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Expert Group Report on

Role and Strategic Use of IPR (Intellectual Property Rights) in International Research Collaborations

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WORKING PAPER
Expert Group Report on Role and Strategic Use of IPR (Intellectual Property Rights) in International Research Collaborations

Final Report - April 2002

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FOREWORD

EXPERT GROUP WORKING METHOD

The purpose of the expert groups is to promote communication and debate at the European level between policy researchers and policy makers on important Research policy topics, and to provide guidelines to researchers and to policy makers. The expert working groups review, consolidate and synthesise results of research to identify issues and options for Research policy. The task of each working group is to prepare a report in a form appropriate for discussion with policy makers and other stakeholders. The overall objective is to promote a shared understanding of the issues in order to facilitate the development of more consistent, concerted and complementary European and national S&T policies, and to provide guidelines and options for researchers and innovators.

THE EXPERT WORKING GROUP

The Expert Working Group '**Role and Strategic Use of Intellectual Property Rights in International Research Collaborations**' met five times in 2000-2001 to develop a broad strategic view of the various IPR and International Research Collaboration issues from a Research policy perspective: what are the issues, their importance, and the best approach in addressing them. Experts also submitted individual contributions to be discussed at the meetings. The group then made its own recommendations concerning the objectives, scope and content of appropriate guidelines and policies, and a final report was prepared by the Rapporteur in conjunction with the Chairman. The meetings were attended by Commission staff, who contributed information on EU policies and programmes.

PURPOSE OF THE REPORT

The purpose of the report is to develop a broad strategic view of various IPR issues from a Research policy perspective.

Key issues covered include:

1. **The Role of IPR and Public Policies in International Research Collaborations**
2. **Purpose and Structure of R&D Collaborations**
3. **IPR and Knowledge Management in R&D Collaborations**
4. **International Legal Aspects of IPR in R&D Collaborations**

DISCLAIMER

The contents of this report are the sole responsibility of the expert working group. Although members of the Commission services participated in this workshop and provided information and assistance in assembling this report, the views expressed both individually and collectively in this report are those of the external experts attending the meetings, and may not in any circumstances be regarded as stating an official position of the European Commission.

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EXECUTIVE SUMMARY

BACKGROUND

The purpose of this Report is to highlight the importance of intellectual property rights (IPRs) in international collaborations, to recommend good practices in relation to the use of IPRs in international collaborations, and to suggest policy responses to problems arising. Problems are generated by the diversity of international practice regarding IPRs, including patenting regimes, rights of privately or publicly employed researchers, as well as social and cultural norms.

The Report focuses on the interaction between three developments affecting intellectual property in research collaborations:

1. Increasing research collaboration between various entities involved with research;
2. Changes in the global economy during the past couple of decades , and
3. Changes in the use of national and international IPR systems.

It is common to assume that IPR frameworks are important in settling how the results of research collaborations are distributed between the various individual members or categories of members involved in collaborations. But IPRs are far more important than that. It is the IPRs and the conditions regarding their ownership and utilisation that determine the nature, scale and participation in such research. The increasingly important role of IPRs at all stages of the research and innovation process will have a determining effect upon the nature of collaborative research, its focus, and its success. The reason for this is that IPR philosophy is intricately bound up with, and controls, knowledge flow, creation, use and exploitation before, during and after a project.

Intellectual outputs from research collaborations include formally protected knowledge, tacit knowledge and other results such as commercial knowledge of markets, consumers and other 'non-scientific and technological' knowledge, as well as contributions to the pool of public knowledge. Policies and strategies must therefore take account of this broad range of results.

The importance of formal collaboration agreements is that they force the participants at the outset to identify their own interests, rights and responsibilities, and to recognise those of others within the project, and to codify these within a legally binding document which can be consulted during and after the project's lifetime. An important, if not central part of these agreements deals with the allocation and utilisation of IPRs.

Long-term relationships are frequently built up between companies and individuals or departments, and these can prove the most successful in generating benefits for all parties. Therefore the intellectual property issues raised by collaborative research should be viewed in a broader context, considering more than just the immediate possibilities of patenting, licensing and contract fees, taken on a project-by-project, one-off basis. IPR and knowledge management involves balancing the advantages and also disadvantages of a variety of exploitation routes.

We conclude that collaborative research is growing in importance both in Europe and around the world. Its success depends upon the existence of a set of IPR rules ensuring both that economic returns are available to participants and that there is reasonable access for third parties to the knowledge generated. Such rules should facilitate trade between the various participants in research and must be designed in the context of an overall system taking account of all interests.

MAIN RECOMMENDATIONS BASED ON THE ANALYSIS IN THIS REPORT

A: SPECIFIC MEASURES AND GUIDELINES

1. There is a strong need for increased awareness of the importance of IPRs in international collaboration. Personnel involved in collaborative research must be subject to confidentiality agreements for a limited period. Academic institutions often include graduate scientists in research projects. Their status must be made clear, including their rights, if any, to benefit from results and their responsibilities to respect confidentiality where appropriate. Usually, the employment contract of permanently employed staff already contains confidentiality provisions. It is important to check that this is so, and if not, to ensure that a separate confidentiality agreement is entered into. (3.3.1)

2. Public research organisations (PROs) and funding bodies should take account of their public mission when establishing their IPR policies and strategies. Collaboration agreements should be structured to ensure that third parties have access to results. Collaborations in which the results could be neither owned nor used by the PRO should be viewed with caution. (2.4.3)

3. In order to benefit from the overall advantages of long-term collaboration, when possible, continuing collaborative relationships should be developed. (3.3.6)

4. Collaborators should ensure that relevant IPR rules are consistent with the goals of the collaboration. This will include considerations of the costs and extent of patent coverage in different jurisdictions. EU participants should be made aware of the different possibilities in some research sectors of protecting inventions in the USA as compared to Europe. In the USA, the system has undergone considerable changes, which have strengthened the coverage of patents and the rights of patent holders, for example in the fields of biotechnology and software related inventions. (3.4.3)

5. Collaborations between European Patent Convention (EPC) member states and countries with a grace period for patent applications must recognise the difficulties that this entails. EPC patent applications would be compromised by previous publication of details of inventions, so US and Japan collaborators, for example, must agree to restrict publications until patent applications have been made in non-grace period countries. A *'first-to-file'* approach should be normal for such collaborations. (3.4.3)

6. Ownership of IPRs resulting from publicly funded work may cause problems with US-EU collaborations. Under the Bayh-Dole Act, US universities expect to retain ownership of such IPRs. There are a wide variety of regimes relating to the ownership of publicly-funded results in Europe, including university, PRO and researcher ownership. (3.4.3)

7. Depending on the goals of the co-operation, IPR protection should be obtained on research outputs, if it seems desirable to do so, independently of the phase in the life cycle of the project. This applies in fields such as materials technologies, bio-technologies and pharmaceuticals, where the differentiation between basic, generic and applied research has reduced, leading to mixed research structures and models. (2.2.1, 2.4.6, 3.3.5)

8. In determining their collaboration strategy, large companies should realise that they can access a greater range of knowledge if they are willing to be flexible on ownership. Hybrid public-private organisations should try to organise collaborations on the basis of maintaining full or partial ownership over the results with the maximum spill-over effects for all participants that provide a significant contribution to the project. (2.4.2)

9. There are companies specialising in running research collaboration, taking responsibility for finances, timetables, etc., and managing the interchange of IPRs. This can be useful in solving the

problems of collaborations involving weaker partners. A key priority is the building up of the IPR and technology transfer skills and expertise of weaker partners. (3.3.4, 3.3.6)

10. The hub management and collaboration concept with multiple bilateral IPR agreements of partners with a central hub organisation is well adapted to international collaborations because it can account for IPR system differences between any two partners. This simplification is essential when projects are close to the market and/or product driven. IPR-handling is determined by the purposes of exploitation. (2.4.6)

B: POLICY RECOMMENDATIONS

1. Intellectual property protection is not a stand-alone issue. It calls for policy coordination among agencies involved in all the associated activities (science and technology policy, industrial policy, trade negotiations, IPR treaty negotiations, siting of commercial research facilities, competition regulations, etc.) to achieve agreed objectives. International scientific co-operation agreements will be increasingly affected by trade negotiations determining international intellectual property regulation and harmonisation. It is essential that the linkages and interactions between these are recognised and that integrated negotiating positions are adopted. (3.4.1)

2. It is often suggested that public funders produce, in addition to basic framework rules on IPR and dissemination, standard consortium agreements (or a set of templates for agreements) in order to clarify the issues and to protect small and medium sized enterprises (SMEs) involved in programmes of collaborative research. Public research programmes supporting a range of subjects and types of participants will find it difficult to cover all these possibilities with a single model consortium agreement. The best that can be done is to identify and explain the issues that must be considered by participants in negotiating agreements and publicise these, especially the IPR aspects. (3.3.4)

3. Large, multinational corporations are already attuned to the intellectual property complications of international collaboration. This is less true with SMEs, many of which will need public assistance both in terms of awareness and in terms of financial support to respond appropriately to the rising demand for strategic knowledge management and intellectual property protection in international collaboration. (2.2.3)

4. In addition to ensuring wide access to results, it is important to ensure that exploitation of publicly funded research results takes place. This will frequently, but not always, require the securing of IPRs where appropriate. Rather than just insisting on detailed IPR (particularly patenting) clauses in collaboration agreements, authorities also should be concerned that there is from the start of a project a planned exploitation route, usually contained in the contract and subsequently monitored. (2.2.2)

5. Research programme designers should be ready to extend the support of collaborative research to the stage of exploitation and be prepared to contribute to intellectual property protection costs to assist exploitation. (2.2.3)

6. Policy makers should not restrict their IPR considerations only to the narrower 'scientific results', but to a wide range of possible outcomes from projects. (2.2.2)

C: LEGAL RECOMMENDATIONS

Chapter 4 clarifies and highlights legal aspects of which collaborators should be aware. In addition, since our concern is to foster international collaborations, it is important to identify legal obstacles to

these. **{**tc \l1 "Introduction**}**Accordingly, it is worthwhile mentioning things that could be changed in the interests of improving the situation, even though at present political and other factors make it highly unlikely that changes will be made in the near future. Therefore, the following items are more in the nature of a wish list for long term action than recommendations that we expect to be acted on soon.

1. Ownership: ownership of rights is crucial to collaborative ventures, but the ownership of IPRs is at present a matter for national law, and national laws differ. It would simplify international co-operative ventures if the principal issues relating to the ownership of IP rights were addressed in harmonising international conventions and EU legislation. (4.1.1)

2. The inventor/creator: the starting point of this Report is that most modern research outputs are the product of team work, and it is difficult or inappropriate to attribute particular inventions and the relevant IPRs to individuals. (4.1.2) Employees in universities, where IPR is concerned, should be handled as they would be in private industry. (4.1.2) Harmonised European employed inventors' inventions ownership rules should be considered, separately from the question of compensation. (4.1.2) We recommend relaxation of any national requirements or practices that IPRs resulting from of publicly funded research automatically belong to the funder. (4.1.2) In relation to software, ownership should vest in the person commissioning the program. (4.1.2)

3. Patent Filing Rules: greater harmonisation in the patent filing rules, and other procedures in patent offices around the world is desirable. WIPO has achieved much in this direction through the Patent Law Treaty, but there is more to be done. (4.1.3)

{tc \l1 "**}**4. Prior users rights**{**tc \l1 "4. Prior users rights**}**: **{**tc \l1 "**}**the existence of prior user rights is not harmonised throughout the European Union. Prior user rights should be recognised in all member states of the EU. A harmonisation directive should be considered for national laws. (4.1.4)**{**tc \l1 "4.1 The existence of prior user rights is not harmonised throughout the European Union. We believe that prior user rights should be recognised in all member states of the EU. The European Commission has made an attempt in Article 12 of the Draft Community Patent Regulation, and this development is to be welcomed, but also a harmonisation directive should be considered for national laws. (4.1.4)**}**

5. Enforcement: taking action against infringers is very expensive and time consuming in almost all countries (including many EU countries) and reduces the value of IPRs especially to PROs/HEIs and SMEs. A pan-European IPR court system is to be encouraged. (4.1.5)

6. Tax regimes on licensing: agreement at an international level should be directed to creating greater simplicity and transparency in this area so that SMEs can make strategic choices about collaborative ventures. (4.9)

CHAPTER 1: The Role of IPR and Public Policies in International Research Collaborations

The aim of this report is to provide an analysis of some of the problems encountered in the present IPR system in relation to international R&D collaborations, and to provide policy makers with advice on specific aspects of these issues. IPRs provide protection for the creators of research results, giving an incentive for such research to be conducted by limiting the possibilities of imitation. Collaboration enables results to be more easily generated and appropriated by participants, but at the same time runs the risk of knowledge and know-how leakages. Thus the treatment of IPRs within collaborative projects is of considerable importance to their success.

