciplinary approach in university work, and who should take them?

5.2.2. Developing European centres and networks of excellence

A combination of the absolute need for excellence, the effects of the precariousness of resources and the pressure of competition, forces universities and Member States to make choices. They need to identify the areas in which different universities have attained, or can reasonably be expected to attain, the excellence judged to be essential at European or at international level – and to focus on them funds to support academic research. This type of policy would make it possible to obtain appropriate quality at national level in certain areas, while ensuring excellence at the European level, as no Member State is capable of achieving excellence in all areas.

As to which areas should be given preference, this should be based on an evaluation within each university system. If it is to be objective and reflect the perception of the European and international scientific and academic community, this evaluation should be carried out by panels including people from outside the national system concerned. The academic excellence to be evaluated could in fact include that of other universities with which the institutions examined are associated through transnational cooperation arrangements. The choice of areas and institutions should be reviewed regularly, in order to ensure that excellence is maintained and to allow new teams of researchers to show their potential.

The concentration of research funding on a smaller number of areas and institutions should lead to increased specialisation of the universities, in line with the move currently observed towards a European university area which is more differentiated and in which the universities tend to focus on the aspects situated at the core of their research and/or teaching skills. While the link between research and teaching naturally continues to define the ethos of the university as an institution and while training through research must remain an essential aspect of its activity, this link is nevertheless not the same in all institutions, for all programmes or for all levels.

The support for excellence and its dissemination, particularly academic excellence is a key principle of the Sixth Community Framework Research Programme. Through this programme's "networks of excellence" the Union is endeavouring to foster the building up of "virtual" capacity for excellence which has the critical mass needed and is, whenever possible, multi-disciplinary.

Questions for the debate:

– How can providers of university funds be encouraged to concentrate their efforts on excellence, particularly in the area of research, so as to attain a European critical mass which can remain competitive in the international league?

– How should this excellence be organised and disseminated, whilst managing the impact of the steps taken on all institutions and research teams?

– How can the European Union contribute more and better to the development and maintenance of academic excellence in Europe?

5.2.3. Excellence in human resources

In order to maintain its position and strengthen its role internationally, the Union needs a pool of top-level researchers/teachers, engineers and technicians. The university remains the focal point for training such people. In terms of quantity, the Union is in the paradoxical situation of producing slightly more scientific and technical graduates than the USA, while having fewer researchers than the other major technological powers. The explanation for this apparent paradox lies in the smaller number of research posts open to scientific graduates in Europe, particularly in the private sector: 50% only of European researchers work in the business sector, compared with 83% of American researchers and 66% of Japanese researchers.

The situation in Europe could well get worse in the years ahead. The absence of career prospects will alienate young people from scientific and technical studies, while science graduates will look to other more lucrative careers. Furthermore, around one third of the current European researchers will retire over the next 10 years. As the situation is similar in the United States, the competition between universities internationally is set to become even keener.

One way of stemming this trend would be to increase the number of women in scientific and technical careers, where they are substantially under-represented, particularly at the top end of the ladder. On average, in the countries of the Union, there are two to four times more men than women graduates in the sciences. Also, women represent only a quarter to a third of laboratory research personnel in Europe. Action is being taken under the "women and science" initiative[28], to encourage women to participate in the European research drive, by pinpointing the obstacles to their presence and generally applying the most effective steps taken by Member States to remove these obstacles.

Another solution would be to enhance the pool of resources by strengthening not only intra-European academic mobility, but also mobility between university and

[28] ETAN working party report "Science policies in the European Union: promoting excellence through mainstreaming gender equality", 1999; Resolution of the European Parliament on Women and Science of 3 February 2000 (EP 284.656); Commission working document "Women and science: the gender dimension as a leverage for reforming science" SEC (2001) 771 of 15 May 2001; Council Resolution on science and society and on women in science of 26 June 2001; OJ C 199, p.1 of 14.7.2001; Report by the Helsinki Group on Women and Science "National policies on women and science in Europe" – March 2002.

industry. In this context virtual mobility based on the use of ICT has also an important role to play.

Although the situation has improved slightly in the wake of initiatives taken in a number of Member States, European universities continue essentially to recruit people from the country or region in which they are established, or even within the institution itself. Furthermore, the evaluation of researchers is based on criteria which neither stress the advantages of nor encourage periods in other European universities.

In this context there is also the core issue of recognition of studies and qualifications at European level. Not having a quick, simple system of recognition for academic or professional purposes is today a major obstacle to research and mobility — and therefore to a greater cross-fertilisation of ideas and research between European universities, and to their wider influence. Specific instruments (such as ECTS, the Diploma Supplement, NARICs, Community directives) have been developed and almost all Member States and candidate countries have invested in quality assurance systems which are networked within the ENQA (European Network for Quality Assurance). It is urgent to examine whether and how a solution could be found (within the framework of the Bologna process for greater transparency and compatibility) to the problem of recognition, which is currently preventing the universities from using their potential and resources efficiently and limiting their wider audience.

In qualitative terms, excellence in human resources depends largely on available financial resources, but is also affected by working conditions and career prospects. Generally speaking, career prospects in European universities, characterised by the multiplicity of configurations, are limited and shrouded in uncertainty. The Commission supports the Bologna process, including its extension to doctorate level training, and is interested to note the experiments in progress on dual doctorates or doctorates under joint supervision. It also stresses the need to train prospective doctorate candidates to a greater extent in an interdisciplinary work perspective.

