

COMMISSION OF THE EUROPEAN COMMUNITIES

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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL

AND THE EUROPEAN PARLIAMENT ON

SCIENTIFIC AND TECHNOLOGICAL COOPERATION

WITH THE COUNTRIES OF

CENTRAL AND EASTERN EUROPE

INTRODUCTION

1. Cooperation with Third Countries on research and technological development came into being practically at the same time as Community activities in this area. Scientific and technological cooperation started with specific activities foreseen in the Euratom Treaty and was placed in its wider context by the inter-governmental conference which established COST.

Such cooperation is currently organised through three main means of implementation. First, there are agreements associating individual countries with particular programmes. In this case, the countries concerned contribute to the overall funding of the programme and individual organisations in the countries participate on the same basis as Community organisations. Second, there are provisions allowing organisations in Third Countries to participate in specified projects on a case-by-case basis. In this instance, the organisations contribute to the cost of the project and to general administrative expenses. Third, the Community participates in the COST (Cooperation in Science and Technology) framework, as do EFTA countries and Yugoslavia. COST actions provide small amounts of funding for coordinating research being carried out on a national basis.

2. Until 1988 it was not possible to make comparable progress in research cooperation with the countries of central and eastern Europe because of the absence of relations between them and the Community. Since then the Community's network of first generation trade and cooperation agreements has been virtually completed. These agreements provide for cooperation in numerous areas of mutual interest, including science and technology. A start has been made, in particular with Hungary, whose agreement with the Community was the first to take effect. Further progress depends, inter alia, on ensuring that adequate protection is given by the countries concerned to western

intellectual property and technology. The process of political and economic reform and the gradual assumption by these countries of their full responsibilities in the open international economic system should help overcome such problems.

3. Amongst the different circumstances which the Community has been called upon to face in the course of its history, the new situation which has arisen in 1989 in the countries of central and eastern Europe¹ is by far the most extraordinary. The Commission has been given the unprecedented responsibility of coordinating western assistance to these countries in the framework of the Group of 24². Substantial assistance, within priority areas identified by the Commission, has been given by the Community and the 24 to Poland and Hungary. The main instrument put in place to help these two countries is the PHARE (Poland and Hungary : Assistance for Economic Restructuring) programme, with a budget of ECU 300 million for 1990.

Other important steps undertaken rapidly include: the constitution of the European Bank for Reconstruction and Development (EBRD) with a particular role for the Member States and institutions of the Community; and loans of up to ECU 1200 million made available by the European Investment Bank and the ECSC.

4. The Commission's proposals for the development of relations between the Community and the countries of central and eastern Europe are set out in a Communication to the Council³. The conclusions of the informal meeting of

¹ For the purposes of this communication, these include Bulgaria, Czechoslovakia, Hungary, Poland, Rumania and Yugoslavia. In the text the term "eastern Europe" is sometimes used for convenience.

² The Group of 24 includes, besides the twelve Member States, Australia, Austria, Canada, Finland, Iceland, Japan, New Zealand, Norway, Sweden, Switzerland, Turkey and the United States.

³ SEC(90)717 final, 18 April 1990

the European Council in Dublin on 28 April 1990 invited the Commission to study the implementation of the most appropriate accompanying measures to encourage transfers of private capital and investments towards central and East European countries.

It was agreed that action within the framework of G-24 should be extended to the GDR, Czechoslovakia, Yugoslavia, Bulgaria and Romania. In order to implement the programme of assistance to countries of central and eastern Europe and to extend PHARE to the other countries, ECU 500 million is provisionally foreseen for the Community budget for 1990, ECU 838 million for 1991 and ECU 970 million for 1992. In addition, and in more general terms, work should be undertaken to complete as soon as possible association negotiations with the countries of central and eastern Europe, subject to the fulfilment of certain basic conditions, to replace the existing trade and cooperation agreements.

5. The GDR is not considered in detail in this communication. It is in principle eligible for G-24 assistance but is expected to become part of the territory of the Community soon; actions on its behalf will therefore mainly be undertaken within the framework of European Community internal procedures or by ad-hoc measures.
6. Cooperation between the Community and the Soviet Union is based on the trade and cooperation agreement which entered into force on 1 April 1990⁴. The agreement foresees collaboration in science and technology, including nuclear research. The first meeting of the Joint Committee established by this agreement, which took place in Moscow on 10 May 1990, noted that a number of priorities for cooperation in these areas have already been identified. Cooperation can be expected to go forward along the general lines indicated in

⁴ OJ No L68/1, 15 March 1990

the Commission's Communication to the Council on scientific and technological cooperation with third countries, with the necessary adaptations to the particular circumstances of the USSR.