In the following sections, we will discuss first the role of Research Collaboration, then the International aspect followed by the IPR legal aspects, and continued with a discussion of relevant policies.

1.1 Research Collaboration{tc \l 1 ""}

Recent decades have seen an enormous growth in collaborative research involving a variety of entities, including individual companies, publicly funded research organisations (PROs), and universities and other higher education institutes (HEIs). Many of these have received public funds from national governments around the world, and in the European Union, from the European Commission.

The motivations for R&D collaborations include:

a. Multidisciplinary research

The complexity of modern technology in many cases requires multidisciplinary approaches, in particular in many areas which are predicted to be most scientifically and commercially significant in the future (e.g. new materials, bio-computing, nano-technology, medical technologies, etc). Companies must therefore collaborate in order to take advantage of complementary skills owned by other companies and PROs.

b. Research markets

Following current management strategies, many companies have slimmed down their activities to their 'core competencies' to maintain shareholder values. Some companies involved in R&D, have outsourced their own laboratories and required them to produce their own incomes from both internal company work and also from outside contracts. **There is now competition between research organisations from public as well as private sectors, creating a market for research.**

c. Internationalisation of research

Accordingly, **the need to access the best research capabilities world-wide, has helped in the creation of an international research market**, and created competition between facilities in that market based on capabilities and availability of competent research personnel, overall costs, background intellectual property and track record.

d. Research specialisation

Within these research markets, organisations have had to become more specialised in their focus, and have therefore tended to collaborate with one another on particular projects.

e. Governments and public research organisations

The relationship between universities and governments has changed. Economic and scientific pressures on universities and PROs have forced these research institutions to generate new sources of income, in particular from the private sector, and at the same time emphasised their role in promoting economic competitiveness by transferring research outputs more quickly and effectively to private companies. The roles of scientists within these PROs have also changed because of this.

f. Speed of Change

More extensive competition at an international level has increased the speed of change that has placed a premium on flexibility as a strategic variable. Flexibility has meant that companies focus on their core business and give up what is considered peripheral. They access the necessary peripheral items, resources and capabilities by means of collaboration.

1.1.1 The Complex Nature of Collaboration in Research

Various types of entity participate in, or fund, or attempt to influence the direction of collaborative research. We identify four groups for our purpose. These are as follows;

Companies and commercial research organisations, which seek to;

- *generate income to produce profits;*
- *create new products and services to meet market demands;*
- *improve capabilities to produce future incomes from new or developing markets;*
- *improve competitiveness.*

Public funding agencies and governments, which have many objectives in funding research, including:

- fostering the *creation of wealth and improvements in the quality of life by means of scientific and technological progress;*
- *advancing fundamental scientific knowledge;*
- *providing trained scientific manpower for industry and public research and teaching;*
- *supporting industrial competitiveness;*
- *encouraging the prudent and efficient use of public funds;*
- *developing the provision of a world class research infrastructure;*
- *supporting other policies such as trade or international development*

Public research organisations ('PROs'), and HEIs, which;

- *fulfil their missions to undertake research and train scientists;*
- *produce private knowledge;*
- *produce public knowledge;*
- *generate income to cover research and personnel costs;*
- *maintain and improve institutional capabilities.*

Pressure and lobbying groups have increased their influence on public and private research policies. These include diverse non-governmental organisations (NGOs) including environmental pressure groups, animal rights organisations, developing countries and charities, specially interested patient groups (such as sufferers from particular diseases), and also voters, political parties and their representatives. The major channel of their influence is public opinion and elections. Their targets are companies, ministries and other agencies that determine and implement science and technology policies (e.g. IPR rules and other legal frameworks, research policies and strategies). The focus of their attention is increasingly on international organisations whose importance in these activities has become recognised, including the World Trade Organisation and international trade conferences. The growing public recognition of the importance of IPRs in the world economy can be expected to lead to increasing efforts from NGOs to influence public and private policies on a national and international level.

In the process of collaborative research, each of the participating entities has its own objectives, carried out in part through IPR management. For example companies may wish to retain all commercial rights that result from research, while universities may insist upon use of results in undertaking further research, or may want to negotiate a royalty from sales. Governments may wish to disseminate knowledge gained as a result of public expenditure, but will have to compromise if the public is to benefit from commercial exploitation. University staff may wish to advance their careers by open publication of results, but be restrained by commercial sponsors of their research. This complicated network of links and motivations is made more difficult to manage by the introduction of the international dimension. Should a university in an EU member state, supported by public funds, collaborate with a US company which retains intellectual property rights? Is there a need for governmental intervention to set standard conditions for such activities? While research institutes wish to gain the maximum advantage for themselves, public sponsors are anxious to gain a local advantage from their investments in research.

In addition, national governments and the European Commission have an extra responsibility in that they determine, initiate, or negotiate the 'rules of the game', that is the national and international intellectual property rights frameworks within which these collaborations take place.

One particular conclusion comes from considering IPRs and research collaboration. It is common to assume that IPRs frameworks are important in settling how the results of research collaborations are distributed between the various individual members or categories of members in collaborations. But they are far more important than that. **It is the IPR conditions that determine the nature, scale and participation in such research. Altering IPRs will have a determining effect upon the nature of collaborative research, its focus, and its success.**

1.2 International Developments{tc \l 1 ""}

a. Changes in the global economy

Developments in trade and company strategies and markets are well documented and have also affected the field of research and development. In addition, there has been a 'regionalisation' of economies, in particular the European Union's emergence as a market to rival the size of the USA.

b. Corporate research facilities

Large companies have for many years had manufacturing facilities spread across different countries and, as mentioned above, are now becoming more international in their research activities. Corporate research facilities have been opened in locations where suitable skills are available, and where markets justify a presence. Research is now carried out wherever it is to the best advantage of companies.

c. Proliferation of research capabilities.

As a result of the changes outlined above, research can now be 'bought' in many locations across the globe, from private, public or hybrid laboratories. Research is no longer the preserve of a small number of advanced industrial countries or companies, but is being undertaken in a increasing variety of alternative locations.

d. Large projects

The nature and importance of 'World Projects' has changed. Science has always been an international undertaking, but now many of the most important projects are beyond the capabilities, budgets or political will of single countries. For example, the International Space Station (ISS), the human genome project (HUGO), research into infectious diseases, ocean and climatic research, energy and telecommunications all involve considerable international collaboration. This spreads costs, increases the feasible scale of projects, speeds up the production of results and alleviates the problem of shortages of talented researchers.

e. Umbrella agreements.

In recognition of the importance of science and technology, and in response to political and economic pressures, governments have concluded general agreements to promote co-operation in these areas. These include intergovernmental treaties and bilateral agreements, such as the European Union-USA agreements.

1.3 IPRs in Collaborative Research and Development

The generic term 'collaboration' is used in this report to describe all forms of agreements between firms, universities, and research institutes whereby two or more organisations share the commitment to reach a common goal by pooling their resources and co-ordinating their activities.

Available empirical evidence has indicated an explosion of co-operative activity since the early 1980s. Collaborations are highly concentrated in OECD member countries, accounting for approximately 92% of the total. North American firms are involved in about 2/3 of world collaborations. Asian firms are involved in 1/3 and European firms in more than 1/4 of the total. More than half of the collaborations of North American firms were with other North American organisations. North American firms were the preferred partners of European and Japanese firms.

Sectors with large numbers of collaborations include telecommunications, electronic equipment, computers, pharmaceuticals, chemicals, and financial and business services. Service sector collaborations have increased very significantly the past decade.

Collaborations may involve equity investments or contracts between participants. They can link vertically related organisations at different levels of the value chain, or they can occur horizontally linking organisations at the same level of the value chain. Member organisations may be based in one or more countries, in the latter case creating an international collaboration. The organisations involved may be companies and other private bodies including large or small manufacturing, services, research or consultancy companies. They can include PROs such as universities, public laboratories, technical institutions or charity organisations. Funding may be entirely from private sources, or may include public financial support. Objectives may be entirely commercial, producing legally protected results, or producing knowledge for public dissemination. The structures of collaboration can include equal participation of members, co-ordinating project managers, or independent research activities with agreements to share results.

It is clear that the phenomenon of collaboration is complex. Although a typology may be produced, each project or programme involves a permutation of the types of characteristics noted above.

Some collaborations are research or innovation-based, focusing primarily on the generation, exchange, adaptation and exploitation of technical advances. Examples include licensing, second-sourcing agreements, customer-supplier relationships, joint R&D pacts and joint development agreements, and joint ventures. **This report is primarily concerned with international collaborations in R&D.**

The results of collaborative projects and programmes can include a variety of useful outputs, such as prototypes, methods, instruments, data, software, and in particular, IPRs such as patents, copyrights, confidential information, etc.

The purpose of this Report is to examine the problems encountered by international collaborations when confronting issues concerning IPRs, and to suggest policy responses to these problems, which are generated by the diversity of international practice regarding IPRs, including patent regimes, rights of privately or publicly employed researchers, social and cultural norms, and different motivations and exploitation strategies.

The Report focuses on the interaction between three developments affecting intellectual property in research collaborations:

- *Increasing **research collaboration** between various entities involved with research;*
- *Certain **international developments** such as changes in the global economy and other developments outlined above, and;*
- *Changes in the use of national and international IPRs.*

The relationships between these are shown in Figure 1. Our focus is on the intersections of the circles in this diagram. We will outline the factors affecting these developments in turn:

