

Selected Papers

1987-1993

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Director, Directorate-General XIII,
Telecommunications, Information Market
and Exploitation of Research

Commission of the European Communities

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INTRODUCTION

The life of an official provides for a curious mixture of pride and esteem combined with self abnegation and humility - grandeur et servitudes in de Vigny's phrase. There is the satisfaction of serving the public good, la fonction publique, of being, in the best sense, a civil servant. With reasonable security of employment, the official can carry out the responsibilities entrusted to him in the knowledge that he is acting from the best motives, that he has the interests of society at heart. Some status goes with such feelings, as well as, usually, some power.

As against that: an official is part of an administration. Did not Max Weber teach that bureaucracy would rule? But at what price? The work of a bureaucrat is rarely exciting; it is normally painstaking. By being held in common, power is rarely held individually. It has to be cajoled, argued for and sought at interminable meetings. If the troubles of this world come, as Pascal said, from the incapability to stay in one's room, officials are on the way to a blessed state indeed. They can sit in discussions and drafting notes for hours at a time.

The nicely judged here and now has to be assessed each day. All braces and bit and not much horse. The stretches of careful labour and tedium are nevertheless mercifully interspersed with moments of exhilaration.

All this seems more marked in the case of an international or European official. Having spent over thirty three years in these endeavours - in the United Nations and, since 1973, in the Commission - I have often reflected on the achievements and the longueurs - the glory and satisfaction of doing something worth doing, that has to be done in this generation - and the difficulty of getting it done. The vantage point for assessing the current scene has no equal. And as for what has been achieved, to use a famous expression, eppur si muove.

This is by way of introduction to the pieces brought together in this compilation. Though an exercise in self-expression, the papers were produced within a context and as part of a wider effort. They consist of a selection from speeches and the like which I made during the years I was in DGXIII. The topics range considerably, like the responsibilities of the Commission and the interests I myself had. The following notes put the pieces in their setting.

1. Getting to Grips with Open Systems. National Computer Users Forum. Nottingham, 21 September 1987.

Preparing this paper took three weeks of the summer holidays in 1987, as I sought to understand just what "Open Systems Interconnection" meant and how far the Community has endorsed this. We can now see that hopes were placed too high in an early success for OSI. What has happened in practice, however, has been even wider; it is open systems in general that have moved into prominence and the links with the networks (and their interconnection) have come to the centre of the stage. The paper is, I believe, still worth reading as a statement of a problem that remains on the table, even if the accent is now much more on the applications and the upper levels and beyond.

2. Telecommunications Policy in the European Economic Community. ITU 5th World Telecommunications Forum. Geneva, 23 October 1987.

Telecommunications policy has not merely been one of the successes of the Community, it has become so in a very short time. In 1987 we were virtually at the beginning with the publication of the Green Paper. The speech at the ITU Forum describes the context and what the Commission proposed - virtually all of which has now been adopted.

3. Current Development in OSI. On Line Conference. London, 18 April 1988

Standards determine markets, especially in information technology. This paper clarifies the position under Community legislation, notably in the application of Decision 87/95 which requires Member States "to ensure that reference is made to: European standards and European prestandards" as well as international standards "in public procurement orders relating to information technology so that these standards are used as the basis for the exchange of information and data for systems interoperability" (Article 5 para 1). Are Member States and their purchasing entities following this? Well, we do an annual report but we (and users) should probably be more vigilant.

4. Speech at the opening of the Rank-Xerox EuroPARC. Cambridge, 16 June 1988.

It should really have been Michel Carpentier, but since he was not available I replaced him at the inauguration of the Rank Xerox EuroPARC facility in Cambridge. The speech deals with R&D in comparative terms - which societies do it well and why - and what role the Community plays. It was the first time I had inaugurated a building. My children were not impressed. "Well", they said "maybe next time you can do roads".

5. The Green Paper and Beyond: The Benefits of Competition, Fletcher School of Law and Diplomacy, Boston, 7 April 1989.

The speech records the progress which had been made since the issue of the Green Paper in the summer of 1987. The breakthrough (the first breakthrough) on telecom services came at the end of 1989, but the paper shows how the ground had been laid. The most recent major step was at the Telecoms Council on 16 June 1993, when the Council agreed to the liberalisation of remaining services by 1998. The issue of market access, referred to in the paper, remains on the international agenda.

6. Reflections on IT and EC - Japan Relations, EC-Japan Journalists Conference, Brighton, 21 September 1990

In the course of my career in the Commission I spent five years dealing with Japan. Like most who have undergone such an experience, I was profoundly marked by considering Japan - the nature of its success and of its society. I admire Japan and the efforts its people have made. But the bonding of that society poses great problems for running the multilateral trading system. The paper, done in note form, tries to reflect some of these concerns in the context of IT.

7. Developments in Information Technology in the European Community, Siemens/Nixdorf Users Conference, Antwerp, 2 October 1991

The Commission has made sustained efforts to help IT users - to encourage them to come forward, to find out their wishes, to see what they are doing. We have sought to increase the "market pull" as well as "technology push". The paper given to the Siemens Nixdorf Users places the European IT industry in its world context - the Commission issued a major communication in April 1991 - and proceeds through the analysis. Since Europe is such a large market, why is it not producing better results for European firms? What are the problems? And what are the users doing? The figures given from a major Commission study on IT uptake remain of interest.

8. Commentary on Articles 130F to 130Q. Contribution to a Commentary on the EEC Treaty to be published by the Oxford University Press

Articles 130F to 130Q (the RTD articles) were introduced by the Single European Act. The OUP Commentary proceeds on an article by article basis which presents difficulties when dealing with a series of interlocking provisions. What the Commentary does bring out

is the complexity of the system and the length of the time it takes : three years or so between the launch of a framework programme and implementation through specific research programmes. The double decision-making (first the framework programme, then the specific programmes) together with the distribution of powers between the Council and the Parliament over the budget (the Parliament having the last word) has tended to produce delays and institutional conflict. The Commission proposed a simpler system in its contribution to the Maastricht Treaty but this was not accepted; The commentary describes the existing system in detail; there can be few aspects of the arcane procedures which are not referred to in the text and pinned down in the footnotes. It was written in 1991 and most recently updated in March 1993.

9. The Future of Europe, Conference of the Girls' Schools Association, Amsterdam, 8 November, 1991.

This paper describes Europe as it might be in 20 to 40 years time - the years 2010 to 2030. It was prepared when the Maastricht Treaty was under discussion and had not yet been agreed at the European Council held in December 1991. To avoid commenting on immediate events, I took the course of looking further ahead. What would Europe and, come to that, the world look like in 20 to 40 years time? The standard view is that attempts to forecast the future are doomed to failure and reflect the hopes and fears of the period when they were made. The standard opinion is no doubt correct. But something is to be gained in putting together the main elements - and for me they are two: the change in the economy and society brought about by IT and communications, and the institutional process we call Europe. The scope and ambition of such a paper lead inevitably to mistakes; no one has 20 : 20 future vision. The effort to think one's way through what can be perceived and what may come about is nevertheless one which may serve to clarify intentions and thoughts.

I wish all readers of this and the other papers may be around to see what happens in the years in question - and indeed beyond. While it would be a source of comfort simply to be able to conclude "Magna est Europa atque praevalabit", nothing is irrevocably secured and much remains to be worked for.

**Michael Hardy
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NATIONAL COMPUTER USERS FORUM
TECHNICAL WORKSHOP CONFERENCE
GETTING TO GRIPS WITH USING OPEN SYSTEMS
NOTTINGHAM 21-23 SEPTEMBER 1987

KEYNOTE ADDRESS

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Check against delivery

The subject of this Conference - how open systems are to be implemented - is of central importance for the future course of information technology. The way this issue is handled and the outcome will determine much of the economic structure of the 21st century. The European Community, in particular the Commission, supports the approach that goes under the general title of OSI (Open Systems Interconnexion). I am grateful therefore for the opportunity, and the honour, which you have given me in inviting me to speak today.

I have grouped my remarks under three broad headings, which seem to me to sum up the leading issues

1. Why do we need OSI and OSI standards?
2. What is the mechanism for achieving OSI and producing OSI standards?
3. How far have we got? How will we know when we have achieved Open Systems?

The need for OSI - to enable IT products to interconnect and to interoperate - is in a sense obvious and, I think, accepted by everyone. No one argues against it as a proposition. But before coming to some of the more particular reasons why the European Community, suppliers, users and so on should favour OSI, and be prepared to take the steps that follow from that position, I should like to step back and look at the matter from a different perspective. Let us consider for a moment what the industrial landscape will look like in, say, one or two generations' time. Forecasting the future in exact terms is not given to any man. But the general historical curve along which we move can be discerned, even if the ripples and jolts on the way remain unpredictable. It is, I believe, already apparent that the course on which we have embarked will lead to a coming together of three basic areas: information technology, telecommunications and advanced manufacturing technologies.

Almost in passing one may note that two of these areas scarcely existed twenty or even ten years ago; telecommunications, the oldest, is in the midst of a profound transformation. The future structure will have as its central feature a communications backbone, an infrastructure on a European scale, based on ISDN (Integrated Single Digital Network) and IBC (Integrated Broadband Communication) linking the major industrial sectors. Specialist suppliers will be grouped around these "core areas". The AMT/CIM (Computer Integrated Manufacturing) systems and industrial local area networks which are now being explored and developed by individual firms, will thus be integrated both on a sectoral basis (finance, motor manufacturing, chemical industry and so forth) and, via a European network, with one another and their peers elsewhere. These sectoral circuits will cover all functions: R and D, design, planning (life cycle

costing, inventory control), production, supply and transport, delivery etc. Integrated operations, rather than "stand alone" elements, will be the keynote.

The effort and investment to achieve this pattern will be enormous. The intellectual power generated (and which it will encapsulate) is beyond anything now available. The spread of this system will be uneven. It will be heavily weighted towards the Northern hemisphere; indeed in the initial phases it seems unthinkable that Africa and most of the Third World will be more than witnesses. Within societies the changes will be marked. Social behaviour always has, of course, a much greater inertia than thought. But the shift in education and marketable needs will be substantial. It is not the case that everyone will have to become a computer engineer or a systems analyst. But it will be a much more numerate society, with the dividing line being between those who understand, construct and direct these systems, and those who stand aside. How this in turn will affect society, and human beliefs and attitudes, are matters for wider speculation which we may leave for coming generations. There is, I suggest, sufficient evidence however to show that the overall production and communications pattern I have tried to depict is, with whatever shading of the details, the future that awaits us, the turning that we have already taken.

By building up this picture - which is not I think a straw man but a plausible reality - I have in a sense reversed the usual argument: we need OSI standards to achieve this future. But the dialectic, the "engrenage" of society, works I think in practice a bit differently. It is because this future can be perceived that we will have Open System Interconnexion and OSI standards. OSI is not a matter of abstract reflection, or a political development like, say, world disarmament, or a scientific step such as nuclear fusion which still has to be done: the issue of OSI concerns what can be realised and where the first steps have, when one stops to look, already been taken.

Individuals and societies do not of course gear themselves up simply, and certainly not principally, in order to help future generations. They do things for reasons of the here and now. The more instant factors why OSI is needed and which motive people now can, I think, be summed up fairly shortly.

- (1) The first reason is the nature of the IT products we have. We already have them and we already know that we can get more out of them if interoperability was more widespread. There is a certain technological dynamism, combined with human curiosity, that pulls us forward. Genies do not go back into bottles.

- (2) The European Community is becoming an industrial and economic reality, not just in the sense of lowering internal barriers and conducting an external commercial policy, but in terms of becoming a single economic entity. The pattern whereby, behind an external EC frontier, a series of national industries have co-existed, is changing - the shift in the past five years, even in the past two years, has been remarkable, and it is significant that the IT area has been to the fore¹. There are many reasons for this: economies of scales, the nature of technological advance, the instability of exchange rates, the investment of skills and finance required which, together, have made corporate restructuring and transfers the best option in ensuring specialisation and a reinforced position on the market. This trend is not limited to Europe, particularly not in the case of IT, but has been of

¹ The following cases may be noted as an abbreviated checklist

(a) EC-US	Siemens-GTE CGE-ITT Thomson-GE Bull-Honeywell Olivetti-AT&T	(b) Intra-European:	Philips-Grundig Thomson-Telefunken Olivetti-TriumphAdler/Acorn Mercedes-AEG Asea-Brown Boveri Philips-GEC SGS-Thomson
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special importance on the European scene. The "great market" of a Europe without legal or other barriers is set for 1992. A regional system whereby goods and production will flow across national boundaries the way they do within countries has as a natural corollary that the European Community supports OSI. Only OSI will enable the widest range of firms (and Europe has of course a high proportion of small and medium sized firms) to participate in the new process; only a multivendor approach will ensure effective competition; only OSI standards will prevent conflicting or inconsistent national standards from hindering trade. The choice for the European Community, shared by its Member States, is clear.

- (3) For suppliers, the overall choice lies in the same direction. In the short term, their advantage lies - or has in the past lain - with the investments they have already made in their individual products, in their proprietary advantage. But can these advantages be sustained? The movement to OSI has gained a certain momentum. There are signs that users look increasingly to interworking and connectivity, and that this is reflected in market trends. And overall, of course, as IT expands to further sectors, the gathering tide will lift all boats.
- (4) Users gain an evident advantage from OSI. Their interests are in a sense reflected in the reasons I have just given. The advantages they derive apply whether the matter is looked at in terms of products already purchased (assuming they are compatible with others), in future purchases, in the use and training of staff and, above all, in the greater range of choices which flow from OSI. More options become available in the

equipment and services that can be bought, and easier use can be made of them.

The means whereby OSI has been generated is sufficiently tied to the question of OSI standards that I will concentrate my remarks on the latter aspect. Functional compatibility is a condition sine qua non for OSI in a multivendor and world-wide environment, and that leads inevitably to the question of standards. We can take as a starting point the adoption by the International Standards Organisation (ISO) in 1978 - still less than a decade ago - of the OSI reference model, with its seven layers, from the physical link to the application layer. This was no more than a concept, a way of approaching the problem. Since then we have proceeded to put flesh on the bones. Whether the matter is looked at in terms of the organisational machinery for producing standards or the nature and definition of standards, specifications and profiles, in both instances the past ten years - essentially the past two to five years - have seen a sharp rise in the complexity and sophistication of the arrangements.

At international level the principal body is the ISO (International Standards Organisation), made up of national standards bodies and operating through a series of expert committees and working groups. Since ISO seeks to function on a consensus basis and work at global levels with many players is inherently time consuming, ISO has tended to be slow in reaching agreement and producing standards. This is perhaps an unfair criticism - the task was formidable and a large volume of standards has been generated - but there has been a certain tension between the universal vocation of IT standardisation and the desire to keep up with those making fastest progress in the production of equipment. The IEC (International Electrotechnical Commission) and CCITT (International Telephone and Telegraph Consultative Committee) are likewise involved at international level, the latter being responsible for work in the telecommunications area within the framework of the ITU (International Telecommunications Union).

In Europe the standardisation bodies have coordinated their activities to an increasing extent. CEN (European Committee for Standardisation) and Cenelec (European Committee for Electrotechnical Standardisation), which group the national standards bodies, cooperate closely and share facilities. Coordination between them and CEPT (European Conference of PTTS) is provided by a joint committee (ITSTC: IT Steering Committee) which monitors standardisation activities. The European Community, supported by EFTA, has played a major part in bringing this situation into existence. EC action has followed from the operation of the ESPRIT programme (European Strategic Precompetitive Research Programme for IT), which caused the firms involved to focus on the standards issue, as well as the Community's wider efforts to harmonize national standards.

The result has been the adoption of EC legislation². Summarising the various instruments, the overall effect is as follows:

- The national standards bodies are required to submit their annual work programme. Action may be undertaken to ensure harmonization within the Community. A parallel procedure exists vis-à-vis the PTTS which notify their technical rules.
- Proposals for standards work in particular areas are drawn up by the Commission and submitted for consultation to the Member States' representatives (SOGITS (Senior Officials Group - IT), 83/189 Committee). The Commission then sends standardisation mandates to the European standardisation bodies, asking them to undertake the necessary work. Up to 64 standardisation mandates have so far been issued authorized, of which 33 are already being processed. EFTA follows

² The main instruments are Directive 83/189/EEC (O.J. No L 109, 26.4 1983, p 8); Directive 86/361/EEC (O.J. L 217, 5.8 1986, p 21); and Decision 87/95/EEC (O.J. No L 36, 7.2. 1987, p 31).

a similar course. The EC and EFTA provide a substantial part of the funding of Cen and Cenelec.

Cen and Cenelec examine the requests in expert groups and adopt (after the national bodies have approved by weighted voting) European standards (EN) or European pre-standards (ENV). European standards (ENs) are incorporated into national standards, replacing any inconsistent rules. ENVs serve as forerunners of ENs, enabling stable documents to evolve towards ENs but produced more quickly.

- The position of CEPT, which has not hitherto operated in exactly the same fashion, merits special attention. With the growing convergence of IT and telecommunications, the question has arisen of how the need for standards in this emerging area was to be met. Standardisation of information technology equipment, following in this regard the traditional pattern of other manufacturers, has been a matter which, in the first instance, has concerned the industry, who have had to produce specifications. In telecommunications, on the other hand, with national administrations (the PTTs) in the position of monopoly buyers, there has been less need for standards as such. The matter was looked at in terms of specifications and type approval. The situation has changed however with technological advances (digitization), the possibility of value added services, and the movement which goes under the heading of deregulation and privatisation. This is a major subject in itself which I can do no more than mention in passing. The points which we need to note here are two.

- Cept may be requested to draw up common conformity specifications (known as NETS (Normes européennes de télécommunications) for terminal equipment connected to the public network. The result of tests to see whether equipment conforms to these specifications is recognized

by other Member States. Accordingly when equipment has received a certificate of conformity with NETs it is not necessary to repeat the tests in another Member State.

- In the case of services specifically offered over public networks for the exchange of information and data between information technology systems, the European standards bodies may be requested to draw up functional specifications.³

- Lastly in this summary of EC legislation, I would draw attention to the requirement that, from February 1988, Member States are to ensure that reference is made to ENs and ENVs, and to international standards accepted in the country of the contracting authority, in public procurement orders relating to IT "so that these standards are used as the basis for the exchange of information and data for systems interoperability"⁴.

In addition, telecommunication administrations are required to use functional specifications for the means of access to their public telecommunications networks for those services specifically intended for exchange of information and data between information systems which themselves use these standards⁵.

The general thrust of EC legislation - to develop and apply open systems standards - is evident.

³ A functional specification is defined as "the specification which defines in the field of telecommunications, the application of one or more open system interconnection standards in support of a specific requirement for communication between information technology systems (standards recommended by such organisations as the "Comite international telegraphique et telephonique" (CCITT) or the CEPT)". Decision 87/95/EEC, Article I, para 10 (underlining added).

⁴ Decision 87/95, article 5, para 1

⁵ Ibid, article 5, para 2

At industry level there has been a plethora of efforts. SPAG (Standards Promotion and Application Group) was set up in 1983 by a group of leading companies to foster OSI, notably through the production of technical specifications which can be fed into the standardisation machinery. It is the European counterpart to COS (Corporation for Open Systems) in the US and the Japanese POSI (Promoting Conference for OSI), which are likewise engaged. At a sectoral level there are also the MAP and TOP Users Groups, and a number of more specialised bodies. For present purposes it is enough to recall that the OSI standardisation process concerns all three levels, international, regional and industrial, and that the adoption of a standard (as opposed to a specification) normally entails recourse to an open, public procedure at some stage - it is, in short, a matter of administration.

Before leaving this section, the evolution that has occurred in OSI standards should be noted. As the initial ISO reference model has been refined, OSI standards have become increasingly sophisticated. The ISO standards have been widely drawn, allowing options at a series of points; they have been base standards, relating to individual layers. There has been no assurance that equipment from different firms (or even the same firm) complying with ISO standards would in fact be able to interoperate. There has accordingly been a need to narrow the choice down so as to enable a given function, extending over several layers, to be performed. Spurred on by industry, Europe has taken a lead in the development of such "functional standards", and many of the standardisation mandates which have been issued have been of this kind. The result is thus a more practical set of standards, and this work has now begun to be picked up at international level (ISO-IEC) as well.

III

How far have we got? How will we know when OSI has been achieved? It is the purpose of this Conference to try and determine what the specific answers are to these questions. The papers to be given in the course of the discussion will enable us to see what the position is in the various sectors. It is nevertheless worthwhile, I think, to reflect a moment and to clear the ground in considering the different ways of approaching these issues.

First, let us be clear that technically OSI can be achieved. If enough effort is made, it is possible to get two pieces of equipment or of software to interact or to be used in a compatible way. Leaving aside special cases (the incorporation in the product of features which deliberately cause it to fail if interconnexion efforts are made), it is well within our technical means to achieve interoperability. There are technical difficulties, but they are not an insurmountable, determining element.

Moving on to the next way the question may be put: do we have the necessary standards to make OSI a practical proposition? The answer here is not easy to summarize and we are confronted by a variegated picture. We need standards for all seven layers. The bulk for the lower layers (1 - 4) have been drawn up, certainly in terms of base standards. The upper layers, and especially the application layer, are the most difficult, and will no doubt always remain so. The key issues on which general convergence is now necessary are:

- Message Handling Systems (MHS)
- File Transfer, Access and Management (FTAM)
- Teletex
- Virtual terminals.

Security and network management are also particularly critical. The outstanding issues in the application area are, however, rapidly in the process of being resolved. We are getting to the promised land - and so far it has taken much less than 40 years.

The next question is: well, if technically it can be done, and the standards are being produced (even if some of these need to be refined or developed further), is OSI a practical proposition? To what extent is it actually in use and on what time scale? We are, I believe, on the verge of a more widespread application. The matter can be put, with a certain amount of simplification, in terms of a kind of "hesitation waltz" between the manufacturers and the users. The manufacturers ask: what are user needs? The users say: where is the catalogue? When will I know what is available and whether one item of equipment will interwork with another?

This kind of circular problem can be regarded as the teething pains of a growing industry. There are a number of developments that I would like to mention, not as a complete listing (and some of them will be treated more fully by later speakers) but as illustrations of the kinds of steps now being taken in what, unavoidably, is a major and complicated process.

First, so far as the manufacturers are concerned, a systematic effort has been made to hold joint demonstrations showing OSI interworking between equipment from different firms. At the Hanover Fair in March 1987, 14 major administrations and firms combined to show on a single stand the X400 standard in operation; the demonstration will be extended at TELECOM 87 in October at Geneva.. This has been a substantial undertaking that has helped boost OSI and MHS possibilities. Well publicised campaigns of this kind provide assurance to suppliers and users alike. It is planned to hold a major OSI demonstration event, involving COS, SPAG, POSI and others in the US next year.. This pattern of OSI demonstrations, showing successive advances, will, I think, become a regular feature; once started, individual firms will not want to drop out in case this is

regarded as an indication that they have not kept up with the others and that their products are not as adaptable.

The extent of the work to be undertaken is evidently immense, extending throughout the development and production cycle, from products ready for the market to those at project stage. An item of particular promise is the Esprit project "Basis for a Portable Common Tool Environment" (PCTE) which is being carried out by a consortium led by Bull and including GEC, ICL, Nixdorf, Siemens and Olivetti. The project has designed and implemented a software system to serve as the basis for a complete software engineering environment. What this means in practice is that it is now possible for development tools, from different sources, to be integrated and run on a number of host computers with little or no modification. PCTE uses OSI for interworking between distributed workstations and the interface specifications are now providing the basis for standardisation. This is a significant step of great benefit for European software firms. So far as network management is concerned, the Esprit CARLOS (Communications Architecture for Layered Open Systems) project will provide network based support for the higher-level protocols. The CARLOS components will enable devices of different levels of complexity and degrees of OSI conformance to interwork with network-based (and potentially host-based) OSI applications. Individuals or small user groups will be suited by the OSI-PC terminal, which will be the first personal computer supporting full OSI; individuals with non-OSI terminals will be able to use the services of the OSI-PAD, a modular packet assembler/disassembler, which will support a number of network communications options. On the suppliers side we thus see a series of efforts, from the products placed on the market to public demonstrations, together with cooperative research ventures under EC auspices, that will benefit the industry as a whole.

Turning to developments on the user side, here too a diversity of measures can be found. To take some of the 'leading edge' applications, the Community INSIS and CADDIA programmes that are about to be introduced will enable computerized high-

speed information services to operate between the Community institutions and the administrations of the Member States⁶. Where INSIS is designed for administrative communications in general, CADDIA is focussed on the specific requirements of three sectors: agricultural policy, statistics and customs procedures. Here too there is a link with the "great market" and developments such as the use of a single administrative customs document. The TEDIS programme will apply for the electronic transmission of commercial documents. COSINE/RARE will help the research community. As these programmes, all of which are on an open system basis, come on stream, so OSI will become progressively the established mode. The supplementary infrastructure is also being put in place. The Conformance Testing Scheme (CTS) developed by the European Community and now about to extend to a certification system, whereby products certified as meeting standards are accepted throughout the Community without further procedures, will give a further boost to manufacturers' and users' confidence. Conformance testing has indeed a particularly valuable role to play in the implementation of OSI standards: it will enable users to be assured that a product does in fact conform to OSI standards, as well as providing a feedback mechanism to allow further refinement of standards to take place.

It is evident that users will gain credibility as they become capable of stating their requirements and making commitments. The Government OSI Procurement Project (GOSIP) which has been undertaken in the United Kingdom, with parallel efforts elsewhere (eg. France, United States) will have a major impact. This effort is to be seen as part of the implementation of the public procurement measures in support of OSI soon to be a mandatory requirement under EC legislation. The big purchasers are inevitably public authorities and major concerns in the private sector. As these come

⁶ Information on these and other programmes mentioned in the text is to be found in various publications. On INSIS and CADDIA see in particular the paper by Mr M Bellardinelli, EUROTALCOM'86 Proceedings, p.126. The Esprit "IES NEWS" contains a series of articles (e.g. on CARLOS, 1985 No 2, and PCTE, 1986 No 3).

together, whether in the form of GOSIP - the guidelines drawn up for the purchases of 70 Government departments in the United Kingdom for example - or as specialised groups, such as the European MAP Users Group (EMUG), their influence will be substantial. All users will benefit as OSI spreads and becomes the norm.

An OECD report called the production of OSI standards "the most complex technical project ever undertaken internationally"⁷. I have sometimes hesitated over this description. But if not OSI, what other project is so wide in its scope? This is an effort involving the major economies of the world, not just one or two of them, as has been the case with earlier measures. The range of applications, the extent of the tasks that OSI will make possible, make it hard to find parallels. In the sense in which each generation stands on the shoulders of past generations, we have already achieved something remarkable with the development of information technology and the promise of open systems - and, assuredly, even standing on tiptoe we only glimpse part of what the next generation will see. A new chapter starts to unfold and calls for our attention.

⁷ Mr R. O'Connor "Open Systems Interconnection: Opportunities and Challenges" in The Open System Interconnection (OSI) Challenge, OECD, Feb 1987, at p. 11

5th WORLD TELECOMMUNICATION FORUM - FORUM 87

LEGAL SYMPOSIUM : TELECOMMUNICATIONS TRADE AND SERVICES

TELECOMMUNICATIONS POLICY IN THE EUROPEAN ECONOMIC COMMUNITY

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The telecommunications sector in Europe, like that in other parts of the world, is in the throes of the most radical and extensive change in its history. The basic reasons are well-known and can be summarized under two main headings:

- technological developments - the advances brought about by digitisation, fibre optics, the coming together, in short, of computer and telecommunications technology; and
- the shift in regulatory focus, from stable, monopoly conditions to a situation variously described as liberalization, deregulation, privatisation, reregulation - a situation, however, where the notions of social utility and public function still have their place.

These two poles of discussion are fully familiar to this audience. The third feature, which is special in Europe, and on which I would like to concentrate your attention, is that this process is occurring within the framework of the European Community and needs to be viewed in that light, whether one is considering the internal or the external aspects. Thus, to illustrate some of the main consequences:

- Telecommunications measures cannot be looked at in isolation from other Community policies, whether one is thinking of regional policy, competition rules, freedom to provide services, or external relations.
- The European Community is engaged in the completion of the Single Market by 1992. European integration can only move forward if it has at its disposal efficient networks of information systems and services accessible at low cost.
- The congeries of separate industries which have existed so far, behind the shield of national practices, will be called upon to adjust to the new circumstances. A European industry as such will be called into existence.
- A Community of twelve States and a population of 320 million is a mighty thing. It is not acceptable, in a democratic Community, that there should be marked discrepancies in the economic level of its members. A substantial effort is required, and is being made to reinforce the cohesion of the Community in telecommunications as in other spheres.

The telecommunications sector thus has a crucial contribution to make to the Single Market, to competitiveness and the internal and external cohesion which the Community has adopted as its goals.

Looking at the overall world picture, what do we find ?

- The telecommunications sector will become immensely more important globally. The two speakers who preceded me, Mr Feketekuty and Mr Bressand, gave you chapter and verse for that. In all economies the information market and telecommunications will grow in strategic significance. Telecommunications will increase from approximately two percent of GDP to seven percent or more in most OECD countries by the end of the century.

- It will not be possible for one country or area to derive the benefit of this process unless it has the cooperation of others. This simple and central fact has to be kept constantly in view. A common effort will be required. How is this to be done ? What mechanisms do we have ?

We have heard one answer. Mr Feketekuty's analysis suggests that it will not be possible to have just one negotiation, a simple one-shot process. Something more sophisticated and permanent will be required if anything approaching optimal benefits are to be achieved. For all the importance we may attach to it, the telecommunication sector is of course hardly unique in this respect. The refrain of interdependence, on every leader writer's pen, applies in a host of areas - one has only to think of international financial and monetary arrangements. We are poised, here as elsewhere, between worlds, - technology and its promise pulls us forward, habits of thinking and political institutions, by contrast, are still rooted in an earlier age. The level of economic and technological interdependence which confronts us may not be matched across the board by equivalent political conditions. Mr Feketekuty spoke tellingly of the need to combine the efforts of GATT and ITU and called for intelligent navigation from all who sail in those waters, but the voices of isolationism and protectionism are not absent in the United States, nor indeed elsewhere. And, as so often, the trade pattern of Japan still leaves much to be desired.

What then of Europe ? First the basic, if somewhat approximate, facts. The United States has about 35 percent of the world telecommunications sector, Japan 11% and the European Community, taken together, 20%. Since, however, the European market in this area is still considerably divided and the industry fragmented, this figure is a composite, little more than an arithmetical addition. No Member State represents more than six percent of the world market, and most far less than that. No Telecommunications Administration in any Member State is substantially larger than any of the seven US Regional Holding Companies, which continue to operate under monopoly conditions as far as network provision is concerned. It is estimated that the costs of developing a new public switching system are now such that it is not possible to achieve a viable result unless 8% or more of the world market can be secured¹. Putting these various figures together with the structure of European industry and past patterns, the stake and the issues are evident.

It is not surprising therefore that European countries have undertaken a review of their regulatory framework, that they are extremely conscious of the challenge and of the need to respond to it. Specific accounts of that response have already been given by various speakers in the course of this Symposium. What may have slipped by with perhaps less focussed attention is the extent of industrial restructuring that has occurred over the past two years, and essentially within the last six months. The details are to be found in the pages of the Financial Times, the Economist, the Frankfurter and the like, and I do not propose to go over that ground now. It is sufficient for present purposes to note that there has been a prise de conscience on the part of the leaders of European industry which suggests that the message of 1992 has been received. This is a positive and encouraging sign on the European telecommunications horizon.