7. In the framework for cooperation described above, particular importance is to be given to the area of research and technological development.

It would be a serious mistake to conceive of such cooperation as a simple extension of traditional tried and tested models and to consider the activities to be undertaken as an enlargement of the initiatives currently under way with adjoining countries, such as those in EFTA, for example. The actions which need to be taken with respect to the countries of central and eastern Europe are not just exceptional in nature but need to have a high degree of specificity in their objectives, means and operation. This means taking into account the particular situation, interests and relations with the Community of each of the countries which have set out on the path, through difficult and practically unexplored territory, from centrally planned economies to market economies.

Wherever possible joint activity is to be promoted which is of interest to the Community and to the eastern and central European countries, through a full assessment of the human resources and know-how existing in these countries.

8. The present document outlines cooperation activities envisaged between the European Community and the countries of eastern and central Europe, the economic consequences of such activities and the means by which these activities could be carried out.

COOPERATION IN SCIENCE AND TECHNOLOGY

9. The activities proposed fall into three main categories: regular scientific cooperation; particular R&D activities to encourage the transfer of technology, cooperation in the field of human resources.

S&T Cooperation

10. The countries of eastern and central Europe have a long and varied scientific tradition, making possible cooperation of mutual interest between scientists, research centres, universities and industries. The general situation in central and eastern Europe can best be described as sound scientific talent which has been undervalued and underused both for training the workforce and for supplying the technological needs of industry. By promoting cooperation between centres of excellence in the Community and scientists from eastern and central Europe, benefit may be derived by both sides. The Community will gain access to a fresh pool of scientific thought, particularly in fundamental research in classical areas and the countries of eastern and central Europe will gain knowledge of how to use that resource for improving their economic growth.
11. An extensive, though still incomplete survey has been carried out in order to identify those areas where collaboration would be mutually beneficial. Particular areas where strengths exist include mathematics, theoretical physics, materials research, life sciences, fine chemistry, and mechanics.

In mathematics, Hungary is outstanding in central and eastern Europe and is strong in applied mathematics, operations research and management science, and statistics and probability. In the physical sciences, Poland has particular expertise, with strong points in acoustics, applied physics, atomic, molecular and chemical physics, optics, spectroscopy, mathematical and nuclear physics and the

physics of particles and fields. In the broad area of physical sciences, Czechoslovakia is also notable in the fields of astronomy and astro-physics, crystallography, geosciences and the physics of condensed matter. Within central and eastern Europe, Hungary is second only to Poland in instruments and instrumentation.

In engineering sciences, Poland is again notably strong in areas such as chemical engineering, metallurgy and mining, materials science and electrical and electronic engineering. Czechoslovakia is also generally strong in the same areas as Poland and is particularly specialized in ceramic materials research and in applied computing and cybernetics. Yugoslavia has strengths in electrical and electronic engineering.

In chemistry, Poland and Czechoslovakia are the strongest performers, particularly in analytical chemistry, electro-chemistry, organic chemistry and polymer science. Hungary, Bulgaria and Yugoslavia have strengths in inorganic and nuclear chemistry.

In the life sciences, Czechoslovakia, Poland and Hungary are again the strongest performers, if the GDR is excluded. Particular strengths lie in veterinary medicine, food science and technology and zoology. It is particularly noteworthy that the scientific strengths of central and eastern Europe often lie in traditional skills and disciplines (such as morphology and taxonomy, for example) which are in danger of becoming "Cinderella" subjects in the West due to the rival attractions of the "more exciting" and newer disciplines of biotechnology. European industry has expressed its alarm at the abandonment of traditional subjects by younger researchers, since they still have an important part to play in helping economic growth.

Research and development: activities to encourage the transfer of technology

12. Analysis of the situation in central and eastern Europe is still being carried out. The information so far available has not been sufficient for a detailed analysis of all sectors, particularly in the area of production. Close cooperation between the Community and these countries in order to increase understanding of specific requirements is thus particularly important and a series of missions is being organised with a view to on-the-spot discussions. Three particular elements should be underlined in the analysis of needs.