1.4 Changes in IPRs and their Use{tc \l 1 ""}

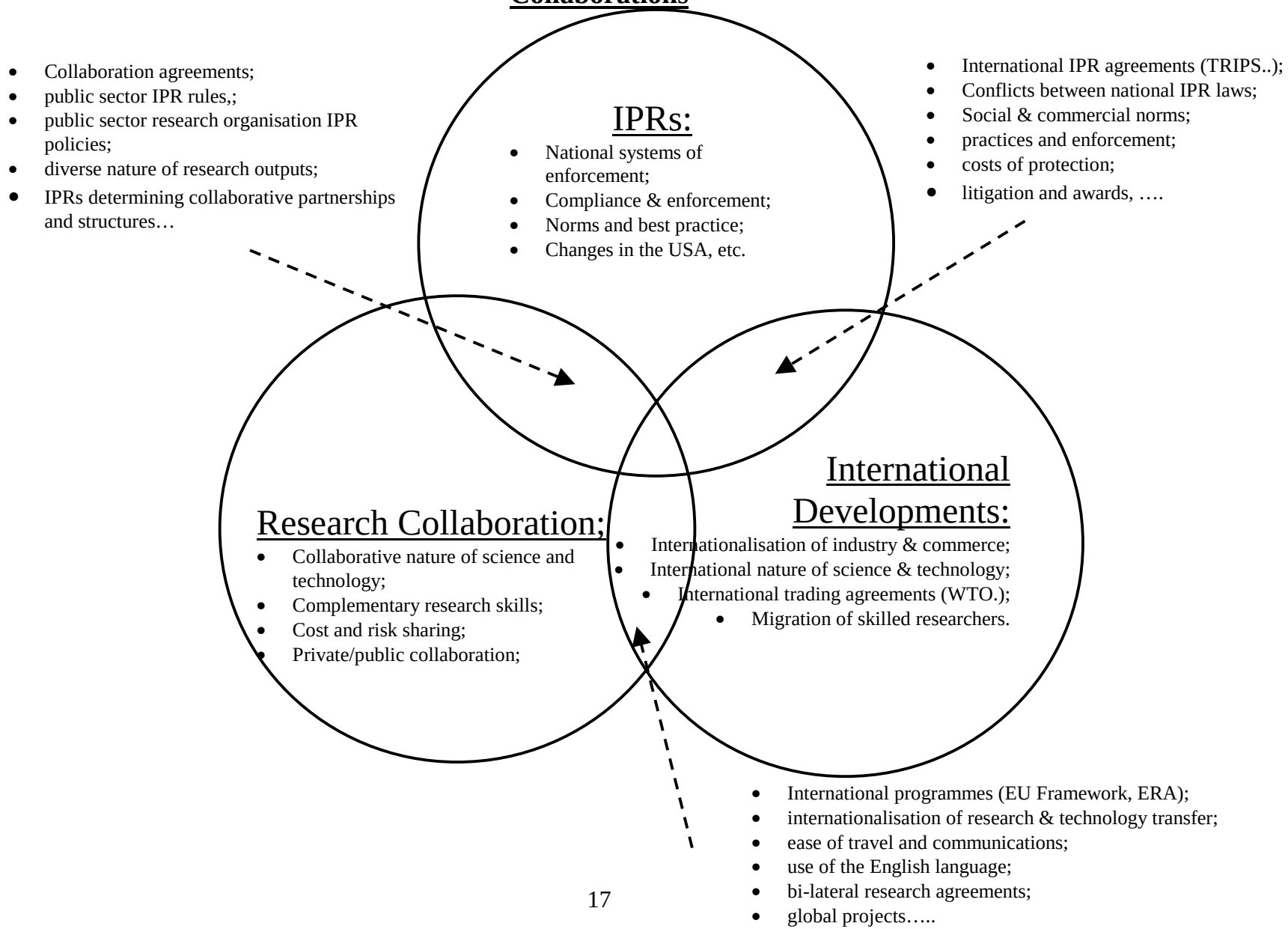
a. IPRs and their evolution.

The basic IPRs are, for present purposes patents, designs, copyright and related rights including trade secrets and database rights. The basic principles of intellectual property law have not been fundamentally altered over time, but recognition of their importance in the world economy and economic competitiveness has led to significant attempts to harmonise rules (in particular the *Agreement on Trade-Related Aspects of Intellectual Property Rights ('TRIPs'*)), and also to encourage more effective compliance and enforcement strategies.

b. Government policy

The USA, which is the most important source of intellectual property rights, has significantly altered its stance in recent years. The Bayh-Dole Act (1980) allowed institutions undertaking federally funded research to retain control of the resulting IPR, and produced a considerable increase in the transfer of such results into commercial use. A new Federal Circuit Court of Appeals has shifted the balance of judgments in favour of patent owners. Together these have produced a new 'pro-patent era', affecting both domestic and foreign approaches to IPR management.

Figure 1: The Role and Strategic Use of Intellectual Property Rights in International Research Collaborations



c. Strategic use and management of intellectual property rights.

The traditional 'narrow' use of IPRs was to prevent unlicensed entities from using proprietary inventions, but their use has now expanded to encompass many diverse commercial strategies. These include blocking whole areas to competitors (blocking strategies) and the use of patents relating to technical standards in gaining control over market sectors. Management of IPRs as commercial assets has increased and manipulation of IPR portfolios now forms an important part of commercial strategies. Many companies now view their IPRs as tradable capital assets, which has reinforced the view of the 'research market place'. Companies advertise their ownership of patents as proof of their commercial strength, and use this in negotiations, often trading or pooling IPRs to form complex products. IPRs may be considered as the currency of the knowledge-based economy.

d. Diversification of means and areas of protection

The application of IPRs to new subject matter has caused problems. The centuries old concept of copyright has been applied to software, and the coverage of patents in the USA has been broadened to encompass business methods. New forms of protection, and organisations for these have occasionally been devised, for example that concerning databases in the EU, and new plant varieties (UPOV, the International Union for the Protection of New Varieties of Plants). On the whole, however, the existing system has been adapted to encompass new subject matter.

e. New technologies

The new information and biological technologies have created severe stresses for traditional IPRs. Concerns have arisen about the capacity of existing systems to cope with them. The extension of coverage to some new technology is controversial. At the same time information technologies have produced the capability to transmit information and knowledge with speed and low cost across the world and thus made it easy to infringe existing rights, for example using the Internet. The difficulties of enforcing rights across frontiers have therefore come to the fore and become an international issue.

f. Future developments.

Recent decades have witnessed the trend for an increasing harmonisation of IPR law around the globe, and new institutions of IP protection, in particular through the work of the World Intellectual Property Organisation (WIPO) and the World Trade Organisation's (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). This trend can be expected to continue at global and regional levels, in particular because of the growth of regional groupings such as the European Union, NAFTA and Mercosur. European harmonisation focuses on the Community Patent, which is now a high priority for European Union policy. The ultimate aim could be the institution of a 'world patent' and unified IPRs system, but this must be seen as a very long term goal. Prominent controversies (genome patents, genetic modification, pharmaceuticals for the developing world, HIV/AIDS, malaria and other generic drugs, traditional drugs, etc.) have thrust IPRs into a public prominence far removed from the tradition of arcane knowledge familiar only to practitioners, and have also identified divergent attitudes to intellectual property definition and protection in different countries. The evolution of the system therefore has seen the generation of diversity regarding different systems' definitions and coverage of IPRs, as well as the harmonisation which may be expected to simplify global rules.

1.5 Incentives and Motivations for Collaborative Research

1.5.1 Public Policy

Since the 1970's, motivated by the new economic competition from Japan, and modelled on the perceived example of its government sanctioned and supported research programmes, European and US policy has been to encourage particular types of research collaboration in the pursuit of economic competitive advantage. Several motivations for this are clear and are outlined above. The increasingly international trading economy has made it imperative in many industries to achieve large-scale production, and to exploit research and development (thus spreading costs) over as large a market as possible. Initially national programmes were instituted in particular sectors, especially electronics, computing and telecommunications, where firms were helped to achieve large scale economies, and research was the easiest avenue in which to pursue this aim. More recently, international programmes have been instituted, including those of the European Union. Now we can see networks of such programmes, involving permutations of participants: EU states, accession states, other European countries (Eureka), Japan (Human Frontiers programme), the USA and Russia (Integrated Space Station), developing countries, etc.

- A large body of economic and business literature since the early 1980s has argued that co-operation in R&D can correct market failures and increase the rate of technology creation and diffusion in industry. The basic rationale has rested on traditional market failure arguments emphasising insufficient incentives for individual firms to undertake uncertain and imperfectly appropriable research benefits at a socially optimal level.

1.5.2 Government motivations for supporting collaborative research

Governments and the European Commission support research and technological development for a variety of reasons, including:

- Advancement of scientific progress;
- Advancing international links and cultural understanding;
- Generating general economic progress and wealth, by;
  - Helping companies to achieve scale economies and other competitive advantages;
  - Exploiting foreign technological expertise;
  - Assisting the transfer of knowledge from publicly funded research organisations to commercial use;
  - Assistance to regional economies;
  - Assistance to small and medium sized enterprises (SMEs).

Support may be in the form of money (e.g. the Framework Programmes) or other forms of assistance (e.g. EUREKA).

1.5.3 Legal and political advantages.

Some economists have also cautioned that collaboration may have a downside for the interests of individual private sector participants and for society's aggregate welfare. Potential *disadvantages* of R&D co-operation include:

- Lack of compatibility with firm core technological interests;
- If subsidised, moral hazard raising doubts about the use of taxpayers' money;

- Limiting parallel approaches to uncertain technological problems;
- Blocking competition and new market entry.

1.5.4 Commercial Perspectives

Research has identified several reasons why private companies enter into collaborative agreements, in particular:

- Strategic planning;
- Risk sharing;
- Cost sharing;
- Access to complementary resources;
- Economies of scale, scope and speed;
- Co-option of competition;
- Pursuit of alternative possible technological options.

In addition, there are more general advantages of collaboration such as;

- Increasing creativeness through interactions;
- Creating and exploiting options;
- Benefiting from joint learning and innovativeness, and;
- Access to commercial knowledge and information about collaborators/competitors.

Of course many of these are present in combination in each collaborative programme or project, the overall objective being to increase competitive advantage.

There may also be drawbacks for companies resulting from collaboration. These include:

- Suppression of alternative R&D pathways;
- The risk of creating dependencies between parties;
- The risk of leakage of proprietary knowledge through other partners.

Policy makers, economists and legislators have long debated the trade-off between the advantages and disadvantages of market competition and agreements relating to R&D and IPRs. There has been a gradual shift from the prohibition of such agreements to their promotion under certain circumstances. This recognises that technological advance may be promoted by the incentives provided by control via IPRs. Such dynamic economic advances are more significant in long-term economic progress than is the traditional static efficiency promoted by traditional competition regulations.

1.6 Public Policy

One of the longest running policies of the EU has been the encouragement of cross-border co-operation in science and technological research between the member states, resulting in particular in the Framework Programmes.

1.6.1 European Research Area{tc \l 1 ""}

In January 2000, the Commissioner for Research announced a major redirection of European Union research policy, towards playing a more co-ordinating and structuring role in European research. The aim will be to improve the performance of this activity by networking and co-ordinating implementation of national programmes and centres of excellence, and supporting the human and physical infrastructure and resources to address more directly the expressed needs of society within the Union. It is clear that one of the major infrastructures underpinning the development of such activities is the IPR system, and this has been recognised by the Commission in this policy statement:

The Three Dimensions of the European Research Area (ERA), and the importance of IPRs.

Measures to implement the ERA (see COM(2000) 612) must take account of:

1) *The overall coherence of European scientific and technological co-operation;*
2) *The regional dimension, encouraging the potential of all the Union's regions;*
3) *The international dimension, fully integrating the accession countries, and also looking outwards. The following objectives should be pursued:*
   a) *to implement co-operation enabling European researchers and industry to have access to knowledge and technologies produced elsewhere in the world;*
   b) *to mobilise the EU's scientific and technological capabilities for the benefit of the international community and relations with partner countries in areas in which Europe has recognised expertise.*

To attain these objectives it will be necessary to include co-operation agreements or specific conventions in certain areas (e.g. the fight against major illnesses in developing countries; advanced materials).

The main goals for IPR within the ERA (see COM(2000) 6) include:

- *Starting the Community patent as soon as possible...*
- *Increasing the impact of research efforts undertaken in Europe in terms of innovation, the relevance and consistency of the intellectual property arrangements used to implement public research programmes should also be improved.*

The protection of knowledge outputs can be achieved by other means than patents. In addition to the initiatives taken in the first Action Plan for Innovation in Europe, information systems and systems for exchange of good practices in this field could be put into place by national and European support organisations for research and innovation.'

1.7 Competition Law

Collaborations between commercial competitors are often considered to be contrary to the public interest. However in the case of R&D collaborations, the EU (see section 4.8), and to a lesser extent the USA, have treated these more leniently, or have even encouraged them. Concerns about the dangers of commercial agreements were outweighed by the need to regain international competitiveness, especially vis-à-vis Japan in the early 1980s.

1.8 Conclusion{tc \l 1 ""}

Collaborative research is growing in importance both in Europe and around the world. Its success depends upon the existence of a set of IPRs ensuring that economic returns are available to participants. These rules usually involve a trade-off between the various participants in research and must be designed in the context of an overall system taking account of all interests.