¹ Estimate by UNICE (Union of Industries of the European Community).

Besides that, the publication by the Commission of the Green Paper on the Development of the Common Market for Telecommunication Services and Equipment, in June of this year, has served to focus the European debate. The Paper is, let me emphasize, a Green Paper, intended to galvanize discussions ; it is not the last and final word in what will be a complex process. But it has had a favourable reception ; no calls of rejection have been voiced, but rather a note of serious attention. We are thus engaged in Europe in a period of brooding and reflexion, the industrialists re-examining their opportunities, the research workers considering what has to be done if possibilities are to turn into achievements (one thinks of RACE² and its immense promise), and the administrators seeking to determine what the new pattern should be.

There are, as there inevitably are on such occasions, those who cry that the Commission is taking on too much, who wish to slow the pace and put a touch on the brakes, and there are those who fear that the Green Paper proposals do not go far enough, that having struck a balanced formulation, the Commission or the Community will eventually finally settle for something less. This apprehensive category is perhaps particularly to be found outside the Community, although it has vigorous adherents in Europe also. The central phenomenon which needs to be clearly seen and grasped is the double operation on which the European Community is engaged: it is seeking to move internally from a situation characterised by national monopolies and national industries to a Europe-wide market and economy equipped with a fully competitive telecommunications industry ; and at the same time it is conducting this process in the

² The Community RACE programme (R&D in Advanced Communications Technologies in Europe) aims at the introduction of Integrated Broadband Communications (IBC) taking into account the evolving ISDN and national introduction strategies, progressing to Community-wide services by 1995. The programme requires cooperation between a large number of players, including both Telecommunication Administrations and industry. It involves concrete planning for the introduction of broadband services in the Community and a range of pre-normative activities. RACE will provide a major tool for ensuring Community-wide network integrity for the telecommunications infrastructure of the 1990s.

midst of world-wide changes and international negotiations, notably in GATT and the ITU, on the future general framework of the telecommunications sector.

This is not the first time the Community has been engaged in such a double exercise ; it can almost be said to be the norm. The previous occasion which comes to mind and is worth recalling here is the reduction in tariff and similar barriers that occurred in the early 1960s. During that period the Community lowered and removed the internal tariffs and quantitative restrictions that hindered trade between its members. At the same time it constructed its external commercial policy and a single tariff and trade regime (with, let me add, a significantly lower overall tariff level than had previously been the case). This process was successfully carried out. Then as now there were doubters as well as enthusiasts, then as now those outside were apprehensive. But what happened ? In accordance with the happy phrase that a rising tide lifts all boats, there was an expansion of internal (intra-EC) trade as there was of external trade. Both grew. No comparison is exact, but I would point to that precedent and encourage those who have doubts to take heart and look more closely at what it is the Community is trying to do.

The Green Paper focuses on the complementarity between competition and the concept of a wider market. Its basic message is that there must be more competition in a wider market ; the telecommunications sector has to be more open to competition if a single Community-wide market is to be achieved. Only a Europe-wide single market can offer the economies of scale and scope which the new environment entails.

The main policy orientations set out in the Green Paper are the following :³

³ The account given is a summary and the text of the Green Paper should be seen for a further account of the argument and the formulation of proposals.

- As regards first the provision and operation of the network infrastructure, it is accepted that the Telecommunications Administrations should continue to have exclusive or special rights. The central role of the Telecommunications Administrations in the establishment of future generations of the network infrastructure is recognized. This acceptance is made dependent however on the elaboration of a common understanding and definition of network infrastructure provisions.

- So far as services are concerned, a substantial Europe-wide opening up of the market to competition is called for, with the exception, at this stage, of a limited number of basic services, regarded as indispensable to meet public service goals.

Exclusivity in such basic services, reserved to the Telecommunications Administrations, is to be narrowly construed and will be subject to review, particularly in the light of the evolution towards a digital infrastructure. It is apparent that a boundary cannot be fixed once and for all. It will not be acceptable for "reserved services" to be defined so as to extend the service monopoly of a Telecommunications Administration in a way inconsistent with the Treaty ; competition policy will apply. Voice telephone services appear to be the chief candidate for a reserved service ; it is in this case that the "universal user" requirement (a principal criterion for reserved services) applies most obviously and the high proportion of revenue (85 - 90%) derived from voice telephony makes this the chief means of ensuring the maintenance of viable networks.

- In the case of other services, ("competitive services" including in particular "value added services"), there is to be free unrestricted provision, both within and between Member States (in competition with Telecommunications Administrations) for own use, shared use, or provision to third parties.

- Community-wide inter-operability is to be maintained or created, building on existing Community legislation. It is specifically proposed that

"Member States and the Community should ensure and promote provision by the Telecommunications Administrations of efficient European-wide and worldwide communications, in particular regarding those services (be they reserved or competitive) recommended for Community-wide provision"⁴, such as ISDN.

- The distinction between services reserved to the Telecommunications Administrations ("reserved services") and competitive services raises the question of how the conditions of access to the network are to be set. A Community Directive on Open Network Provision (ONP) will therefore define the requirements which Telecommunications Administrations may impose on providers of competitive services for the use of the networks. The common principles to be included in the Directive will cover such matters as network termination points, usage conditions, tariff principles and frequencies. So far as tariffs are concerned, besides greater transparency ("unbundling"), a move towards a more cost-based system is called for.
- So far as terminal equipment is concerned, free unrestricted provision is to be provided, subject to type approval as compatible with Treaty obligations and existing Directives. Provision of the first (conventional) telephone set could be excluded on a temporary basis. It is proposed that "Receive Only Earth Station" (ROES) for satellite down-links should be assimilated to terminal equipment and be subject to type approval only ; in the case of two-way satellite communications systems, limited competition is envisaged on a carefully monitored, case by case basis.

⁴ Green Paper, Summary Report, figure 3

- The regulatory and operational activities of Telecommunications Administrations are to be separated. Regulatory activities concern in particular licensing, type approval and interface specifications, the allocation of frequencies and general surveillance of network usage conditions.
- Since Telecommunications Administrations will retain considerable powers as service providers and as regulatory bodies, there will be a strict review of their operational (commercial) activities, under the competition provisions (Articles 85, 86 and 90 of the EEC Treaty). This applies in particular to the question of cross subsidisation in the competitive services sector and manufacturing. A similar review will be made of private providers (under Articles 85 and 86) to avoid the abuse of a dominant position.
- In the sphere of external relations, besides the general provisions of the Treaty, the Community's common commercial policy will apply in the telecommunications sector. This will be most obviously the case in the GATT negotiations.

I have so far dealt with the Community chiefly from an internal point of view, in order to explain the domestic process and the background against which the Community conducts its trade relations. Turning to the external side, EC exports of telecommunications equipment (including components) last year were 4.3 bn Ecu whilst imports were 3.1 bn Ecu⁵. While there are problems of definition, exchange rate differences and so forth in arriving at exact comparable figures, US and Japanese exports are at roughly the same level as those of the Community. On the import side however, the large scale of US imports (\$ 3.2 bn in 1985)⁶ puts the US into sectoral

⁵ Commission estimate

⁶ Financial Times, World Telecommunications Supplement, 20 October 1987.

deficit, whereas Japanese imports are negligible (\$ 123 m in 1985)⁶. The difference in performance is thus above all on the import side.

So far as the Community's trading pattern is concerned, it had an overall trade balance of 1.2 bn Ecu (1986) in Telecommunications equipment (including components). This surplus has however been falling over the past few years. The deficit with the US was 620 m. Ecu last year, and that with Japan 685 m Ecu, now the largest with any of the Community's trading partners. The Community's position in trade in telecommunications services is more difficult to evaluate, but it is clear that the market in those services which are tradeable is currently dominated internationally by US service providers, although European firms have built up a strong presence in niche markets, such as financial services and a range of videotex based services.

Before looking further at some of these aspects, a general remark. The Community, as I have indicated, is a major exporter of telecommunications equipment, and it should try to attain a similar position in the case of services. The creation of a common market in the telecommunications sector will greatly contribute to improving the Community's competitive position - this is indeed a principal objective of the exercise. It would evidently be a mistake however for the Community to try and undertake this task in a manner which would insulate its market from the rest of the world. As explained in the Green Paper, we have a basic interest in an open competitive international trading environment as the only route to a competitive European industry on the world market. There is no alternative to exposing our industry to a competitive environment and relying on European ingenuity and competence to confront our competitors.

If the Community for its part is determined not to isolate its emerging market, what is the position as regards our principal competitors and suppliers ? Let me take first the United States. Whereas the US has a substantial positive trade balance with the

EC in this sector, it has a heavy deficit with the Pacific countries, particularly Japan, which have largely contributed to the total US deficit in telecommunications equipment of around \$ 2 billion in 1986 (\$ 1.5 billion in 1985). Because of the global US trade deficit, the US Administration is under pressure to respond to what are regarded as unfair obstacles to trade imposed by third countries. The draft trade legislation under consideration by Congress relies heavily on the assumption that the deficit is largely caused by such barriers. The European Community has expressed its concern over the direction of this legislation. The EC opposes the approach of sectoral reciprocity and the threats of mandatory action set out in these proposals. Liberalisation of the US regulatory framework furthermore has not been as extensive or uniform in practice as has been suggested ; the central office and transmission sectors, where the European firms are strong, has shown little change, unlike the customer premises sector which has seen a substantial rise in exports from Pacific countries. In the event that the US should take restrictive action on the lines of the current proposals, the Community has made it clear that it would retaliate.

The effects of such measures, if a chain reaction were started, are evident. The climate of international trade and investment would take a downward turn, the hopes for the GATT Round would receive a setback, and for those of us engaged in the telecommunications sector the glorious vistas we have painted, those technical advances we can achieve, would be dealt a major blow. Telecommunications, as it struggles into a common activity, would thus be particularly affected. Since EC-US relations in the telecommunications area are characterised by close and regular contacts, our hope must be that this risk of unilateral and unjustified measures can be avoided.

Turning now to trade relations with Japan, it has to be said that there is still no noticeable sign of an opening of the Japanese telecommunications equipment market to EC suppliers. EC exports to Japan remain at negligible levels - 39 m Ecus in 1986, as

against imports from Japan of 724 m Ecus. Exports thus represent only 5 percent of imports and Japan is the country with which the Community has the largest, and rising, deficit in telecommunications equipment. EC trade with Japan thus reflects the same pattern as is found in trade between the US and Japan. Since the US manages to sell quite successfully in Europe, and Europe elsewhere in the world, the inference is that the Japanese market is to a large extent closed to both the EC and the US, in this as in other sectors. This is highly regrettable. An opening up of the Japanese market, in terms of actual, substantial trade figures, is one of the most highly desirable conditions for the continued pursuit of world trade.

The principal forum for discussions on the future framework for trade in the telecommunications sector will be the new GATT Round. So far as services are concerned, the current assumption is that all services which can be traded will be covered by a GATT agreement. An essential element in the negotiations will therefore be an agreement on which services are tradeable, the general trend of opinion at the moment appearing to focus on the so-called value-added services. Much of the debate however will turn on the question of what constitutes "appropriate" or "acceptable" regulation, the wavy boundary which, as previous speakers have indicated, will vary over time. The issues considered in the Green Paper will evidently have their international equivalent. Although the discussions on the approach to be taken in the Uruguay Round are still at an early stage, a conceptual framework for trade in services has been drawn up at the OECD and it is likely that all sectors, including telecommunications, will be considered in terms of such a general pattern. Determining the relationship between the overall scheme and particular sectors is a matter which will evidently take a great deal of attention. The concept of "appropriate" or "acceptable" regulation is indeed to some extent a shorthand reference to this forthcoming debate. In the case of trade in telecommunications equipment, the discussion may be expected to focus on the topics of public procurement, technical barriers to trade (e.g. acceptance procedures) and tariffs.

Here too we are only at the opening stages. A point of interest here, and which appears to apply more particularly in the case of telecommunications than most other sectors, is the close relationship between the "services" and "goods" aspects. The thrust of technological developments and the regulatory shift has indeed been to push the industry into an intertwined continuum. We may set the elements apart for the purposes of negotiation, but we will have to put them together in order to conclude the process.

This leads me then to the ITU, whose importance for the Community, as for others, I would wish to emphasise. The Community will continue to support and strengthen the ITU as a principal stabilizing factor in international telecommunications. The ITU World Administrative Telegraph and Telephone Conference, the WATTC, will have a major influence on Community policies, like that of the CCITT in the standards area. It is apparent that GATT and ITU discussions will be drawn into a closer relationship. The typology presented by Mr Feketekuty of the points of emphasis of the two bodies and of those who participate in them, is, I believe, correct. The aspect which may nevertheless be underlined once more is that we will of course need discussions in both institutions, in a more intense pattern than has so far been the case.

In conclusion then it is clear that we will all have much work to do in interesting times. I have sought to set before you the approach which the European Community is following, the circumstances in which it finds itself, the factors which will determine that approach. For the Community the telecommunications sector, on which some sixty percent of the work force will come to depend, is of vital importance. A fully competitive telecommunications industry is a critical component of the future European economy. The European Community, more engaged in trade than either the United States and Japan, accustomed to a constant give and take in internal debate, is aware of the need for agreement and mutual accommodation if this sector is to achieve optimal, viable results. Telecommunications will be more evidently a common international service than

has been the case in the past, and for this to succeed an exceptional effort of intelligent leadership and rationality will be required.

CURRENT DEVELOPMENTS IN OSI

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The paper summarizes the reasons why there is an increasing drive for Open Systems as the use of information technology extends throughout the economy. The Community's move to a single market in 1992 reinforces the trend. A series of legislative measures have been adopted to support the development and use of OSI standards. Under Decision 87/95, public procurement orders are to include references to standards, thus bringing the influence of the public sector to bear in the move to Open Systems.

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Introduction

In recent years the move towards Open Systems has received increasing support and picked up speed and momentum. Basically this is due to the fact that the key parties, the users, the suppliers, the standards bodies and the various administrations involved, have come to recognize the need for intercommunication and thus for standards. We have therefore witnessed the development of an extensive IT OSI standards activity which matches the growth of the industry itself. The result is that acceptable standards are becoming available and are to be found implemented in IT products.

In general the value of standards has been amply demonstrated. They have enabled market growth to continue, with a greater degree of fair competition and user satisfaction in many areas. They represent nevertheless a recent development in the Information Technology sector. The question may be posed why this is so.

Basic Elements

The IT sector has become, in not much more than a decade, a major sector in its own right and a powerful agent of change. The evolution from a largely centralised approach to distributed systems and a range of applications has highlighted the need for a much greater degree of compatibility between equipment. This can only be realised if appropriate standards are available. Without such standards IT equipment cannot be openly and effectively used. The main cases that illustrate this may be summarized as follows:

- Systems that were previously isolated, stand alone units come into increasing contact and need shared data, staff, terminals and networks, within an organization.
- The shift in emphasis from specific-purpose data processing systems to general purpose systems means that flexibility is necessary to cover possible future requirements, linked to information flows and development directions rather than optimisation of current requirements.
- Information technology is coming to be used in an ever wider range of public and private sectors, throughout an administration or an industry. This increases the probability that organisational changes will also impact on IT systems, and so produces another reason for wanting flexibility.
- Fourthly, the expansion in the range of IT products and services has been so great that not even the largest supplier can cover the whole range. Nor will all the products in the range that is covered necessarily be the most competitive in terms of price and performance. Multivendor supply of different systems and components has become the order of the day.
- Lastly, the degree of reliance on information technology by users has reached the stage where being at the mercy of commercial policies and

commercial fortunes of a single supplier becomes an unacceptable risk. Multisourcing has become prudent.

The cumulative effects of such developments are apparent to all. Worldwide user initiatives such as from MAP, TOP, COS, OSITOP, EMUG, etc. seek to increase the effectiveness of the OSI standards process, through the efforts of those who want standards applied in practice. Suppliers, too, have come increasingly to accept this approach, which allows them to sell in a wider environment, without unduly restraining their technical and commercial freedom in the way they design and market their systems.

As a result, the OSI concept has been developed to the point where there exists many levels of integration of Open Systems, with groups of common interoperability. The regional bodies concerned with IT standards-making, which in Europe include groups of established IT manufacturers, e.g. SPAG, the industrial user-driven groups looking at specialised application areas, such as Trade Data Interchange and EDIFACT, or the profile-making activities from both public and private sectors, are beginning to converge to interact in workshop mode. The past year has seen the establishment of the European Workshop for Open Systems (EWOS), grouping suppliers, users and standards bodies. The overall aim of this process is to achieve a global network of interoperable systems.

As part and parcel of this development, there is a need for quality and feedback mechanisms through independent conformance testing and certification; solutions to interoperability will continue to be ongoing and dynamic rather than static goals.

As far as the needs of the European Economic Community are concerned, interconnectability and the exchange of information between different makes of computer are absolute prerequisites in an IT strategy. To this is added the need for cross-border flow of information. The application of OSI standards and profiles is not sufficient if such standards are different between Member States. As you are all aware, the year 1992 has been chosen as the time by which cross-border restrictions will disappear. The objective which the Community, at its highest level, has set itself is to achieve a "unified market", an area of 320 million people in which business may be freely conducted and from which existing obstacles have been removed. It is estimated that by the end of the century some 60 percent of the labour force will be dependent, directly or indirectly, on the IT and telecoms sectors. An effective, competitive IT and telecoms industry is vital for our future.

In the case of IT standardisation therefore, a series of powerful factors come together in Europe

- the drive towards the interworking of equipment
- the need for a unified "economic space".

These are the two fundamental objectives, the underlying reasons, for the Community's approach to IT standardisation.

Integration within the Community can only be achieved if standards, and in particular OSI standards, are harmonised and applied in a similar way in all Member States. The Community has accepted this objective and adopted a series of measures to aid the process, notably through the adoption of Decision 87/95 of 22 December 1986. EC action has followed from the operation of the ESPRIT programme, which is now about to enter into its second phase, as well as the Community's wider efforts to harmonise national standards.

EC Legislation

Summarizing the various instruments which have been adopted, the main elements are briefly as follows:

- The national standards bodies are required to submit their annual work programmes. A parallel procedure exists on the PTT side. In the light of the full range of available information, the Commission draws up proposals for the standards work to be done at European level "to ensure the exchange of information and data and systems interoperability" (Decision 87/95, Art. 2 (a)). In the case where clear provisions do not exist at the international level, allowing uniform application, European standards, prestandards or telecommunication functional specifications may be prepared "having recourse if necessary to the drafting of functional standards, to ensure the precision required by users for exchange of information and data and systems interoperability" (Art. 2 (b)).
- The Commission's proposals are submitted for consultation to the Member States' representatives (Senior Officials Group IT (SOGITS), 83/189 Committee). The Commission then sends standardization mandates to the European standardization bodies asking them to undertake the necessary work. Over 70 standardization mandates have so far been requested, of which over 40 have been accepted as active work items. EFTA also cooperates in this procedure. The EC and EFTA provide a substantial part of the funding of Cen and Cenelec.
- So far as the technical machinery goes, the requests are handled by Cen/Cenelec or Cept expert groups. EWOS, which was established last year within the Cen/Cenelec framework, will allow users and suppliers to participate in the process. When the work of the expert groups has been completed, and the national standards bodies have given their approval (by weighted voting) Cen/Cenelec adopt European standards (EN) or European pre-standards (ENV). European standards (ENs) are incorporated into national standards, replacing any inconsistent provisions. ENVs serve as forerunners of ENs, but produced more quickly and enabling stable documents to evolve towards ENs. Both ENs and ENVs are fully harmonized versions of international standards and therefore preserve total compatibility. At the present time, nearly twenty ENs and ENVs have been completed and approved, covering Local Area Networks, the Package Switched Data Network, MHS and so on. A further eleven are at an advanced state of processing and will be published this year.

- On the telecommunications side, CEPT (the Conference of European PTTs) may be requested to draw up common conformity specifications (known as NETS (Normes européennes de télécommunications)) for terminal equipment connected to the public network. The work to be done in the telecoms sector will be handled in future by the European Telecommunications Standards Institute (ETSI), which was set up last month.

There has thus been a great deal of movement on the European scene over the past two years, and the administrative procedures are still in the process of being refined. But the structure has been set up and the elements are in place to enable us to proceed. Already the notion of functional standards which has been initiated within the Community has made major gains and received international acceptance by the ISO, an important step in the path to more widespread OSI application. You may note that Decision 87/95 defines a functional standard as one "worked out to yield a complex function required to ensure systems interoperability" (Art 1, para 9) and a functional specification as

"The specification which defines in the field of telecommunications, the application of one or more open system interconnection standards in support of a specific requirement for communication between information technology systems (standards recommended by such organizations as the "Comité international télégraphique et téléphonique" (CCITT) or the CEPT" (Art 1, para 10 (underlining added)).

The use of Standards in Public Procurement

The main lines of what I have said above will be reasonably familiar to a number of you. The matter is set out in Decision 87/95, the text of which is available. There is a major element which has not so far received as much attention and which recently came into force under Decision 87/95 in February 1988, and that concerns public procurement. I shall like therefore to concentrate on that aspect in the remainder of my remarks.

The influence which the public sector can bring to bear is evidently considerable. Within the public sector there exists sufficient expertise for a user-supplier dialogue to be authoritative and sufficient purchasing power to influence the market. This has been seen by the effect of Federal procurement in the US in areas such as ADA and COBOL programming languages. Users, particularly large users such as public authorities, have an indispensable role to play in achieving agreed, open system goals. As is stated in the Decision

"the field of public procurement orders is suitably placed to encourage wider acceptance of open systems interconnexion information and data exchange standards through reference to them in purchasing".

Under the Decision therefore, Member States are now under an obligation

- "to ensure that reference is made to:
 - European standards and European prestandards...;

- international standards when accepted in the country of the contracting authorities;
in public procurement orders relating to information technology so that these standards are used as the basis for the exchange of information and data for systems interoperability" (Article 5, para 1)

This means the IT products delivered to public authorities throughout the Community will in future be required to be in accordance with the identified standards, whether purchase, lease or rental is concerned.

The type of standards applicable are defined as those to be used as a basis for "the exchange of information and data for systems interoperability". How the equipment is used will therefore largely determine which particular standards are specified. Standards such as those specifying OSI protocols will in any event be involved. Other standards which can provide a basis for interoperability may also be relevant, such as those for programming languages, etc.

All OSI protocol standards will certainly be applicable, and some non-OSI standards relevant in the case of private Wide Area Networks (WAN) and Local Area Networks (LAN). Equipment used for public telecommunications services is generally excluded (Article 3, para 2) but there is an express requirement that end-to-end communication on the basis of functional standards is to be supported (Article 5, para 2). When equipment has to be connected to a public network, that equipment is covered by another Directive (86/361/EEC) concerned with type approval for the connection of terminals to public networks. Other areas covered by Decision 87/95 include functional standards for communications, text communication standards for protocols, including OSI-related Teletex and Message Handling Systems (MHS) and local interconnection standards.

National standards may be used only indirectly, where European and international standards have been transposed to the national level. They may, as an exception, be referred to in the rare cases where the subject in question covers essentially national needs. Character sets may be cited as an example.

I would mention, in passing, that express provision is made for the inclusion of IT standards when national technical regulations are drafted or amended (Article 6). This requirement will need to be borne in mind by agencies drawing up regulations setting out how IT is to be used in their field of responsibility. By this means technical discrepancies can be reduced or avoided at the regulatory level.

(a) Application

The requirement applies to any public body, at national or local level, irrespective of its field of activity. This includes defence and security forces in as far as their IT administrative purchases are concerned.

There has been considerable discussion of what type of purchasing is involved. Is it primarily hardware, or software as well? Does it cover rental or leasing of services? In effect, the Decision refers to equipment and thus covers hardware and associated software. However, the provision of services will not normally entail the

specification of standards when no equipment is supplied. A case in point would be a private firm supplying data processing services to a public body.

(b) Derogations

Whilst the main aim is to see OSI standards applied in practice, there may be situations where this is difficult or not feasible. The legislation therefore foresees some occasions where standards will not be an immediate requirement. The derogations provided for (in Article 5, para 3) are the following:

- (1) Where the use of ENS, ENVS or international standards is not compatible with the operational continuity in existing systems. This is a recognition of the need to recognize practical realities, to follow a progressive policy. The use of this exception is thus conditional on the definition by the public authorities of "clearly defined and recorded strategies for subsequent transition".
- (2) In the light of the "genuinely innovative nature" of certain projects. This applies to experimental situations, not simply the introduction of new products.
- (3) Where the standard or functional specification in question is technically inadequate or adequate conformity testing measures do not exist.
- (4) Where, after careful consultation of the market, important reasons related to cost-effectiveness make the use of the standard or functional specification inappropriate.
- (5) Finally, in the case of contracts under 100,000 Ecu in value (approx. £ 70,000), other specifications may be applied. This ceiling figure is used in order to avoid unnecessary bureaucracy and paper work, in view of the large number of low value purchases. This is not to say that conformity to standards of low value items is not important ; the provision is, in any case, optional ("contracting authorities, if they consider it necessary, may apply" etc (Art 5, para 7). The ceiling is set to enable the greater part of public procurement in terms of value to be covered, and the expectation is that there will be a roll-on effect from the higher value orders to the lower.

When a public authority wishes the purchase to be considered as an exception, it is under an obligation to record the reasons for the derogation. Other parties have the right to challenge the use of any derogation that is concerned with appropriateness of a standard. If the matter is not settled locally, complaints may then be made to the responsible committee, the Member States Advisory Group to the Commission, SOGITS, or directly to the Commission.

(c) Procedural aspects

A committee, consisting of Senior Officials from trade and communications ministries, is responsible for advising the Commission on policy aspects of the implementation of the Decision (Senior Officials Advisory Group for IT (SOGITS)). They will have the job of advising on the interpretation of the legislation, particularly in cases of challenges to derogations. In that task, they will be assisted by the European forum of public procurement officials known as PPSC, which is already active in preparing contributions to help users to understand the nature and impact of IT standardisation. A useful Guide to the legislation has been prepared under their auspices. Other committees connected with standardisation activities in this sector include the Committee set up under Directive 83/189 and the Senior Officials Group for Telecommunications (SOGT).

The Commission is required to submit a report to the Council and to European Parliament every two years on the implementation of Decision 87/95. The purpose is to assess how the process of implementation is proceeding in the Member States and what measures have been taken to apply IT and OSI standards. In particular, the application of such standards in public procurement contracts and technical regulations will be assessed.

Conclusion

In considering the effectiveness of Decision 87/95 and related Community legislation, the question is raised of whether and how far the underlying issues will be affected. In practice it is likely to prove difficult to separate the impact of the Community legislation and the efforts of suppliers and users. The latter clearly have a considerable role to play, as they formulate their requirements in more precise terms, and turn away from black box solutions. Users are no longer content to find themselves in a captive, one supplier situation or to employ different systems for each application. Their requirement is for a coherent IT infrastructure which preserves the integrity of the organisation's information source and is not dictated by technical constraints. The results of this strategy will thus reinforce the influence of the EC legislation across a broad spectrum of standards related to Information Technology, and stimulate a management interest in quality rather than quantity in this sector. When one thinks of the relative unit costs involved (according to some estimates the human training costs are a 100 times those of hardware), the reasons for open systems which allow staff to function on a range of equipment, are indeed very substantial.

This trend is likely to mean that the incorporation of user-generated profiles in purchasing specifications will become more widespread as users seek to define those specific options left open in the standards themselves. The move in this direction is already well advanced with the GOSIP initiative in the UK and the US. I believe you will hear more on this later in the day.

No application of standards can be successful however without the possibility for the user to check that the product concerned conforms to the standards requirements. The standards to be cited in purchasing contracts will be of limited use in practice if no independent conformance testing services are available. There

has accordingly been much discussion of the setting up of the appropriate structures and procedures of a European IT testing and certification scheme. The Commission has lead the way in this area by launching the development of Conformance Testing Services, to provide conformance tests which are mutually acceptable throughout the Community. Laboratories participating in this scheme operate on the basis of harmonised test suites, procedures and reports, which are ultimately submitted as a contribution to the European and international standardisation process. The test suites cover all areas of ISO/OSI private and public domain, as well as language compilers, graphic systems, buses and software quality assurance. I should stress that only testing activities based on stable standard specifications are being launched. Indeed, a number of proposals are being delayed because the elaboration of the much needed standards concerned are not proceeding at the desired speed.

Finally in conclusion, I should like to sum up what from a European perspective it is hoped the various measures will achieve. A sufficient legal basis now exists in the form of approved Community legislation covering European needs in standardisation. This legislation includes the Directive on the exchange of standards information (Directive 83/189), the type approval for terminals to be connected to networks (Directive 86/361), the public supplies Directive (77/62) and the Decision 87/95 which forms the centrepiece of the Community's IT Standards policy. Implementation of these legal instruments will provide user and supplier in Europe with a sound base to obtain a wider application of IT standards. Having put this legislation in place, the Commission believes it is now up to users, suppliers and the public authorities in the Member States to play their part in achieving the goal. Public procurement will, we hope, provide a substantial impetus, which combines with the other factors previously outlined. Application will of course depend on the rate at which standards are produced. This is something we are assisting at the European level by ensuring that the standards-making infrastructure is capable of rising to the task. The legislation should encourage more users to participate in standardisation activities. The European Workshop on Open Systems in CEN/CENELEC opens an extensive potential here. Only with greater participation and commitment will cheaper standardised solutions be developed.

Although I have particularly emphasized the public user in my remarks, a greater impact of private users formed into effective user groups, may be expected to follow as awareness becomes stronger.

I hope therefore that it will be clearly understood that the Decision is to be seen as a support and stimulus for wider and more active participation in the preparation of IT standards, especially those related to open systems. The process should indeed become self generating, as standards-conformant products appear in larger quantities on the market and as users define their requirements in a joint or wider endeavour. It will thus become easier to pursue policies where suitable migration strategies take precedence over short-term solutions. The Commission is doing its part to provide the overall conditions for the harmonisation that is needed. The underlying trends of market and user demands converge in the direction we want to go, and it should indeed prove possible, by our combined efforts, to achieve the results in terms of open systems and OSI that we all wish to see.

**Speech of
Mr. Michael Hardy
Director,
Directorate-General for Telecommunications, Information Industries
and Innovation
Commission of the European Communities
on the occasion of the
inauguration of RANK XEROX EuroPARC
research facilities**

**Cambridge
16. June 1988**

Check against delivery

The pleasure and honour of being here this morning go far beyond the feeling one usually has at being invited to this kind of ceremony. Not only is Cambridge a splendid and interesting place, not only is the creation of EuroPARC an important event in itself - what is especially pleasing for me is that an EC official is found to be the appropriate person to assist in the inauguration of this research centre. You will not be surprised that I see this as being the right approach. The Community is playing an increasing role in determining the framework of economic activities and related R + D work. And this role is likely to be further strengthened in the future. I can only congratulate Rank Xerox therefore for having included the European dimension in EuroPARC right from the beginning.

Since EuroPARC is a major research facility you will certainly expect me to say something about EC policies and programmes in the field of R + D and how they may affect the future work of this Centre.

Before taking up that aspect, it may be helpful to consider for a moment how research and research policy have moved generally to the forefront of attention. The underlying cause is familiar: modern economies have tended to move from production based on factor endowment in natural resources towards a more capital intensive, and now knowledge intensive basis. This development inevitably places the accent on knowledge (education, research) and how it is to be encouraged, applied and conveyed; research policy and technological development are closely tied and become matters of public concern. While this adjustment is well known, what is often overlooked in the debate on research policy is the position of the non-Western world. Besides the situation of the developing countries,

seeking to achieve "modernisation", the Soviet Union and China are grappling - as they have grappled for a century - with what turns out to be one of the great questions of history: whether modern technological change can be introduced without also accepting changes in social relations, in values and attitudes, and in society itself. It is difficult for us to be certain what the final result may be, but if it proves to be extensive, then modern technological change will indeed be shown to be an "unbound Prometheus" (in the phrase of David Landes) carrying all before it.