13. First, there is evidence of a substantial technological gap between the industrialised West and central and eastern Europe. Despite significant investment in scientific and technological research and the importation of advanced foreign technology, this gap has widened. Such studies as have been carried out by these countries indicate this gap to be the result of the deficiencies of the former economic and political systems. As noted, R&D have tended to be academically oriented and detached from the needs of both industry and teaching.

Innovation is subject to administrative decision and long investment gestation has brought about protracted delays in the introduction of new techniques. There appears to have been a disincentive for enterprise managers to innovate, for fear of temporary deterioration in enterprise performance and, as a result, there has been a fear of inducing more ambitious central targets. There has thus been a relatively disappointing performance of R&D and productivity trends outside a few sectors such as space and military industries, where administrative management of technical change was accompanied by privileged access to resources and an alternative system of incentives.

14. Second, central-eastern European countries are characterised by wasteful energy and material-intensity, growing at times of increasing international prices and

reaching multiples of Western countries at equivalent development stages. For instance, Poland is one of the largest consumers of energy per unit of output. Investment in energy savings and material saving techniques can be among the most effective forms of technology transfer, of immediate importance for the external balance in view of the "hard" nature of energy and fuels in international trade. Energy saving is also bound to have an important benefit for pollution reduction, especially in the case of coal.

Contrary to what might have been expected, socialist economies have not taken into account the difference between the social and private cost of production, and have not assigned great importance to environmental protection and safety. Smokestack industries have grown without restraint and environmental neglect has led to widespread pollution and occasional catastrophe. This is true of all the countries in the area, affected by industrial emissions into air and waterways. Neighbouring countries have also been affected, and there is a strong element of self-interest in any western assistance in this area, which might be reinforced by forms of conditionality. Nuclear safety is of particular importance; though the slowdown (including cancellations, for instance in Poland) of the nuclear energy programme is opening the possibility of exports of conventional power generating equipment.

15. Third, there is evidence for a quasi-structural incapacity to satisfy demand for consumer goods by adequate supply and hence an urgent need to fill the gap between consumer needs and industrial. In general, investment has often been concentrated on capital goods for an inefficient heavy industry, to the detriment of consumer goods and food production.

In consumer durables there is a great deal of pent up domestic demand - so far repressed through high relative prices and shortages - which needs to be satisfied. This area includes a wide range of goods, from motorcars to refrigerators, from audio-video equipment to household appliances. The need

is greatest in consumer electronics, where traditionally the technological lag is more evident. Here products are mostly of a "mature" kind, obtainable even from domestic inputs and machines as long as know-how and modest amounts of western equipment are made available. An area of particular interest may be the conversion of the military complex in these countries towards the production of consumer durables.

It remains true for eastern and central Europe, as it does for western countries, that the most successful innovators are those that take heed of customer requirements. The satisfaction of consumer needs is necessary to ensure the social consensus required for the acceptance of the market economy and the initial sacrifices imposed by its implementation.

16. The above analysis allows the following conclusion to be made: technology transfer through appropriate forms of collaboration is both necessary and urgent. Without it, neither the technological gap described above, nor the inadequate supply of consumer goods will find a solution.
17. Existing Community methods for collaborating with third countries in the R&D field must be adapted and developed accordingly. Community R&D programmes are aimed at technological progress and not, at least directly, at the preparation and encouragement of technology transfer. The Community must therefore encourage as a priority the introduction and adaptation of appropriate technologies into the economic systems of central and eastern European countries rather than the development of new technologies. Private industry will also have an important role to play in this respect, particularly on the identification of the technologies required for the improvement of production systems.

It will be appropriate to fund research linked to the final stages of pre-

competitive research and feasibility/production studies. Such an extension of the boundaries of normal publicly funded research would be carried out with a view to future joint ventures. It should be noted, however, that the introduction of modern technologies to central and eastern Europe implies the development of an associated support service infrastructure.

18. Joint actions are needed to identify the technologies required for the improvement of production systems and to study their application "on the ground", including their adaptation to particular needs and conditions. A particular category of research will be needed to identify the best methods of improving the industrial and service sectors with reference to the particular circumstances in the different countries. This requires specific research (in the main, paper studies) as well as the provision of technical and managerial assistance. Examples could include research on identifying the best means of improving safety in nuclear power plants, on improving steel production techniques, dyeing in textiles and on helping the banking system to cope with a market economy, for example.
19. The key question arises whether assistance should be focused on the rehabilitation of existing capacity, which might soon be superseded by new, more advanced techniques, or whether efforts should be made to scrap inappropriate technology and concentrate on building up entirely new structures. Determination of the exact course to be adopted will need to be made in the light of the position in individual sectors and countries. The high quality and new products required for successful export promotion are associated with modern technologies.