CHAPTER 2: Purpose and Structure of R&D Collaborations

2.1 Forms of Collaboration

This section describes, in relation to IPRs, the different forms of research co-operation between organisations, and the structures for achieving technology transfer between them.

We will first discuss issues that concern the different participants;

- public sector organisations;
- private sector organisations, and;
- the new hybrid organisations.

Subsequently, the resulting technology transfer structures are considered, including:

- Contract research;
- Spin-off companies;
- Licensing know-how;
- Strategic alliances, and;
- Multiple partners in a 'hub' type of collaboration.

2.2 The Public Sector in Research Collaborations

Publicly funded institutions have various goals. These goals include supporting their local knowledge and research base, teaching, publication, and more recently, supporting the economy, employment and opportunities for SMEs, and making sure research results are disseminated. The question we address later is: how can IPR rules be used in order to advance these goals?

The natural goal of public funding of R&D projects is to encourage organisations to do more R&D, to collaborate more and to start more challenging and long-term projects. As the R&D often is expensive and commercial outcome of it uncertain, the possibility of public funding is of great importance when R&D projects or collaborations are planned. The further goal is to create new businesses based upon R&D, which will maintain employment and ensure the sustainable competitiveness of the locality.

2.2.1 Changes in the Research System

Recent years have seen considerable changes in the means by which knowledge is produced and used. After 1945, it was generally accepted that publicly supported research was openly available and was passed on to commercial organisations for subsequent exploitation in marketed products. For the last two decades, the pressures on these institutions have made them search for alternative sources of funds such as contract research for companies. At the same time, in several fields such as new materials, bio-technology and pharmaceuticals, the differentiation between basic, generic and applied research has reduced, leading to mixed research structures and models. Whereas previously knowledge was acquired for its own sake as an exploration of nature, today even the most basic modern research either has eventual products in mind, or creates commercially important spin-offs. Hence IPR protection should in principle be obtained on many research outputs, if it seems desirable to do so, independently from its phase in its life cycle.

However, this leads to controversial changes in the role of PROs. Given that they originally were intended to produce public knowledge from public funding, to what extent is it legitimate to withhold the results of privately contracted work, either by ownership of IPRs or by giving these to companies. And, if PROs become participants in 'research markets', is this 'unfair', subsidised competition for commercial research laboratories?

2.2.2 Public Research Interests

Research with purely public funding in publicly funded institutions tends to be more oriented towards *'pushing back the frontiers of science'* for matters that have a strong societal impact, generally in the longer term: health (e.g. AIDS, cancer), climate (e.g. weather prediction, greenhouse-effect), energy (e.g. hydrogen as a fuel, nuclear waste storage and disposal), high energy physics, (e.g. CERN), space sciences (e.g. NASA, ESA). In general, this research falls into the traditional pattern in which results are disseminated openly. Scientific progress depends upon this, and few IPR problems should be encountered if results are not expected to be commercially valuable in the near future. Of, course, in some instances results are unexpected and may be used very quickly in commercial contexts. For example the development of new instrumentation or sensors may result from publicly funded basic research, and may be quickly taken up as marketed products. Again, **policy makers should not restrict their IPR considerations only to the narrower 'scientific results', but to wide range of possible outcomes from projects, and ensure that benefits are not entirely appropriated by private companies.**

This kind of research can be done either at universities or in dedicated research institutes. This basic science approach includes such fields as nanotechnology and the life sciences, where commercial application is closer. There currently exists co-operation programs between the EU and the USA in these fields, with the NSF (National Science Foundation) and the NIH (National Institutes of Health), respectively, within the framework of the EU-USA technical co-operation agreement.

Such basic science research necessarily has world-wide applications and can also be done more efficiently on a global scale, as was the case in the Human Genome Project, CERN, ISS-space module. **This research gets its funding increasingly from supra-national sources as their goals are reaching far beyond national borders**, and hence collaborations should be organised accordingly. Usually it is the EU, USA and Japan that have the will, the wealth and the resources to address these problems, and often have the greatest interests, economic and otherwise, in their solutions. The IPR over outputs of such research should be considered appropriately, and should be open to those nations that have contributed. The increasing role of global non-competitive projects with substantial funding (e.g. HUGO, global warming, etc.) may require the management of IP in an open regime where this is thought most effective. **A distinction can be made between knowledge aimed at increasing the knowledge base, which should be either published openly or made publicly available through non-exclusive licences, and that capable of direct exploitation, for which ownership and exploitation should be determined more carefully, for example by ownership residing with the originating party or by other arrangements determined by the contracting parties.**

It should be emphasised that much modern research cannot be classified as basic or not basic merely by its content. Its nature may be defined by the IPR treatment that is applied to it. A good example is the Human Genome Project (HGP), where one group defines the knowledge as basic by publishing it, and other defines it as commercial by obtaining IPR protection. In negotiating collaboration agreements, public sector organisations should be careful to guard their access (and that of the general public) to, or ownership of, knowledge produced from public funding, as far as possible. This can be done either by journal publication or by ensuring access to IPR that they generate, preferably by ownership, or at least by licence access.

The example given above, the HGP, is having a great influence upon the IPR debate. Some academic researchers fear that the *'privatisation of knowledge'* may restrict their ability to undertake leading-edge research if companies develop new methods, testing procedures or materials, or databases (notably, for example, the human genome), which are only available at high costs. Perhaps it is worth reminding ourselves here that the function of IPRs is to encourage invention and innovation for the public benefit, rather than specifically to reward inventors. The required publication of patent details is intended to make possible successor inventions**. If the fears of academic researchers become justified in important areas, public policy makers may decide to make specific provisions for use of privately held IPRs for research purposes alone.** There exist experimental use exemptions from patent laws, and there are exceptions in other IP laws, but it may be necessary to extend these.

However, against this is the trend for public institutions to undertake commercial research. Clearly the IPRs resulting from this would not be covered by any such exemption, which would only be for research for public knowledge purposes.

In publicly supported programmes, policy makers must decide upon the extent to which they restrict the freedom of participants to decide upon IPR conditions. Ideally, public knowledge may be the objective, but this will not usually appeal to companies. The greater the proportion of costs borne by the public, the more conditions may apply, but the less appealing involvement will be to companies. Programmes such as the EU's Framework programmes have over successive 'generations' gradually tended to relax their rules on this, on the grounds that **it is more important to ensure that exploitation takes place, than to ensure wide access to results**. Companies prefer to control IPRs in order to restrict competitors or to receive licence fees, and to help raise finance to exploit new developments. **Thus rather than insisting on detailed IPR (particularly patenting) clauses in collaboration agreements, there should be a planned exploitation route from the start of a project, including clear agreements on the use of any IPRs generated, which is contained in the funding contract and monitored subsequently.**

2.2.3 Exploitation of Publicly Funded Research

The Fifth Framework Research Programme of the European Community requires projects to have an exploitation plan for project results, as public funding institutions want results to be exploited commercially or to result in further research either by the owner or by others, project participants or even third parties. The Bayh-Dole Act in US resulted from similar concerns. Traditionally it is required in publicly funded R&D projects that the results are public as far as this does not prevent the protection of knowledge or open publication of trade secrets. However, there is development in the other direction too, as many framework rules nowadays also accept exclusive ownership and exclusive licences as far as proper exploitation of results requires. For example the model contract of FP5 acknowledges the right to grant exclusive licences or to refuse to grant any licences if this is economically indispensable. This may be particularly important in international programmes.

The proper protection of results is a key factor in successful exploitation. An increased awareness of the role of IPRs can be seen also in obligations to protect the results as in FP5, and where appropriate as proposed for FP6, as well as in new funding rules that allow the use of funds to cover the costs of protection of the results. Even pre-project funding schemes have been introduced in order to enable the organisations to check in advance that there are no IPRs existing which can be infringed by the project. These schemes are especially useful for SMEs.

There is also the fact that the ratio of market size to patent cost is so much more favourable in the USA than in the EU, that there is always a strong tendency to patent and ultimately exploit in the USA. **EU public**

funding in international collaboration clearly needs to take account of this high cost of patenting in Europe, for example by meeting patenting costs. However, this cannot solve the problem of litigation costs in the USA. Apart from the Framework Programmes, there are no harmonised funding structures in the European Union. Technology projects are mostly funded at the national level under national rules and with national instruments. This may cause conflicts between the interests of companies and the interests of national funding institutions. These concerns should be addressed in the context of the evolving European Research Area.

The changing and developing situation of the R&D driven research market has had important consequences for the public sector, which has attempted to adapt its instruments. **IPR expertise and talent are the decisive basis for any institution to participate in the research or commercial market with new and technologically dependent products.**

2.3 Private sector Collaboration

These are not the primary concern of this report, but do pose some problems for public policy, in particular:

- Appropriation of public knowledge;
- Problems of 'outsiders' accessing outputs, and;
- Parallel research.

There are various forms of research consortia funded by industry alone, such as International SEMATECH (USA), MCC (USA), SELETE (Japan), to name some examples out of the semiconductor business, the SNPs consortium from the biotechnology industry. Most of such **consortia are sector oriented** and have a **closed nature**. This means, only those industrial members who are co-sponsoring the consortium have access rights to the IPR being generated within the consortium research program. The program definition is determined and imposed by the consortium.

Most such private sector industrial research consortia were set up with the aim of strengthening national industry, based on a cost-shared basis. Lately, such industrial consortia are rethinking their model in a more global way, in view of the increasing complexity, increasing costs and increasing shortage of talent. They are opening up their membership to non-local national companies as well, e.g. International SEMATECH has opened up its membership to non-US companies. Most of these collaborations are eventually converted into joint-ventures, when consideration of competition law becomes crucial. However, the SNP consortium is an important counter-example, where the mission was to develop 300,000 SNP's (single nucleotide polymorphism) without IPR restrictions by immediate publication, although sometimes patents are taken out to guarantee public access.

2.4 Public/private Technology Transfer Structures

2.4.1 Obstacles to the Technology Transfer Process

The term 'technology transfer' has been applied to many phenomena, including the transmission of rights and knowledge of use of particular technological developments from academic laboratories to companies, or international transfers, etc. In this Report we will use the term to refer to the transmission of rights and knowledge from producers to users of research results.

This transfer process consists of at least the following elements:

- An IPR - already established - or at least the possibilities that a right can be obtained
- A source who can provide an IPR or the right and information necessary to obtain one

- A potential user who wants to acquire the IPR - or who wants to acquire the right and necessary information to establish and use an IPR

Quite often in addition to these elements, one or more facilitators or intermediaries play a role in the technology transfer process.

The potential user of a transferred IPR may be:

- A company, including a start-up company. This is the typical target for an IPR transfer process and by far the most important one, both in numbers and in social impact. A private individual who acquires an IPR is considered a start-up company, since usually IPR can only be exploited if a company is initiated.
- A university or an institution. This is not a very typical case, however there are a number of examples where a university or a research institution may wish to acquire an IP right in order to conduct further research within an area covered by IPRs owned by others or in order to develop and license a commercially useful product or process or to be able to offer a commercial service related to its institutional aim.
- a government, in such fields as environment, energy or health, with a large impact on society.

Experience shows that any possible combination of the above can occur. In addition a technology source or potential user may consist of a group or consortium composed by members that are subject to very different legal and practical conditions. This may impose a number of **obstacles on the technology transfer process**. Some of these obstacles are:

- In cases where the technology source is not a single person or entity, but for example, a research group or a consortium, the **ownership of IPRs** often becomes very complicated. The parties may be of different nationalities and therefore subject to different laws and legal frameworks. The parties may be subject to different individual contracts with employers, customers or co-operation partners, which may affect their freedom with regard to technology transfer.
- **Differences in national IPR law** may create problems. Some of the partners may be subject to national IPR-law which excludes certain technologies from protection (e.g. business ideas) or which does not allow certain protection forms. Specific national laws related to technology transfer can be a further obstacle. In some Asian countries, government approval of technology transfer is required.