European universities also offer fewer possibilities at post-doctorate level than their American counterparts. There would be a case for expanding the range of opportunities for holders of doctorates outside research careers.

The Union has pursued a number of initiatives to encourage and facilitate research and mobility in Europe. Under the project on the European Research Area, it has defined a strategy to foster research and mobility through a range of tangible measures. Moreover, the Commission will shortly submit a Communication on the matter of scientific careers.

Questions for the debate:

– What steps could be taken to make scientific and technical studies and careers more attractive, and to strengthen the presence of women in research?

– How — and by whom— should the lack of career development opportunities following doctoral studies be addressed in Europe, and how could the independence of researchers in carrying out their tasks be fostered? What efforts could universities make in this regard, taking particular account of the needs of Europe as a whole?

– What ways are there of helping European universities to gain access to a pool of resources (students, teachers and researchers) having a European dimension, by removing obstacles to mobility?

5.3. Broadening the perspective of European universities

5.3.1. A broader international perspective

European universities are functioning in an increasingly "globalised" environment and find themselves competing with universities of the other continents, particularly American universities, when it comes to attracting and keeping the best talent from all over the world. While European universities host only slightly fewer foreign students than American universities, in proportion they attract fewer top-level students and a smaller proportion of researchers.

All in all, the environment offered by the European universities is less attractive. Financial, material and working conditions are not as good; the financial benefits of the use of research results are smaller and career prospects are poorer[29]; there is also the inappropriate and poorly harmonised nature of arrangements with regard to visas and residence permits for students, teachers and researchers from other countries — be they from the Union or from other countries in the world. Several Member States have recently taken steps to enhance the attraction of their universities, their laboratories and their businesses for top-level researchers and students and qualified workers from third countries, e.g. through "scientific visas".

Similarly, the Commission has submitted a proposal for a Council directive on the conditions of entry and residence of students from third countries. A parallel initiative for researchers from these countries is expected in 2003. The Union will also step up support to enhance the attractiveness of European universities through action to support mobility under the Sixth Framework Programme, which will enable over 400 researchers and doctoral students from third countries to come to European universities between 2003 and 2006, and under the "Erasmus World" initiative.

Questions for the debate:

– How can European universities be made more attractive to the best students and researchers from all over the world?

– In a context of increasing internationalisation of teaching and research, and of accreditation for professional purposes, how should the structures, study programmes and management methods of European universities be changed to help them retain or recover their competitiveness?

5.3.2. Local and regional development

There are universities throughout the Union's regions. Their activities often permeate the local economic, social and cultural environment. This helps to make them an instrument of regional development and of strengthening European cohesion. The development of technology centres and science parks, the proliferation of regional

[29] See also Section 5.1.3 on the management of intellectual property.

cooperation structures between the business sector and the universities, the expansion of university regional development strategies, the regional networking of universities, are all illustrations of this dimension of university activity.

The regional dimension of the university activity is thus set to get stronger, given its essential role in achieving the Europe of knowledge, particularly looking ahead to enlargement. The European Union supports these developments, particularly through the Structural Funds and the Sixth Framework Programme.

In addition, the role played by the universities as a source of expertise and a catalyst for multiple partnerships between economic and social players within a range of networks is very relevant at the regional and local levels.

The increased involvement of the universities locally and regionally should not, however, overshadow a more outward-looking international perspective and a constant endeavour to improve their excellence in research and education. These remain essential and will indeed enable the universities to make a more effective contribution to the development of their local and regional environment.

Questions for the debate:

– In what areas and how could the universities contribute more to local and regional development?

– What ways are there of strengthening the development of centres of knowledge bringing together at regional level the various players involved in the production and transfer of knowledge?

– How can greater account be taken of the regional dimension in European research, education and training projects and programmes?

6. CONCLUSION

This Communication makes a number of points which reflect the profound changes taking place in the European university world. After remaining a comparatively isolated universe for a very long period, both in relation to society and to the rest of the world, with funding guaranteed and a status protected by respect for their autonomy, European universities have gone through the second half of the 20th-century without really calling into question the role or the nature of what they should be contributing to society.

The changes they are undergoing today and which have intensified over the past ten years prompt the fundamental question: can the European universities, as they are and are organised now, hope in the future to retain their place in society and in the world?

If it is to achieve its ambition of becoming the world's most competitive and dynamic knowledge-based economy and society, Europe simply must have a first-class university system -- with universities recognised internationally as the best in the various fields of activities and areas in which they are involved.

The questions raised in this document are intended to help in determining what action should be taken for a move in this direction within the enlarged EU.

All interested parties -- institutions, public authorities, individuals or representative associations -- are therefore urged to give their points of view on this subject, and describe their experiences and their "best practices".

7. HOW TO CONTRIBUTE?

The Commission intends to review the contributions it has received up to the end of May 2003.

These contributions can be sent to either of the following two dedicated e-mail addresses:

– eac-consult-univ@cec.eu.int

– rtd-consult-univ@cec.eu.int

They can also be sent by physical mail to:

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EAC A1 (Consult-Univ)
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B - 1049 BRUXELLES