There is thus a vital point to be noted here. It is the Western world which has produced this technology and whose structure and values make provision for adjustment, which are indeed geared for change. On both sides of the Atlantic and elsewhere it is common ground that research should be freely pursued and its results applied. This is an approach which we share. Looking at the pattern overall, it is clear that over the past forty years the Western world has shown a remarkable vitality and ability to develop. Despite difficulties and strains, our societies have been capable of furnishing new ideas, new ways of being, new sources of prosperity. And nowhere more so than in Europe, that particular laboratory of social and economic change.

That brings me then to the European Community, where it is possible to trace the evolution of ideas on research and the forms which research cooperation might take. Research and Development have been a feature of EC policies from the creation of the first Community institution, namely the European Coal and Steel Community in the early 1950s, followed by Euratom in 1958. The accent at that time was on natural resources and energy, and the research followed what one

may term the classical pattern. The subsequent creation of the Community's Joint Research Centres and the work of the Commission's Directorate-General "Science, Research and Development" permitted a broadening of the scope of the EC's involvement in R + D and gave a profile to the Community's activities in this field. With the ESPRIT Programme (European Strategic Programme for Research and Development in Information Technology), launched in the early 1980s, the Community took another step forward. The engagement of firms - and the need to improve performance in what was acknowledged to be a crucial sector of the economy - made European cross-border cooperation an acceptable and viable possibility. The practices used in ESPRIT have come to form the model of a range of other Community R + D programmes.

On the basis of these developments, a further move has been taken. The Single European Act, which is the first major amendment of the Treaty of Rome, stipulates that

"The Community's aim shall be to strengthen the scientific and technological basis of European industry and to encourage it to become more competitive at international level".

This new article of the Community's constitution is important under two aspects

- it provides a proper and future oriented legal basis for Community activities in this field,

- it defines Community activities in the field of science and technology in terms of the international competitiveness of European industry.

From mentioning "international competitiveness" there is only a small step to the big issue of "information and communication technologies" which fall under the responsibility of the Directorate General in which I work. Information and communication technologies already represent a turnover of 650 billion USD at world level. By the end of the century, 60 % of the workforce will be engaged in or dependent on these technologies, their development and their use. Thus the importance of these sectors does not need more argument. It would be irresponsible to ignore their significance.

Now - with regard to competitiveness - what is Europe's position in information and communication technologies? The situation in short, is that the Community has been faced with a deteriorating situation vis-à-vis the US and Japan and increasingly also vis-à-vis South-East Asia countries. This is reflected in the trade figures where, although our internal market has grown, we have moved into deficit in the electronics sector. In a number of areas we are holding our own, the rate of deterioration in terms of market share has stabilized, company balance sheets have improved, but the position remains precarious.

So far as R + D is concerned, total R + D expenditure (private and public) in the IT field represents 0.39 % of European GDP (90 % of it being concentrated in 4 countries), compared with 0.51 % in Japan and 0.62 % in the United States. Per capita R + D spending in this

sector is 101 ECU (72 £) per head in the US, 59 ECU (42 £) in Japan, and only 40 ECU (28.5 £) in Europe.

Now - if the sector is so important, if trade figures and figures about R + D expenditure indicate an overall deteriorating situation - what can we do? What can the EC do?

The short answer here is that European cooperation is essential if European competitiveness is to be increased. In the past we have been unable to use the advantages of a large internal market. Besides that, it is not just a matter of programmes and projects, although they have an important role to play. What is required is an overall approach: agreement on the broad conditions that allow research workers, industrialists and all the other economic actors to play their part, to carry out the work they are able and willing to do - in the interest of their companies and organisations as well as in the overall interest of the EC.

Now you may ask, what does this "overall approach" consist of?

I could obviously try to answer by saying that our approach is a genuinely "European" approach as compared to - let's say - the American approach. But that would be too easy and not even really correct. The European Community is made up of a great variety of different cultures, languages, traditions, educational systems, research approaches and so on and so forth. Therefore you cannot really say that there is one European approach. Nevertheless we do not intend - and in fact we would not have the power nor the instruments - to harmonise these varieties, to turn all the different

concepts and approaches into one.

The contrary is true: the approach we have worked out seeks to exploit the variety of thinking, of working, of research methods, but within an agreed framework. This variety is one of the major advantages we have in comparison to our American and Japanese competitors, and we do have the proof that the approach - should I call it the ESPRIT approach ? - works. It has always been part of the European dream that if we could combine our efforts so as to put together the best of which we are capable as individual nations, the results would be remarkable.

I call it ESPRIT approach because much of the thinking and the philosophy behind it has been developed for and within the ESPRIT programme, which continues to be the flagship of Community R + D work in the information technology sector.

The approach works in the sense that ESPRIT partners - and by this I mean big companies, small and medium size enterprises, research institutions

- contribute to the definition of common strategies,
- respect the priorities of precise work-plans,
- collaborate across frontiers in jointly defined projects,
- respect the competitive approach in project submission,

- provide co-financing and
- share the results of their work.

Most of you will know that the first phase of ESPRIT is already completed. The Community put 750 million ECU (£ 535 million) into it with research partners spending the same amount of money on their collaborative work.

ESPRIT II will have of a total budget of ECU 3.2 billion for five years (£ 2.3 billion) 50 % of which will be financed from the Community budget. The first public call for proposals under ESPRIT II has just taken place. We received some 700 proposals, amounting to a total value of 10 billion ECU, in other words roughly three times the total amount available. Since we will not allocate all of the money this year, the competition is extremely tough, with a rigorous evaluation process. The extent of interest in ESPRIT, which has grown with each call for proposals, is a sign of the importance attached to the programme. ESPRIT II will involve some 5.500 research workers and at its peak represent about 30 % of all European precompetitive R + D in information technology.

Besides the considerable technical and scientific results already achieved, what is equally important, maybe even more important, is that ESPRIT has contributed to the creation of a climate which is nurturing wider changes. A degree of self confidence has been regained by European firms, a feeling that it will be possible for them to hold their own. This is reflected in corporate alliances: the number of new corporate alliances between Community firms is

currently running at the same level as partnerships between European and non-European firms. This was not the case four or five years ago. This is a change, and an important change to which ESPRIT has contributed. Let me quote in this connection Jacques Stern, President of Bull, who said at the ESPRIT conference last September that the joint initiative of Bull, Siemens, and ICL in setting up their joint research laboratory was "a purely company initiative, but one that would have been inconceivable had it not been for ESPRIT". There are other examples of that kind which I could cite.

In similar terms I could talk about the RACE programme which addresses the issue of future Integrated Broadband Communication in Europe. RACE is not just a programme for cooperative research and development work. It consists of an attempt, on a continent wide basis, to design a whole scenario for the technologies, infrastructures, services and usages which will be become possible through Integrated Broadband Communication. Advanced communications will have a major influence on the whole way we will work and live.

It is sufficient to mention aspects like

- the numerous new means of access to information sources (audiovisual media, databases, knowledge bases and optical storage, expert systems, etc.),
- the soaring demand for communications (financial and commercial transactions, research networks, international tourism, cultural exchanges, etc.),

- the growing rate of technological innovation (digitization, optical-fibre cable, computer networks, cellular radio, satellites, etc.) and
- the possibilities of decentralized but integrated manufacturing and distribution operations.

IT Application programmes in the field of road transport, education learning methods and health care (DRIVE, DELTA, AIM) are now under consideration in the Council.

This brief survey allows me to turn now to the "internal market issue", of which you are all no doubt aware.

Let me briefly elaborate on this:

The 1957 Treaty of Rome envisaged that the Community's prosperity and, in turn, its political and economic unity would depend on a single, integrated market. And to bring that about it set out specific provisions for the free movement of goods, services, people and capital. It also foresaw that this would need to be backed up by action in other related spheres, such as establishing freedom of competition and developing common legislation where necessary. In spite of this early vision a true common market does not yet fully exist. This is especially ironic as in the minds of most people that is supposed to be the Community's central purpose. Indeed, the European Community is often referred to as "the Common Market".

The importance of the European Single Act lies in the fact that it sets out a precise deadline for the completion of the internal market and

the date is the 31st December 1992. The Single Act thus reflects the renewed political will of the Community, endorsed by the Governments of the Member States, to overcome fragmentation and to complete within a given timeframe, the aims of the original Treaties.

Now: the Single Act says that

"...special account shall be taken of the connection between the common research and development effort, the establishment of the internal market and the implementation of common policies, particularly as regards competition and trade".

The connection between R + D on the one hand and the completion of the internal market is clear. Simply take the example of sophisticated digital switching systems for telecommunications. Europeans invested almost ECU 10 billion in their development, ending up with 9 different systems. Americans invested ECU 5 billion, Japanese ECU 4 billion in the same R + D work. You will not be surprised to hear that the nine European systems were mostly designed for the home market of the country where they had been developed. However: even the biggest of these home markets does not account for more than 5-6 % of the world market, and experts agree that you need a minimum share of 8-10 % of the world market if you want to amortize your R + D investments. The Americans and the Japanese clearly reach this critical threshold and so will the Europeans once they have created their "Common Market".

This illustration brings out the point I made earlier: companies in Europe have tended to operate on too small a scale to acquire the technological capacity or the market share that would allow them to compete or to cooperate internationally from a position of strength. It is only the European dimension of the market that offers the great opportunity of strengthening European competitiveness

- through collaboration in R + D,**
- through the development and application of common standards,**
- through the opening up of public procurement.**

Most of you will know that the Commission is pushing very hard on these issues. In the telecommunications field for instance the Commission's Green Paper, containing our proposals for the progressive opening up of national markets to wider competition has become the reference document for Europe-wide discussion and will define the framework for regulatory adaptation in the Member States.

Let me conclude:

The lack of transnational structures for science, industry and public authorities to cooperate in leading-edge R + D has undoubtedly been one of the greatest handicaps which Europe has had in meeting international competition. The fragmentation into national territories for science and research, which has been the rule up to now in Europe, has prevented an economically rational division of effort that would stimulate productivity and benefit from synergy. Data on

European competitiveness in key technologies show the extent of the problem. The danger which has threatened Europe is the loss of position in main-line growth markets and the future of Europe as a major industrial power depends on how this challenge is met.

1992 provides an opportunity. An internal market of 320 million people will offer scope for new possibilities, new achievements. The accompanying concept of a European Technology Community will help ensure the long-term strengthening of European potential in innovation, paving the way for leading research workers, know-how and capital to be brought together in further projects such as those in ESPRIT. The single internal market will indeed entail the complete opening-up of the research and technological borders in Europe.

It is my understanding and my hope that the creation of the RANK XEROX EuroPARC here in Cambridge gives proof of this spirit of opening-up and commitment to a common endeavour. And it is in this sense that I extend my warmest best wishes in your forthcoming work - in the interest of your company and in the interest of the European Community.

Thank you.

THE GREEN PAPER AND BEYOND: THE BENEFITS OF COMPETITION

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1. Introduction: the European Perspective

In recent years European telecommunications policy has made extensive progress. The measures outlined in the Green Paper¹ and now being introduced will lead to substantial changes in the telecommunications sector. The essential aim of these changes will be to allow services to operate more freely and efficiently on a pan-European basis; the creation, in short, of a European telecommunications space in keeping with the Europe of 1992.

In approaching this topic and the question implicit in the title, it is necessary to see the issue in the context of the evolving European scene. In Europe, as in the United States and elsewhere, telecommunications grew up nationally. The network systems operated independently of one another, under monopoly conditions and official authorization. The ties to equipment manufacturers were close; in the US, it may be recalled, the network operator and the principal equipment manufacturer were indeed members of the same firm. Services were limited to telephony. As in the case of the railways, that other great 19th century invention, the result was a series of centralized systems, radiating out from the capital, providing, with considerable success, a universal service. It was a public function, like other public utilities. Cross frontier connections took place at the periphery; world-wide connections operated under governmental control.

This steady state reacted to the greater complexity of the 1960s and 1970s with relative skill. But as the demand increased for more and faster lines, as the nature of the messages changed from voice to data, as the prospect of an information society moved forward, so the pressure to adapt this structure has mounted. The shift from analogue to digital means, from individual to business communications, has meant that a wider and more flexible form is required. This has led to demands of basically two kinds: pressure for the introduction of new competitive services; and calls for improved network services. Digitisation has already entailed large investments; the introduction of Integrated Single Digital Networks (ISDN) in the late 1980s and early 1990s requires that

¹ Towards a Dynamic European Economy - Green Paper on the Development of the Common Market for Telecommunications Services and Equipment COM (87) 290, June 1987

greater consideration be given to pan-European developments²; and the following generation of Integrated Broadband Communications (IBC) can only be approached on a Continent-wide basis (the RACE programme).

At the same time as these technology-driven events have been gathering force, the galvanizing of European efforts which goes under the name of 1992 has also come into play. Barriers are to be removed; a single European market means more competition; a more efficient industry is to be brought into being. It is accordingly necessary for the economy as a whole that the European telecommunications sector should be improved and, indeed, created, so that European firms are not disadvantaged in world markets.

We have therefore in the telecommunications and information technology sector a double revolution

- a cumulative technological advance, involving digitisation and an explosion in the nature of available services and their economic importance
- an institutional change, as a new level of European integration is achieved.

Whereas the first set of changes has its parallels in other parts of the world, the challenges of the second have to be faced in Europe. To put the matter another way, whilst the United States and Japan could proceed on the basis of a single telecommunications system, a monopoly operating effectively from one end of the country to the other, and a single economy, the Community was not in that position. This aspect has to be clearly seen in order to understand the European situation and the proposals now under consideration.

² ISDN is now the strategic aim for all European Telecommunications Administrations. In the early nineties, 70% of long distance transmission, 50% of long-distance switching, 30% of local switching and a large part of PABXs and technical equipment will be digitized. The Council adopted a recommendation in 1986 on the coordinated introduction of ISDN. A memorandum of understanding is due to be adopted by CEPT providing for pan European ISDN services in 1992.

The point at issue can be illustrated in a number of ways

- The number of trunk lines in Europe is about the same as that in the US. The networks do not operate, however, as a single system. Difficulties remain in interconnexion links.
- While there is pressure to reduce tariffs, the relatively small size of individual networks³ makes it difficult to provide revenue for capital investment on the scale required.
- The principle of a universal service is embedded in the European social fabric, and reflected in legislation. It would not be acceptable to abandon this principle, which has yet to be fully achieved in all parts of the Community.
- The closed nature of equipment markets has meant a duplication of efforts. European firms spent almost 10 billion Ecu in the development of digital switching systems, ending up with nine different systems, whilst US firms spent five billions and the Japanese four billions in the same R&D work. The EC transmission and switching equipment sector is however relatively strong. Collectively the EC represents about 20% of the world market for such equipment.

The task seen from a European perspective is to overcome these deficiencies and to realize this potential; these are the challenges that have to be surmounted in order to provide a telecommunications structure which meets the needs of the Community of post 1992.

2. The Consensus Process

The discussions following the publication of the Green Paper led to a broad consensus, reflected in the resolution adopted in June 1988 by the Council of Ministers giving their endorsement to the main proposals and its overall approach. A series of

³ The larger Member States' networks are approximately the size of a regional Bell operating company, and the others considerably smaller

legislative proposals have been put forward in Member States⁴. There are four principal elements of this consensus, determining action at EC level and at the heart of the national reform debate.

- (1) The trend of liberalisation. The new technological possibilities offer a range of new activities for users and others in the services and terminals field. The Green Paper takes a clear position in favour of liberalisation of the terminal equipment market and far reaching liberalisation of the telecommunications services market, in particular for value added services.
- (2) Participation in the new markets. The Green Paper position is that users, service providers and public telecommunications operators should all be able to participate in the new markets. The Green paper aims at "creating more freedom of action for the European user, for European industry, and for the European Telecommunications Administrations". Europe has clearly voted against any "line of business" restrictions. I believe that a lesson has been learnt here from the United States' de-regulation experience.

This implies a number of changes at Community level:

- regulatory and operational functions must be separated in a more competition-oriented environment. Telecommunications Administrations cannot at the same time be player and referee;

⁴ Reference may be made to the following:

- The Poststrukturgesetz submitted in March 1988 in the Federal Republic of Germany
- In the Netherlands a new law entered into force on 1 January 1989
- Spain adopted its new telecommunications law
- France has adopted important measures on liberalisation of value added services and mobile communications
- In Belgium, Italy and Portugal major steps have been taken in the direction of structural reform
- In the United Kingdom, further liberalisation has occurred following the 1984 Telecommunications Act, with the VADS licence of 1987 and the 1988 move on satellite communications.

- there must be clear rules for Open Network Provision - ONP. Conditions for access to the public network and the most basic public services must be defined in a transparent and open way;
- tariffs must follow overall cost trends; they must be cost-oriented.

- (3) Organizational change. All Member States accept that the organization of the Telecommunications Administrations must be adapted to the new competitive environment. Within the framework of the EC Treaty, this major issue in the national debates is largely a national responsibility. The "Green Paper proposals concentrate on priority issues which must be resolved at Community level for all Member States". They leave out "questions which are important but fall to the national level, such as which status - private or public - is best suited to facing the developing competitive market, and related questions of finance, organization and employment relations".

This is also true for the issue of network competition, which is left to the national level in the Green Paper. The Green Paper accepts the continuation of exclusive rights for the provision of the basic network infrastructure, and for the provision of telephone (voice) for the general public.

It also states that a number of infrastructures/services adjacent to the main network infrastructure need special consideration. This concerns in particular satellite communications, mobile radio communications and cable-TV networks. Satellite communications have been singled out as an area on which a common position must urgently be reached.

- (4) Safe-guarding the integrity of the network. The long-term convergence and integrity of the network must however be safeguarded - an objective strongly endorsed by the EC Council of Ministers in its Resolution of 30 June 1988. The promotion of a strong Europe-wide network infrastructure, integrating fully the peripheral regions of the European Community also, has been a major goal of EC telecommunications policy since 1984. The goal is at the heart of our initiatives and measures in favour of

- the co-ordinated introduction of ISDN;
- the measures to develop the new Europe-wide digital mobile system;

- the promotion of a strong European standards system in telecommunications;
- the strengthening of Europe's technology capability in the sector through the RACE programme, focused on Integrated Broadband Communications;
- the promotion of telecommunications investment in the peripheral regions of the Community, with the STAR programme, financed from the EC's European Regional Development Fund with a total contribution of 780 million ECUs up to 1991 and a roughly equivalent contribution from the countries concerned: Italy, Spain, Portugal, Greece, Ireland, United Kingdom, France.

3. Progress to date

In February 1988 the Commission proposed a detailed schedule of actions up to 1992 in order to implement the goals set out in the Green Paper (annexed). The position reached so far on the main items is summarized below.

- (1) Terminals. In May 1988 the Commission issued a Directive opening up the European market for terminal equipment. Under this instrument, the telecommunications administrations no longer have exclusive rights over putting terminals on the market. The deadline for achieving this objective is the end of 1990. The legal basis for the Commission's action has been challenged in the European Court of Justice by France, joined by Belgium, Germany and Italy. The issue is whether the Directive should have been adopted by the Commission under Article 90(3), or whether action should have been taken under Article 100A, which would have entailed approval by the Council. There is no disagreement on the purpose of the Directive.

The freeing of the market is only part of the story however. The differences in type approval procedures make it necessary that progress should also be made in this regard. A draft EC Directive has been drawn up pursuant to Article 100A, which provides for the approximation of national laws and administrative provisions, so as to require the mutual recognition of type approval procedures for terminal equipment (point 8 of schedule). The approval

gained in one Member State will thus be accepted throughout the Community, instead of the repetition of type approval procedures that now occurs.

Terminal equipment includes receive-only satellite antennae not connected to the public networks, for which the market should be fully open by the end of this year. This provision does not address the overall issue of the future development of satellite communications in Europe, where significant progress towards a European policy may be expected .

- (2) Telecommunications Services. There are a series of points involved here.

The aim for the services market is the liberalisation of value-added services. This is set out in a draft Commission Directive drawn up last year (under Article 90(3)) and now under discussion with the Member States. Because of the need to respect public service obligations, the draft Directive accepts the continuation of exclusive rights for the Telecommunications Administrations regarding voice telephony for the general public. A transition period is foreseen for data transmission services.

Accompanying this is the proposal for Open Network Provision. A draft ONP framework Directive has been submitted to the Council (under Article 100A). The ONP proposal concerns the harmonization of conditions of access to the network, a fundamental issue for the opening up of the services market. Given that European national networks have developed separately, with only loose coordination in the past, this emphasis is essential to achieving this aim. The ONP process differs in this respects from the Open Network Architecture (ONA) process in the United States.

The overall aim of the two measures is to create conditions whereby any service legally offered in the Member State can be offered in another without the need for any additional procedures; a common market in value added service throughout the Community.

- (3) Separation of regulatory and operational functions. This principle is now generally recognized and integrated in all the current national reform projects, though the form it takes will vary between Member States. The separation of the authorities responsible for granting terminal equipment approval from those

responsible for operational activities is required under the Commission Directive on competition in the market for terminal equipment.

- (4) Cost-oriented tariffs. The Council made it clear last June that telecommunications administrations will have to move towards cost-oriented tariffs and the Commission will review progress by 1 January 1992. But this action cannot and need not rely solely on regulatory action; there are also international trends in competition pushing in this direction.
- (5) The Standards-Setting Process. The Green Paper proposal for the creation of a European Telecommunications Standards Institute (ETSI) resulted in a major reform of the standards-setting process. ETSI was established in April 1988 in Sophia Antipolis, near Nice. ETSI members include administrations, telecommunications operators, users and manufacturers. The new process involves transparent public procedures and the adoption of standards after consultation and national voting. Europe needs to be at least as well organized in this respect as the US with its TI Committee and Japan with the TTC. The work undertaken by ETSI is intended to support and supplement that done by CCITT, as part of the Community's efforts to foster open international standardization.
- (6) Opening of procurement markets. The Commission has submitted its proposals for a Directive providing for the opening up of procurement by telecoms operators by 1992. This proposal applies to all telecoms network operators, whether publicly or privately owned, which have received monopoly or special rights. The key to opening up the procurement market lies in bringing transparency into the tendering and award procedures. The measures taken will have to be transparent and capable of being monitored in order to ensure that they are being carried out fairly and without discrimination.

4. Conclusion

In looking down the administrative road leading from the 1987 Green Paper to the 1992 single European market it is easy to lose sight of the extraordinary new possibilities opened up by the technology itself. It is as if a city were to change its transport system from public tramways to private cars. Removing all the traffic lights is not necessarily the best way to resolve traffic problems - the Green Paper is designed to ensure that the traffic lights are coordinated and stay green unless there is a good

reasons to the contrary. As with 1992 overall, deregulation has to be combined with appropriate measures.

Besides legislative and structural steps, efforts have to be made such as the Community's RACE programme, which is optimizing the pre-nominative technological development needed for the rapid introduction of IBC communications that are not only advanced but, most importantly, cost-effective.

And the benefits of competition can only be maximized if they serve the Community overall. That is why the telecoms infrastructure in the peripheral regions of the Community is being upgraded, in close liaison with the national governments, under the STAR programme.

The success of the Europe-wide momentum for reform in telecoms cannot be ensured simply by competition alone - by removing the traffic lights. We have to show that high quality public service is compatible with a more competitive environment; to ensure the continued long-term convergence of telecoms developments; to safeguard the integrity of the network; and to respect the social dimension that is the counterpart of opening up new business opportunities for 1992.

All this takes place in an international context. The Council has called for common positions to be taken on international telecommunications questions. At the World Administrative Telegraph and Telephone Conference (WATTC) held last December, in which the Community participated, all twelve Member States signed the final text, accompanied by a joint declaration that they will apply the new International Telecommunications Regulations in accordance with their obligations under the EEC Treaty.

A further test case will be the treatment of telecommunications issues in the current GATT round, where progress to date is currently under review. EC-EFTA cooperation will have to be further intensified, in the context of an overall evolving relationship. The Community must also use its particular ties with the Third World to ensure that developing countries are included in the on-going information revolution.

The trade area will need careful attention. While the Community continued to have a billion Ecu overall surplus in its telecommunications equipment trade (1987), this picture was flawed by deficits of almost a billion Ecu with Japan and some 500 million

Ecu with the US. The global trade balance - or imbalance - of the Community with Japan in telecoms equipment is indeed at a dangerous level.

So far as the position vis-à-vis the United States is concerned, the situation is now marked by the fact that the US Administration, acting under the Trade Act, has named the Community as a "priority country" for failing to open up its telecoms market. Since the United States has a favourable trade balance with the Community (unlike the position with some of the US's other trading partners), and Europe, as I have sought to explain, is engaged in making sweeping changes towards a more open and competitive environment, there is, in our view, no justification for this action. There are no grounds to lay American difficulties in this sector at Europe's door. The Community is ready, as I have indicated, to conduct negotiations in the context of GATT, but not under the threat of US legislation. A policy of moderation is called for on the part of the US authorities if we are to avoid serious difficulties in this area.

While contributing to the global framework, the Community's most immediate task lies at home. Progress towards a coherent, competitive European telecoms sector has been rapid since the Council took the first decision in this domain, less than five years ago. The broad picture as we look further ahead will be somewhat as follows. The emphasis will be on maintaining high quality public service within a competitive Europe-wide environment. We will see full liberalization of the terminal equipment markets and substantial liberalization of telecommunications services and the use of public networks. The Telecommunications Administrations will turn more and more into commercially oriented enterprises. We will see substantial restructuring and more and more cooperation agreements at the European level in telecommunications services, as we do in the field of telecommunications equipment.

These are far-reaching changes and show what is involved in the current process of implementing the Green Paper in order to provide a more effective and competitive telecommunications sector, a sector that has a primary role to play in making an everyday reality of the Community's 1992 objectives.

**SCHEDULE OF ACTIONS ANNOUNCED FOR THE IMPLEMENTATION OF THE
GREEN PAPER (DOC COM (88) 48)**

1. Rapid full opening of the terminal equipment market to competition by 31 December 1990 at the latest.
2. Progressive opening of the telecommunications services market to competition from 1989 onwards, with all services other than voice, telex and data communications to be opened by 31 December 1989. This should concern in particular all value-added services. Special consideration should apply to telex and packet- and circuit-switched data services
3. Full opening of receive-only antennas not connected to the public network, by 31 December 1989.
4. Progressive implementation of the general principle that tariffs should follow overall costs trends. A review of the situation is to be made by 1 January 1992.
5. Clear separation of regulatory and operational activities.
6. Definition of Open Network Provision (O N P). This is initially to cover access to leased lines, public data networks, and ISDN. Directives to Council to be submitted according to progress of definition work.
7. Establishment of the European Telecommunications Standards Institute.
8. Full mutual recognition of type approval for terminal equipment.
9. Introduction - where this does not yet apply - of value-added tax to telecommunications, by 1 January 1990 at the latest.
10. Guide-lines for the application of competition rules to the telecommunications sector, in order to ensure fair market conditions for all market participants.
11. Opening of the procurement of Telecommunications Administrations.

Reflections on IT and EC-Japan Relations

Michael Hardy

EC-Japan Journalists Conference, 21 September 1990

Introduction

Pleased to have this opportunity to discuss some ideas with you. Remarks are made in a personal capacity. Aim is to show scope and nature of issues, not details of sectors, cases.

1. International Structure. Three political events this year:

1. End of Communism
2. German Unification
3. Gulf Crisis

A year ago, who would have foreseen them? Who did foresee them? Consequences? Cf. Japanese references to internationalisation/globalisation. Japanese commentators do not turn to reflections on the political inter-state system; Europeans more used to this (familiarity with inter-state relations inherent in European history). New international order/restructuring in process. Japan as major non Western industrial participant.

- USSR. Lenin's equation "Communism is Soviet power plus electrification" was correct. Command economy was able to provide heavy industry, and defence. Steel production high (though inefficient). Space. But system incapable of using IT in the economy. System proved inherently unable to create an effective market for IT products. Though individuals were interested, and knowledge spread, IT as such could not flourish. It is incompatible with a State directed economy. Problems of Academy of Science and ineffectual links with industry (let alone market).

- Eastern Germany. The most successful of the East European countries/economies. 40th anniversary was 7 October 1989; still less than a year ago! Horst Sindermann, number 3 in Eastern German hierarchy, described the last Politburo meeting with Gorbachev:

"Gorbachev made a speech that moved me and most of my colleagues deeply. Without being a know all, he urged us to seize our chance, uttering the new famous phrase "he who comes late gets punished by life". Honecker did not agree with Gorbachev at all, but went on and on about the process of the German Democratic Republic and its four-megabit chip. We were all furious and the meeting ended in icy silence. After that we were all agreed that Honecker could not remain Secretary-General" (1).

A remarkable meeting: much to reflect on. DDR invested 14 billion Ostmarks during 1980s in development of 4 Megabit chip. Extraordinary achievement in a way, and a total waste of money. The problem is not just to make but to mass produce; market side non-existent and unable to create it; by the time they had done this, we were a generation further on.

- China. Has always chosen to maintain integrity of the Empire: number 1 rule of Chinese politics. Result: compare standard of living/economic advance of Taiwan, Singapore and Mainland. Compare Tienamen Square and Gorbachev's reforms directed towards a looser structure, institutionally quite like the EC. He knows that "He who comes late" etc, that it is necessary to change the whole system if IT is to achieve its effects. This is a crucial point to understand.

Emerging large structures/actors in emerging international order:

EC : 340 m (incl. East Germany)(+ EFTA etc.)

USSR : 280 m

US : 240 m

JAPAN: 120 m. Only unitary, national state. Others all federations.

2. IT : What is it?

You know, but let me recall. "IT" taken in its widest sense: electronics, telecoms, communications, etc.:

(1) IT now about 5% of GDP of EC . 10% by 2000. Largest single sector

(2) Impact. Necessary to distinguish:

- industry itself ((1) above), and

- effect/involvement with other sectors: enabling technologies. Cars : design, manufacture, content, and traffic system, cannot be conducted without IT. Banking, retailing etc, etc.

(1) Interview in Der Spiegel.

(3) Need to see clearly speed and scope of impact

- 2/3 of work force by 2000

- efficiency of 25-30-40% of economy determined by use of IT.

Conclusion: an advanced market economy = use (development and applications) of IT and communications.

"World global industry" it is said. Means US, Japan and Europe. Japanese speaker (Mr Hara) has just said:

- No one country can do it all

- No one company can achieve all/highest level in all.

What then? What conclusion are we to draw? How do we proceed?

3. What Stage is the IT and Communications Industry at?

The immediate industry is in a deep, and fast, adjustment process. Technology has its own dynamism in our kind of society.

<u>1980s</u>	<u>1990s</u>
Open System price increases	UNIX
Excessive royalty of CISC chips	RISC
Tied maintenance	3rd party
Intransigent PTTS	Liberalisation backlash
Network tie in	Open Systems, ONP, OND

Tremendous innovation - and new low margin world. An industry in transition. Balance/tension of opposites:

<u>Collaboration</u>	<u>Consolidation</u>
Innovation	Commercialisation/ marketing
Start Ups	Financial resources
Regionalisation (US, Japan, EC)	Globalisation
Industry power	User power

Financial resources crucial. Users will be eventual power brokers (e.g. X/OPEN Users Council, MAP, TOP, public authorities, EPHOS, EUROMETHOD) as in most markets, although forum/fora not clear. Commission is working on this: very aware. This is the eventual overall trend. Those with proprietary/largest cash flows (ensured markets) are best placed to weather the transition to this new open systems world and this places most of the Japanese players in good position.