Language problems **are not only found where various partners in a technology transfer process have a different mother tongue. Semantic problems easily occur within the same language.**

2.4.2 Hybrid Organisations

Hybrids exist as a form of technology transfer mechanism in which private and public sectors can learn from each other. A hybrid organisation can be any independent research organisation (university, research institute) combining both a public mission with clearly defined public goals and private objectives. This combination is possible because:

- public goals can be complemented in a balanced way with private market driven objectives;
- critical mass in the field of research often requires a mixture of public and private funding mechanisms.

The public part in the overall funding is justified mostly by a number of facts and arguments:

- The market is normally less willing to contribute financially to embryonic type of research (in the very early phase of the technology life-cycle). So, public authorities play their part in this respect by allowing such risky, but potentially promising, research to be performed by providing funding for this type of research (infrastructure, cost of research people, working costs). This allows a hybrid organisation to build critical mass and to generate crucial background information, (including expertise and dedicated knowledge, patents, crucial networking and cross-disciplinary collaboration) as an essential requirement for future further collaboration with industrial partners;
- The public authorities will normally also request the hybrid organisations to take care of a number of challenges, which are not always (fully) addressed by the private market.

Typical activities of hybrids are:

- hands-on training related to core competencies;
- special consideration for regional development (attraction pool);
- special attention to SME's and spin-off initiatives;
- special attention towards societal aspects & challenges;
- sustainable growth.

In summary, there are a number of 'impact expectations' added to the mission of a hybrid organisation, which are not fully covered by the market itself. As competition requires the availability of ‘differentiators’, industrial players are increasingly moving towards more early involvement in the life-cycle, as to gain a competitive advantage towards their competitors. Early insight has become a major driver, especially in combination with increasing complexity, risks, costs and shortage of talent, forcing industrial players to seek sources of well established background information, with challenging research programmes and critical infrastructure, especially when addressing 'generic technology avenues'.

The complementary condition of this type of research is that the IPRs will have to be shared amongst the participating (i.e. contributing) partners. Licensing rights on background information will be non-exclusive and the foreground information will mostly be of a shared nature. A strong *'me too'* effect occurs quite often. Once a major competitor has joined a programme, this often triggers others to join the programme in order not to be excluded, provided the research programme is of an open nature (meaning that any partner signing up a contract and contributing to the programme can join). More closed types of organisation will restrict their IPRs to the 'paying members'.

It is crucial for hybrid organisations to have enough critical mass and background information in order to have enough appeal to the market. As important is the notion of re-usability of jointly established new foreground information, together with the industrial partners. Re-usability of foreground information is essential for the hybrid organisation as to be able to continue building further research in the future in the same generic fields and to keep its own independence.

Co-operation does not prevent exclusive rights being given to single industrial partners, provided that such results are rather company specific and based upon company confidential (background) information. Such exclusive rights are normally more 'product' (or material, or systems specification) oriented and hence, closer to the market. They do not constitute the bulk of the research outputs of a hybrid organisation. For a hybrid organisation, it is essential to keep enough co-owned results to maintain its strategic position in future generic R&D without having large *‘black holes'* in its strategic future R&D path, based upon its past established background information and expertise. R&D rules and R&D labelling, linked to the expected deliverables should be clearly discussed and agreed upon as part of the contract, before the collaboration

starts. This reinforces the clear understanding of mutual IP-rights amongst the contractual partners. Special attention is however needed for spin-off initiatives.

2.4.3 Contract Research

There is now a global research marketplace in many significant sectors, and companies can often go to many alternative locations in the world to have research performed. Pure contract research exists where an company needs an R&D solution and is willing to subcontract such a mission to a recognised research centre or university.

The company wanting to buy the technology will usually insist on control over it. The research organisation wants to keep its basic (background) IPR, and yet wishes to ensure a revenue stream and to hang on to aspects of academic freedom such as right to publish and use foreground for further research. Different sectors have different goals. Many PRO's have licensing strategies in place, accommodating differences between specific fields of applications.

Most EU members have organisations for contractual research, some of which are public (e.g. Fraunhofer, Germany; TNO Netherlands, etc.), others in privatised organisations (e.g. Bertin, France). IPR is granted in projects on a case-by-case basis, wherein contract and patent strategies exist and must be maintained. Contract research institutions must take care of their IPR basis, and should direct their patent strategies to increase their base of knowledge, as in all other research situations.

Contract research institutions must also perform basic research to be an attractive partner for industry, and increase this basic knowledge and IPR by the experience gained in each applied-research project with its contracting partners. This system only works within a well organised institution with the benefit of a professional IPR management. Again, this may be well suited for international collaborations where participants may have particular constraints or requirements.

The contractual research partners need professional expertise for handling the IPR being created in a project. They need confidentiality for the non-protected IPR and professional application and licence handling by the contract research organisation. The Fraunhofer Institutes have the policy of granting exclusive rights only on a defined area of application. In many cases only non-exclusive rights are granted. Background information rights are granted non-exclusively against royalties.

Protected IPR always is an additional asset within an R&D contract. It should be remunerated accordingly and is not included and transferred with the research result. This understanding for example is also common in the US, where the payment for the R&D project means the remuneration of the labour and investment. The licences and exploitation rights must be agreed on separately. Contract research (as solving more individual industrial problems) will be a more regional matter of co-operation or a smaller subset of a larger programme.

One of the crucial points of contract research is to provide a competitive advantage for the client. The ways to reach such an advantage may be very different and many flexible models are possible. Appropriate measures are agreed upon and therefore contracting for IPR is crucial in R&D contracts and cannot be replaced by structural considerations.

2.4.4 Transfer of Know-how by Licensing and Personnel

Licensing of know-how (knowledge not protected by formal IPRs) has increased considerably. Licensing needs to be embedded in a business strategy as a modern and efficient management tool for IPR-handling. It includes the patent strategies for participation in co-operation and joint ventures as well as a clear view of the business model for exploitation of these rights.

Strategically **the transfer through exchange of people and their experience is the most direct way of transferring technology.** Knowledge with the potential to generate formal IPRs and valuable trade secrets and know-how is embedded in people which means that the host can take full advantage of all explicit and tacit knowledge of the researcher. IPR in this context has the bridging function between **knowledge of the host** and of the **scientist's know-how** that is transferred during his stay, also providing a cross-fertilising leverage. IPR matters are often dealt with in the context of contracts between employer and employee. A clear distinction should be made between the contractual relationship between employer and employee (scientist), and the contractual relationship between 'donor' organisation and host. The exchange of research students or post-doctoral researchers may complicate the issue further.

Exchange of people is sometimes achieved on the basis of a commitment between companies or institutions with very different objectives (e.g. education, implementation of a research result, enabling staff to work with new technologies). IPR generated during the exchange must be agreed upon in a clear way in advance to avoid problems afterwards.

In some European countries, IPRs generated in the host company or university may belong to the scientist or his employer (depending on inventor law), but not at the outset to the host. If the scientist stays for a longer period, it may be that IPR will be based upon the hosts' knowledge, and ownership becomes more problematic. Then the user rights, or an obligation to transfer them, may be required.

US universities manage this problem easily and effectively. By contract, the visiting scientist is under the same IPR-policies and measures as the local staff, which is something that should be considered for EU universities. Changes in some national laws would be required to effect such a policy.

2.4.5 Strategic Alliances

These are different co-operation forms. Simple co-operation agreements are also strategic alliances as are large joint venture companies. The strategic alliance simply means that two or more partners commit themselves in whatever way to reach their strategic market goal. They differ from single project collaborations because they have a longer lasting intent, recognised in the form of co-operation and in the collaboration agreement. They also tend to be negotiated at the highest level in companies rather than by the R&D department. In some cases strategic alliances result in joint ventures or even in the long term into more permanent mergers or acquisitions.

Important requirements for a successful alliance are:

- having the appropriate partners;
- having a well adapted and efficient management structure;
- having identified the IP ownership rights and the user access rights to knowledge.

The following questions related to IPRs can arise:

- How to deal with exploitation rights in a co-operation agreement? ;
- Whether to develop a company to create a basis for a future production company, as a first step?;
- Whether the university will be directly involved in any aspect (including financial) of production?

- Which business model can integrate all the required partners, in the case of complex and expensive products, with a view to risk and cost sharing?

IPR plays very different roles and functions in co-operation schemes, joint-ventures and other strategic alliances. For collaboration between research centres and industrial partners this will become more important in the future. They will be based upon international recognition of the research institutes or universities, as outsourcing of strategic research will be done on a selective basis. The notion of programme driven research programmes will gain momentum, especially for research with a high threshold in terms of:

- infrastructure and research costs in general;
- complexity;
- multiplicity of technological options;
- research risk.

Joint ventures of partners from different cultures (i.e. R&D-Institute, company) depend on their management, and require there be complete identification of the knowledge base including IPR.

2.4.6 Multiple partners linked by a hub.

The hub concept with bilateral IPR agreements (e.g. the hybrid system outlined above) is well adapted to international collaborations because it can account for IPR system differences between any two partners at a time within a project with many participants each with particular requirements. This simplification is essential when projects are close to the market and/or product driven. For example, in an EU-USA-Japan collaboration, simultaneously negotiating the IPR between clusters of organisations in a field where commercial exploitation is possible becomes too complex. On the other hand, one hub organisation with well defined IPR rules between its partners is well placed to negotiate internationally with each partner individually, taking account of the specificities of each region.

IPR-handling is determined by the purposes of exploitation. The scientific partners often transfer their IPRs in favour of the exploiting industrial partners. Remuneration may be *ad-hoc* or part of the co-operation arrangements. Research co-operation on a general basis takes place between research institutes and companies of similar disciplines. In this case each organisation holds its own IPR and grants non-exclusive licences to the other partners.

International agreements, such as EU standard consortium agreements, often do not produce a consortium agreement with acceptable IPR provisions. **International collaborations are not more difficult than collaborations between different entities from European countries. The crucial aspect is the mutual access to knowledge and IPR of each other and the exploitation rights.** Additionally, competition law plays a role. The legal systems may be slightly different, but in the general sense they are very similar. The factual and not the contractual aspects are decisive. Therefore, the creation of *general framework* international co-operation agreements may be neither necessary nor helpful, and if they do exist, should be kept to an absolute minimum of terms. Therefore, the existing EU regulations in the FP5 model contract are not useful in fostering collaborations because, as suggested above, they overspecify. Guideline-type unified consortium agreements exist, but are not always a solution. The IPR situation is sometimes unclear, but the necessary licences are granted to perform the work and to exploit the result. For international agreements to work well in areas with commercial implications, the rules for public funding need to be as flexible, simple and transparent as possible, in order to allow the partners to adjust the rules to the specific situation.

Especially for longer term research which industry is not willing to fund, it is important that the different parties contributing to such research programmes can co-own the overall program results, without any accounting to each other'. Each party can then afterwards re-use the overall results as it wishes, and can embed such IPR into its existing overall background information portfolio at a fraction of the overall cost (cost sharing principle). The only thing that they can no longer do is grant exclusive licences without the permission of others because of the nature of co-ownership.

Also co-operation between partners having complementary expertise (e.g. microelectronics and biotechnology for biochemical sensors) can be an excellent basis for such co-operation amongst research centres. Here, cross-disciplinarity is the major driver, apart from cost sharing of the results. Mostly, such co-operation is ideal in the early phase of the life cycle, where high technological risks are at stake and where there is still enough time for further exploitation afterwards, in relation to the right 'window of opportunity'.

Strategic technological alliances amongst companies are often driven by the same cost sharing notions or by complementarity of expertise. As in the above case, also here, industrial partners will co-operate in larger alliances (on a certain generic technology), early enough in the research life cycle to take a competitive differentiating position afterwards. Bilateral alliances are often for longer periods and target both cost sharing, risk sharing and complementary commercial networks. Quite often, in the later case, cross-licensing on complementary background patents are part of the deal.