In the near future, central and East European countries might import "common practice" technologies, but they are likely to be reluctant to install new capacity which leads to the production of sub-standard goods for a number of years. The latest modern technologies are very often absolutely superior i.e. they are the

best technologies regardless of relative factor prices not only for new products but also for high quality traditional products. Cheaper labour might affect the pattern of specialisation but not necessarily the choice of technologies. The actual opportunities for common practice technologies will thus have to be assessed by Western businessmen and their counterparts in central and eastern Europe, rather than be the object of deliberate policy.

20. Technology transfer may take different forms: export of equipment (including turnkey plants) and subsequent technical assistance; licensing; franchising (and the associated quality control, which can have a considerable importance); swaps of intermediate products; sub-contracting; buy-back agreements; joint ventures and co-production. Investment in infrastructure, such as in telecommunications, as well as socially and mutually important investment in environmental protection and reclamation are worthy objects of western aid or of long-term loans. Some forms of technology transfer (licensing, franchising, transfers of know-how) would not require particularly large investments and could be self-financed. Other investments would have to pass the test of commercial viability and could be left to the partners' discretion, with the provision of public funds only to supplement the lending capacity of private finance.

The most promising areas for the encouragement of technology transfer are the following: consumer durables, especially electronics; telecommunications; energy saving and material saving investments; environmental protection and reclamation; computers and informatics, and more generally the modernisation of enterprise management and public administration; agricultural inputs and food processing; chemicals, especially plastics, pharmaceuticals, biotechnology.

21. A particular requirement is for the development of telecommunications. The standards and rate of diffusion of telecommunications (both voice and non-voice) are much lower than those of countries at a similar development level;

partly this was due to intense political control which no longer applies. Dramatic improvements in this area are a precondition of intensified relations between enterprises, to accompany the process of change to market economies; in particular, they are a crucial precondition of intensified international economic relations, both financial and trading. Current plans for the de-monopolisation of the Post Office in Hungary and Poland open a new opportunity for Western direct involvement. The transfer might extend from switching equipment to mobile communications, where central and East European countries might actually benefit from being late starters. A specific Communication on telecommunication problems in the countries of central and eastern Europe is being submitted at the same time as this Communication.

22. Under the present circumstances, COCOM (Committee for the Multilateral Control of Exports) controls are still applied to eastern Europe. These controls cover in particular "dual use" of goods and technologies and goods of a strategic nature. Despite some easing which has just been announced after the high-level COCOM meeting at the beginning of June, these restrictions may still be an obstacle to adequate technology transfer. A further easing of controls would appear necessary, at least in certain cases.
23. The measures outlined above can and must be carried out taking into consideration future economic developments in the countries of central and eastern Europe as well as the interests of these countries and the Community.

Western investors will wish to take advantage of the growing and hitherto closed domestic markets of central and eastern Europe, while these countries give high priority to export promotion. The question arises as to whether there is a risk of a "boomerang effect", i.e. Western investors losing competitiveness as a result of the growth and upgrading of central-eastern European capacity.

This preoccupation is not new; for instance in the 1980s the Reagan

administration had repeatedly emphasised the risk of east European and in particular Soviet "technological raid" and the "haemorrhage of a national heritage". However, in the past this preoccupation has turned out to be unfounded. Technological transfer has benefited individual branches but has not upset relative competitiveness. Assimilation of techniques is always slow, and a lead can be maintained; even in a more efficient market environment the danger could be easily overestimated, in view of the continued R&D progress in the West. In the past, technology transfer has taken place in a haphazard fashion and, on occasions, illegally; in the future, it should occur through profitable commercial channels.

24. Some preoccupation has been expressed in certain Member States which have a similar technological level to the countries of central and eastern Europe about the possible diversion of trade and of R&D effort. The Community's responsibility vis-à-vis its own Member States is clear in this regard. The general stimulus to trade and economic activity created by the completion of the internal market should, however, offset any such effect. The Commission will, in any case, monitor the situation and re-examine the matter if necessary.