4. Issues

Convergence - From computing (specialised business, data processing) to communication for comparative advantage. (See Japanese performance and that of other large firms, Telecom networks)

Elasticity - \$/MIP, \$/Mbit-sec ratios will fall/continue to fall faster than demand growth due to non-technological limitations

Storage - Storage capacity will explode

The applications are not being developed now to use all this capacity.

Know-how - Present IPR concerns will evolve into new, more clear cut practices. Other forms of know how will replace classic patents and copyright at centre of value system. Remember this is essentially a knowledge/application industry - not materials based or (necessarily) capital based. Royalty flows, over time, may be better test of economy's performance, rather than trade or capital flows.

Summing up: - a new industry; size; impact; structural change; nature of economy and society changed by 2010/2020. May change received economic principles of comparative advantage/factor endowment relating to competition (school of US economists) (see survey in today's Economist 21.9.90). "First to market" may indeed have different effects in IT area, not like classic production of goods.

5. US-Japan-EC

US

One market, one language. Capital. Innovation/Start ups (new players e.g. SUN over past ten years). Education a weakness (but still drawing bright students from developing world). Cohesion/decision-making difficult. Federal system excellent after 200 years for some issues, but great difficulties in forming a view on issues such as those discussed here. Washington machinery has problems.

Japan

- Most protected as a matter of historic fact: protection was most complete until well into the 1970s.
- Government industry leadership/cohesion/consensus formation works best - especially in this sort of area, (cf. IBM in Japan in 1950, 1960, 1970, 1980 and 1990). ICL-Fujitsu deal reported as "Domestic producers vs IBM: confrontation becomes clear cut" in Nihon Keizai Shimbun. Public position of Japanese firms, speakers is "cooperation". Understandable wish of Japan to succeed and to be accepted: if not sure to be accepted, feels uncomfortable.
- Home market held/not shared, in any significant sector (cf. US, EC).
- No real anti-trust enforcement.
- No take overs. Not compatible with Japanese attitudes.
- Oligopolistic; export dependent.
- International cooperation ventures begin: HSFP, IMS.

Europe

- Most divided in industry structure; industry has smaller/weaker firms by comparison with Japan.
- Market largest. Trade deficit in the sector.
- R&D. Single European Act: followed ESPRIT. Technology gap filled/caught up. Standardisation, stress on open systems.
- How serious is the situation of EC IT Industry?

Part of wider shift described above. 3 priority areas:

- need to improve economic returns on R&D efforts by reducing delay in introduction of new products;
- take account of rising development and capital costs;
- planning horizon of R&D projects to be expanded.

World-wide - short product life cycles and low returns on sales. Europe needs wider range of innovative new products in fast developing markets.

- How successful has EC IT effort been so far?

Technology gap shortened/filled. Standardisation. Telecoms policy.

But strong challenges and shifts. It is our responsibility to support, whenever necessary, the business environment of European industry actors in a global context of good and fair market competition.

In retrospect, European industry should perhaps have given even greater weight during past ten years to mass market: consumer products, open systems (OSI, UNIX), key peripherals (displays, drives memories).

- Time for significant change in EC policy?

EC IT policy is changing. Progressive adaptation. Our policy is becoming much more user and market oriented: use of technology. User orientation in standards policy, in IPRs (access to interface information and code decompilation for specific purposes). Users in advisory bodies.

Esprit, Race: 2,200 m Ecu, 1990-1994, and other policies.

Conditions for participation:

- (1) Research effort in Europe
- (2) Firms to find partners, agree to collaborate
- (3) Project to bring added value to technological basis of EC firms
- (4) IPR conditions in contract.

Market and Applications

EC IT policy is about the role of information and communications in the development of a contemporary industrial economy.

- Competition

It is also about competition. Although neutral about the ownership of companies, we are not neutral about the prospect of certain technologies and products becoming concentrated in the hands of a few Japanese and/or US companies. There have to be several autonomous sources of supply of all the major components and systems. This is in global as well as European interests, and we will act as necessary to ensure this result, which may indeed involve cooperation on a case by case basis with US and Japanese companies.

Vice-President Pandolfi has initiated steps with the US. Less advanced with Japan.

EC Merger Regulation: Reciprocity aspect to be noted (cf. F.T. article on 21.9). Boone Pickens incident to be pursued at another level?

US: Exon Florio. Proposal that ventures over 30% foreign owned to be excluded from proposed extension of anti-trust exemption for joint production ventures. EC has no such measures.

Thus: access/conditions of access in fact not equal if we compare Japan, US, EC. This has to be stated and borne in mind as we talk of cooperation and the conditions under which it can take place.

5. Conclusion

Vice-Ministers of MITI are all capable and important men. Perhaps amongst the 100-200 most powerful men in the world today, together with their opposite number in the Ministry of Finance. When I was dealing with Japan on a more daily basis, I was very impressed by Mr Naohira Amaya. He struck me - indeed I think all who met him - as a man with an exceptional depth and range of view.

He once wrote:

"If the world were ideally free and open, the Japanese economy should take every opportunity to make itself the head office in the international economy. In other words, she should disperse her factories, which consume large quantities of natural resources and extensively affect the environment, around the globe and concentrate the head office functions in Japan. Such functions would include data gathering and processing, decision-making, banking, insurance, distribution, R&D (research and development), studies, art, entertainment, and also high value added industries which process materials into highly sophisticated goods. If this direction were adopted, the knowledge intensification of the supply structure in Japan would make a remarkable progress" (2).

This is a quotation which leads one to pause. On the basis of Japan's achievements, one can see how this could seem a vision rationally within reach, a tempting culmination of Japan's effort over a century. But as Mr Amaya went on to say - I said he was a wise as well as clever man - "However, the assumption that the world is ideally free and open is not necessarily a realistic one".

In the paradoxical way in which success leads on to change and more change, so as to undermine its own foundation, Japan will be called upon to make further adjustment as part of the overall process I have sketched out, just as Europe will. Japan will, in short, have to adapt its internal situation, in order to maintain multilateral economic stability and prosperity, and abandon the "narrow island view". It will not be enough just to consider how the external behaviour of Japanese firms should be conducted, how Japanese management is to be adjusted to fit practices in Europe and the US etc. What happens in Japan itself will be crucial: a closer integration there too is required. In return Japan can have a closer and firmer relationship with Europe, on which it will be able to rely more confidently as a partner. In this two-way street it will be a primary task for the Europeans to make their own positive response to Japan; we have to find means of cooperating together in ways which ensure effective, mutual benefit.

(2) "A look at knowledge intensification from the viewpoint of cultural history: Japan Reporting, 5, 1975. He also once said "The trouble with dealing with Europe is that it is like playing golf with a man whose handicap is 25, but who does not know he is as bad as that".

**5th International Congress of
Siemens / Nixdorf IT users**

- Antwerp, 2 - 4 October 1991 -

Developments in information technology in the European Community

**Speech delivered by
Mr Michael Hardy
Director for General Affairs,
Directorate General for Telecommunications,
Information Industries and Innovation,
Commission of the European Communities**

Check against delivery

Mr Chairman, Ladies and Gentlemen,

The title of my contribution "Developments in Information Technology in the European Community" is particularly ambitious, but then, so is the industry with which it deals. The position of the European IT industry and the future well being of the European Community are indeed closely connected. Over the past year the Commission has given a great deal of attention to the state of the industry and in April it issued a major communication:

The European Electronics and Information Technology Industry -
State of Play, Issues at Stake and Proposals for Action.

The report has been widely distributed and discussions are now under way on the steps to be taken to implement the report, to give substance to the recommendations. The present meeting of Siemens Nixdorf Users, and the fact that you have been kind enough to invite me to speak today, may be seen as part of this overall process. As you may also have seen from the press, a meeting was held last week at which Mr Hans Dieter Wiedig and other industry leaders discussed the issues. We are, in short, in the midst of a major debate.

It is not possible in the time available for me to try to cover all the factors and every aspect in depth, or to repeat all that is in the Commission's report. Copies of the report are available, in Community languages, I might add, and the excellent secretariat of the Siemens Nixdorf Users might consider distributing it to members. It constitutes, I would say, part of the basic documentation, a bench mark, which needs to be in the "permanent additions to the literature" category for those concerned with the European IT industry.

But it would be useful nonetheless if I were to attempt to sketch out the main outlines of the field and context, before turning more specifically to remarks of particular concern to IT users. Stepping back a little and taking a broad view, we may say that Europe is currently undergoing a double revolution or, if that word is too strong, a period of radical change. There is:

- First, the process of institutional or constitutional change. This in turn has two main aspects:
 - The Inter-Governmental Conferences and Treaty drafts which will be considered at Maastricht in December. These flow from the 1992 exercise of which you are well aware.
 - The changes on the European political scene. The developments in Central and Eastern Europe are familiar. The emerging "European Economic Area" involving the EFTA countries has received less attention but is of great significance.
- Besides these institutional shifts, there is, secondly, the introduction, the growing penetration, of information technology in economic and daily life.

It is always difficult to cope with periods of radical change; to have two major streams of development at the same time is hard to comprehend. But the issues have to be seen, the relationship between these various changes, the concepts, perceived and brought home in public debate, if we in Europe are to "manage" this period successfully.

With this by way of general introduction, let me turn to the IT and electronics industry. It is, first, already a major industry or group of industries in its own right, comparable in size to the motor industry or the chemical industry.

- World-wide turnover 700 billion Ecu (1990), with an EC-wide turnover of 175 billion Ecu. The market now represents 5% of GDP and will be nearing 10% by the year 2000.

But besides the activities of the industry as such, the importance of the sector resides above all in the fact that IT is an enabling technology. The hardware, software and applications systems are used or capable of being used in virtually all economic and social activities (though not yet to an equal degree - a point to which I will return). The competitiveness and effectiveness of modern industry and services, including public services, depends increasingly on information technology.

It follows from this that the impact on employment is considerable. It is estimated that between 60 and 65% (two-thirds) of the working population is directly or indirectly affected by these technologies and their applications.

If this is the overall situation, where does the European IT industry stand? It is agreed I think, that despite the efforts that have been made and the extensive restructuring undertaken, the European industry has weaknesses and shortcomings which need to be addressed.

I do not want to belabour you with too many figures and statistics, but a closer look at the production and market reality help in understanding the situation:

- In semiconductors, Japan has a 49.5% share of production, compared with 36.5% for the United States and 10% for Europe.
- 49% of computer peripherals are manufactured in Japan, 25% in the United States. Production in Europe accounts for only about 15%.
- In consumer electronics, Japan accounts for 55% of world production and controls 99% of its domestic production, 27% of production in Europe and 21% of US production. EC industry produces some 20% of the world total.
- In computers, production in Europe covers only two-thirds of internal demand, and 60% is accounted for by firms of US origin, such as IBM, DEC and Hewlett-Packard. After staging a significant recovery between 1984 and 1987, the Community industry has again lost ground in Europe.

Overall therefore we have to note that the demand for electronics and IT products and services in Europe is only met to a limited extent from European sources. Production in Europe covers about 75% of consumption in the electronics and IT sector, as compared with 140% in Japan. This imbalance has generated a trade deficit in Europe which has worsened since the early 1980s. For electronics as a whole, the deficit was 31 billion Ecu in Europe compared with a surplus of 57 billion Ecu in Japan and a deficit of 7 billion Ecu in the United States. In terms of products, Europe's deficit is mainly attributable to trade in components, computers and consumer electronics, where in 1989 the deficits were 5.6, 15.3 and 9.6 billion Ecus respectively.

This balance of trade position is significant, not so much in itself - the Community strongly supports a multilateral trading system - as in its indication that the Community industry is not sufficiently competitive in the world in which it finds itself.

In the annual Datamation list of the top 100 global information technology vendors, 61 are USA based, 22 are European and 17 are from South-East Asia. In terms of the total sales by these 100 vendors, 61% are by American suppliers, 22% by Japanese suppliers and only 17% by European suppliers.

Given a total European market of around 90 billion Ecu for computer hardware, software and services, these figures suggest that the European vendors probably hold little more than 50% of their home market and small parts of markets outside Europe.

So if one returns to my point of departure - the importance, actual and increasing, of information technology - it is evident that we in Europe have cause for concern. The Commission's paper seeks to take stock of the situation and to suggest what might be done. This is a matter in the first instance of course for the industry itself and individual companies to consider. But the issues and stakes are such as to merit wider examination, in particular as regards the "user issue" - the rôle of users in the broadest sense as encompassing demand conditions and IT applications - the take up of IT in short.

Historically three main categories of users have shaped the overall context of IT development, the structure of demand and the features of the market.

First, the public authorities. Public procurement, which now represents about 15% of the market, has had a marked impact that extends over the sector as a whole. In the past, public procurement involved heavy and extensive equipment. Orders placed by national public bodies, such as for mainframe computers or telephone exchanges tended to create captive, protected markets throughout the world. Public procurement helped national champions to emerge and proprietary standards, often incompatible, to develop. These features are blurring; public procurement has increasingly to deal with the emergence of distributed products and systems. In Europe furthermore, with the completion of the internal market, public procurement is being opened up to competition. This then raises further issues. Will European firms be able to take advantage of the opportunities provided for them? European IT and electronics firms have inherited a dependence on national buyers, proprietary standards and telecommunications infrastructures which are not properly interconnected at European level. The European market is still fragmented, limiting the possibilities of economies of scale and reducing size and networking effects.

Secondly, there is the position of the purchasing companies. They, like their competitors elsewhere in the world, face a two-fold challenge: to obtain the most innovative IT products, under optimum price and performance conditions; and to integrate these products in their current operations. This raises the question of the capacity of European producers to respond. Close relations between manufacturing and user firms, the existence of a large market for standardized hardware and applications, and the presence of leading-edge users, are now preconditions for a strong IT and electronics industry. Although the position varies from sector to sector, the situation is on the whole less favourable in Europe in these respects than it is in the United States and especially in Japan.

Thirdly, individual consumers and the widening product range. Much of the IT sector, notably for hardware and components, is taking on the character of a mass or consumer market, with severe demands in terms of cost and quality. The vertically integrated firms, provided they have the scale required - and here consumer electronics have an important part to play - have on the whole been in a better position to respond than firms which have concentrated on given types of equipment. The market is highly competitive, subject to a high rate of innovation and involves taking major risks in introducing new products and de facto standards. To remain competitive and "in the game", firms must sustain a high R&D effort and have substantial financial, production and commercial resources.

So - and this will not come as a surprise to you - it is a battleground out there. Or, to put the matter more precisely, Europe is confronted with a major challenge in determining how it should proceed and what steps it should take to ensure a positive outcome so far as its own stake is concerned.

The Commission communication sets out a response in a series of action lines covering the requirements of demand, technology, training, external relations and the business environment. It is not possible to this afternoon go over these proposals in detail, although I will say something about them in the course of my remarks. I would again recommend that you get hold of the document and see what it says. Since I imagine that most participants here represent the second type of user, namely a professional IT user in a firm which is aware of the importance of IT for its operations, I would like to put forward some thoughts related particularly to this category of user - the informed but not uncritical user, shall we say, who wants value for his money and to know where the industry is going.

As you know from your own experience - it is always a pleasure I find to speak to an IT audience each member of which has his story to tell - the rôle of IT products and services has extended over the past decade, from administrative operations to a range of functional applications. Available information suggests that Europe is relatively behind its two main competitors in the diffusion and use of the new technologies. Let me quote - as an illustration - the amounts which American, Japanese and European companies spend on average on information and communications technologies:

The US have a clear lead with 2,149 Ecu per year and per employee, followed by Japan with 1,613 Ecu and Europe lagging behind with 1,264 Ecu of IT investment per employee per year.

I leave aside the question whether the average investment is reflected in corresponding return on expenditure. This is obviously difficult to calculate at a global level. Also I do not want to address the problem of uneven expenditure in the various EC Member States: the situation in Germany and France is obviously different from that in Greece and Portugal.

What I would like to do instead is to consider the link between what I said before about the difficulties of European companies in the IT sector and the apparent needs and opportunities on the side of the users. The link is to be established in considering the question: Could a greater implication of the users, together with a better understanding of their needs, have helped to create a firmer basis for medium and long term projections and objectives, on which European manufacturers could rely and have not really been able to formulate in the past?

We in the EC Commission believe that the reply to this question is yes. Yes, manufacturers should make greater efforts to develop and produce goods corresponding to the real needs of the users. But yes, users also need to learn how to improve the articulation of their needs and requirements, how to coordinate their views and wishes. We do not think that this in itself will be sufficient to solve all problems at a stroke; we have no illusions that this is a simple matter. But we do consider it a crucial part of the overall approach we in Europe need to adopt.

This approach requires an open and fair dialogue between all parties concerned, and we believe that such a dialogue needs the Community dimension; corporate or national efforts are not sufficient by themselves to meet the scale of the problems. A comprehensive endeavour by all the main parties is called for.

Let me say a few words about how the EC and more specifically the Commission tries to initiate and promote this process of better and more frequent interaction between users and manufacturers.

Now we tend to believe that we know something about manufacturers; but we know somewhat less about "the user", about national or sectoral particularities, about the structure and organisation of individual interests. We therefore commissioned a major study on information and communications technologies users in Europe which has been delivered recently and which we have started to evaluate in order to draw the necessary policy conclusions and prepare a possible operational follow-up.

One of the interesting results of the study was an attempt to categorize users according to their overall strategies towards information and communications technologies. The study distinguished three main types of users:

- (1) *Leading edge users.* These are the firms which have the longest term and one may say the clearest vision of the rôle of information and communication technologies in their organization. They seek to capture the future potential of information and communication technologies.

Typically this may involve them in major projects whose objective is to ensure that they are the first or one of the leaders in the development of a new strategic application. These users may also take action to secure permanent leadership, for instance by acquiring suppliers of technology or setting up their own separate divisions. A number of vehicle companies have done this in order to secure their positions in the vehicle electronics field. These users also tend to be active in participating in research programmes and industry forums.

- (2) A second group may be considered as *implementers of established practice.* These organisations will not innovate and may consciously avoid innovation as too risky. They will look to implement major applications only once they have been successfully implemented in other organisations. On the other hand they will often behave in a highly competitive way and seek to ensure that they are not left significantly behind in the implementation of competitive information and communication technologies.
- (3) A final group may be considered as *followers*, organisations who will follow some distance behind. They may be constrained by lack of finance, skills, awareness of developments or by factors in their environment, such as the lack of efficient networks.

Of course some organisations may be leading edge for some applications and followers in others. Thus in vehicle manufacturing, particular firms are leaders for the development of robotics while others were leading edge for the development of networks linking dealers.

It is clear that the number of firms which are leading-edge users is very limited. There are two important conditions for being a leading edge user:

- Preparedness to engage in a form of risk capital venture. A leading edge user is by definition engaging in a venture, with probably a high level of investment and a high level of risk.
- Having the potential to reap substantial benefits from the investment. It will tend to be users with very high absolute levels of potential gain who will be prepared to make this kind of investment.

Accordingly the leading-edge user tends to be an organisation capable of taking large risks, which already is an indication that they are likely to be relatively few. The study suggests furthermore that they are probably very unevenly distributed between sectors. In sectors such as aerospace and vehicle manufacturing with very large users and very high potential benefits, there are a number of firms who have taken leading edge positions in specific applications. Even in these sectors it is not clear that a leading edge user might be found

for all strategic applications. On the other hand in more fragmented sectors it is not clear that there are any firms ready to take the risks involved.

One of the features to emerge from the study, indeed one of the reasons for undertaking it, is the breakdown between sectors. In terms of expenditure by sector, the percentages were estimated to be as follows:

Manufacturing	23.1%
Banking, Insurance, Financial Services	21.5%
Public Administration	14.9%
Retail, Wholesale Distribution	9.2%
Social, Personal	7.6%
Transport, Communications	7.2%
Others	16.5%

The expenditure per employee in the various sectors is a more revealing set of figures, because it shows which areas have, as a whole, made the greater investment, where the IT penetration has gone furthest.

	<u>Ecu expenditure per employee</u>
Banking, Insurance, Financial Services	4,769
Utilities	3,028
Restaurants, hotels	2,893
Mining	2,224
Transport, Communications	1,518
Public Administration	1,238
Social, Personal	1,261
Manufacturing	1,010
Distribution	758
Construction	587
Agriculture	251
Average	1,269

We could each of us, I imagine, easily and happily set about commenting on those figures and saying what they mean. I will limit myself to commenting on one striking feature, namely the amount spent per employee in the banking and financial services sector - nearly 5,000 Ecu per head - and that for manufacturing, of just over 1,000 Ecu. Although it is discovering a rather obvious piece of history, the fact is that banks had the means and the know-how to move similar kinds of data on their own networks (head office and branches, etc). Manufacturing, on the other hand, encountered many more problems; it is dealing with a wider range of functions (design, production, sales, etc) and varying outside contact points in each case. Thus introducing IT in manufacturing has on the whole been a more difficult task. Lastly, whereas banks knew that they had to informatize once their competitors did so, the manufacturing sector has proceeded more slowly even though - and this is an extremely important point - the productivity benefits from the introduction of IT in manufacturing are often easier to demonstrate than in many service sectors.

The analytical and methodological aspect of the "user study" is without doubt important and interesting. What may be even more interesting for you as users is the possible operational follow-up. No decisions have been taken yet, but amongst the proposals is one for improving the means at Community level by which to measure the progress of the diffusion and impact of IT; to identify obstacles to diffusion and to assess the potential gains; to assist the Commission in its efforts to further this process; and to monitor developments world-wide. It is not that we have not attempted to cover these matters in the past, but we would now proceed to do so in a more systematic and comprehensive way.

The steps to be taken on the organisational side so as to provide a structure for the representation of users and user bodies at Community level is also considered in the report, a matter which we have been studying ourselves for some time. There is certainly scope for a broad based body which would enable a range of information and communication technology users interests to be represented and to channel their views to Community instances and others.

A further recommendation in the study is to encourage greater user involvement in Community R&D programmes. The Commission is fully in favour of this suggestion, which echoes one of the points made in the Commission IT communication. The application orientation of our R&D programmes has to be strengthened, and for this to be effective then, for the reasons I outlined earlier, users have to be involved at an early stage. By that means users will be able to help industry to pull research results and technology through to the market place.

The "Telematics" programme which is part of the Community's "Third Framework Programme for Research and Technological Development" is designed to achieve this interaction. This programme addresses problems concerning the use of advanced technologies and communication services in areas of general interest. Let me mention two of these areas of general interest in order to illustrate our overall thinking and planning. In the field of *medicine and health care* it is not sufficient to develop and manufacture sophisticated equipment which subsequently will not be taken up because it does not respond to the needs of users and service providers further down the chain. What is required therefore is to provide for the cooperation of medical doctors, representatives of hospitals, health care organisations, insurance bodies and of the IT industry in order to develop products and services for which there will be an appropriate market uptake. That is what has been successfully tried out within the AIM exploratory action and what we will try to continue within the "Telematics" programme.

A second area is that of *public administration* where there is agreement on the need to interconnect, through trans-European communication networks and services, those public administrations which are particularly important for the functioning of the Single Market - customs services and statistical offices, immigration police and social security organisations, etc. Here again it would not make sense for manufacturers and network operators to go ahead with the development and commercialisation of their offerings without having involved the end users in determining the infrastructures and services required. We all know by experience that missing the opportunity of early end-user involvement can lead to heavy losses; in order to gain the "first to market" benefits the supplier needs a close knowledge of just what it is that the customer wants and when.

So much for application and user orientation of Community R&D with specific reference to the Telematics programme. What has been said in this context is - *mütatis mütandis* - also true for the other well known major programmes ESPRIT and RACE. In all of these areas we need to proceed by way of a closer involvement of users and producers, including public authorities and Community bodies where appropriate, as part of the process of building up a common view, a consensus, on what needs to be done.

Let me add a word about the problem of standards and open systems which is of concern to both users and manufacturers.

The Commission and Member States have made major efforts to move towards open IT systems, and Community legislation provides for the recognition of common standards in order to foster the elimination of barriers to trade. These goals have been embodied in the well publicised schedule for the completion of the internal market by the end of 1992.

In the domain of information technology and communications, the "openness" relates to implementation of common standards for the exchange of information between computing systems. The common standards may come from the official consensus mechanisms provided at world level by ISO, IEC and CCITT and at European level by CEN, CENELEC and ETSI. The application of these common standards has been the subject of EC legislation since they reflect an important objective for the Community.

The ever widening number of procurers of IT&T systems, and even some of the suppliers, are in some danger of being overwhelmed by the increasing volume and complexity of IT&T standards. They need however to refer to these standards in order to achieve the desired openness and mobility of information and people. In recognition of this problem, the public procurement officials of the EC Member States, together with the Commission, have launched the European Procurement Handbook for Open Systems (EPHOS) initiative. The initiative is aimed at simplifying the procurers' task in this difficult area.

The interconnection of public administration, or the creation of the European Nervous System as we tend to say in our jargon and to which I made reference before, is expected to give further emphasis to the EPHOS exercise.

In a medium-term perspective the EPHOS project is targeted at more than the Member States' public procurement agencies. Initiatives are planned to ensure the applicability and usability of the EPHOS consensus handbook in other potential user domains, in particular large private procurement organisations, management of telecommunications networks and Small and Medium Enterprises (SMEs).

In this area, as in others therefore, the widening of applicability - which is one way of describing the central theme of my remarks - will depend on bringing the supplying and consuming parties together.

In conclusion, it is clear that we will all have work to do, a contribution to make, in ensuring that a coherent European strategy and response is developed. It will not be the purpose of that strategy to provide for the well being of the European IT industry as an end in itself but to ensure that that industry and those other branches of the economy which buy and use IT products and services together may flourish, since it is only in that way that the future prosperity of our society and the competitiveness of European industry can be secured and advanced. The difficulties and stakes are substantial. In my remarks this afternoon I have tried to set out some thoughts on one crucial part of our task: the importance of the user and the rôle the user is called upon to play. I hope you will reflect on my remarks and see if you can find thoughts and suggestions on which you will be able to build, that you will be able to put to use, as your contribution to a substantial undertaking, hard to tackle, but on which Europe is now engaged.

COMMENTARY ON ARTICLES

130F TO 130Q.

CONTRIBUTION TO COMMENTARY

ON THE EUROPEAN COMMUNITY TREATY

· ARTICLE 130f ·

1. *The Community's aim shall be to strengthen the scientific and technological basis of European industry and to encourage it to become more competitive at international level.*

2. *In order to achieve this, it shall encourage undertakings including small and medium-sized undertakings, research centres, and universities in their research and technological activities; it shall support their efforts to co-operate with one another, aiming, notably, at enabling undertakings to exploit the Community's internal market potential to the full, in particular through the opening up of national public contracts, the definition of common standards, and the removal of legal and fiscal barriers to that co-operation.*

3. *In the achievement of these aims, special account shall be taken of the connection between the common research and technological development effort, the establishment of the internal market and the implementation of common policies, particularly as regards competition and trade.*

COMMENTARY

The aims and means for the conduct of Community policy in research and technological development (RTD) are set out in Articles 130f to 130q of Title VI. They were added to Part Three of the EEC Treaty by the Single European Act in 1987. The Community was thus provided for the first time with clear and extensive powers in the RTD field in place of the previous approach whereby, apart from some selected areas, RTD activities were based on Article 235.¹ This change was brought about by a combination of factors: the growing importance of research and technology in a modern economy, rising RTD costs, the pressures of external competition, and the need for Community firms to be able to take advantage of the internal market.

The eleven Articles of Title VI (Articles 130f–130q) are an interlocking set of provisions, containing two main stages. In the first, a multiannual framework programme is drawn up by the Commission and adopted by the Council, acting unanimously after consulting the Parliament and the Economic and Social Committee. This overall instrument sets out the scientific and technical objectives and priorities, the main lines of the activities envisaged, and the amount of financial resources deemed necessary (Article 130i). Specific research programmes are then prepared by the Commission on the basis of the framework programme and adopted by the Council, acting by qualified majority after consulting the Economic and Social Committee and in co-operation with the Parliament (Article 130k). It is these specific programmes which constitute the essential corpus, providing the means for the research activities undertaken, mainly through collaborative research projects conducted by firms, research centres, and universities. Provision is made for additional measures: supplementary programmes involving certain Member States only (Article 130l); Community participation in research programmes undertaken by several Member States (Article 130m); co-operation with third States (Article 130n); and the setting up of joint undertakings or other structures (Article 130o). Under the terms of Title VI, the legislative authority adopts the programmes and the budgetary authority has the final say over the means to conduct them. Whereas in a State the legislative and budgetary authority are normally identical, this is not the case amongst the Community institutions. The framework programme decision fixes the overall amount deemed necessary and its breakdown between activities. When the specific programmes are adopted, the decisions establish the detailed financial arrangements to apply for the duration of the programme. The amounts entered into the annual budget are determined, however, by the budgetary authority (Article 130p and Part II, Title II).

The experience with the framework programmes and specific programmes adopted under the existing procedure has shown that the process is complex and lengthy. Two to three years are required between the launch of a framework programme proposal and the conduct of research under an individual programme. Institutional difficulties have arisen, notably between the Council and the Parliament.

During the preparation of the Political Union texts in 1991, consideration was accordingly given to the possibility of modifying the system in Title VI so as to improve efficiency and shorten the decision-making period. The Commission put forward proposals for a consolidated, simplified procedure, in place of the full double decision-making process, and an amended series of Articles was included in the draft Treaty drawn up in June 1991 by the Luxemburg Presidency.² The discussions on RTD procedures formed part of the wider debate on the institutional powers of the Council, the Parliament (notably the idea of co-decision) and of the Commission. The text approved at Maastricht in December 1991 provides that the framework programme is to be adopted by the Council, acting unanimously in accordance with the co-decision procedure, while the specific programmes are to be adopted by the Council by a qualified majority after consulting Parliament 3). The central structure, namely a multi-annual framework instrument establishing overall policy and the main activities and conditions, and the elaboration on that basis of specific measures, is thus maintained. There is a substantial increase in the Parliament's powers since its approval is required under the Article 189b procedures for the adoption of the framework programme instead of the previous consultation; since the Council's unanimous consent is also necessary and the co-decision procedure under Article 189b includes a legislative double reading and the possibility of recourse to the Conciliation Committee, decision-making in the RTD area remains however a complex matter and considerable efforts will be needed if procedural difficulties and delays are to be avoided. The simplification of the arrangements for the specific programmes, where a single reading by the Parliament replaces the double reading under the cooperation procedure, should lead to a shortening of the decision-making process in this respect, while emphasising the importance of the framework programme decisions.

The Community's aim in undertaking research and technological development is "to strengthen the scientific and technological basis of European industry and to encourage it to become more competitive at international level."⁴ The scope of possible action is thus extremely wide and includes virtually all types of research and technological development activities; it is on research and technological development that the production and exchange of the goods, processes, and services which characterize a modern economy now indeed depend.