2.4.7 Spin-off Companies

Most spin-offs from PROs have two aims: to increase the value of the research through implementation and to perform an incubator function for research results to make them ready for commercialisation.

This generic type of research is increasingly being conducted in a cost-sharing, risk sharing, talent sharing and IP-sharing mode. This is especially feasible in the early phases of the technology life-cycle.

However, spin-off companies, which are in many cases subject to the overall objectives of research institutes and universities, usually require a distinct IPR policy.

Spin-off companies are, by definition, small in size when created, and have to prove their existence in a very fast evolving and competitive environment, without a standing track record and without yet being internationally recognised or even known. They also usually require venture capital to underpin their financial position. Heads of institutions are reluctant to back spin-off companies if there is not a unique, preferably protected, technology behind them, providing the spin-off company with a unique selling proposition. Not only are patents important, but also the exclusive rights on the technology are quite often mandatory, so as to give such spin-offs some protection against established market players. Research has shown that spin-offs relying exclusively on one patent, however important, are the most at risk of failure. The key business strategy for new companies is to establish a portfolio of IPRs quickly in order to be less dependent on one business area.

One drawback of spin-offs for PROs, HEIs and companies, is that they may in the long run conflict with the objective of building up strong background IP position and thus bargaining power in collaborative negotiations: the spin-off may become a competitor.

Hence a valorisation scheme, where technology is being generated together with other industrial partners on a IPR-shared basis, is not adapted for a spin-off scheme. Spin-offs, although set-up on the basis of a technology, usually have the intention to sell clearly defined products, applications or solutions. They act, almost by definition, close to the market.

This implies that a university or a research institute often has to make an early decision whether to follow a dedicated spin-off route or to build technology on a cost-shared and IPR-shared basis.

If a spin-off route is selected, the costs for building up the technology could be borne by the university or the research institute, partially complemented by structural funding from the public authorities as part of their mission to reinforce local or regional development. In many cases however, the spin-offs can only acquire the IPR against fair market conditions so as to avoid unfair competition, especially when public money is involved. Occasionally, it is possible to use a more generic technology on a non-exclusive basis and to offer a set of patented applications/products on an exclusive basis to a spin-off.

It is clear that spin-offs themselves require a well-established exploitation and IPR policy.

Isolated licensing seldom has a separate strategic role. It is similar to buying or selling available knowledge. Complete IPR portfolio management is one of the most important strategies for all companies and institutions.

Having a patent strategy does not only mean increased application efforts and more licensing of patents, it means building a business strategy based on IPRs. It can also mean buying or selling patents, building patent-clusters, buying and selling small companies in the possession of important IPR, co-operating and cross-licensing. Licensing can be part of a strategy within a co-operation or strategic alliance.

CHAPTER 3: IPR and Knowledge Management in R&D Collaborations

3.1 Traditional Models of Research and Exploitation

For much of the past 50 years it was assumed that there was a linear, chronologically sequential process by which basic research funded from public or charitable sources produced basic scientific knowledge, which was then used by commercial organisations to produce new or improved products and processes which benefited society in general. New inventions from the private sector were protected where appropriate, by IPRs, and patents in particular.

Recent experience has developed a far more complex system model of the system in which knowledge production and use takes place. There are many interactions between those involved, and feedbacks from markets and industry which identify important areas of research. The changes outlined in Chapter 1, such as the faster movement to exploitation in new fields, and the wish of governments to use scientific expertise more effectively in the pursuit of economic and social progress, have generated policies aimed at producing closer links between companies, and between research laboratories and companies. The global nature of both business and science has broadened the scope of these links.

IPRs have the essential function of defining the relationships between those involved in these interactions, and **we are now experiencing a process in which new IP ground rules are being established by commercial, academic and government bodies in an attempt to enable the system to work effectively and efficiently**.

But this is a difficult process, with the distinct objectives and requirements of all participants being negotiated in a changing cultural and regulatory environment.

This Chapter identifies the significance of IPRs for collaborative research, and the issues they raise for those involved in negotiating collaboration agreements, especially at an international level. The objectives of the participants in collaborations, both conflicting and complementary, are discussed, leading to an assessment of the particular problems encountered in international collaborations. Finally, some structures are described which address the problems of collaboration and IPRs, and may be used by policy makers and participants as solutions to some of these problems.

3.2 The Key Role Of IPRs In Research Collaboration

IPRs play a key role in determining the nature and participation in collaborative research projects and programmes. In entering into such activities, the participants take a view of what the expected outcomes will be, and what the benefits will be to their organisation. Projects must include participants who can bring essential background knowledge to the work planned. Some potential participants may be excluded because of fears that they will gain too much insight into the technological knowledge or commercial strategies of others, or because they will be able to exploit outputs more effectively.

These outputs will entail IPRs of various kinds: patents and other formal IPRs, and also increased skills and forms of tacit knowledge. **Even those taking part for mainly financial gain (such as contract research companies) will consider the wider benefits such as increased knowledge and skills in both technological and commercial spheres. Not all outputs are easily translated into marketable products, but instead can contribute to the overall capabilities and competencies of companies and other research institutions.**

This is especially true for public funders of research collaborations, which are intended to produce economic and social benefits listed in Chapter 1. Apart from pure sciences, most public support for research is explicitly intended as an investment, producing longer term economic and social returns. The justification is traditionally that research produces social benefits which are greater than the private benefits to companies because many of these benefits are non-appropriable or are difficult to protect or even identify in detail. The resulting under-investment in research produced by private decisions can be corrected by public funding decisions.

Implicitly, therefore, the success of programmes or projects cannot be evaluated merely by counting the numbers of patents generated, but by the more difficult assessment of the overall impact of the range of knowledge and results coming from the research. **Intellectual outputs from research collaborations includes formally protected knowledge, tacit knowledge and other results such as commercial knowledge of markets, consumers and other 'non-scientific and technological' knowledge, as well as contributing to the pool of public knowledge. Policies and strategies must therefore take account of this broader range of results.**

3.3 General Collaboration Issues in IPRs

The main intellectual property issues concerning collaborative research may be outlined briefly. First we will consider those issues which affect all research collaborations, and subsequently focus on those issues which arise specifically with international collaborations.

3.3.1 Foreground and Background

Each participant will bring to a project **background IP** that is essential for the work of the project and must be available to others as required. This background must be developed and protected well in advance of a relevant collaborative project, as a means of creating bargaining power in negotiations. Use of background outside the project (for exploitation or further research work) would be negotiated, perhaps on preferential terms. For example if the background is existing commercial software, then the terms of use would probably have a commercial basis. Careful research is needed before a project to determine if third party IPR protection exists that might hamper either the research or future exploitation of the project.

Rights to **foreground IP** (results) of the project must be allocated. It is rare that a single result is produced; usually a variety of outputs are envisaged, and unexpected ones usually occur. With partners having complementary interests, different modes of exploitation may be specified; universities will insist on rights to use results for further research, usually without payment. Companies will insist on rights to use results in their respective spheres. If these involve direct market competition, there may be restrictions due to competition regulations. The rights of participants to license third parties may be specified, to prevent these parties using the foreground in competition with other participants.

An important specific condition of IP agreements will be the rights and duties of each participant to apply for patents in order to protect the foreground. This will also require restrictions on public announcements of results, so academic participants must accept at least some delays in publications where appropriate. To whom the agreement applies may be an issue for academics: are research students involved who are not 'employees' of the institution, and must they sign confidentiality agreements? Are sub-contractors to be used, and under what confidentiality conditions?

Intellectual property is not just patents. Projects must identify all protectable IPRs, such as databases and other confidential information, and specify its treatment. Tacit knowledge conditions will be more difficult to specify as it is more difficult to control the movements of people.

Research projects may be affected by external circumstances such as changed commercial positions of participants. If a participant withdraws, the access to the relevant IPRs must be ensured for remaining members, and also be made available to new, replacement, participants.

Two further considerations are important. First, it is in the nature of collaboration that participants will be able to exploit results in different ways, and gain very different returns. A large firm may be able to articulate its new IPRs to more advantage than an SME. This must be acceptable to participants, and will usually be reflected in the agreement terms, but these aspects often cause difficulties, especially between potential competitors, and between large firms and SMEs.

Second, it is similarly in the nature of research that results are often (usually?) not exactly what was expected or planned. Therefore negotiators should take a broad view of what may result unexpectedly and outline the conditions which should apply. Further negotiations during the course of a project may be needed if important developments occur, although these can clearly create difficulties if collaborators' interests begin to conflict due to unexpected developments. Against this, it must be accepted in projects that not all possible eventual outcomes (both within a project and external to the project) and can be predicted and allowed for. It is a futile exercise to construct agreements in this spirit: negotiations over agreements are often lengthy anyway, and may delay urgent work, so it is usually better to aim to cover only the significant possibilities, possibly specifying conditions for re-negotiation.

Finally, collaboration agreements should specify the avenues through which disagreements may be settled. These can include arbitration institutions, and the national jurisdiction under which the agreement is made. However, it must be stressed that it has in the past been very rare for such research agreements to result in litigation between participants. Enforcement in Europe depends more upon the wish of companies to maintain good 'collaborative credentials' that will ensure their inclusion in further rounds of collaboration. Companies are rarely involved with others in single independent projects, but usually have a series of projects with permutations of past and new participants being involved in each generation of work, so a reputation for reliability is important. Whether this reliance on trust and goodwill can be supportable in the looser relationships of broader international collaborations is open to considerable doubt, however.

With this perspective, the importance of collaboration and consortium agreements, in particular the intellectual property requirements, is that they force the participants at the outset to identify their own interests, rights and responsibilities, and to recognise those of others within the project, and to codify these within a legally binding document which can be consulted during and after the project's lifetime.

3.3.2 Influences On Choice Of Collaborators' IPR Strategies

The business models (or operational philosophies) of participants in collaborative research are not necessarily the same. Though this may imply that IPR issues should be difficult to negotiate, in practice the reverse is often the case. The variety of forms of outputs from research, as well as the ways of exploiting them, often result in participants having complementary rather than conflicting interests. **Companies will collaborate more easily with each other if they are not direct commercial competitors, for example if they address different complementary markets or different aspects of the research activity. Companies operating in different countries may be more willing to collaborate than**

companies confronting each other in single markets. A software research project may include interests such as software production, customisation for different uses, training, hardware development and demonstrator provision. It is important for all concerned that the interests of all participants (and sponsors) are taken into account. The presence of an international dimension adds more to the complexity of relationships in projects: this will be discussed below. When collaborators are in direct market competition, great care must be taken to ensure that the interests of the parties are protected, for example in projects to develop industrial standards, all participants must have rights to use the results equally.

Also, such collaborators must be aware of the potential anti-competitive nature of such collaborations: can non-participants in such projects gain rights to use resulting standards? The treatment of this may be different if we compare the EU's block exemption for collaborative research with that of the anti-trust authorities in the USA. It seems likely that conflicts between EU and US competition law in general will be a growing feature of trade relations between the two in the future, and that IPRs will be an important component of these.

3.3.3 IPRs and Collaborative Participation

The importance of recognising IPRs in research collaborations is that they provide the framework in which different participants' objectives can be identified and protected. Taxpayers may also be reassured that their money is well spent if it produces identifiable results, and if these are as widely diffused as possible.

So, in parallel with the selection of participants, collaborative structures and legal agreements must be decided upon in order to ensure the rights of members to use of outputs, and the obligations to provide access to necessary background for others. **Each participant will wish to protect its own rights to own or use foreground results, and also to restrict any use of foreground by others which could be used against its own interests. Similarly, policy makers wish to protect the rights of taxpayers who support research by ensuring that international agreements concerning research collaboration address the specific problems which these generate.**

3.3.4 Evolution of Collaboration Agreements

Collaboration agreements are complex legal documents which must be agreed by participants in projects, and may also have to comply with public funding conditions. Many participants (especially SMEs) have no previous experience of such projects or legal issues, and have to rely on larger or more experienced partners to draft documents.