Cooperation in the Field of Human Resources

25. A primary aim of cooperation should be industrial revival through the introduction of modern technologies. However, such revival would be impossible without a workforce and management able to sustain it. In particular, R&D management in the competitive environment of a market economy is very different from that in a command economy. As noted above, it is also the case that the scientific structures in eastern and central Europe have not been geared towards training the workforce. Training needs will vary from level to level and from sector to sector. Scientific and technological cooperation can contribute to the solution of this problem through the training of R&D managers as well as by alerting industrial managers to the contribution that science and technology

can bring to industrial innovation.

26. To this end the Human Capital and Mobility specific programme proposed under the third Framework Programme could be extended to the countries of eastern and central Europe and its scope could be extended to training in R&D management. This programme aims at creating a pool of highly skilled young researchers at post-doctoral level through stimulating movements and exchanges between centres of excellence. A growing interest in the programme is emerging outside the Community, particularly in EFTA countries and other industrialized countries such as the U.S. and, notably, eastern and central European countries. The involvement of central and eastern European countries would be two-way but not strictly symmetrical with respect to the Community, in order to take into the account the specific needs of both partners.
27. A separate possibility for meeting the skills requirements for industrial development might be an extension (with consequent technical and budgetary adaptation) of the TEMPUS scheme for assistance to the countries of central and eastern Europe in the area of higher education (adopted by the Council on 7 May) to include also the mobility of pure researchers. In accordance with the Decision of the Council, the TEMPUS scheme provides for a study of the demand for and practicability of exchanges of researchers between the eligible countries and the Member States and, depending on the results of the study, for further consideration to be given to the provision of support for such exchanges, whether within TEMPUS or by other means.

In addition, the question of the training and retraining of managers, particularly in regard to the industrial application of new technologies, forms an integral part of the work of the newly created European Training Foundation. These activities will be closely coordinated with any relevant R&D-based assistance measures.

MEANS OF IMPLEMENTATION

28. The following section describes the options available for setting up and financing the various activities to promote cooperation in S&T examined above. The choice of instruments which may be used for the purposes of scientific and technological cooperation with the countries of central and eastern Europe will evidently vary according to the assessment reached of the needs, the particular sector and the wishes of the country concerned. In determining the activities which might be conducted by the Community, regard is also to be had to those which may be undertaken by the Member States and by those outside the Community, including the Group of 24. The means reviewed here are: coordinated assistance from the Group of 24; assistance through the EBRD; COST; existing Community programmes; other S&T cooperation activities.

Coordinated Assistance

29. This form of intervention is particularly important. It is the only one which contains direct elements of aid. The Community's contribution to assistance for economic restructuring in Poland and Hungary in the framework of the Group of 24 is defined in a Council Regulation⁵. The areas of assistance are broadly defined and include, in particular, training, investment promotion and environment. Recent discussions with Poland and Hungary in the course of the PHARE operation have led to the identification of a need for assistance with industrial and trade reform with a strong aspect of technical cooperation. A proposal for the enlargement of the coordinated assistance programme to cover Bulgaria, Czechoslovakia, the German Democratic Republic, Romania and Yugoslavia will be formally decided by the next Ministerial meeting of the Group of 24.

⁵OJ N° L 375 of 23 December 1989

Certain forms of cooperation along the lines set out above could reinforce assistance within the priorities identified by the Group of 24. The Commission will consider ways and means by which such forms of cooperation can be incorporated in actions undertaken within the G-24 framework.

This form of assistance is currently the only one available for funding such cooperation at Community level. This does not exclude the possibility, however, that specific instruments could be developed for this purpose.

General Financial Assistance

30. General financial assistance is given by the European Investment Bank (EIB). It is also provided by international organisations such as the International Bank for Reconstruction and Development (IBRD). A specific instrument, the European Bank for Reconstruction and Development (EBRD), has been newly created and will perform a similar function specifically vis-à-vis central and eastern Europe. The Bank's aim will be to assist in the restructuring process by means of loans for the private sector and for infrastructure.

Access to and use of contemporary technology would in many cases be a critical consideration. As in the area of similar initiatives which have been successfully pursued by the World Bank, it is possible that while not directly financing research, the EBRD could provide finance for this activity as part of a larger investment.

COST Activities

31. As noted in paragraph 1, COST is one of the original activities in the field of scientific and technological cooperation. It often provides an inexpensive and effective way of getting cooperation activities started where no particular formal