As regards the relationship with other Community objectives, Article 130f refers to the exploitation of the internal market (the opening up of public procurement, standardization, and the removal of legal and fiscal barriers), and to the implementation of common policies. There is an evident link between steps taken pursuant to industrial and technological policy goals and the application of RTD efforts (for example, in the establishment of trans-European networks). Particular importance is attached to the strengthening of social and economic cohesion. In accordance with Article 130b, the objectives of Articles 130a and 130c must be taken into account in the implementation of Community RTD policy. There are provisions in the various framework programme and specific programme decisions confirming that the Community activity is justified as contributing to social and economic cohesion, while being consistent with the pursuit of scientific and technical quality. During the adoption of the specific programme decisions under the Third Framework Programme, a recital clause was included at the request of the Parliament referring to the assessment of the economic and social impact as well as of any technological risk of the programme; it was also provided that the evaluation report must be established in accordance with Article 2(4) of the Third Framework Programme Decision which refers to the contribution to be made by specific programmes to economic and social cohesion.⁵

Article 130f(3) emphasizes the connection between RTD and Community competition and trade policy. The framework programme decisions specify that the activities are to be pre-competitive in nature, namely those which may be undertaken jointly by entities, distinct from the commercial manufacture and marketing of products.⁶ This requirement is to be read together with the provisions of Commission Regulation 418/85 which deals with the joint conduct of research and development. State aids for R & D are subject to similar limitations.⁷ The extensive issues raised in this area include consideration of the conditions of access to major markets and the way competition rules may be applied internationally.

The term "European industry" which is used in Article 130f(1) refers to firms and others established in the Community. The "undertakings, research centres and universities" are those operating in the Community and which agree to undertake research together. It is these bodies which are invited to share risks and research costs, to transfer know-how, to produce results, and to develop intellectual property rights, under the research contracts entered into pursuant to specific programmes. The choice of activities set out in the framework programme is intended to reflect the needs of European industry, concentrating on those aspects considered of most relevance, whilst incorporating the principle of subsidiarity. The work programmes are drawn up in collaboration with those directly involved and efforts are made to bring together manufacturers, research bodies, and users in order to ensure an effective uptake of research results. The strengthening of European industrial potential in various key areas was discussed during the adoption of the specific programmes under the Third Framework Programme and a recital clause included in a number of the decisions.⁸

The provisions introduced by the Single European Act dealt with RTD activities under the EEC Treaty and did not change the basis for research undertaken pursuant to the European Coal and Steel Community Treaty or Euratom Treaty. The framework programmes have nevertheless included RTD activities under the Euratom Treaty, as well as those under the EEC Treaty, in order to provide as comprehensive an instrument as possible.⁹ This has been possible since it is the Council which takes the necessary decision on the basis of unanimity under both the Euratom and EEC régimes, unlike the case for steel and coal research.

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1 Provision was made in the EEC Treaty for RTD activities in several areas where common policies were conducted (agriculture: Arts. 41 and 43; transport: Article 75). Apart from such cases recourse was required to Article 235. There was thus a lacuna in the EEC Treaty by comparison with the ECSC Treaty (Article 55, para 1) and the Euratom Treaty (Arts. 4-11) which conferred extensive powers in the research area on these two Communities.

Under the Treaty on European Union ("Maastricht Treaty"), Title VI is renumbered XV and "all research activities deemed necessary by virtue of other chapters" are to be decided on and implemented in accordance with the RTD Title (Article 130f(1) and (3), as amended).

2 Luxembourg Presidency Draft Union Treaty of 18 June 1991, Pt. 3, Title X. The Commission submitted a similar series of proposals in its "Initial Contributions" to the Intergovernmental Conference on Political Union (doc SEC (91) 500), originally outlined in its opinion of 21 Oct. 1990, *EC Bull.*, Suppl 2/91.

3 Article 130i of the Treaty on Political Union. Article 130i (1) provides specifically that the Council "shall act unanimously throughout the procedures" in Article 189b. The principal change made by the Maastricht Articles concerns the decision-making process. The maximum overall amount required (instead of the amount deemed necessary) is also to be determined in the framework programme decision, thus removing one of the previous causes of difficulty. The Economic and Social Committee will continue to be consulted on both the framework programme and specific programmes.

On the RTD position in the light of the Maastricht Treaty, see generally Commission, *Research after Maastricht: an Assessment, a Strategy*. *EC Bull.*, Suppl. 2/92. The text of Title XV, Articles 130f to p, of the Treaty establishing the European Community, as contained in the Treaty on European Union, is in Appendix . . .

4 Article 130f (1). The Maastricht text adds "while promoting all the research activities deemed necessary by virtue of other Chapters of this Treaty".

5 See e.g. Article 4(3) of the Decision on the Information Technologies Programme, 91/394/EEC, (OJ L218), 6 August 1991, 22.

6 See e.g. Decision 90/221 Euratom, EEC, (OJ 1990 L117 29), 12th and 13th recital clauses.

7 Commission Regulation (EEC) 418/85 on the application of Article 85(3) of the Treaty to categories of research and development agreements, (OJ 1985 L53/5). The Regulation provides for block exemption under Article 85(3) for R & D agreements in all sectors, subject to the limitations indicated. See also the amendment extending authorisation of specialisation and research agreements to distribution, (OJ L 21), 29 January 1993). Under the Community Framework for State Aids for Research and Development (86/C/83/02, OJ 1986 C83/2), Member States are required to notify proposed State aids in the R & D area, which are assessed under Article 92. The State Aids Framework defines the stages of R & D and the method of calculating the intensity of aid.

8 See paragraph 2(c) of the Commentary on Article 130k.

9 Article 7 of the Euratom Treaty is accordingly used as part of the basis of Second and Third Framework Programme decisions, as well as for specific nuclear research programmes. Under Article 55 of the ECSC Treaty research action is determined by the Commission and financed by a levy on operators in the coal and steel sectors.

With the introduction of the co-decision procedure, the adoption of framework programme decisions covering both EC RTD activities and Euratom RTD activities will no longer be possible. The Working Document on the Fourth Framework Programme submitted by the Commission in 1992 accordingly envisaged two decisions following the entry into force of the Maastricht Articles, one based on the new Article 130i (1) and the other on Article 7 of the Euratom Treaty. Doc. COM (92) 406 final, 9 October 1992.

· ARTICLE 130g ·

In pursuing these objectives, the Community shall carry out the following activities, complementing the activities carried out in the Member States:

- (a) implementation of research, technological development and demonstration programmes by promoting co-operation with undertakings, research centres, and universities;*
- (b) promotion of co-operation with third countries and international organizations in the field of Community research, technological development, and demonstration;*
- (c) dissemination and optimization of the results of activities in Community research, technological development, and demonstration;*
- (d) stimulation of the training and mobility of researchers in the Community.*

COMMENTARY

Article 130g lists the four types of activities which the Community may conduct pursuant to the framework programme.¹ The engagement of the Community in this sphere does not affect the competence of Member States; the Community activities are not exclusive but complementary to those carried out in the Member States, an aspect which is dealt with further in Article 130h.

The "research, technological development and demonstration programmes" mentioned in subparagraph (a) may cover:

- fundamental research, basic industrial research, and applied research;
- technological development, namely activities which, on the basis of applied research, are aimed at the development of new or substantially improved products, processes, or services, excluding industrial application and commercial exploitation;
- the pilot project phase, when research results are tested on a sufficient scale to determine the reliability of the technical data prior to the demonstration stage. The latter precedes the investment phase and is characterized by the high degree of risk entailed. In keeping with the precompetitive criterion, "demonstration programmes" have so far been interpreted as meaning demonstration projects to determine the technological feasibility of the product or process, not its economic viability.

The importance attached to RTD co-operation with third countries and international organisations is indicated by the reference in the second subparagraph. This issue is the subject of Article 130n.

The dissemination and optimization of the results of Community research activities is a pre-eminent need. Europe has tended to be advanced in scientific research and to have lagged behind in its application. In addition to subparagraph (c), reference is made in Articles 130k and l to the need to include detailed arrangements for the dissemination of knowledge in specific and supplementary programmes. The research contracts contain provisions concerning research results and intellectual property issues. A central activity for the dissemination and explanation of results was launched in the Third Framework Programme, financed by 1 per cent of the amount deemed necessary, and the object of a separate decision.²

The training and mobility of research workers was likewise singled out for special attention (subparagraph (d)). For much of the period since 1945 there has been a pattern for European graduates and research staff to do advanced work, and often to remain, in the United States. Within Europe there has been a trend, on a smaller scale, for postgraduate studies to be done in the larger Member States, a move broadly from the south to the north or from the periphery to the centre. Community efforts are designed therefore to foster a greater mobility and flow of experience at European level. Line 6 of the Third Framework Programme provides for postgraduate opportunities, relying on networks of laboratories and research teams.³ More focused activities are undertaken within individual programmes (e.g. basic research actions in the Information Technologies Programme).

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Article 130g Notes

¹ The Working Paper on the Fourth Framework Programme, submitted by the Commission in 1992, was organized in terms of the four activities mentioned in Article 130g, Doc COM (92) 406 final, 9 October 1992. See further the Commentary on Article 130i.

² Decision on the dissemination and exploitation of knowledge resulting from the specific programmes of research and technology development in the Community, 92/272 EEC, (OJ L 141), 23 May 1992, 1. This follows Decision 89/412 EEC adopting a programme for the dissemination and utilization of scientific and technological research results (VALUE 1989-92), OJ L200, 13 July 1989, 23.

³ Decision on human capital and mobility, 92/217/EEC, (OJ L 107), 24 April 1992, 1.

· ARTICLE 130h ·

Member States shall, in liaison with the Commission, co-ordinate among themselves the policies and programmes carried out at national level. In close contact with the Member States, the Commission may take any useful initiative to promote such co-ordination.

COMMENTARY

Discussions are held at Community level on national policies and programmes, most notably in the Comité de la recherche scientifique et technique (CREST), which groups senior scientific advisers from the Member States under the chairmanship of a Commission representative.¹

With the development of Community programmes, national activities have in a number of cases been adapted or reshaped in the light of those pursued at European level. This has been particularly marked in the information technology area, where several national programmes were substantially modified in view of Community research activities. National efforts have also taken on the character of a relay for passing on information about Community programmes and orchestrating national participation; practice has developed towards an amalgam or interaction between Community and national efforts. The Commission's right to undertake "any useful initiative" to promote co-ordination is not confined to activities covered by the framework programme, but may extend to other areas where such steps are necessary in order to meet the broad aim set out in Article 130f.

Experience has nevertheless shown that it is difficult on the basis of Article 130h to make substantial progress in co-ordinating the policies and programmes conducted at national level. In its submission in 1991 to the Intergovernmental Conference on Political Union the Commission declared that the provision had proved unsatisfactory and proposed a new wording, designed to strengthen co-ordination and stipulating that the aim was to ensure that national policies were consistent with one another as well as with Community policy.² The amended version of Article 130h adopted at Maastricht endorsed this approach of reinforced co-ordination between Community and national activities.

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Article 130h Notes

¹ Set up under Council Resolution of 14 January 1974, (OJ C7), 29 January 1974, 2.

² Commission "Initial Contributions", Article 130f. n. 2, above. The Luxembourg draft Treaty included a proposed strengthening of Article 130h on these lines.

· ARTICLE 130i ·

1. The Community shall adopt a multi-annual framework programme setting out all its activities. The framework programme shall lay down the scientific and technical objectives, define their respective priorities, set out the main lines of the activities envisaged and fix the amount deemed necessary, the detailed rules for financial participation by the Community in the programme as a whole and the breakdown of this amount between the various activities envisaged.

2. The framework programme may be adapted or supplemented, as the situation changes.

COMMENTARY

The essential features of the framework programme are that it should be multi-annual and comprehensive, setting out all the activities which the Community proposes to undertake in pursuit of the aim in Article 130f(1) during the period in question. The main elements—scientific, technical, and financial—having been established by Council unanimity after the Parliament has been consulted, the research programmes are then drawn up in the light of the global policy and decided by majority vote in co-operation with the Parliament. Under the system instituted by the Single European Act, individual Member States thus accepted the possibility of being in a minority when specific programmes are adopted in the knowledge that these decisions would be subject to the conditions laid down by unanimity in the framework programme.

Three Framework Programmes have been adopted, covering the periods 1984–7, 1987–91, and 1990–4. The Fourth Framework Programme is intended to cover the period 1994–98. The first Programme, contained in a 1983 Council resolution 'on framework programmes for Community research, development and demonstration activities, and a first framework programme 1984 to 1987' was based on Article 235 of the EEC Treaty and Article 7 of the Euratom Treaty.¹ The resolution endorsed the notion of a common strategy and approved the principle of indicative framework programmes which would provide the basis for specific decisions on individual programmes. Scientific and technical objectives, selection criteria, and a financial indication of 3,750 m. ECU for the years 1984–7 were also established.

This initial effort was the first occasion when the research activities of the Community were drawn together comprehensively so as to include both those long-established, as in the case of agriculture, and those initiated in the late 1970s and early 1980s (notably thermonuclear fusion and information technology). The experience gained was drawn on when elaborating the provisions of the Single European Act.

The Council decisions on the Second and Third Framework Programmes for the periods 1987-91 and 1990-4 were adopted following the entry into force of the Single European Act and were accordingly based on Articles 130q(1), which in turn refers to Article 130i.² They are more elaborate instruments than the 1983 resolution. In the case of the Second Framework Programme (1987-91), eight themes or activities were laid down, together with a description of their main contents and a statement of scientific and technical objectives.³ A reserve of 5,396 m. ECU was established as the amount deemed necessary (2,275 m. ECU for information technologies, telecommunications, and new services of common interest, and 1,173 m. ECU for energy research). While the scientific and technical content, determined in consultation with sectoral and general advisory bodies, was agreed fairly easily, the financial provisions constituted a major point of difficulty in the adoption of the Second Framework Programme. The Commission proposed an overall amount of 10,000 m. ECU, which most Members of the Council considered too large an increase. A lengthy debate took place on budgetary issues and priorities during which the United Kingdom in particular sought to obtain what it considered a more balanced overall allocation. Difficulties also occurred because of the interaction of the procedures for the adoption of the Framework Programme and the specific programmes and those for the annual budget. The framework programmes lay the basis for the financial arrangements, providing an estimate by the legislative authority of the action which it considered the budgetary authority should take under Article 130p(2).⁴ In view of the different powers of the Council and the Parliament in the two cases, the stage is set for a conflict in the event of disagreement over priorities and needs in the RTD area. So far as the duration of specific programmes was concerned, the Second Framework Programme established a temporal "window" during which decisions could be adopted even though their actual implementation might extend beyond the period of the Framework Programme itself. By contrast the Third Framework Programme provided that the duration of the specific programmes should not exceed that of the general instrument.

The Third Framework Programme, adopted for the five years 1990 to 1994, provided for six activities and a total "amount deemed necessary" of 5,700 m. ECU.⁵ The six activities were grouped under three headings so as to show the main themes:

- I. *Enabling Technologies*: (1) information and communications technologies (2,221 m. ECU); (2) industrial and materials technologies (888 m. ECU);
- II. *Management of Natural Resources*: (3) environment (518 m. ECU); (4) life sciences and technologies (741 m. ECU); (5) energy (814 m. ECU); and
- III. *Optimisation of Intellectual Resources*: (6) human capital and mobility (518 m. ECU).

The decision on the Third Framework Programme was adopted so as to overlap for two years with the previous one. The specific programmes of the Second Framework Programme were retained, the Third Framework Programme providing a degree of continuity as well as an innovatory thrust.⁶ Programmes were introduced on telematic systems in areas of general interest and on human capital and mobility, together with a centralized action for the dissemination of knowledge and exploitation of results.

In order to verify whether the choice of areas and the means allocated are correct, provision is made for a system of evaluation during and after the framework programme. In the mid-term review the Commission is required to determine whether the "objectives, priorities and activities envisaged and financial resources are still appropriate" and to submit proposals for revision accordingly.⁷ The evaluation report by independent experts is an important input in determining the shape of the succeeding framework programme. The specific programmes are likewise reviewed, normally at mid-point and at the conclusion, and a report sent to the Council and Parliament.

The possibility of adapting or supplementing the framework programme, mentioned in Article 130i(2), was used in order to amend the financial arrangements of the Second Framework Programme.⁸ In the debate in the Parliament and Council leading up to this amendment the relationship between the legislative and budgetary authority as reflected in Articles 130i and 130p was discussed extensively.

Under the system of rolling framework programmes, the Fourth Framework Programme is intended to cover the period 1994 to 1998. The length and complexity of the decision-making procedures, together with delays in the ratification of the Maastricht Treaty, raised the possibility, however, that the necessary decisions (including the specific programmes) would not be adopted in time for implementation in 1994. The Commission accordingly had recourse in 1992 to a two-track procedure: it sought a financial complement for the specific programmes under the Third Framework Programme for 1993 and 1994 (as it had already declared in 1990 it would do on the ground that the amount agreed by the Council would be insufficient); and it submitted a working document on the Fourth Framework Programme.

The decision on the financial complement was subordinate to the overall position on the future financing of the Community and the financial perspectives (the "Delors II" package), on which agreement was reached at the Edinburgh European Council in December 1992. Agreement was subsequently given to the provision of 900 million Ecu for the 1993-94 period.⁹

The working document on the Fourth Framework Programme which was submitted in October 1992 set out elements relating to three basic features: the legal aspects, the content and the financial aspects.¹⁰ Since the Treaty on European Union (the Maastrich Treaty) had not yet entered into force, the legal aspects were dealt with by providing a draft text in two columns, one based on the EEC Treaty as amended by the Single European Act and the other on the Treaty on European Union. It was stated that once the latter Treaty entered into force, the text drawn up on that basis could become the Commission's proposal, to be adopted in accordance with the procedures in the new Treaty. In order that the Fourth Framework Programme might be implemented in good time, however, it was proposed that the matter should be considered before the Treaty entered into force by the institutions including recourse to an interinstitutional dialogue between the Council, the Commission and Parliament. The document was extensively discussed and led to the introduction of further proposals. The contents consisted of a thematic framework divided according to the four activities referred to in Article 130g, with particular reference to the role of generic technologies and research in the service of common policies. The approach was broadly endorsed in the conclusions of the Edinburgh Council, which stated that:

"Community support for R & D should continue to focus on generic, precompetitive research and be of multisectoral application. EUREKA should remain the principal vehicle for supporting research activities which are nearer to the market and the Commission should bring forward proposals to improve the synergy between the Community's research activities and EUREKA. Improving the dissemination of results among enterprises, particularly small and medium sized businesses, cost-effectiveness and coordination between national programmes should be priorities for Community action.

These conclusions should be reflected in the consideration and adoption of the 4th Framework Programme"¹¹

The Commission's proposals for the financial aspects were made in accordance with the Maastricht provisions and the Commission's document on the 1993-97 financial perspectives.¹² The overall financial position was subsequently delimited by the agreement on Community financing reached at the Edinburgh European Council.¹³ The Council specified the ceilings for the commitments for the Community's internal policies between 1993 and 1999. It was stated that:

"The development of expenditure on R & D should be consistent with the overall development of expenditure on internal policies under Category 3 of the proposed Financial Perspective, remaining between one half and two thirds of the overall figure".¹⁴

The amount to be made available for the Fourth Framework Programme will thus be set within these limits.

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Article 130i Notes

1 OJ No C208, 4 August 1983 1. Of the total financial indications of 3.750m ECU, 1.770m ECU (47.2%) was allocated to energy research and 1.060m ECU (28.2%) to promoting industrial competitiveness, of which 680m ECU was for new technologies. Only 3.000m ECU were actually decided and committed.

2 The Second Framework Programme was adopted by Council Decision 87/516/Euratom, EEC, OJ L 302 24 October 1987, 1, amended by Decision 88/193/EEC, Euratom, OJ L89, 6 April 1988 (subsequently referred to as "FP2"). The Third Framework Programme was adopted by Decision 90/221/Euratom, EEC, OJ 1990 L117, 8 May 1990, 29 (subsequently referred to as "FP3").

3 The eight lines covered research in the following areas: quality of life; towards a large market and an information and communication society; modernization of industrial sectors; exploitation and optimum use of biological resources; energy; science and technology for development; exploitation of the sea-bed and use of marine resources; and improvement of European science and technology co-operation. These eight lines were implemented by 33 specific programmes plus three programme decisions concerning Joint Research Centre activities—a total of 36 decisions. A description of these programmes is contained in Commission *EC Research Funding* (1990).

4 These elements were reflected in the FP2 decision which had to deal with the amount outstanding for specific programmes under FP1 (1.084m. ECU) and that which it was expected would be committed after 1991. The Council determined that, without prejudice to the amount required for the earlier programmes, the total amount deemed necessary for Community participation "and therefore the sum to be allocated to specific programmes to be decided on" during the period should be 5.396m. ECU, of which 4.533m. ECU were deemed necessary to be committed for execution before the end of 1991 (Article 1(3) of FP2 decision). The remaining 863m. ECU to be committed after 1 January 1992 were called the "overhang". The amount deemed necessary in the period 1987 to 1991 was fixed provisionally at 4.979m. ECU, pending a further decision on the remaining 417m. ECU. This was taken in Decision 88/193/EEC, Euratom, OJ L89, 6 April 1988, 35. In view of the length of time taken in adopting the specific programmes under FP3 and the risk that there might be a gap in the execution of the specific programmes under FP2 and FP3, it was decided in 1990, at the initiative of the Parliament, that part of the "overhang" should be advanced for commitment earlier. The amount of 4.533m ECU for execution before the end of 1991 was increased to 5.193m. ECU. At the same time the Parliament increased the amounts for certain programmes beyond those deemed necessary in the decisions (in particular, a further 40m ECU for the energy programme JOULE). See also the Commentary on Article 130p. The relationship between the legislative and budgetary provisions is further considered in J. Elizalde, 'Legal Aspects of Community R&D Policy' [1992] 29 *CMLRev* 309

5 As in the case of FP2, the main difficulty concerned the financial provisions. The Commission's original proposal for the overall amount for FP3 was 7.7bn ECU. The Commission declared that it would propose in due course a revision to obtain the 2bn ECU not agreed in 1990. Secondly, since the Financial Perspectives drawn up by the Council, Commission and Parliament extended only to 1992, anticipation of the subsequent financial perspectives through the Framework Programme decision raised institutional issues. In the FP3 decision it was eventually decided to separate the amount deemed necessary up to 1992 and that for the following two years. If the amount of 3.200m ECU intended for 1993 and 1994 was covered by the forthcoming Financial Perspectives, it was to be deemed to be confirmed. In any other circumstances, the Council was required to take the necessary action (Article 1(4) of FP3).

6 It was expressly provided that outstanding decisions under FP2 might still be adopted. See fifth recital clause and Art. 1(1), FP3.

7 Article 4, FP2 and Art. 5, FP3. The provision of complementary financing for the Third Framework Programme was also dealt with under this provision.

8 Decision 88/193 EEC, Euratom, n. 4, above.

9 The Commission requested 1.6 billion ECU (COM(92) 309 final, (OJ C225), 1 September 1992, 9), the Parliament proposed an amount between 1.2 and 1.5 billion ECU (Opinion of 18 November 1992). The Council adopted a common position on 23 December 1992 in favour of 900m. ECU; the Parliament did not seek to have recourse to a conciliation procedure on this figure. The 900m. ECU represented an increase of 15.8 per cent, divided so as to provide approximately a further 13 per cent for five chapters and a 30 per cent in the case of the energy chapter.

10 Doc COM (92) 406 final, 9 October 1992.

11 Conclusions of the Presidency, Part C, Section B iv, European Council, 11-12 December 1992.

12 Doc COM (92) 2001 final, 10 March 1992.

13 Conclusions of the Presidency, note 11 above. See also the Commentary on Article 130p below.

14 Ibid. The annual RDT budget would thus be between 1.9 bn ECU (50% of internal policies expenditure determined at Edinburgh) and 2.6 bn ECU (66%) in 1993, and between 2.5 bn ECU (50%) and 3.4 bn ECU (66%) in 1999. The total RDT expenditure for the period 1993-1999, would be between 15.4 bn ECU and 20.8 bn ECU.

· ARTICLE 130k ·

The framework programme shall be implemented through specific programmes developed within each activity. Each specific programme shall define the detailed rules for implementing it, fix its duration, and provide for means deemed necessary.

The Council shall define the detailed arrangements for the dissemination of knowledge resulting from the specific programmes.

COMMENTARY

The specific programmes constitute the essential core of the Community's efforts and of the RTD programmes envisaged in Article 130g; it is in terms of the success achieved in the given areas, in the co-operation between participants, and in the improved supply and application of research results that the Community's endeavours are mainly to be judged—that constitute the Community's "added value" to national and private efforts.

Pursuant to the overall policy set out in the framework programme decisions, the Commission submits draft decisions for the specific research programmes "developed within each activity". At least one specific programme is required for each activity described in the framework programme. In the case of the Second Framework Programme (1987–91), the eight activities were divided into 36 programmes; in the Third Framework Programme (1990–4), this was reduced to fifteen programmes in order to achieve a greater concentration.¹ Using the experience gained earlier, the specific programmes under the Third Framework Programme contained for the most part uniform provisions, thus reinforcing the coherence and transparency of the individual actions. The decisions on specific programmes cover institutional aspects, the duration of the programme, and the modalities. The scientific and technical objectives and contents of the programme are detailed in an annex to the decision. An indicative breakdown of expenditure is also given, together with rules for the conduct of the programme and for the dissemination and exploitation of results.

Under the terms of Article 130q(2), the Council is called upon to adopt the specific programme decisions by qualified majority, after consulting the Economic and Social Committee and in co-operation with the European Parliament. The decision-making system under the EEC Treaty as amended by the Single European Act thus provided the Parliament with a larger role as regards specific programmes than in the case of framework programme decisions.² The scientific and technical content of the programme is evaluated by CREST, as well as by other advisory bodies. In the light of the advice received, the programmes are considered by the relevant bodies of the Council (normally the Research Group) and by the Parliament (notably the Committee for Energy and Research and Technology, which appoints a rapporteur for each proposal). Although Article 130q(2) provides for the adoption of specific programmes by qualified majority, the Council has in practice largely sought to adopt decisions by unanimity.

Serious institutional difficulties arose following the transmission in 1990 of the Commission's proposals for the specific programmes under the Third Framework Programme. The Parliament considered that the Council had taken insufficient account in its common position of the amendments which the Parliament had proposed in the first reading, and feared that the Council, acting by unanimity, would proceed without sufficient regard for the Parliament's views and the Commission's amended proposals. At the Parliament's Plenary Session in March 1991, the chairman of the Committee on Energy, Research, and Technology declared that the Council had "effectively rewritten each specific programme" in the common positions it had adopted.³ The EP Committee considered that the Council's common positions "very substantially amended" the Commission proposals, so as to alter their nature. Although the Council believed that it had respected the Treaty, in the Parliament's view the Council's application of Article 149(b) was inadequate. The Parliament therefore called on the Commission to respect the terms of the code of conduct which President Delors had presented to the Parliament on 13 February 1990 and, in particular, to abide by the principles laid down by the Court of Justice for the reconsultation of Parliament in the event of amendments that altered the nature of a Commission proposal.

The Commission stated that, in the light of the Community interests involved—respect for the inter-institutional balance and the efficacy of the Community RTD programme—it had decided to apply the code of conduct and to withdraw the five programmes on which the Council had adopted a common position.⁴ In order to ensure continuity, the Commission undertook to present new proposals without delay.

Discussions were held between the three institutions on the "horizontal questions" which had given rise to differences of opinion during the co-operation procedure. These questions concerned the budgetary provisions, the choice of committee and committee procedure, assessment of the economic and social impact and technological risks, relations with third countries, and the so-called exceptional procedure. After the Commission had transmitted replacement texts agreement was reached and recorded in conclusions signed by the Presidents of the three institutions on 17 April 1991. These were submitted by the Presidents to their respective institutions so as to allow the speedy adoption of the programmes in question. In the light of these procedural steps, it was established that the conditions set out in Article 149(2)(g) had been met. It was also agreed that the elements of the conclusions on the disputed issues would be incorporated in the specific programmes on which a common position had not yet been drawn up. The agreement was endorsed and the specific programmes under the Third Framework Programme were adopted on that basis.⁵

Following the adoption of the Council decision, the execution of the programme is the responsibility of the Commission, which is assisted in its task by a committee of Member States' representatives. Operationally the specific programmes consist chiefly of a series of research contracts or projects entered into by firms and research bodies with the Commission, normally on a shared cost basis, following a request for expressions of interest and a selection process. The various elements are described below.

(I) FORMS OF PARTICIPATION

There are three forms of participation in specific programmes.

(a) *Shared cost contracts* between the Commission and the participants. 80 per cent of the activities come into this category. The participants provide a given per cent (which may be up to 50 per cent, depending on the circumstances) of the project costs and the Community the remainder.⁶ Since an individual participant may furnish only, say, 10 per cent of the total cost and has access to all the results achieved, as well as background information supplied by others, a substantial "gearing up" is achieved. Universities and other non-commercial bodies have the option of requesting either up to 50 per cent reimbursement of the full research costs or 100 per cent funding of additional marginal costs.

(b) *Direct action* by the Community in the case of activities undertaken by the Joint Research Centre. Activities here are in principle fully funded. Under the Third Framework Programme 550m ECU were so allocated amongst the different activities.

(c) *Concerted actions*. These are activities usually funded nationally (eg for medical research) for which the Community meets co-ordination costs, such as travel and publication expenses. The Community may provide up to 100 per cent of these further costs.

(2) PROCEDURES

A series of steps lead up to the conclusion of research contracts.

(a) *Work programmes*. The major industrially oriented programmes (notably in information technology (ESPRIT) and advanced communications (RACE)) adopted from the outset the practice of drawing up work programmes, following the procedures in industry. These plans are usually prepared through workshops or expert meetings in which representatives of European industry and research bodies participate. This has been extended to all programmes. The work programmes "set out the detailed objectives and types of projects to be undertaken, and the financial arrangements to be made for them".⁷ The work programmes are submitted to the programme committee for its opinion.

(b) *Calls for proposals*. On the basis of the work programmes, the Commission publishes calls for proposals in the Official Journal of the European Communities, indicating areas of interest and inviting potential participants to submit proposals within a given period. Background material is made available on request and an information package distributed to interested parties. Proposals made are sent direct to the Commission and not via national or regional authorities.

While the publication of calls for proposals and their subsequent treatment within an individual programme represents the standard method, provision is made for the receipt of proposals which cut across several programmes or are otherwise of special significance. As stated in a general information notice on the implementation of the specific programmes under the Third Framework Programme, the Commission

"reserves the right to receive, evaluate and accept, in accordance with the derogation procedures provided for in the programmes, proposals which come under a number of specific programmes or which, by their nature or means of execution or urgency, assume particular importance for strengthening the scientific and technological base of European industry and for promoting the growth of its international competitiveness."⁸

By such means it is possible to allow for proposals which may not fall entirely within a given work programme since they reflect a recent development or involve several areas (for example, projects relating to energy and the environment, or proposals such as that for an "environmentally friendly" car which may concern environmental research, energy, new materials, and information technology).

(c) *Participants*. Shared cost research projects must, as a general rule, "be carried out by participants established within the Community".⁹ Projects in which, for example, universities, research organisations, and industrial firms, including small and medium-sized undertakings, take part "must provide, as a general rule, for the participation of at least two partners independently of each other and established in different Member States".¹⁰ In the more industrially oriented programmes, these two partners will normally be industrial undertakings, except in the case of basic research projects. The consortia which submit proposals must evidently be composed of members which are prepared to work together under the terms of the research contract, to undertake the research at installations in the Community, and to share the results.