It is often suggested that public funders produce standard agreements (or a set of templates of agreements) in order to clarify the issues and to protect SMEs involved in programmes of collaborative research. These can be helpful, but should aim at a simplicity covering key issues. Any attempt to cover every possible contingency will result in over-complexity and often internal contradictions.

For programmes with a range of subjects and types of participants, the permutations of possible inclusions is formidable; it is unlikely that a single acceptable model agreement can be formulated. It is also to be remembered that promulgators of such standard agreements could be held responsible for any problems that arise. The best that can be done is to identify and explain the issues that must be considered by participants in negotiating agreements and publicise these, especially the IPR aspects.

It is rare for agreements to be written from scratch. Always, there are existing agreements that can form the basis of new negotiations, and be adjusted as necessary. Many participants have found that the best approach is to identify the basic IPR concerns of each, and operate relatively simple rules.

3.3.5 Life Cycles & IPRs

An important determinant of the structure of collaboration (including the organisation and distribution of IPRs) is the maturity of the subject, or its stage in the life cycle. In work early in the R&D process the partners will probably be more willing to share IPR, so a cost-sharing, talent sharing and risk sharing approach will be preferred. Near-to-market work will be more difficult to share, and exclusive rights may be demanded. Here a more contractual research structure will be preferred. However, in some fields of R&D, such as micro-electronics, the time between more basic research and market exploitation has become much shorter, making the allocation of rights in this way more difficult.

3.3.6 Exploitation of IPRs

Traditional forms of exploitation assumed that companies would hold patent and other rights to exploit either internally for processes and products, or would license IPRs for use by other companies. Public research organisations (PROs) did not usually exploit outputs themselves other than for research. **Now more strategic approaches to IPR management are becoming common in PROs.** The foreground generated by projects will be in a variety of forms, and so should be the exploitation. Universities may have spin-off companies to exploit directly, used patenting and licensing, undertake contract research, and (particularly important in the USA) may receive sponsored chairs, new laboratories, buildings, equipment or software, etc. **Long term relationships are frequently built up between companies and individuals or departments, and these prove the most successful in generating benefits for all parties**.

Therefore the intellectual property issues raised by collaborative research should be viewed in a broader context, considering more than just the immediate possibilities of patenting, licensing and contract fees, considered on a project by project basis. IPR management involves balancing the advantages and also disadvantages of the variety of exploitation routes. For example, several prominent universities have been excluded from collaborations with major companies after gaining a reputation for conducting aggressive negotiations over intellectual property.

Another factor affecting PROs' attitudes to patenting specifically, has been the recognition that patenting costs do not end with applications fees, attorney's fees and renewal fees, but must be monitored and protected sometimes by the use of litigation, which is extremely expensive, time consuming and with uncertain outcomes. Often they are best left to companies which are expert in such matters and have the financial weight to be credible to potential infringers. The overwhelming majority of patents do not justify the expenditure involved in their acquisition, though it is often difficult to identify valuable ones *ex ante.*

3.3.7 Employees Rights and Academic Freedom

These apply in particular to international collaborations, which must confront difficulties such as differences between the normally accepted rights of staff in academic or public research facilities to ownership or rewards from their research. The accepted rights vary between countries, and are also being revised in some countries, for example in Germany. In the UK, universities have always asserted patent rights, with some proportion of any proceeds going to individuals and departments concerned. However with copyrighted material (books, teaching materials and articles), academics traditionally have had the right to control the IP

resulting from their work whilst employed in universities, with the condition that the institution has the right to free use, for example of copyrighted teaching materials. However the increasingly important contract income from companies must be by agreement with the institution, and individual rewards may be negotiated. University College London has initiated a dispute with staff over its attempt to assert ownership of all employees' copyright. At the same time other universities, notably MIT in the USA, have begun to make available teaching materials on the Internet, free of charge. Though these changes have affected mainly copyrights, it is clear that the traditional systems are under pressure, and that changes can be expected to affect research results in future.

All personnel involved in collaborative research must be included in agreements. Academic institutions often include graduate scientists in research projects. Their status must be made clear, including their rights to benefit from results and their responsibilities to respect confidentiality where appropriate. The most often cited potential difficulty is the academic's need to publish against the company's need for confidentiality. In practice this rarely creates serious problems if the conditions are agreed in advance. Usually it is sufficient to adopt a delayed publication approach, with immediate publication being dependent upon the agreement of all parties after inspection of intended publications. Long term collaborative relationships help develop the trust between participants which enables this approach to work effectively.

We consider below a variety of structures for research collaborations which address the relationships between organisations undertaking such research, focusing particularly on the IP treatments which define these project relationships. It is worth stressing here again that **the IPR aspects of the relationships between participants in collaborative research determine the nature and success of these activities, and play a crucial pole in the design of the structures of collaboration; they cannot be added as an afterthought.**

3.4 Specific International Issues for Collaborative Research

The issues outlined above apply to all collaborative research. International collaboration adds further issues for policy makers.

3.4.1 Integrated Policy Approach

It was noted above that participants in projects expect different returns from involvement in collaboration. Public policy must address the implications of this, in their roles both as financial supporters of research (e.g. Framework programmes) and also in providing overall regulatory powers (in particular IP laws and competition regulations) and as negotiators in international agreements (bi-lateral and multi-lateral trade treaties and research agreements). **Bearing this in mind our recommendation is that the agencies involved in all these associated activities must co-ordinate their policies to achieve agreed objectives. International scientific co-operation agreements will be increasingly affected by trade negotiations determining international intellectual property regulations and harmonisation. It is essential that the linkages and interactions between these are recognised and that integrated negotiating positions are adopted**

3.4.2 Asymmetry of Returns

In negotiating specific international collaboration agreements, the asymmetry of returns to research efforts must be addressed. For example, in the early 1980's there emerged in Japan, Europe, and the USA a number of collaborative research programmes in the field of advanced information technologies; e.g. fifth generation computing programmes. Japan and Europe were in principle in favour of collaboration, but it

was found (for example by the UK), that Japanese firms were enthusiastic about collaborating with European universities, but not with European companies. Though research itself is a significant economic activity, the economic returns from exploitation of research accrue in the first instance to the firms that commercialise the technologies. Such collaborations may have been in the short-term interests of European universities (financial support for research), but would not have been to the benefit of European industrial competitiveness. **Collaboration programmes must ensure that the overall benefits accruing from research can be appropriated fairly by institutions, companies, and countries.**

More recently, a response to this issue has been to site research facilities close to centres of academic research excellence, or even funding university departments: a 'clustering' approach. Japanese and US companies such as Cannon and Microsoft have used this strategy. Links with the academic institutions may be formal, through contracts, personnel secondments, and employment of graduates. The success of these approaches has been varied.

3.4.3 Intellectual Property Regimes

Despite the aim of long term harmonisation, in particular through the TRIPS agreement, considerable differences exist between IP regulations in different countries. In addition, the interpretations given to IPRs vary considerable between countries, including the court systems and litigation decisions, and general social and commercial norms. Comparisons are frequently made between Europe, the USA, and Japan. The USA has undergone considerable changes which have strengthened the coverage of patents and the rights of patent holders. This has been less true of Europe and Japan.

Patent Coverage

The broadening of US patents to include business methods, for example, and certain subject-matter in the genetics field, have not always been followed in Europe. Collaboration in fields with differing regulations or interpretations of regulations must take account of jurisdictional differences: some research outputs may be patentable in the US but not in Europe. **Participants from EPC member states may not be aware of the extended possibilities of protecting inventions in the US, so information on this should be made available as appropriate.**

The Grace Period

One particularly important difference concerns the grace period. The US system allows a 12-month period, and Japan 6 months, after the public dissemination of knowledge, during which period patent applications are possible. Most of the rest of the world will not allow patents to be awarded for inventions that were already in the public domain.[1] **A US-EU(-Japan) collaborative research project (or programme) must take account of this, probably by ensuring that no publications are made before participants have had the opportunity to apply for appropriate patents.** This would be particularly important if a project had EU participants intending to exploit in the EU, and US participants intending to exploit in the US. There would be no cause for US participants to restrict publication as it would not affect US rights, but would negate any possible EPC patent application. **If US participants intend to market results by selling commercial products in the EU, they must first be made aware of the different system and its implications, and then undertake to restrict publication of details.** It is normally preferable for both EU and US collaborators to adopt a 'no-disclosure' regime as this allows both sides to get patents in both markets.

[1] There has been much recent discussion about the introduction to the EU of a grace period, but at present there has been no agreement to introduce one, although it has been introduced into the SPLT negotiations at WIPO.

The Bayh-Dole Act

The Bayh Dole Act was intended to ensure the exploitation of federally funded research by giving ownership to the universities carrying out the research. Thus it generated the expectation by universities that this should be the case with commercially funded projects. European companies, in contrast, would normally expect to have ownership.

Litigation

Collaboration agreements should specify which party is responsible not only for applying for patents and in which jurisdictions, but also for enforcing them. The latter point is particularly important in US collaborations due to the very high costs which can result from litigation in that country.

Cost of filing

The low cost and ease of patenting in the USA is a great attraction compared with the system under the EPC. It is actually current practice for many hybrid collaboration groups to apply for IPR protection only in the USA and not in Europe. Concerns are often expressed in Europe that there is too much foreign filing, but encouraging both USA and EU partners to file in both places would stimulate exploitation in both places.

Non-Europeans are the major users of the European patent systems. The most frequent US criticism of European patenting is the lack of a single system, with the only alternative to multiple national filings being the European Patent Office's bundle approach under the EPC. The costs involved are significantly greater than in the USA, much of which is accounted for by the costs of translating into the various required languages. There is no advantage to any user, European or foreign, in keeping the European system as complicated as it is. Within Europe, cutting down on costs of translation would facilitate filing from the USA and Japan. Also, the multiple court system in Europe is a problem.

3.4.4 Use of Funds

International collaboration is also desirable as new markets and possibilities can be reached through R&D collaboration. There exists, however, a conflict between this goal and national interests, as it may be difficult to combine national funding and international collaboration because there exists a danger that national funds leak to foreign organisations either on purpose or accidentally. This is why the funding rules try to take into account these danger. In the Fifth Framework Programme no third country sub-contractor is allowed to be involved without permission from the Commission and access rights for third country affiliates can be excluded by a special clause in the contract.

3.4.5 Tax Treatment of R&D Expenditures

A frequent policy tool of governments aimed at increasing R&D expenditure by companies, is to give favourable tax treatment to R&D expenditures, for example early write-off of this category of cost. If these are significantly different in the countries of collaborators, this may distort the allocation of research effort between those countries. **Programme designers should take this into account and specify the location and extent of research activities, and similarly agree any contributions to patenting costs in particular jurisdictions.**

3.4.6 Internet collaborations

A major new means of conducting research collaborations is the Internet. Originally developed specifically to facilitate research collaborations in science, it is now available to all users including for commercial purposes. It is significant to our subject for a number of reasons:[2]

- It was originally developed for use in the 'IPR-free' environment of open scientific exchange of results and knowledge, then modified for e-commerce and other commercial uses, and was therefore technically not designed to cope with research collaborations having IPR aspects.
- It has coincided with the emergence of large scale and complex databases as major scientific resources (in particular the human genome database) having enormous commercial potential, and is ideally suited to the assembly, manipulation and communication of information of this nature.
- There is an incentive to establish IPRs over databases due to this, and therefore a considerable pressure upon the traditional open science model. This pressure is asymmetric, as once IPRs become established there is both an incentive for others to act similarly as well as the motivation to establish rights before others do so. Following this it is difficult to return to the open exchange model.