Issues relating to the strengthening of the international competitiveness of European industry and the participation of firms which, though established in the Community, are not largely owned by Community citizens, were raised during the adoption of the specific programmes under the Third Framework Programme. It was eventually agreed to include in the decisions on programmes of a more industrial character a recital clause reading as follows:

"Whereas the constitution or consolidation of a specifically European industrial potential in the technologies concerned is an urgent necessity; whereas its beneficiaries must be research establishments, undertakings, including small and medium-sized undertakings and other bodies established in the Community which are best suited to attain these objectives."¹¹

The Commission has in fact frequently given its agreement to the participation in Community programmes of companies whose majority shareholding is held by persons who are not Community citizens. The criteria applied by the Commission for giving its approval are:

1. The participant must conduct research and development and be able to engage in production in the Community.
2. The research projects in question have to be undertaken in collaboration with other firms in the Community.
3. The proposals submitted have to be within the technical scope of the specific programme and of the call for proposals based on the work programme.
4. The right of joint access to the results by all participants in the project has to be guaranteed, while at the same time the property rights of project participants generating such results are safeguarded, notably with respect to transmission to third parties.

(d) *Selection.* Projects submitted must involve at least two mutually independent partners established in different Member States. The number of participants forming a consortium is often larger, four to seven being about the average and considerably higher figures in certain cases. In the selection process the Commission seeks to ensure that the number and range of partners is such as to enable the project's objectives to be achieved. To help facilitate the efforts of potential partners to find one another, "proposers days" are held and other means used (e.g. a system of electronic mail and database to enable firms and research bodies to advertise their suggestions and availability).

Potential partners are required to submit projects coming within the work programme and the call for proposals, and to determine the distribution of tasks as well as the financial arrangement for their share of the costs. Applications usually far exceed the funds available on the Community side, the demand being frequently three to four times higher.

The high level of interest shown supports the view that the programmes constitute an effective means of conducting research: the advantages encompass "state of the art" research activities on a Community-wide as opposed to national level, as well as contacts and exchange of information amongst participants. The range and scrutiny of applications provide an overview of trends and needs within the sector. The cumulative effect of the framework programme, the specific programmes, the work programmes drawn up in conjunction with industrial and research bodies and the submission of proposals is to achieve a systematic refinement of "top down" and "bottom up" contributions—a combination of overall assessment and the response of those directly involved in the sector.

While the total amount of Community funding for research and technological development is relatively limited, equivalent to about 4 per cent of public R & D expenditure,¹² the percentage may be much higher within a given area; it is in this sense that the complementary nature of Community programmes and the element of subsidiarity and the strengthening of the scientific and technological basis of European industry achieve their impact. Thus in the case of information technology the Community programme ESPRIT was estimated to represent some 30 per cent of European pre-competitive research in the sector. With project applications running far in excess of available funds (commonly in a ratio of 1 : 6, or 6–8 bn. ECUs for each 1–2 bn. ECUs from the Community), examination of the proposals, even after discarding those of incidental value, provides an in-depth view of the sector as a whole which can be used in determining needs and future orientations.

The general selection criteria, set out in an annex to the framework programme, relate to the kind of research projects which may be undertaken. Expert teams designated by the Commission examine the applications and evaluate their scientific and technical quality as well as their viability and potential contribution to the achievement of the work programme. The Commission's project selection proposals, based on the expert team's evaluation, are then submitted to the relevant advisory board and management committee for consideration.

After the committee has discussed the choice of proposals and given its opinion, the Commission concludes research contracts with the selected participants. Following the entry into force of the Single European Act, the Commission drew up a harmonized contract for the execution of projects under the specific programmes. Since a firm or university may be involved in a number of Community research projects, there was an obvious advantage in ensuring a common form of contract. This describes the work in detail, the system of allowable costs and other financial aspects, the timetable, and related rights and obligations. The participants are required to submit period reports and "deliverables", and Commission project officers follow the progress of the project. Project partners exchange information amongst themselves (commonly by electronic mail) and meet (usually two or three times a year) to review the steps taken. Meetings of all programme participants are also held, normally on an annual basis, to assess results and to exchange views. A degree of cohesion and *esprit de corps* is thus engendered, to encourage the spread of knowledge and the sense of participation in a common European endeavour.

(4) COMMITTEES

The committee structure of individual programmes has reflected the legislative background and history. Broadly speaking, the more scientific programmes and those concerned with concerted actions tended to have consultative advisory bodies and the more industrially oriented programmes to have management committees. With the harmonization of procedures following the Single European Act and the 1987 comitology decision, a greater degree of uniformity has been achieved. The application of the comitology procedure was amongst the issues considered in the inter-institutional discussions in April 1991. The conclusions of the three Presidents included agreement on the type of committee to be used for the specific programmes under the Third Framework Programme.¹³ The conditions under which the committees were to be consulted and the delimitation of their powers were also agreed, the Parliament gaining acceptance of its view that a Council proposal requiring consultation at the request of four Member States should not be retained. While the powers and procedures of the committees vary according to the type used in individual programmes, the matters on which committees are called upon to give an opinion are broadly the same¹⁴:

- the preparation and updating of work programmes
- departures from the general rules set out in Annex III of the programme decisions
- the assessment of research projects and accompanying measures and of the estimated amount of the Community's contribution where this exceeds a given threshold figure
- the participation of bodies and undertakings established outside the Community
- the contents of calls for proposals
- adaptation of the indicative breakdown of the amount set out in Annex II of the programme decision
- evaluation measures, and
- arrangements for the dissemination, protection and exploitation of research results under the programme.

(5) INFORMATION PROVIDED TO THE PARLIAMENT

In the discussions during the inter-institutional meetings in April 1991, the Commission undertook, in accordance with the undertakings entered into with the Parliament on 11 December 1987 on the Commission's implementing powers, to forward to the Parliament for information all draft legislative acts, apart from those which would cause problems of confidentiality *vis-à-vis* firms and research bodies, at the same time as such information was submitted to the committees assisting the Commission, and to provide the Parliament with all information it wishes on the management of the programmes.

A significant adjustment of arrangements thus occurred between the specific programmes of the Second and Third Framework Programmes. The Parliament was provided with the means to exercise a degree of surveillance over the execution of programmes, distinct from the role of the committees assisting the Commission in the implementation of programmes, but nevertheless a *droit de regard* and supervision of considerable scope.

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1 Decisions were adopted on the following specific programmes under FP 3: marine science and technology (OJ 1991 L192 1), communications technologies (ibid. 8), telematic systems of general interest (ibid. 18), environment (ibid. 29), life sciences and technologies for developing countries (OJ 1991 L196 31), information technologies (OJ 1991 L218 22), non-nuclear energy (OJ 1991 L257 37), agriculture and agro-industry (OJ 1991 L265 33), biomedicine and health (OJ 1991 L267 25), and industrial and materials technologies (OJ 1991 L269 30): fission (OJ 1991, L 336 42; (Euratom Treaty); fusion (OJ 1991, L 375 11); human capital and mobility (OJ 1992, L 107 1); biotechnology (OJ 1992, L 107 11); measurement and testing (OJ 1992, L 126 12); and concerning the Joint Research Centres (OJ 1992, L 141 11). See also Commission Decision 93/95/ Euratom on the reorganization of the Joint Research Centre, OJ L 37, 13 February 1993, 44. The Commission's original proposals are in OJ 1990 C174 1, OJ 1990 C247 2, and OJ 1990 C261 8. For the FP2 programmes and decisions, see Article 130l, n. 3, and *EC Research Funding*.

2 Under the Maastricht Treaty this situation is reversed: see Commentary on Article 130f.

3 European Parliament, Verbatim Report, Plenary Session, 11 Mar. 91, 17. Mr La Pergola's remarks continued: "The Council does not feel itself bound by the normal parliamentary conventions and has not limited itself to amending the original proposals. In fact, the Council cut Parliament's budgetary amendments from the text, reduced dramatically aspects concerning training, evaluation and economic and social impact, restricted the possibility of agreement with third countries, changed the technical annex and insisted on a regulatory committee. Type 3 comitology for all but life sciences."

4 Statement by Vice-President Pandolfi, European Parliament, Verbatim Report, Plenary Session, 14 Mar. 91, 308. The five programmes concerned were: communications technologies, development of telematics systems of general interest, environment, marine sciences and technologies and life sciences and technologies for developing countries.

5 The decisions on the five programmes were formally adopted by the Council on 7 June 1991. The only further amendment of significance following acceptance by the three institutions of the 17 Apr. 1991 conclusions concerned a recital clause relating to the strengthening of European industrial potential in certain technologies. See the Commentary on Article 130k, below.

6 The rules governing rates of Community financial participation are set out in Annex IV of FP3. See also Annex II, para. 6, of FP3 and Article 87 of the Financial Regulations.

7 Article 5(3) of the draft decisions, n. 1, above. The work programmes of the specific programmes under FP3 were published in the Official Journal, together with the call for proposals. See e.g. the work programme for the Communications Technologies Programme, OJ 1991 C154 15.

8 General information notice, OJ 1991 C149 14. The Commission suggested in its initial proposals that the derogation or exceptional procedure should be used when projects "make a particularly promising and significant contribution as regards the originality of the theme proposed, the novelty of the scientific and technical approach and the methodology of execution, also taking into account the particular nature of the proposers" (Annex III, para. 4, draft decisions, n. 1, above).

This issue was amongst those raised in the inter-institutional discussions and reflected in the conclusions of the three Presidents of 17 Apr. 1991. In the case of interdisciplinary projects directly proposed by bodies or undertakings, departures from the general rules in Annex III of the decisions are implemented transparently in accordance with the committee procedure laid down in Article 6 of the decisions.

9 Annex III, decisions, n. 1, above. See also the Commentary on Article 130f concerning the definition of European industry and on Article 130n on the participation of non-Community States or entities.

10 *Ibid.* See e.g. Annex III of the decision on the Information Technologies Programme under FP3, n. 1.

11 Decision on the Information Technologies Programme under FP3, 7th recital clause, n. 1. The other programmes concerned are those on Communication Technologies and Industrial and Materials Technologies. Network operators are amongst the entities referred to in the Communication Technologies Decision.

12 Research support at European Community level was estimated to correspond to about 4% of public, or 2% of public and private, research expenditure in the Member States. Commission, *EC Research Funding*, 7.

13 It was agreed by the three institutions that the committee procedures should be applied as follows: Committee procedure I: marine science and technologies, life sciences and technologies for developing countries, biomedicine and health, non-nuclear energies and measurement and testing. Committee procedure IIIA: telematic systems in areas of general interest, environment, industrial and material technologies, agricultural and agro-industrial research, human capital and mobility, biotechnology and dissemination of information; Esprit II committee procedure confined to the work programme: communication technologies and information technologies. A proposed inclusion of the words "in particular" in the list of matters on which committees should be consulted was not maintained.

14 See e.g. Article 7 of the Decision on the Information Technologies Programme, n. 1. The Commission may provide information to the committee on matters besides those on which its opinion is required.

· ARTICLE 130l ·

In implementing the multi-annual framework programme, supplementary programmes may be decided on involving the participation of certain Member States only, which shall finance them subject to possible Community participation.

The Council shall adopt the rules applicable to supplementary programmes, particularly as regards the dissemination of knowledge and the access of other Member States.

COMMENTARY

Whereas the specific programmes, as provided in Article 130k, are a required means for the realization of the framework programme, supplementary programmes are an ancillary instrument, to be used when opportune. It is not obligatory that they should be incorporated in specific programmes.

While Article 130l has not so far been directly applied, the Third Framework Programme decision stated that supplementary programmes might be used "as necessary", subject to the appropriate Council decision.¹ The Council, in its "unanimous" form, thus opened the possibility of the use of supplementary programmes, without pronouncing itself on particular measures which were left for the "majority" Council to determine in the light of eventual Commission proposals. Since recourse to a supplementary programme under Article 130l may have financial implications for the Community, it is desirable that a reference to the possibility should be made in the framework programme decision. Similar considerations apply in the case of the possible use of Articles 130m and n.

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¹ Article 2(2) FP3. The Commission's original proposals for the specific programmes under FP3 included a similar reference which was not retained in the Council decision. In so far as the available Community financial contributions have been allocated to specific programmes, in practice there has been little incentive to use Article 130l independently. Whilst not involving the application of Article 130l or Article 130m, the co-operation between the Community Information Technologies Programme and the Joint European Submicron Silicon Project (JESSI) launched under the Eureka programme may be noted. The Community participates, through the Commission, in the Eureka programme and co-ordination between Community and Eureka projects is encouraged. Reference may be made to Annex I, IA(a) FP3 and Annex I of the Decision on the Information Technologies Programme under FP3 (Article 130k (n. 1)). Activities concerning High Definition Television (HDTV) which include projects under both the Eureka and Community programmes, a European Economic Interest Grouping (with Community involvement), and a Council decision, may also be noted in this context. On Eureka and its relationship with Community activities, see generally Commission, *EC Research Funding* (1990), 20 and the references in the conclusions of the Edinburgh European Council, cited in the Commentary on Article 130l.

· ARTICLE 130m ·

In implementing the multi-annual framework programme, the Community may make provision, with the agreement of the Member States concerned, for participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes.

COMMENTARY

The Third Framework Programme decision provides for the possibility of recourse to Article 130m.¹ There has been no express instance yet of Community participation in research and development programmes undertaken by several Member States. The nearest parallel is Community participation in projects under the Eureka programme. There has been consistent support for a close and complementary relationship between the Community's research activities and those undertaken within the Eureka programme. This was underlined in the conclusions of the European Council held in December 1992.²

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See under Article 130g

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Article 130m Notes

¹ Article 2(2) FP3.

² See the Commentary on Article 130i (and *ibid.* n. 11) and Article 130l, n. 1.

· ARTICLE 130n ·

In implementing the multiannual framework programme, the Community may make provision for co-operation in Community research, technological development and demonstration with third countries or international organizations.

The detailed arrangements for such co-operation may be the subject of international agreements between the Community and the third parties concerned which shall be negotiated and concluded in accordance with Article 228.

COMMENTARY

The Community has engaged in cooperative research activities with third States and international organizations for many years. With the entry into force of the Single European Act and the adoption of a series of framework programmes and substantial research programmes, international co-operation has attracted increasing attention.

Article 130n provides for the implementation of the second type of activity set out in Article 130g. In legal terms, Article 130n furnishes the Community with an explicit competence for external relations in matters within the scope of the framework programme, in place of the previous implicit competence. The exercise of this competence is subject to the rationale set out in Article 130f(1): the Community's efforts, externally and internally, are made with the aim of strengthening the competitive position of European industry. International co-operation activities undertaken in implementation of the framework programme are thus to be distinguished from steps taken, normally as part of development assistance, to improve the research and technological capacity of a third country. While the two categories may converge, when activities are conducted for mutual advantage, a separate legal basis is required for cases which do not satisfy the criterion of Article 130f(1).¹

Within these broad limits a pattern of co-operation has begun to emerge, in which the framework programmes and accompanying activities have come to play an increasing role. The situation is, however, an evolving one and the institutional arrangements—the requirements laid down in Article 130n and in the framework programmes and specific programmes—have to be considered in relation to a wide range of topics (from “pure” science and large-scale projects to projects of more immediate industrial relevance) as well as the various categories of third States potentially involved.

A number of co-operative activities were launched prior to the framework programme. In the case of European non-Member States the procedures under the COST programme (European Co-operation in the Field of Scientific and Technical Research), which began in 1971, enabled collaborative ventures to be undertaken; arrangements were also made with various other States for the regular exchange of information, the holding of expert meetings and similar actions, commonly in joint bodies set up under bilateral agreements.² In the nuclear field particularly, bilateral and multilateral programmes were launched with the United States, Canada and others. With the adoption of the Second Framework Programme matters were carried further in the case of the EFTA countries. Two main forms of co-operation were used besides concerted actions. In the more scientifically oriented programmes EFTA countries were accorded so-called association status, under which they were treated much as Member States. The EFTA country paid a contribution, pro rata to its gross domestic product, to programme costs and took part in the various advisory bodies. Firms and institutions in the EFTA country were also eligible to participate in individual projects within the programme. In programmes of more immediate industrial relevance, involvement was limited to the latter form (so-called "project-by-project" participation). Firms, universities, and research bodies in EFTA countries were thus allowed to take part in projects in programmes such as EPRIT (Information Technology), RACE (Advanced Communications), and BRITE (Industrial Technology and Materials), although the EFTA country itself did not participate in the programme. These arrangements were based on framework agreements for scientific and technical co-operation between European non-member countries and the Community, to which reference was made in the specific programme decisions.

The development of the framework programme system and the growing interest expressed by third States in the Community's RTD activities led to further attention being given to international co-operation. The adoption of the Third Framework Programme was accompanied by a general review of the prospects for co-operation with third countries.³ Besides issues relating to co-operation with other major industrialized countries, notably the United States and Japan, consideration was particularly focused on the position to be taken as regards European non-Member States. In the case of both the EFTA countries and the countries of Central and Eastern Europe, the arrangements concerning RTD co-operation were reviewed in the more general context of evolving relations with the Community: the plans for the European Economic Area and, as regards the Central and Eastern European States, the establishment of closer ties through co-operation and association agreements.

Although the Third Framework Programme decision itself included a reference to the possibility of recourse to Article 130n, as well as to Articles 130l, m and o,⁴ the main discussion of the issue took place during the consideration of proposals for the specific programmes. The Commission proposed that it should be authorized to negotiate international agreements when these were required in order to achieve the objectives of the programme, without specifying the countries concerned.⁵ The Council wished to take a more limited approach, concentrating on the possibilities for EFTA members. The Parliament for its part was particularly concerned about the countries of Central and Eastern Europe. The issue was amongst those dealt with in the inter-institutional discussions held in April 1991. The final result, as contained in the specific programme decisions under the Third Framework Programme, was that the Commission was authorized to negotiate in accordance with Article 130n: "international agreements with third countries which are members of COST, particularly the member countries of EFTA and the countries of Central and Eastern Europe, with a view to associating them with the whole or a part of it."⁶ In addition:

"Where framework agreements for scientific and technical co-operation have been included between the Community and European non-member States, bodies and undertakings established in these countries may, in accordance with the procedures laid down in Article 6 and on the basis of the criterion of mutual benefit, be allowed to become partners in an action undertaken within the programme."⁷

The texts thus establish a distinction between European non-member countries, which are given a particular status vis-à-vis the specific programmes under the Third Framework Programme, and other third countries. So far as EFTA members and the countries of Central and Eastern Europe are concerned the position also needs to be considered in the light of the wider institutional arrangements made or envisaged with them.

In the case of the EFTA countries, the Treaty establishing the European Economic Area (EEA), which was agreed in October 1991, provides, amongst the "flanking policies", for the full participation of the EFTA countries in the framework programme and its specific programmes.⁸ This will be effective for the Third Framework Programme and its specific programmes when the EEA Treaty enters into force. Under the EEA agreement, arrangements are made concerning the modalities of participation, the rights and obligations of EFTA participants, the financial contribution (proportional to the GDP of the EFTA countries), participation (without the right to vote) in committees dealing with RTD matters, and the diffusion of research results. Following a series of interim measures and the conclusion of the transitional arrangements, which will provide for a phasing-in of closer ties, the establishment of the European Economic Area will mean that framework programmes and specific programmes will, subject to agreement, be subsequently conducted on a basis of joint collaboration between the Community and the EFTA countries concerned and that individual firms and research bodies in these countries will be treated on the same footing as their Community counterparts.

A number of Central and Eastern European countries have applied to become members of COST.⁹ It will thus be possible for agreements to be negotiated with them in accordance with Article 130n, so as to enable these countries to participate in specific programmes under the Third Framework Programme. While the Council has already given its authorization for negotiations so that COST countries can be associated with the whole or part of individual programmes, the content of the agreement will have to be determined before the treaty is concluded in accordance with Article 228. The possibility of "project-by-project" participation by firms and research bodies in European non-member countries may also be available. This form, contained in Article 8(2) of the specific programme decisions under the Third Programme, enables participation in an individual project to go ahead even though an agreement under Article 130n may not have been concluded, provided there is a framework agreement for scientific and technical co-operation between the Community and the country concerned. In the case of five programmes, "project-by-project" participation by research bodies or other entities in European non-member countries may take place without the conclusion of any agreement¹⁰

Besides possible participation in Community programmes, RTD can play a part more generally in the efforts of the countries of Central and Eastern Europe to improve their economies. These States have been faced with the task of restructuring their scientific institutions; under a system of monopoly suppliers, industrial research capacity has languished. The conduct of research and development has had to be established on fresh lines in circumstances of exceptional difficulty. While activities under the framework programme include aspects which may be attractive to research bodies in the countries concerned, they were not designed with the needs of these nations in mind: more particular measures, more adjusted to their circumstances and to the provision of technology, may be called for.¹¹ Under the PHARE and TACIS programmes, the countries of Central and Eastern Europe and those of the Commonwealth of Independent States may request assistance for the strengthening of their RTD infrastructure as well as for technological development in individual sectors. A range of projects of this kind has been undertaken, besides requests relating to scientific and technical training. The assistance provided through bodies like the European Bank for Reconstruction and Development and the European Investment Bank likewise takes into account the need to reinforce the capacity for technological adaptation and development. The economic co-operation agreements entered into by the Community with these countries provide for more general forms of RTD cooperation, chiefly through discussion and the exchange of information in the joint committees set up under these agreements. The process is carried further by the "European Association Agreements" negotiated under Article 238 with various Central and East European countries¹², under which co-operation activities may be undertaken, including in the RTD field, designed to help these countries in their efforts, as well as providing a stronger institutional basis for future relations.

While special arrangements have thus been made for closer co-operation with European non-member States, co-operation with countries outside Europe is subject to the general provisions of Article 130n. The express reference to European countries in the specific programme decisions does not prevent the conclusion of agreements with other States where these are considered appropriate. In these instances, however, it is necessary for the Commission to make a proposal specifically related to the third country concerned.¹³ The Community institutions will assess such cases in the light of the individual programme, the third country, and the nature of the cooperation, and the benefits to be derived by European industry.

Recourse to the conclusion of a treaty may in any case not be required in order to conduct co-operation; more informal means may be more suitable and provide greater flexibility. The Commission itself retains powers to enter into administrative arrangements and liaison agreements, to undertake preparatory actions, pilot projects, and feasibility studies and in general to maintain relations with others, in order to keep itself informed and be in a position to make proposals. Reference may be made in this connection to the Joint Consultative Committee established in 1990 between the United States authorities and the Commission, under which there are regular exchanges on RTD policy and developments in particular areas. More specialized meetings and workshops are held on topics of mutual interest; in view of the rising cost of RTD and budgetary restraints, both sides have felt the need to avoid duplication of research effort and to achieve synergies where feasible. In the case of Japan several ambitious, multilateral cooperation ventures have been launched, notably the Human Frontier Science Programme and the Intelligent Manufacturing System initiative, involving the US, EFTA and others as well as the Community. Such exercises serve as a test whether a framework for international RTD cooperation acceptable to all participants can be established. Where the same or a related topic is being studied within the framework of a third country's efforts as well as within a Community specific programme, it may be possible for various forms of co-operation to take place directly between the project participants. There are possibilities of cooperation, for example, between participants in various external programmes and participants in Community programmes, where co-ordinated efforts may be undertaken, without the passage of financial contributions from one to the other or the conclusion of a treaty, subject to a balance of mutual interests being established.

In summary therefore, the area of third country co-operation covers an array of mechanisms which may be used according to the individual circumstances, most notably as regards European non-member countries. The majority of EFTA countries will in future participate in the framework programme and its constituent elements as part of the arrangements for the European Economic Area. The arrangements for other COST countries, including those from Central and Eastern Europe, enable co-operation agreements to be concluded under Article 130n for participation in individual programmes. Firms and research bodies in these countries may be eligible to take part in individual projects, normally when an appropriate framework has been concluded. The assistance provided to the countries of Central and Eastern Europe may also cover RTD, including help for RTD restructuring.

So far as other countries are concerned, the possibility exists for the conclusion of agreements pursuant to Article 130n. Participants in Community projects may engage in coordinated endeavours with their opposite numbers in third countries, particularly those in other industrialized countries, when such joint efforts are mutually beneficial. The Commission may conduct enquiries and feasibility studies in its own right. With the addition of other forms of co-operation under which views and information may be exchanged (notably through the mixed committees established under bilateral discussions and the Eureka framework), the means are available for the conduct of a Community external RTD policy of considerable dimensions and sophistication.

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Article 130n Notes

1 The main instances concern development assistance or general co-operation; the Articles principally involved are Arts. 11, 236 and 238. Under the Lomé Convention assistance may be provided to improve the RTD capacity and infrastructure of African, Caribbean, and Pacific States. The Programme for Life Sciences and Technologies for Developing Countries, which came within FP2 and FP3, is concerned with tropical medicine and agriculture and aims to strengthen the scientific and technological bases of European industry in those areas. This Programme is, by its nature, conducted in co-operation with entities in developing countries.

2 The COST programme involving member States, EFTA countries, Turkey, the former Yugoslavia and others. See *EC Research Funding* (1990), 19. The Czech and Slovak Republic, Hungary, and Poland became COST members in Nov. 1991. The links established under COST helped bring about the conclusion of framework agreements for RTD co-operation between individual EFTA countries and the Community; these were entered into under Article 235 prior to the Single European Act and, subsequently, under Article 130N in the case of Iceland, the only EFTA country which had not made an agreement earlier. A list of agreements on RTD co-operation is contained in the annex to the report on scientific and technological co-operation with third countries outside Europe (Rapporteur: Mrs A. Goedmakers) prepared for the ENER Committee of the Parliament, Doc PE 148, 115, ANN, 1991.

3 Reference may be made to two Commission communications, 'Co-operation in Science and Technology with Third Countries (COM (90) 256) and 'Scientific and Technological Co-operation with the Countries of Central and Eastern Europe' (COM (90) 257 final) and related Council and Parliament discussions. The Commission Working Document on the Fourth Framework Programme dealt with external cooperation as the second activity. Doc COM (92) 406 final, 9 October 1992.

4 Article 2(2), FP3.

5 Article 10, draft decisions, Article 130k, n. 1.

6 Article 8(11); Specific Programme Decisions, *ibid*.

7 Article 8(2), *ibid*. There are some differences between individual programmes; see n. 10, below. It is specified in Article 8(2) that no contracting partner based outside the Community and participating in a project may benefit from Community financing for the programme. Such partner is required to contribute to general administrative costs.

8 The EEA Treaty sets out the provisions in general terms in Articles 78-88. Protocol 31, Article 1, covers participation in FP3 and its specific programmes. In the event of a major redirection in these programmes the question is to be treated by the EEA Joint Committee. The preparation of the Fourth Framework Programme will be undertaken together, although the EFTA countries will not take part in Community decision-making. The Joint Committee will consider the arrangements for participation in the Fourth Framework Programme, although it may be assumed that the EFTA countries will in fact participate. Since Switzerland will not take part in the EEA, special arrangements, based on existing practice, will apply in this instance.

9 The applications of the Czech and Slovak Republic, Hungary, and Poland were approved at the Conference of European Research Ministers in November 1991.

10 Environment, Biomedicine, and Health, Non-nuclear Energy, Nuclear fission safety and the Human Capital Programmes. Special budget provision is made for the participation of bodies from these countries. 10.7m ECU was provided for this purpose in the 1993 budget. In the case of the Environment programme, "project-by-project" participation in projects within area 1 of the programme is open to entities in any Third State engaged in similar activities. This is made possible by the global scope and generic nature of research in this domain.

11 See generally the Commission communication, n. 3, above. The European Parliament voted 30m. ECU credits for improving RTD facilities in the countries of Central and Eastern Europe, as part of the 1991 Budget ("Let's Go East" programme). These credits were entered within the PHARE programme. In addition 5m ECU was granted for participation in Cost activities. Further credits allocated in 1992 (40m ECU) and 1993 (45m ECU) were administered separately and enabled more extensive efforts to be made, notably through the award of fellowships, the creation of networks and the conduct of joint research ("Copernicus" programme).

In the case of the States of the former USSR, RTD related assistance has been dealt with under the general programme (TACIS) or under ad hoc arrangements. 15m of the 45m ECU allocated in the 1993 budget is intended for CIS countries. The International Science and Technology Centres which was set up to aid Russian RTD activities and personnel (particularly those who had been engaged in defence activities) was established by a treaty between the Community, Japan, Russia and the United States. The Community provided a contribution of 20m ECU. Council Regulation 3955/92, OJ L 409, 31 December 1992, 1.

12 European Agreements were agreed with the Czech and Slovak Republic, Hungary, and Poland in November 1991.

13 Agreements of this kind have been made with Australia and Canada.

· ARTICLE 130o ·

The Community may set up joint undertakings or any other structure necessary for the efficient execution of programmes of Community research, technological development and demonstration.

COMMENTARY

Article 130o offers a way of reflecting the subsidiarity principle and of adapting the means employed to fit the nature of Community involvement. The range of activities pursued under framework programmes provides considerable scope for joint undertakings and the conduct of research through agencies or similar structures. The decision on the Third Framework Programme included a reference to the Article, although it has not yet been used in any specific case.¹ The use of Article 130o, like Article 130i, is subject to Council unanimity.

The possibilities offered by Article 130o were mentioned in a Council resolution adopted in December 1989 concerning broad band communications. A working group was set up by the Commission to consider whether recourse should be had to Article 130o in order to provide a mechanism for the conduct of the activities envisaged. It was concluded that the existing mechanism under the RACE programme has proved fully satisfactory for the conduct of research.²

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Article 130o Notes

¹ Article 2(2) FP3. The recital clauses of the draft decisions on the specific programmes stated that steps might be taken under Article 130i, m, or o, in accordance with the option made available under Article 2(2) of FP3, and a reference to Article 130o was included in Article 9. These provisions were not retained in the decisions adopted. The notion of joint undertakings has a precedent in Arts. 45-51 of the Euratom Treaty. These provisions were used when the Council set up the Joint European Torus. OJ 1978 1151/10.

² The issues involved concerned both research and development and the conditions under which implementation could be facilitated. Research is of course conducted with a view to eventual implementation, and in areas where the investment costs are high and involve a series of participants (e.g. telecommunication operators, equipment manufacturers, and service providers) the question of the need for consensus formation and overall co-ordination arises. This aspect, of particular concern in the case of infrastructure and strategic projects, remains on the Community agenda.

· ARTICLE 130p ·

1. *The detailed arrangements for financing each programme, including any Community contribution, shall be established at the time of the adoption of the programme.*

2. *The amount of the Community's annual contribution shall be laid down under the budgetary procedure, without prejudice to other possible methods of Community financing. The estimated cost of the specific programmes must not in aggregate exceed the financial provision in the framework programme.*

COMMENTARY

Article 130p is linked to the adoption of framework programme and specific programme decisions pursuant to Articles 130i and k, although it also covers any supplementary programmes which may be agreed. The decisions on the framework programme, adopted by unanimity, fix the "amount deemed necessary" for the overall programme, the detailed rules for Community financial participation and the breakdown of the amount between the various activities. It is over this sum that the discussions in the Council and the Parliament particularly centred in the case of the Second and Third Framework Programmes.¹

The specific programme decisions use the breakdown given in the framework programme and lay down the "means deemed necessary" for each programme (as opposed to the "amount deemed necessary" for each activity, set out in the framework programme decision). The detailed arrangements have to be established at the time of the adoption of the specific programme. The financial statement accompanying the decision consists of a multi-annual schedule, indicative in nature, showing commitments and payments during the period of programme execution. As stated in Article 130p(2), the estimated cost of the specific programmes, taken together, may not in any case exceed the financial provision in the framework programme.

The amount of the Community's annual contribution has to be determined under the budgetary procedure, without prejudice to other possible methods of Community financing. The financial participation of the Community may be replaced or completed by contributions from Member States, firms, earnings from services undertaken for third parties, or from loans or other means. Subject to such possibilities, the actual expenditure on programmes is consolidated and treated within the overall Community budget. The budgetary authority thus retains the power to open the necessary credits each year within the budgetary procedure. Research credits are classified amongst non-obligatory expenses over which the Parliament has the last word.² One of the effects of the system established by the Single European Act under which the legislative authority cannot easily revise its initial estimate of the amount deemed necessary may thus be to reinforce the position of the budgetary authority. The different distribution of powers between the Council and the Parliament as regards legislative and budgetary functions tends indeed to lead to institutional disputes, as experience has shown: what is required is a successful co-operation between the institutions and a shorter, more flexible decision-making process to meet the needs for effective programming in areas of fast-moving technology. The interaction between the legislative and budgetary procedures and RTD planning activities (the adoption of the decision, the establishment of the work programme, calls for proposals and contract negotiations) is thus a complex and difficult process.

BIBLIOGRAPHY

See the Bibliography under Article 130f.

Michael Hardy

Article 130p Notes

1 See the Commentary on Article 130f and 130i and *ibid.* n. 4 and 5. for the discussions concerning the so-called "overhang" and the financial perspectives.

2 On a number of occasions the Parliament has restored amounts in the research allocation when the Council has made reductions in the annual budget. The issues involved concern the division between compulsory and non-compulsory expenditures and the interpretation of the financial perspectives by the three institutions, as well as the interpretation of Arts. 130l, k, r and q relating to legislative and budgetary powers, on which the Council and Parliament have repeatedly taken opposing views. The Inter-institutional Agreement on Budgetary Discipline and Improvement of the Budgetary Procedure is contained in OJ L185, 15 July 88, 33, and includes the 1988-1992 financial perspectives as an annex. On the financial perspectives for the period after 1993 see *The Community's Finances between Now and 1997* (Doc COM (92) 200 1 final, 10 March 1992) and the conclusions of the European Council held in December 1992. For the position as regards RTD, see the Commentary on Article 130i.

· ARTICLE 130q ·

1. The Council shall, acting unanimously on a proposal from the Commission and after consulting the European Parliament and the Economic and Social Committee, adopt the provisions referred to in Articles 130i and 130o.

2. The Council shall, acting by a qualified majority on a proposal from the Commission, after consulting the Economic and Social Committee, and in co-operation with the European Parliament, adopt the provisions referred to in Articles 130k, 130l, 130m, 130n, and 130p (1). The adoption of these supplementary programmes shall also require the agreement of the Member States concerned.

COMMENTARY

The provisions of Article 130q are straightforward in the case of the adoption of the framework programme and joint undertakings (Articles 130i and 130o). Council decisions on the Commission's proposals in these areas require unanimity, after the European Parliament and the Economic and Social Committee have been consulted. All other decisions are taken on the basis of a qualified majority in the Council, after consulting the Economic and Social Committee and in co-operation with the Parliament. The agreement of the Member States concerned is also required in the case of programmes under Articles 130l and m.

The unanimity requirement evidently enables a Member State to block agreement if it considers such action justified, even if the remainder of the Council and the majority of the Parliament are of a different view. Experience has been that such disagreements are more likely to concern general or institutional issues than scientific and technical questions. Differences of opinion between the institutions, notably the Council and the Parliament, may range more widely. In the case of the adoption of the Third Framework Programme they concerned the relative priority to be given to various research sectors, the total amount deemed necessary and the financial division between areas, as well as issues relating to structural policy and subsidiarity. The conciliation procedure was used prior to the adoption of the Council decision in this case.

The difficulties over the adoption of the specific programmes under the Third Framework Programme were also marked. Under the co-operation procedure provided in Article 130q(2) for specific programmes the Parliament was however, able to play a greater role, subject to the overall amount and breakdown fixed in the framework programme. The double reading under the co-operation procedure is nevertheless a lengthy process accentuated by the pressures on the Parliament's timetable. A period of about a year or more may elapse between the adoption of the framework programme and the specific programme decisions, after which the implementation of the specific programmes may be undertaken. This may in turn affect the planning of the subsequent framework programme and the need to draw from the latest scientific and technological experience in determining future priorities. There are thus substantial arguments in favour of devising a more flexible and streamlined procedure within a politically agreed framework, as proposed during the preparations for the Maastricht Treaty.¹ Until such measures are taken—and the Treaty on European Union, while making some improvement, did not provide an adequate solution in this respect—the decision-making process, whether under the EEC Treaty as amended by the Single European Act or that agreed at Maastricht, requires close cooperation between the three institutions if the system is to function and meet the increasing demands placed on it. The question of institutional change in this area thus remains on the agenda. Community research and technological activities are now of sufficient importance to make this a significant task if the aims of these activities are to be fully achieved.

BIBLIOGRAPHY

See the Bibliography under Article 130f.

Michael Hardy

Article 130q Notes

¹ See the Commentary on Article 130f and *ibid.* nn. 2 and 3.

THE FUTURE OF EUROPE

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The remarks are made solely on a personal basis

Madam President, Ladies and Gentlemen

I should like to thank you Madam President for your words of introduction. May I also express my gratitude to the Association for the opportunity to address this year's Conference.

As the President has revealed, I am neither an educationalist nor a futurologist. Like everyone else, I have of course an interest in what happens next, but that is a rather different thing from sitting down to distil one's ideas into a comprehensive picture, to think "the future", or a large part of it, through in some sort of consistent way. The invitation to speak today meant that I had to attempt to put some order in my reflections and to see how indeed one part of what one dimly sees relates to another.

While some of the ground to be covered is familiar, an attempt to describe the future of Europe is unavoidably a complex and ambitious task. What is to be left out and what is to be assumed? What claimed and what demonstrated - and what does "demonstrate" mean when talking about that unvisited country, the future?

Let me therefore state at the outset the limits of my undertaking. So far as the date of this "future" is concerned, I have set a scale of 20 to 40 years hence - the years 2010 to 2030. The central elements of my remarks - the core around which the rest is built - are two

first, that Europe, together with North America and Japan will constitute one of the three poles which dominate the world economy

secondly, that information technology and communications will be the predominant means shaping that economy and much of society.

These are broadly familiar topics, if not received truths. How accurate are they likely to be however as prognoses and what would they mean? What sort of world would this be and how would it operate? It is on these aspects that my remarks are chiefly concentrated.

The thesis which I would advance - if I may begin with a summary before trying to show some of the reasons - is that during the coming 20 to 40 years we will be dealing with a double change. Europe will undergo both a constitutional or institutional adaptation, and a change in economic structure. To understand the processes bringing about either of these changes is difficult, and to grasp the relationship between them - related though they are - is more difficult still. Comparisons are of course odious and inaccurate, but there is perhaps some parallel with the period between 1790 and 1840, when new questions of identity made their way to the fore - when the French revolution displaced the old order, when German philosophy completed the move from theology to idealist (and ultimately materialist) philosophy, and when the industrial revolution brought in the factory system and mass society.

We are now somewhere after the beginning of a similar, and more rapid, adjustment of the main features of the landscape. By the year 2020 or 2030 the process will have been completed, the essential changes will have occurred. It will then be for society to digest those changes, as it was in the second part of the 19th century and the earlier part of this - to work out the consequences and to deal with the problems they in their turn present. The task of the coming twenty to thirty years on the other hand - or such is my argument - will be to manage, to stage manage if you like, the installation of these changes, to bring them about and to understand them.

I Why should these changes come about?

Assuming the general thesis or something like it is correct, or at least merits reflexion, how did this come about? Why should matters come about in this way?

The answer - the evidence for the propositions - can be given at various levels. The first concerns the span of 20 to 40 years I have chosen. This duration is about the limit of the period on which one can usefully reflect. Beyond, one steps into speculation and reverie. If one takes a period of the next 20 to 40 years one can do so in the knowledge that most of the people who will be alive then have already been born, that most of the technologies

which will be applied have already been invented, and with a fairly accurate idea of which societies will be able to put their stamp on developments. One can, in short, steer a course between the silence which reason suggests if one tries to forecast the exact sequence of events and the folly of the crystal ball.

That the three societies I have mentioned are now economically dominant is well established. The figures are indeed striking and proceed in a double direction

- the predominance of the three poles (the Triad) relative to other areas
- as between the members of the Triad, the relative decline of the United States or, to put it the other way round, the growth on the European and Japanese sides.

Total world GNP in 1989 was approximately

19,500 billion dollars ⁽¹⁾

of which US 5,238 billion \$ (1990: 5,330 bn \$)

" " EC(12) 4,980 billion \$ (1990: 6,021 bn \$)

" " Japan 2,920 billion \$ (1990: 2,891 bn \$)

Collectively the GNP of the three amounts to something like two thirds of the world total (\$13,000 bn out of \$19,000 bn). There are individual countries whose per capita income is equal to that of members of the Triad (eg Scandinavian countries, Saudi Arabia, Canada, Korea, etc) but these do not form a large grouping.

⁽¹⁾ World Bank Atlas 1990, p 10. Billion as 1,000 million. Figure for EC (12) in 1989 includes FRG before reunification i.e. without the five Länder (ex DDR). The 1990 figures are from OECD and Le Monde, 9 July 1991.

The 1970 figures in the next table are from World Bank Atlas 1972.

To track the movement of the GNP figures of the three regions is a laborious exercise, so let me take the figures for 1970 and 1989 as benchmarks

	GNP (in bn \$)	
	1970	1989
EC (12)	688	4,980
EFTA	90	721
Total	778	5,701
US	975	5,237
Japan	198	2,920

In broad numbers, Japan has gone from 2/9ths of US GDP in 1970 to three fifths, and Western Europe (EC plus EFTA) from 7/9ths to an appreciably higher figure than US GNP.

These are large numbers to get one's mind round but they are the simple A.B.C. of political arithmetic. They also illustrate the fact - the phenomenon one may say - that real incomes in literate societies have risen in each of the 20 decades since James Watt invented the steam engine in the 1780s - that once a society has made the step of industrialisation there is a shift to sustainable wealth.

How did this process happen over the past decades? The short answer is to be found in the 45 years of peace we have enjoyed and the modified market economy; the basis was there and we were lucky enough, rational enough, to be able to build on it. We have been, *mirabile dictu*, a fortunate generation. On the European side, the establishment of the Community and its institutions, the growth of internal trade and "1992", are well known and I do not need to repeat these elements with which you are already familiar.

It may however be worth recalling some of the wider context

- Over the past 40 years world output has gone up eightfold
- World GDP increased during much of this period at 3-5 % a year
- International trade has flourished. Exports have grown faster than GDP rates, commonly at around 5-8% a year.

While these figures in themselves tell much of the overall story, there have been underlying changes in the world economy which should be noted. It is these changes which give substance to the belief that the lead now enjoyed by the three regions will continue and indeed accelerate.

Three fundamental changes ⁽²⁾ have occurred.

- (1.) The primary products economy (the production of raw materials) has to some extent become uncoupled from the industrial economy. The amount of industrial raw materials needed for one unit of industrial production is now no more than one fifth of what it was in 1900. In 1986 raw material prices were at their lowest levels in recorded history in relation to manufactured goods and services.

⁽²⁾ See generally P Drucker, *The Changed World Economy*, Foreign Affairs, 1986

The implications of this are enormous.

- In the late 1920s, farmers constituted nearly a third of US population and farm income accounted for almost a quarter of GNP. The figures for most European countries are broadly comparable ⁽³⁾. Today US farmers account for less than 5% of GNP. Even if one adds the contribution that producers of foreign raw materials and farm products make to the US economy through their purchases of American industrial goods, the total contribution of the raw material and food producing economies of the world to American GNP is at most one-eighth. In most other developed countries, the share of the raw materials sector is even lower.
- This decline is accelerating. The Japanese experience is particularly striking. In 1984, for every unit of industrial production, Japan consumed only 60% of the raw materials it consumed to make the same volume of industrial production in 1973, 11 years earlier.
- Amongst the consequences of these changes, which are permanent, not temporary in nature, is that it will be impossible for countries like Canada, Australia or Brazil (or, one may, add, Africa) to "catch up" through the export of raw materials. The "value added" will not be there to provide the capital. The foreign markets for their foodstuffs and raw materials are in long term decline.

⁽³⁾ Immediately after the Second World War, farmers represented over one third of the working population in France. By 1960 that had dropped to 20%. Today they represent no more than 6%. Between one third and a half of the remaining farmers are expected to disappear by the end of the century. At the same time agricultural productivity has tripled over 30 years and France is the world's second exporter of farm produce after the US.

(2.) In the industrial economy, production has tended to become uncoupled from employment. Blue collar employment, in the US terminology, has declined although manufactured production has remained at around the same percentage of the economy or with only a relatively small decline. It is not so much the economy which is being "deindustrialized", but the labour force⁽⁴⁾. The trend is not new, it has been running for a long time; it has lately accelerated to the point where increases in manufacturing production are unlikely to reverse the long-term decline in the number of blue-collar jobs in manufacturing or in their proportion of the labour force.

This trend is the same in all developed countries. In 20 or 30 years the Triad countries will employ a much smaller proportion of the labour force in manufacturing than they do at present. A country, an industry or a company, will have to reduce its blue collar workers and increase productivity over the next 20 years; unless it does so it will not be competitive.

There are several separate shifts that have brought about or are bringing about these changes: (1) an acceleration of the substitution of knowledge and capital for manual labour (2) a shift from labour-intensive to knowledge-intensive industries - embodied above all in information technology and its applications and (3) a complex industrial restructuring, moving from large, monolithic plants to more varied arrangements and specialised firms.

⁽⁴⁾ In the 12 years 1973 - 1985 total employment in the US grew faster than at any time in the peace time history of any country - from 82 to 110 million - that is by a full one third. The growth, however, was in non-manufacturing, and especially in non-blue-collar jobs.

In considering this aspect - the changing composition of the labour force - from a European perspective, there are several elements to be kept in mind. First, there are demographic factors: by the year 2020 or 2025, the labour force may well have declined appreciably ⁽⁵⁾. But even more significant, there will be the impact of information technology. According to a study recently done for the Commission by IFO (Institut fuer Wirtschaftsforschung), the introduction of new technologies in the period up to 2005 will result in more productivity, more real income and leave the labour market more or less unchanged. If information and communication technologies are introduced more quickly over the next 15 years, this would imply an increase in labour productivity (GDP per head) of nearly 10% and a fall in consumer prices by more than 5% compared with the baseline scenario in the year 2005 ⁽⁶⁾. Once again, a more synchronised, European approach will produce greater benefits.

To appreciate the weight of these figures, let me point out that in the Cecchini Report the "Operation 1992" was estimated to result in an increase in GNP in the range of 4 to 7% in the medium to long-term. While dynamic effects may be added to that, Europe will in effect undergo two impulses - 1992 and, increasingly, information technologies. The IFO Study suggests that the impact of IT on GDP will be of the same magnitude as "1992".

⁽⁵⁾ The EC(12) labour force, assuming constant participation rates, is estimated to fall from 147 million in 2000 to 132 m by 2025, a drop of 15 million. IRDAC Opinion, Skills Shortage in Europe, p.7.

⁽⁶⁾ The IFO Study Impact of Information Technologies on Future Employment in the European Community was prepared for the EC Conference on Social Aspects: Impact on Employment and Training, held on 17-18 October 1991.

(3.) Thirdly, international money flows and capital movements rather than trade have come to drive the world economy. The reduction of trade barriers, the virtual elimination of tariffs for whole swathes of goods, has led to a greater degree of interpenetration of economies. This has occurred most evidently in Europe but also on a world-wide basis through the successive Gatt Rounds. Restrictions on capital movements have been removed. The multinational, multiregional corporations are a major source of investment and of currency flows. The result is that direct investment has grown by 20% or more a year, at three or four times the growth of world trade. Of this investment, 80% of the flows are between the US, Japan and Europe. Foreign direct investment is thus dominated in the Triad; it is even more concentrated than the trade flows.

The changes in economic structure I have outlined support the central argument: the three regions which are now in a leading position, the United States, Europe and Japan, are likely to be maintained in that position over the coming decades.

None of the other potential participants looks likely to emerge to join the front rank, certainly not in the 20 to 40 year span we are considering. Individual countries may advance (Korea is a case which comes to mind), but none will be on the scale of the three major players to which they will be, in essence, tributaries or side players. Of those with large populations, Russia, China and India, internal difficulties will prevent rapid progress. Radical adaptations will be required if they are to achieve the levels of those now ahead; the extent and nature of those changes will be such that it is highly unlikely they will manage to make the adjustments in the near future.

As regards Russia, it is worth pausing a moment to consider once again the puzzling issue: just why and how did the Soviet Union so signally collapse? Books and theses have been written on this, and others may be expected before our Gibbon emerges. But at least one major cause was once more information technology and the kind of economy, the kind of society, it required. You may recall the celebrated remark of Lenin "Communism is Soviet

power plus electrification". It was indeed possible through a command economy, by terror, to introduce heavy industry, to develop coal and steel. But to go beyond meant not merely more wealth but enabling people to act on their own; one needed a market and market forces. This is most markedly so in the case of information technology and communications. These elements come together in a marvellously graphic description by a member of the East German Politburo of the last meeting of Gorbachev and the DDR Politburo in Berlin just two years ago (in October 1989)

"Gorbachev made a speech that moved me and most of my colleagues deeply. Without being a know all, he urged us to seize our chance, uttering the now famous phrase "He who comes late gets punished by life". Honecker did not agree with Gorbachev at all, but went on and on about the successes of the German Democratic Republic and its four-megabit chip. We were all furious and the meeting ended in icy silence. After that we were all agreed that Honecker could not remain Secretary-General" (7).

What this story bears out, with some of the direct force of a folk tale or a parable, is that by the time of the meeting it was clear to Gorbachev, as it was to most of the members of the DDR Politburo and to the staff of the Soviet Army, that being economically and militarily strong was no longer a matter of piling up shells and tanks, of commanding resources, that you needed a different kind of society in order to have a developed electronics industry. This required a range of outlets, an opening up of possibilities, which their system was inherently incapable of providing. The DDR invested 14 billion Ostmarks in developing the 4 megabit chip and it proved a total waste of money. It was an investment which did not produce any economic gain. The problem is not just to make a limited number of semiconductors but to produce them in series and to apply them in a range of products; the market side was non-existent and they were unable to create it without a total reversal. By

(7) Interview with Horst Sindermann, former number 3 in East German hierarchy, in Der Spiegel.

the time they had advanced, we were a generation further on. The system could not adapt, as ours has done, and has been abandoned.

II What will Europe look like after this period and how will it operate? What will be its tasks and concerns?

Proceeding to the year 2020 or thereabouts, I assume that the three principal players will be the United States, Europe and Japan. As far as Europe is concerned I presume that Europe at that time will consist of

- the "grand market", a trading area of over 400 million people, with accompanying policies and practices
- an economic and monetary union
- with a foreign and security policy determined in common
- with legislative and institutional powers.

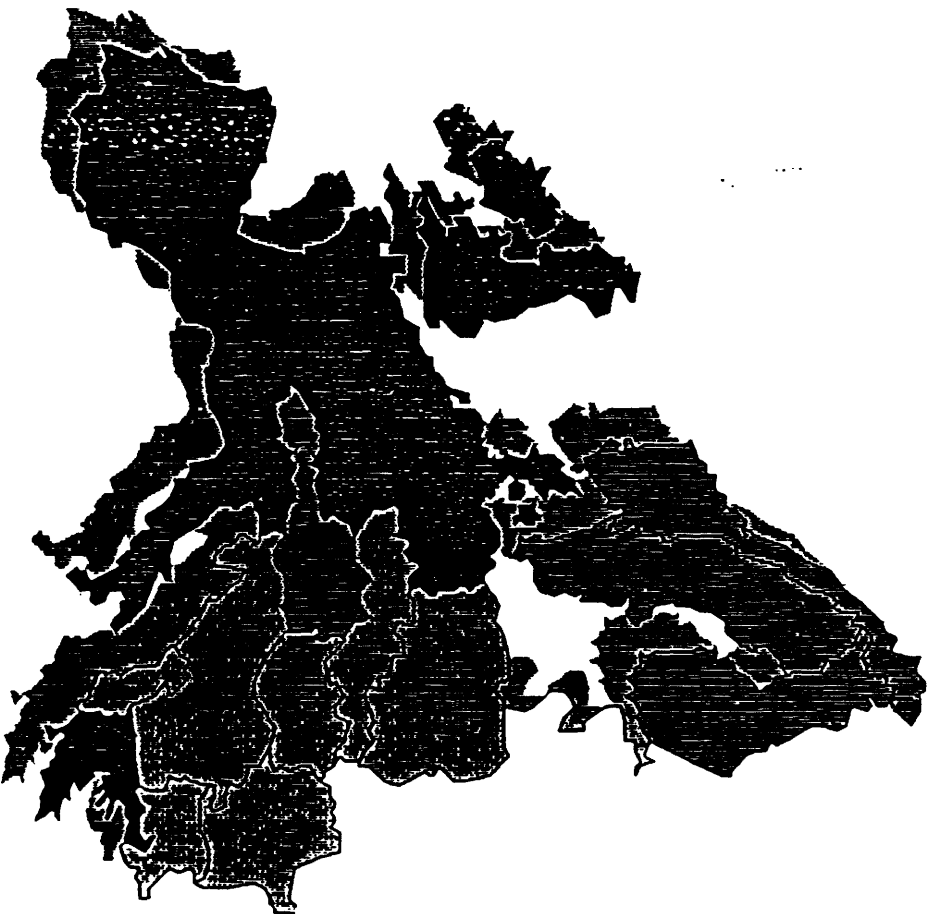
Such a system will not operate without a government or form of government. It is this which forms - nearly - the greatest single problem in achieving it.

A Europe of over 20 Member States with a population of 400 to 500 million people and a GDP of 6 to 7 billion Ecu at present prices will be far and away the most central and, collectively, the richest area of the world. Such riches represent power. Who is to exercise it?

That question is tied to the issue on which most attention has been turned: the division between the federal powers and those of the constituent states. There is no simple and straightforward answer, no consensus at present on what this division should be. European construction has proceeded from the 1950s on a functional and sectoral basis: first let us deal with coal and steel, then wider economic issues. We have tiptoed up to the central questions. That means that those at the extremes, whether federalist at one end and those



POPULATION & GDP



■ 345 m people
4860 bn Ecu

E-19 ■+■ 380 m people
5550 bn Ecu

E-26 ■+■+■ 500 m people
6100 bn Ecu

nta12jma

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relying on national sovereignty at the other, have rarely entered into a systematic debate. Each has sought to engage the support of those in the middle. The political discussions, the choices to be made, the pros and cons, have been waged and weighed so far as the public has been concerned largely through the media - and essentially through the national media. It has not been a steady or tidy process, but one can say that it has, judged by the results, on the whole worked. Europe has moved forward. Eppur si muove! But the next stage will require a greater level of clarity, of distillation, than we have so far achieved and hence the need to try and focus attention on the new issues we will have to deal with.

If one problem in this area is the question of fora - where and how is Europe, as opposed to a collection of national societies to discuss these matters? - another concerns the ideas involved. Which concepts and principles are the key pieces assuming, as we may assume, that we need and will finally acquire a balanced and articulate system for this Europe of 400 million people?

There are several threads which lead one through this labyrinth of discourse. The first of these is the doctrine of subsidiarity. This somewhat clumsy word contains a virtuous principle: that matters are to be decided and dealt with at the most appropriate level. It is of course a question begging principle: How does one know what the right level is? - that is just what the argument is about. But it provides a conceptual tool, a way of approaching the problem which is indispensable. It has an echo, one may note, in that other great federal system, the Constitution of the United States. The advantage to be derived from the principle of subsidiarity is that it is open; it does not proceed on an a priori basis that a central or non-central solution is predetermined. It has to be argued, the case has to be made out for whatever course or combination of means is chosen.

This recourse to reason and function - though we lack our James Madisons - is central to the exercise. It means that it is not the case that "Europe" will eliminate its constituent parts. This will not happen. The Europe of the future - indeed one may say the Europe of the present day - is one which has and will have multiple loyalties, multiple allegiances.

People will be English or French or Greek as well as European. It is not an either/or matter. We touch here on national feelings, those songs and memories which make the heart beat faster, the national rallying cries with which we are all familiar. It is superficial and indeed foolish to think they will disappear, or even to argue that they should. They are the means by which collective entities recognise themselves, are conscious. Without them who would we be, how would we know ourselves? Supposing they did not exist, what would it be like to be a citizen in an entity of 500 million? Can one move people and hold a society together without such symbols?

We do not have an answer to this last question, and certainly I have no easy panacea to put forward, to drop out of my sleeve. The problem can be put in something of the following form: broadly speaking people know where they are in a national setting; the larger the unit and the more technological change speeds up, the more - or at least this is one of the reactions - they cling to the past - whether it is milk bottles delivered on doorsteps, or working practices. Is it the case that Europe will not achieve its ambitions unless it comes to offer a similar set of rallying points?

We do not know the answer in any categorical sense to this question. Sometimes it seems all-important, the most decisive of them all - What moves people and how is it done? - at others irrelevant, a dogma of the sociologists. We also have to take account of the impact of enlargement: will the existing Europe be able to help the development of the countries of Central and Eastern Europe and prevent a destabilisation of the present cohesion? The balance within the Community, and the sense of identification with it (that each country and region has its place within it) will be of fundamental importance.

One way of approaching the matter, and one which I would offer, is to refer once again to the principle of functionalism; my second thread through the maze. It is this practice which will have to be applied to the tasks which the Europe of the future - indeed the near future - will have to confront. The matter can be put in fairly simple concrete terms: We know how to run a country like, say, Denmark or the Netherlands. We have accumulated

experience and confidence here. But how are we to run a Europe of 350 or 400 million? That is something we have not previously done as a collective, common undertaking. We are still at the opening stages.

Some at least will put the question however : Why must Europe be "run"? Does this not prejudice the debate? The reply here goes back again to a matter of political choice and the subsidiarity principle: we will in all instances have to decide at what level or levels and by what combination of means we wish to pursue our aims. Bearing in mind therefore that the subsidiarity principle will be there as an operational guide, there is a range of social goods that there is good evidence for saying can only be achieved by proceeding at European level. These social goods are of many varied kinds but a substantial proportion of them require the application of information and communications technologies, the second principal element of my remarks.

One may illustrate this by referring to the infrastructure needs of this future Europe. Let me again draw a parallel with previous experiences. James Watt's steam engine was a stand alone affair, used to drive cotton looms and other forms of early industrial manufacturing. It was only when it was mounted on wheels and became the railway engine that it achieved its full impact. When in the mid 19th century it became apparent to the German States that they could not set up viable railway systems, assemble the capital and develop mining, steel and chemical industries on an individual basis, they established the Zollverein, that predecessor of the Community, where Bismarck spent so many happy years in the equivalent of the Committee of Permanent Representatives (Coreper).

Just as Germany did not manage to industrialise successfully until it made the institutional changes required to achieve the economies of scale needed for a railway system, that mobile steam engine, so now the benefits of the combination of computer power and communications cannot be achieved in Europe without a degree of consensus building, without a degree of interoperability, which only actions on a European scale can provide.

It is that sort of functional challenge - which Europe will have to deal with well before 2030 - which will provide the answer to the question "Well, where are your symbols?" and, no less pertinently "Why should we do it?" and "Does it work?" There will of course be other symbols, from the European Cup to the Eurovision Song Contest, to help this process along, but the link between industrial restructuring and proceeding on a European basis will be central for the future well being of Europe's citizens.

A further word on the European aspects of the application of information technologies and communications may be useful at this point. We all know about personal computers, it may be said. We have them at school and in offices. Why should the Community be involved?

That a number of formerly basic industries are no longer of the same importance is well known. The past 20 years have seen the decline of the smoke-stack industries in the West. Steel, mining, textiles and shipbuilding are amongst industries that have lost market share. The supplier industries geared to them have shrunk in parallel. The human consequences have been severe; structural unemployment remains a serious political and social problem for the Community. At the same time new industries and services are in the process of emerging. The important characteristic of information technologies and communications is not only that they constitute a major industry or a sector in itself, currently about the size of the automobile industry, but that they provide the means by which other services and industries will be required to operate. They are "enabling" or "diffusion" technologies, potentially available for use throughout the economy. The new information technologies are thus at the core of the present direction of technological change. The proportion of all industrial investment that is directly related to information and communications technologies (ICT) products and services is currently estimated at about 35% and it is expected that by the end of the decade ICT will influence directly or indirectly two thirds of all economic activity.

The difficulties which we have are that the capital goods and organisational structures embodying new information technologies have high levels of incompatibility with pre-existing capital stock and organisational structures. You cannot just plug them in or add them on. What we now stand on the verge of - though it will take some ten to fifteen years to complete - is the integration of these systems in manufacturing and in European-wide services.

The picture is varied and difficult to describe fully even with the best of visual aids. The broad features which emerge are somewhat as follows. Most offices now have word processors and personal computers are common place. They are in the process of becoming commodities, assimilated within the activities they support. But this is not an easy or straightforward task. The difficulty is to link the machines and to use the means, the information which is made available, in order to gain comparative advantage. It is this last aspect which is usually the most difficult, particularly for an administration. Although some of the illustrations are familiar, they are worth putting together in order to see the overall process.

According to studies which the Commission has undertaken, the banks and financial services have made the largest investment in IT per employee. The banks were used to dealing with a mass of similar data, they already had large computers and they had a network (head office, branches). They also had the capital. Since they were also competing with one another, whether in the high street or for international markets, once one bank started to informatize, the rest had necessarily to follow and promptly did so. So it was not just a question of a word processor or an automatic teller, but of providing a system whereby each transaction was more or less simultaneously recorded, being passed over telecommunication lines leased from the telecom operators and private networks. Only by informatisation and digital communications could the banks cope. The Governor of the Bank of England declared several years ago that without such means the entire population of the United Kingdom would be required to provide the current level of

services⁽⁶⁾. But to employ an appreciably larger number of people - to reply to the evident question - even assuming it could be organised, would be prohibitively expensive. Clearing the same number of cheques and the other financial operations which our society requires, which we as salary earners and consumers demand, could not otherwise be done without a prohibitive rise in costs. The bank would not be competitive. Structural adjustments must accompany, not hinder, the process. Otherwise we too would be following the path of the DDR Robotron megachip venture.

In retailing it is much the same picture. The electronic recorder at the check-out counter does not merely do the adding up. It means that if you are running a branch of Sainsburys, you will know the quantity of each item sold each day; indeed it will be possible to know this on a national basis. From this you can determine which stocks to order. Indeed, in some systems, the reordering will itself be done automatically; the computer programme will work out what you need and in which warehouses the goods are to be found. (eg. Volvo parts). The branch manager will receive a message on his computer screen telling him which goods are being supplied that day.

The start-up costs of such a system are considerable, and once established it will be critical for the operations of the firm - it will be its "brains" and nervous system, to use the usual simile. If one wants to set up in competition one will have to install a similar system. If one wants to do business with a major firm one will have to accommodate oneself to its informatics requirements. As a supplier to Marks and Spencer or the National Coal Board most of the messages will pass on informatics networks using Electronic Data Interchange (EDI).

These systems are currently introduced or are being introduced. The difficulty which is now experienced concerns systems integration and is partly technical and partly a matter of organisation.

⁽⁶⁾ The Economist, 25 March 1989.

[Diagram of industrial/service sectors and broadband. See next page.]

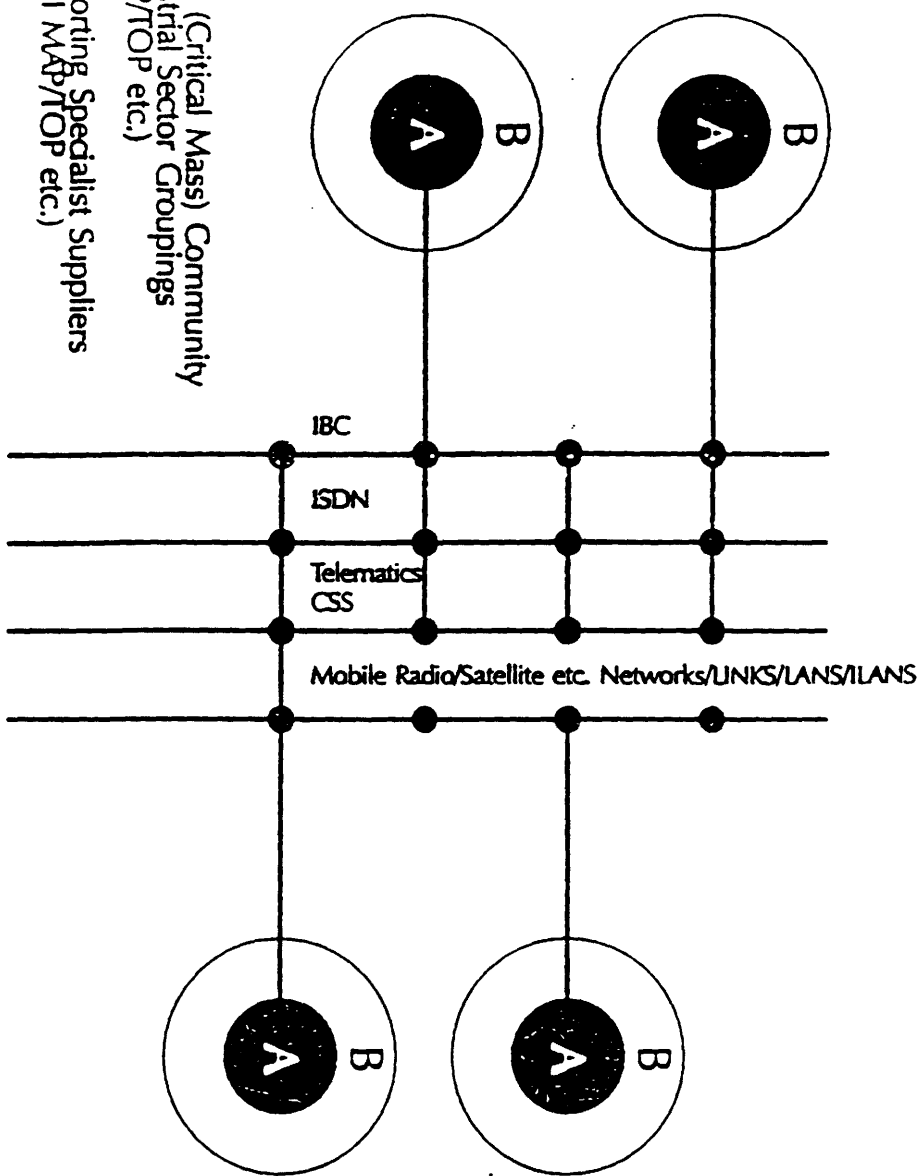
The circles represent a given sector, say the banking sector or the chemical industry. They have achieved - will certainly by 2020 have achieved - a degree of integration of their informatics at the level of individual firms (the major companies) and their suppliers, and between one another. These sectors will then be in communication with one another (the lines in the centre) by means of high speed, high volume networks. It is the increase in the volume of information, passing at high speed and low cost, which is the key element. It will be like moving from a garden path to a super highway.

At the present time (1991) these systems are embryonic and piecemeal: a patchwork of LANs - Local Area Networks, WANs - Wide Area Networks, private networks and islands of ISDN (Integrated Single Digital Network). The task is to stick them together. This applies particularly in manufacturing. In producing, say cars, there are considerable degrees of informatisation already in application (see Annex p.1)

- in the design of the car (CAD - computer-aided design)
- in aspects of production (CAM - computer-aided manufacture, CIM - computer-integrated manufacture)
- in the components (within a few years 20 to 30% of a car will consist of electronic components, regulating petrol consumption, steering, braking, etc)
- in relations with suppliers (deliveries, ordering) and in after sales aspects (stocks, marketing). Here the issues are similar to those in the banking and retail sector.
- and, not least, when the car is on the road, in providing an "intelligent" as well as "clean" (non-polluting) vehicle, operating on an "intelligent" highway. The car will "know" how it is to be steered, the best route to take, the traffic patterns will be under our control. It is not possible to increase the capacity of our roads to a



CEC Industrial Base concept, based upon projected 'back bone',
Community IT, Telecommunications and ATM Infrastructures.



- A- Large (Critical Mass) Community Industrial Sector Groupings (MAP/TOP etc.)
- B- Supporting Specialist Suppliers (MINI MAP/TOP etc.)

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degree comparable to the demand. The only solution is to find ways of using the roads better and of increasing road safety.

The means are available. The information technologies exist or are in preparation. The question is how to apply them, a matter of competition and organisation. Manufacturing - the production of goods, the main spring of the economy - will, over the next 20 years, undergo the process which to a considerable if uncoordinated extent has been undertaken by the banks and some of the retail trade.

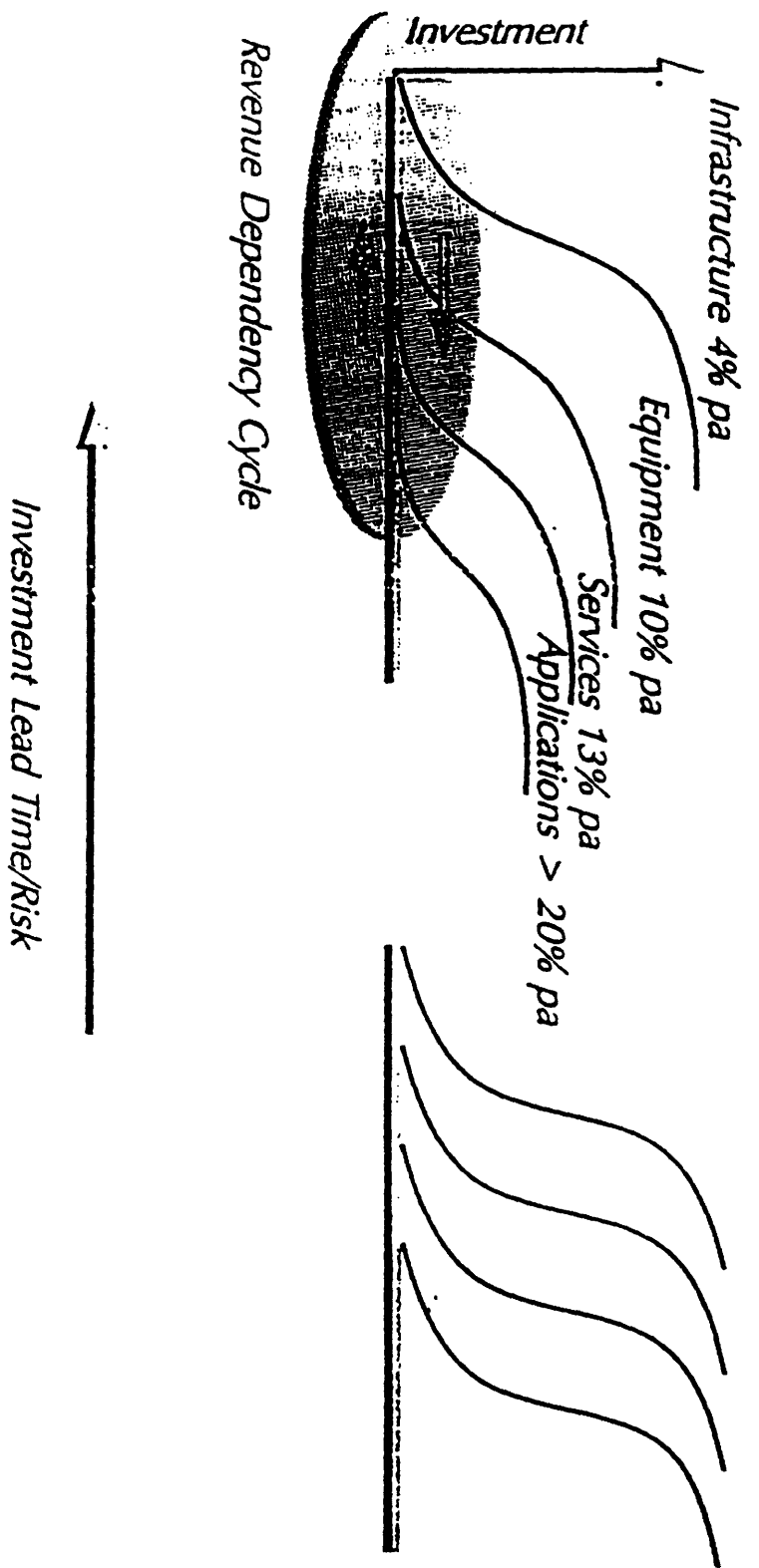
This is a more elaborate task than that partly carried out by these service sectors because of the wider range of activities involved. It is more complex than constructing the 19th century railways. Whether in terms of the number of major actors, the technical expertise required, the capital expenditure, the involvement of administrations, a stupendous effort is involved. The studies which the Commission has made, in conjunction with those potentially involved, show that these endeavours only really make sense, only achieve the optimal benefits (so-called leading edge applications) equal to those achieved or achievable by our competitors in Japan and the United States, the necessary economies of scale, scope and integration, if the systems are instituted on a European scale. Otherwise the critical mass cannot be obtained, the investments will not be made effectively because there will be insufficient assurance that the market (the demand) exists on a viable scale, the technical standards will not be available. Remember we are speaking here of the advanced technologies of enormous regional economies - it is at this level that world competition will in future be conducted, not at that to which we have been accustomed.

[Diagram: Investment curves of operators, equipment firms, service providers. See next page.]

The challenge which Europe now confronts, and which by 2020 it will have overcome, is to organise this construction. These are the tasks on which the Europe of 12 or, as it may be, of 16 or 20, will be involved, the organisation of the infrastructure of the 21st century on a pan European basis.



Present Probable situation by 2000



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This will not be done through edict or by a command economy, but through a complex process of consensus formation, operating at a range of levels. The general political objectives will be set - the Maastricht text contains indeed an article on trans-European networks, intended to meet transport, telecommunications and telematics, energy and education needs - not as matters of black letter law or out of centralist or federalist ambitions - but out of a realisation that social goods - here, the establishment of a competitive European industry for the well being of European citizens - cannot be achieved by other means. The actual mechanisms - which bodies, which technologies, which combinations of capital - will be worked out painfully and laboriously in endless committees and meetings, so as to result in the formation of a consensus amongst the range of participants. There is no alternative to this last. Notions of a command economy or dirigisme can be dismissed because we know that they do not work - we have Mr Gorbachev's word for it, and the DDR experience. A Europe of 400 million or more cannot function on that basis. My remarks earlier "How are we to run this future Europe" are thus given contour. This is the kind of effort I have in mind. Can we do it? Will we, by 2020, have managed this and if so, what then?

III Issues to be tackled in 2010 - 2030

(a) Issues which will confront the European Community

Besides the organisational/institutional issues, three themes can be picked out.

- (1) The development of the infrastructure for a pan-European economy. I have already referred to this aspect.
- (2) The balance between the central area (approximately the balloon shaped area between Milan-Hamburg-London-Paris) and peripheral areas (see map Annex p.2). The European economy will be primarily a land-based continental economy and its core region will be this central axis. All other things being equal, wealth will tend to flow to the centre.

What allocation of funds and services, what system, will be required to ensure the outlying regions share the benefits of rising living standards and a viable economy - that it is indeed a Community which is functioning?

The existing system of structural policies will need to be extended and rethought, combined by this future date with the operation of the European monetary system. This system will not be a simple, static mechanism, setting bank and exchange rates. It will exercise many of the functions of economic policy, the equivalent of a Minister of Finance's annual budget presentation. Insofar as part of those functions will be the balancing of the needs of the less and more advanced, the poorer and richer, regions of the Community, how will this be organised, how agreed?

If there is a system of financial transfers how will this be determined and what scale would be needed to achieve an effect ⁽⁹⁾. Will a Community tax system (with rebates!) become necessary, Will there be the equivalent of "universal service" provisions on a European basis? What will be the role of the federal bodies, capitals and regions? What powers will the European Parliament exercise and what part will be played by the body which has been proposed (in the Political Union Treaty) in which the regions will be represented?

(3) Allocation issues. This theme is indeed sufficiently wide as virtually to cover all the others. It will however take particular forms in post industrial European society. Allocation issues will be the new matter of politics.

Let some examples suffice. If information and access to it is to be the key element, how is such access to be distributed, what play of public and private forces? Who is to pay and who is to benefit? In the current discussions on telecommunications policy, the Community has endorsed the notion that access to public networks is to be available to both the existing operators and to others on an equal basis ("Open Network Provision"). Public interest in the operation of, and access to, public service networks has to be balanced against

⁽⁹⁾ The locus classicus remains the MacDougall report, Report of the Study Group on the role of public finance in European integration, 1977.

considerations of comparative advantage and the use of intellectual property rights. Who indeed can be said to own the information passing incessantly from one system to another?

On an even wider plane, the balance between work, leisure, education and consumption will enter more squarely into public debate in this more conscious, more capable world. At any one time in any one society these elements can be said to be in some sort of balance, they are accepted and enable the society to function. If indeed it is the case that manufacturing will require a much smaller portion of the available labour force, how is work to be allocated? Will everyone move to shorter hours and longer holidays, earlier retirement? Or will there be a greater differentiation, from a corpus of highly specialised employees at the centre of the firm (running its key systems), to groups of part time and specialised sub-contractors (rather like the Japanese system now) and many beyond in the equivalent of service and routine tasks? I am struck by the fact that there is a virtual unanimity amongst IT commentators that it is the second which will prevail.

So far as work organisation is concerned, the following check list provides a summary of the direction of changes.

Old and New Models of Industrial Organisation ⁽¹⁰⁾

<u>"Fordist model"</u>	<u>"New model"</u>
(1) Rationalisation of labour by mechanisation	Global optimisation of whole production flow
(2) Design and then manufacture and organise work	Attempt to integrate R&D, Design, Production
(3) Indirect mediated links to consumers	Close ties between producers and users
(4) Low cost by standardisation quality comes second	"Zero defect" objective at each stage
(5) Mass production for stable rising demand and batch production for unstable	Flexible fast response to market whether batch or mass
(6) Centralisation of the production management	De-centralisation of production decisions
(7) Vertical integration with circles of sub-contractors	Networking and joint ventures to reap gains of specialisation and co-ordination
(8) Use sub-contractors to stabilise cyclical demand fluctuations	Long-run cooperation with chosen sub-contractors
(9) Divide and specialise production tasks for productivity gains	Integrate some production maintenance and management tasks ("re-compose")
(10) Minimise skill and training and education requirements	Effective training plus general education to maximise competence
(11) Hierarchical control and higher wages to get consent to poor job content	Human resource policies to spur the competence and the commitment of workers
(12) Adversarial industrial relations Collective agreements to codify provisional armistices	Explicit long-term compromises between management and workers: via job tenure and/or sharing dividends
(13) Technical change from top down	Consultation and participative approach to technical change

⁽¹⁰⁾ Profs L. Soete and C. Freeman, *Macro Economic and Sectoral Analysis of Future Employment and Training Perspectives in the new Information Technologies in the European Community, 1991*. Conference: Social Aspects: Impact of Information Technologies on Employment and Training, 17 - 18 October 1991, Brussels.

In this context education will become even more important, if that were possible. There will be the well known increase in the range of topics. According to the Commission, within ten years all employment will require an elementary knowledge of informatics; 30 to 35% of those in industry will need an advanced knowledge. The process of retraining will be more intensive. The obsolescence of knowledge of an engineer now occurs in about ten years - an erosion of 7% a year. This is equivalent to three times the number of people a firm would normally take in on a replacement basis ⁽¹¹⁾. The educational system will have to be reassembled (Again? you will say. And again the answer will be yes) to provide the skills required at different periods of the career cycle. But this already well-explored field ⁽¹²⁾ can be left aside for another occasion.

The theme of allocation leads on to the broader topic of the politics of this future Europe. Largely released from wage slavery, more people will have more choice in their way of life, in their life chances, in Sir Ralf Dahrendorf's agreeable phrase; such indeed is the possibility. Problems will nevertheless be present in a society which, even more than today, will be without a classic received structure such as Europe has traditionally known or an established religion, and having as its main fabric a highly organised interlocking knowledge based economy. A whole set of new doctrines will be required to determine the allocation problems and to handle the clashes of interest which will arise. There is perhaps a tendency for large democratic federations, if one looks at the United States, to be relatively less ideologically inclined in their internal debates than has been the case in national European politics over the last two centuries. The US Government is commonly termed the Administration and much of the business of Congress is concerned with regional allocation. The European Parliament is organised on party lines, but most observers would agree that in the majority of cases there is usually a regional or geographical axis as well as a doctrinal one. That said, it is difficult to imagine that all will be sweetness and light in the

(11) Sir Robert Telford, Hon Life President, GEC Marconi

(12) See generally the papers prepared for the Social Aspects Conference, 17 - 18 October 1991, and the IRDAC Opinion Skills Shortages in Europe, 1990.

year 2030, that all problems will have been solved through administrative legerdemain, by the subtle play of checks and balances. People will still wish to march in the streets, to write letters to the (electronic) newspapers, to stand up and be counted. The issues will be new - the operation of a very different economic structure and, at European level, a wider stage - but the underlying principles of notions of justice, control and allocation will remain. What utopian ideas do we have to combine social and economic progress? "En sciences sociales, le nouveau relativise l'ancien. Mais le périme rarement" (Jacques Lesourne).

(b) Issues involving relations between the three regions

It is difficult to say how close the relations between the three regions will be at this future date. We approach the edge of the exercise. One can only note that there is no inherent conflict or clash of ideologies between them, unlike the period of the past 40 years, or even one may say since the 1930s, when ideological divides were irreconcilable. On the contrary, all three regions share similar beliefs and a similar approach - a happy outlook on which we will need to build.

It will be foolish however to imagine that there will be no differences of views. Each region will be distinct, with its own characteristics and set of priorities.

It may be worth reflecting a moment on the relative positions of the three regions in the year 2020 and how the world may appear to them. Each of the other two pillars of the Triad has enormous strengths. It is hardly necessary to underline the dynamism of US society, its vitality, its low population in relation to land areas, its capacity to begin anew. In a free trade area with Canada and Mexico, and by 2020 no doubt others also, the United States will continue to forge ahead. The difficulties will be internal, and we will have of course variants of the problems here: educational levels and the issue of forms of work⁽¹³⁾.

⁽¹³⁾ 31 million currently lack health insurance. 20% are functionally illiterate.

The services sector will be even more dominant. (See diagram of aggregation of US work force Annex p.3). But which sectors for which people? A more stratified society looks highly probable.

So far as Japan is concerned, its present strong points are even more evident. With three fifths of US GDP, Japan invests more in absolute terms in plant and equipment. Its educational levels are the highest in the world. By application and effort Japan has made the greatest progress of all the three regions over the past 40 years. A middle aged Japanese looking at what has been achieved can indeed feel proud. The problem for Japan will be to maintain its lead. It is, one may say, the last of the national states on the 19th century model, homogeneous in a way that Europe and the United States can never be. With a population of 120 million, Japan's dependence on exports will remain a goad and point of vulnerability. That these exports will take the form of substantial flows of capital and investment as well as of goods appears inevitable and beneficial. With all those strengths, it is nevertheless over Japan that it is hardest to tell what its relative position will be in 40 years. Powerful though Japan is, by the scale we are discussing it will be by far the smallest of the three. Will closer relations to its Asian neighbours emerge, comparable to those in Europe and in North America? Will those countries wish to combine their efforts? The outlook is hard to determine.

As you will know, the officials of MITI are capable and important men. One of the most farsighted and exceptional amongst them once summarised the future problem as seen from a Japanese standpoint in the following terms.

"If the world were ideally free and open, the Japanese economy should take every opportunity to make itself the head office in the international economy. In other words, she should dispense her factories, which consume large quantities of natural resources and extensively affect the environment, around the globe and concentrate the head office functions in Japan. Such functions would include data

gathering and processing, decision-making, banking, insurance, distribution, R&D (research and development), studies, art, entertainment, and also high value added industries which process materials into highly sophisticated goods. If this direction were adopted, the knowledge intensification of the supply structure in Japan would make a remarkable progress⁽¹⁴⁾.

On the basis of Japan's achievements, one can see how this could seem a vision rationally within reach, a tempting culmination of Japan's efforts over a century. But as Mr Amaya, a former MITI Vice Minister, a wise as well as clever man, went on to say "However, the assumption that the world is ideally free and open is not necessarily a realistic one".

Much of world politics will in fact concern relations between the three regions and be so conducted. There are four areas that can be looked at to provide a glimpse at such a future

- (1) The first of these concerns international trade. Since these regions will be large, the extent to which they trade with one another will be relatively small as a percentage of their respective GDP. In the case of the Community (of 12), for example, external trade (exports) represent about 10% of GDP. This is so even though tariffs are low and 10% of EC GDP is of course an enormous amount. With the European Economic Area, this percentage will be further reduced. Since the figures for the US and Japan are broadly comparable, this suggests that international trade, important though it will be, will be relatively less significant as an issue. Much of it, furthermore, will be generated by multinational, multiregional companies; it will be intra-company trade, most notably in high technology goods. Correspondingly, however the conditions of investment within the three regions will be of increasing relevance. It is here that the future trade disputes (or what will succeed the trade disputes) will lie.

⁽¹⁴⁾ "A look at knowledge intensification from the viewpoint of cultural history". Japan Reporting, 5, 1975.

These arguments will concern the conditions of competition and market structure within the region, inside its boundaries. The competition among firms will thus be competition (and friction) between systems in the three regions, involving anti-trust policy, merger controls, R&D, the terms of direct investment and the conditions of corporate finance ⁽¹⁵⁾. A forerunner is to be found in the current Gatt negotiations over trade in services.

- (2) The second area is that of monetary relations. The shift to a European monetary union will radically change world finance. As the currency of the world's largest trading area, the Ecu will become the money around which the others gravitate. "European money will be dominant because it will represent the richest part of the world, the most dynamic part and also the part that is most conservatively managed"⁽¹⁶⁾. If indeed in the course of the next century the monetary supply arrangements between the three main areas become matters of discussion and collective decision, then indeed we will be only a step from world government. But that will require another generation or two, a sixth form or two hence.
- (3) The problems of the environment stand high in the list of global issues which the three regions, acting in concert, will be better able to tackle. It is in fact one of a panoply of topics where a collective effort will be required since the endeavours of a single region will be insufficient. The emerging area of "megaprojects" in the R&D field is another prime example. Endeavours such as monitoring global environmental change, or mapping the human genome can only be effectively pursued on a collaborative basis. But while such research projects and information systems can be undertaken, more difficult problems will arise over their application.

⁽¹⁵⁾ S Ostry, Beyond the Border: The New International Policy Arena, OECD Forum for the Future, October 1990.

⁽¹⁶⁾ Prof R Dornbush, Massachusetts Institute of Technology.

The current discussions on carbon dioxide emissions (the "greenhouse effect") provide an illustration of how matters might operate. The scientists have made their observations; they have filed their reports and expressed their concern. What then? It is difficult for one region to act effectively on its own; first, this would not have a sufficient impact to bring about an improvement in the environmental situation (at least to halt further deterioration) and, secondly, its competitors would get an advantage. But regional pressure - peer group pressure - can help. The Community has proposed a tax on energy to help the EC meet its commitment to stabilise carbon dioxide emissions at 1990 levels by 2000 ⁽¹⁷⁾. The tax would be fiscally neutral, offset by tax cuts in other areas. Exemptions would be provided to energy intensive industries such as petrochemicals until the EC's trading partners, such as the US, adopt equivalent regimes. Thus at the World Environment Conference, to be held in Rio next year, the Community will be in a position to make a binding commitment to reduce carbon dioxide emissions, and so convince the Americans to follow suit. The US - responsible for 23% of world carbon dioxide emissions against 13% from the EC - has so far refused to commit itself to cutting emissions and is reluctant to use fiscal means to do so.

The particular case will proceed. It illustrates the kind of topics which will be on the inter-regional agenda and the issues that will arise.

⁽¹⁷⁾ The Member States would rebalance their tax systems to impose a tax equivalent to \$10 on a barrel of oil, rising from an increase of \$3 in 1993 by \$1 a year to 2000. Half the new tax would be on the carbon dioxide content of fossil fuel and half on all non-renewable energy, to even the burden and promote energy efficiency across the EC.

Italy has proposed that 20 - 30% of the proceeds should be used to help countries in the developing world and eastern Europe use the latest environmentally sound energy saving devices.

- (4) The three areas which have been mentioned concern essentially relations between the regions. Issues concerning other parts of the world - the great mass of the world's population - will also present themselves. The resentment at anything approaching a Directoire, a triumvirate, will be immense, the brute misery in which much of the world's population is likely to live, will be indeed the greatest problem the three regions face before the 40 years are over. A world one sixth in electronic splendour and five sixths in squalor will not be acceptable to ourselves or our successors nor will it be sustainable.

If that will be the position in the long run, what of the interim? The problems are of course of many kinds: access to markets, finance for development, security, human organisation. The issues vary from one part of the world to another; there is not one single set of difficulties and a blanket solution which clever people could devise. Nevertheless if, over the next 10 to 20 years, the three regions manage to make a go of their cooperative arrangements, the results of their various conclaves, this is the area to which they will surely have to turn. To some extent they already do so, but the cooperation tends to be ad hoc, episodic, not sustained. The conditions under which the regions, separately or collectively, could do more, have yet to be determined. It would be possible to devise a method of burden sharing indices, showing contributions to a mixture of international public goods, ranging from grants to development agencies, access to markets, environmental measures, defence expenditures and so forth. The difficulty is not to draw up such schemes but to make a start in applying them. Elements, faint beginnings, are there. To take the case of security, one could argue that recent events - the Iraq War, the Middle East Peace Conference, the Community's proposals concerning Yugoslavia - show the emergence of a pattern of involvement of immediate participants, the local players, and members of the Triad acting in consultation. No one would argue

that the global system shines upon us with Leibnizian felicity, but the outlook is not all bad.

Conclusions

1. The evidence that there will be three main players in 20 or 40 years, the US, Europe and Japan, is overwhelming.
2. Internal organisation, internal affairs and those of immediate associates, will be the main focus of these entities. With entities of the size and complexity described, how could matters be otherwise? There will be changes in political thinking. We have now a set of 19th century models and ideologies (or the remains of them). It will be necessary to go back to basic principles. The issue of allocation of socially provided and socially determined goods will be at the centre of the internal debates of post-industrial, information society. What price for the system? As with the Dutch dykes and the Chinese canals, the engineers and mandarins will be needed, but a human balance will be required if the system is to survive. The particular problems of the age will be education and access to the interconnected networks.
3. There will be a greater capacity to tackle global problems, notably the environment ("global change" issues) and monetary questions (monetary supply). Wars, if we are lucky, will continue to be local; there will be a notion of world peace, if not yet universal peace.

There will then be much to discuss at the Conference of this Association in the year 2030. Someone will be able to find a copy of my remarks and point out how amazingly blind and in error I was, how much I got wrong and how incidental the shafts I got right.

I will leave then - before something goes wrong with the lighting, as the poet says - with two quotations. The first is from the end of Jean Monnet's Memoirs, where he writes

"The Community we have created is not an end in itself . . . (It) is only a stage towards the form of organisation of tomorrow's world."

The other is from an American commentator, who I was pleased to see, pointed out the other day that

"Although the world is increasingly driven by high technology, it continues to be influenced and managed by high spirits."

C.E.C.



Vehicle manufacturing - The logic of diffusion

ICT FOCUS

BASIC ADMINISTRATION

STEP 1

- . Mainframe
- . Mainframe
- . Pay

EQUIP KEY FUNCTIONS

STEP 2

- . Departmental systems
- . Purchasing and stock
- . Advanced engineering
- . Production engineering
- . Production management
- . Sales
-

LINKS BETWEEN SITES

STEP 3

- . Networks
- . Stock management
- . Production management
- . Spare parts

INTEGRATION OF FUNCTIONS

STEP 4

- . Network in real time
- . Integrate design and production engineering
- . Integrate purchasing, stocks, production, sales
- . On board electronics

STRATEGIC GAINS

Mastering financial process to allow growth

Cost reduction Management of greater complexity

Integrate basic functions nationally and internationally

Product quality Customer service Rhythm of product development

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Economic Regions in Europe



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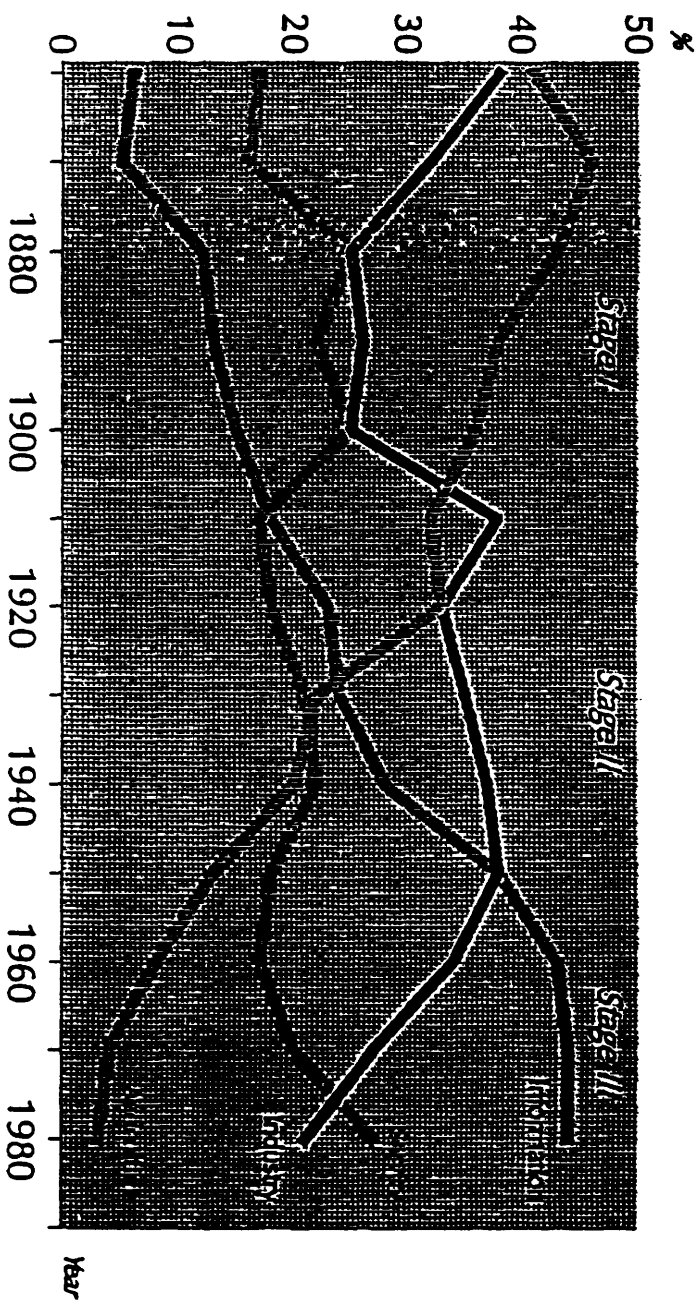
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Four-sector aggregation of the United States work force, 1860-1980
(using median estimates of information workers)



Source : Marc U. Avrat & Michael R. Rubin, *The Information Economy*, (Washington, D.C. United States Department of Commerce, 1977), vol.1, chap. 7, p.121.

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