The implications for collaboration are considerable. They can produce barriers to collaborations which rely upon exchanges of information, and may even prevent them from occurring. In general, the advent of the Internet and database science has added a new dimension to the existing argument about IPRs. IPRs are intended to increase net social benefits by increasing the rate of innovation, brought about by intervention into private decisions about costs and benefits. If inventors are encouraged in their activities by the incentive of temporary monopoly profits to be derived from ownership of IP, then their private decisions will be to increase innovative efforts. However there may also be social costs of increased use of IPRs, in this case by restricting the avenues of research available to non-owners and by introducing transactions costs. Some observations concerning internet-based collaborations seem plausible:

- It is not yet clear that the existing legal structures governing databases (mainly copyright outside Europe) are adequate for the new circumstances. For example, the creating of new, powerful copyright protection by the manipulation of one, or integration of several, existing databases both of which may not be protected.
- Different jurisdictions have dissimilar approaches to database use and protection, in particular the USA and EU, which may produce difficulties for international collaborations.

The dangers for open science are well understood, but the balance between the retained public science system and the encroaching commercial science system with its associated ownership of intellectual property will be the subject of continuing debate. Some recommendations that can be made, however, are:

- **Public authorities should undertake awareness activities to publicise the implications of the developing system to scientists and others involved in collaborative research.**
- **Those involved in collaboration must negotiate agreements on the basis of specific project circumstances. It is unlikely that a 'standard agreement' could be used, though a number of model agreements may help resolve conflicts and assist in identifying the IPR issues.**
- **As the Internet and its use develops, the possibility of new regulatory structures should be kept under review if imbalances between social and private benefits are detected.**

[2] These considerations are based on the report which followed the Workshop on "IPR Aspects of Internet Collaborations", 22/23 January 2001, Brussels, Report EUR 19456, ISBN No. 92-894-1012-4

CHAPTER 4: International Legal Aspects of IPR in R&D Collaborations { TC \l3 "}

4.1 General legal background and problems of ownership rights

4.1:1 Introduction: the rights concerned{tc \l1 "4.1 General legal background and problems of ownership rights}

The IPRs with which we are concerned in co-operative ventures may be divided into formal rights acquired by registration and informal rights not necessitating registration. The distinction is important in relation to rights management, as will be explained later. Other rights such as trademarks may be involved, but for present purposes we are not concerned with these.

4.1.1 Ownership{tc \l1 "4.1.1 Ownership}

Ownership of rights is crucial to collaborative ventures, but the ownership of IPRs is at present a matter for *national* law, and national laws differ.

International conventions have to some extent standardised the basic IPR system since the late nineteenth century. However, these conventions in themselves are ineffective as enforcement mechanisms because they do not impose sanctions for non-compliance. Moreover, the problems and disputes of ownership in connection with IPRs at present must be dealt with under individual national laws[3], and in many cases disputes about these matters are determined before authorities not specialised in dealing with IP matters, such as labour courts. This is also true for countries on the verge of accession to the European Union and countries outside Europe. Moreover, even within Europe, and in accession countries, only some aspects of the national laws have been harmonised. For example, employed inventor's rights are not harmonised in Europe, and a harmonising initiative is not yet being contemplated.

It would simplify international co-operative ventures if the principal issues relating to the ownership of IP rights (other than amounts of compensation, damages, mutual claims and restitution) were addressed in the international industrial property conventions and EU legislation in order to try to achieve a harmonised regime.

The outcome of any proceedings to settle ownership of rights should also have effect for all Contracting States.

In addition a harmonisation directive should set the limitation period for taking action.

4.1.2 The inventor/creator

The starting point of this Report is that most modern research outputs are the product of team work, and it is inappropriate to attribute particular inventions and the relevant IPRs to individuals.

Employees in publicly funded universities are not treated on an equal basis as concerns their inventions. This creates a problem for international co-operative ventures, especially if universities are involved. In

[3] Art 60 EPC: If the inventor is an employee, the right shall be determined according to the law of the state in which the inventor is mainly employed;.....

Japan, and some other countries, for example, there are 'professors' privileges' so that inventions made in their research units belong to the professors concerned. The result is that developing such inventions into innovations requires the consent of the relevant professor. **We think that employees in universities should be treated like any employee in private industry where IPR is concerned. A current trend in some universities is to employ collaborators under normal labour contracts. This would also facilitate transfer of the IP rights by university management entities.**

In the USA, as noted above, rights from government supported research resulting from universities accrue to the institution which has the option to license such rights to the most appropriate developer; there are now proposals to extend this practice to government laboratories.

Naming of the inventor is mandatory, but can be problematic, as noted above, under modern research conditions, particularly in the case of joint ventures. Moreover the formal requirements for compliance with this requirement vary around the world.

In the case of HEIs, as a matter of good practice, the persons involved should be listed as soon as the invention is submitted to the IP managing department of the relevant institution. This holds true particularly for guest researchers whose inventive activity should accrue to the university rather than to the normal employer.

Since this issue has a bearing on labour laws, the European Commission up to now has been reluctant to take any action. However, serious problems can arise in R&D co-operation if employed inventors' rights are not taken care of and the *succession in right* is not clear from the beginning.

The problem is also acute if the number of contributors to an invention, for instance on university level, is great and the individual contributions cannot be defined. A so-called *group invention* could arise. Then all of the contributors must be named as inventors. However, they may not all be of the same 'grade' in terms of employment, e.g. as noted above, different provisions of law may pertain to a university professor and to a scientific employee involved in the same project.

The European Commission briefly touched upon the problem in the *Follow-up Paper* to the *Green Paper on Innovation*. The Green Paper raised the question as to whether current differences between national laws of employees' inventions were affecting innovation and the conditions of employment and/or freedom to provide services and/or conditions of competition. One of the recommendations given in the Follow-up Paper is that the *"Issue of employees' inventions is one which should be dealt with primarily at national level". "The differences in national laws are not such as to justify a move towards harmonisation at Community level"*. Thus, the subsidiarity principle is invoked. While there is sympathy in large companies for the Commission's point of view, because most big industrial concerns have their own employed inventor's schemes, this does not hold true for HEIs and PROs.

Therefore, harmonised European employed inventors' *ownership* rules through a directive should be considered, *separately* from the question of compensation.

We recommend relaxation of any national requirements or practices that IPRs resulting from of publicly funded research *automatically* belong to the funder, as funders are usually the least well equipped party to the research venture to exploit resulting IPRs successfully.

A particular problem exists in relation to the ownership of software at present. Many parts of present day software programs are written by independent consultants and it is a fundamental principle of copyright law (enshrined in the Berne Convention) that copyright vests in the author i.e. the consultant. On the other hand, according to some national laws employed author's creations automatically belong of the employer. **We believe that in relation to software, the most appropriate rule should be that ownership vests in the**

person commissioning the program in question from the consultant for a fee, and in relation to employee works created in the course of employment that it should vest in the employer.

4.1.3 Patent Filing Rules

Greater harmonisation in the patent filing rules, and other procedures in patent offices around the world is desirable. WIPO has achieved much in this direction through the Patent Law Treaty, but there is more to be done.

4.1.4 Prior users rights

The existence of prior user rights is not harmonised throughout the European Union. Thus it is for example possible to possess prior user rights in Austria, but not in Germany. This creates an obvious barrier to the free movement of goods embodying the relevant invention. The European Commission therefore has made an attempt in Article 12 of the Draft Community Patent Regulation to deal with the situation. This provides:

> *A Community patent may not be invoked against a person who, in good faith and for business purposes, had used the invention in the Community or had made effective and serious preparations for such use before the filing date, where priority had been claimed, the priority date of the application on the basis of which the patent is granted; the prior user shall have the right for business purposes, to continue the use in question or to use the invention as planned during the preparations.*

This is to be welcomed, but additionally, a directive harmonising national laws along the same lines should be considered. **We believe that prior user rights should be recognised in all member states of the EU.**

4.1.5 Enforcement

Taking action against infringers is very expensive and time consuming in almost all countries (including many EU countries) and reduces the value of IPRs to PROs/HEIs and SMEs. Within the EEA, the Brussels and Lugano Conventions on jurisdiction and the enforcement of judgements are in operation, but have deficiencies in relation to IPRs. Improved and harmonised (cross-border) enforcement is under discussion by the Hague Conference on Private International Law, but it remains to be seen what intellectual property proposals, if any, it will produce. **The possibility of a pan-European court system, at least for patent disputes, is being considered, and we believe this development is to be encouraged and ideally should have jurisdiction over all forms of IP dispute, given that the functions of the different types of property often overlap.** The object of this court or courts would be to provide appropriate and speedy decisions at reasonable cost.

4.1.6 Copyright and Designs

Copyright which comes into existence automatically in Berne Convention countries, can protect many of the outputs of co-operative ventures. Unfortunately, what precisely it protects is determined pursuant to national laws that differ considerably. There are also differences in other fields, for example in some countries functional industrial designs are protected through copyrights, in others through a neighbouring right and in others not at all.

Designs can be protected under specific design laws and/or by copyright, but with different protection periods in different jurisdictions. Moreover, in some countries cumulative protection is not possible. Design protection is fragmented in some countries and will be even after the Community Design Regulation, and implementation of the directive. Naming of the creator is not always mandatory in national design laws, which creates problems with background rights.

As with patents, even if copyrights/design rights are properly secured there exist problems with enforcement, due to the relatively simple means of unauthorised copying and the sometimes cumbersome, costly and lengthy litigation procedures before national courts of first and second instance. This has a bearing for example on a collaborations between universities and industry. Frustrated copyright/design owners, in particular individuals lacking substantial litigation resources, are increasingly resorting to alternative enforcement measures, such as publicising the infringers and participating in self defence organisations such as the British ACID (Anti-Copying in Designs). The current anti-counterfeiting measures taken by the European Commission are a first step in the right direction. However, as suggested above (4.1.5), a pan-European court dealing with industrial property disputes is desirable.

{tc \l1 "**}4.2 Background and foreground knowledge{**tc \l1 "**}**

As explained elsewhere in this Report, collaborative ventures involve *background* knowledge: existing IPRs, trade secrets and other confidential information, as well as other valuable knowledge which the parties bring to the project and which, whilst not qualifying for legal protection, is nevertheless valuable to the project. The object of contractual provisions relating to background knowledge is to ensure:

- disclosure of all such knowledge by the collaborators as is necessary for the project, if not at the outset, at least as soon as its importance becomes apparent;
- that the other collaborating parties can use this knowledge without infringing IPRs;
- confidentiality on the part of all the collaborators in respect of such knowledge as may be disclosed to them by the other contributors.

In general, use of such knowledge will be limited to the attainment of the objectives of the programme. Subsequent use for exploiting research outputs will usually require a further licence. A provision will usually be inserted entitling participants to such a licence on ‘fair and reasonable terms’.

Foreground knowledge is IPRs, including trade secrets and other confidential information, as well as other valuable knowledge, which are produced *by* the collaboration. At least in theory, ownership of this knowledge can be allocated according to who produced it, in proportion to the funding contributions of the participants, or it may be pooled. In practice, it can be difficult to ascertain which collaborator produced which results, or where each has pursued a different route to a particular goal, it may not be appropriate to give the successful collaborator the whole fruits of the collaboration. Moreover, research collaborators may have differing capabilities for turning the foreground knowledge produced into innovations. This will very

often be the case where PROs and HEIs are involved. For such organisations, licensing is usually the only viable option.

4.3 Legal structures for collaborative ventures{tc \l1 "4.3 Legal structures for collaborative ventures}

4.3.1 Equitable and contractual joint ventures

There are two widely used structures for collaborative ventures: the equitable joint venture and the contractual joint venture. The former is an arrangement whereby a separate legal entity is created in accordance with the agreement of several parties who undertake to provide money or other resources such as background knowledge as their contribution to the assets of the legal entity. The latter is usually a limited liability company, but the EIGG discussed below would be an alternative possibility, and perhaps simpler where the parties involved are SMEs or HEIs/PROs. The contractual joint venture is an alternative where a separate legal entity does not need to be established, or the planned collaboration will take place in a jurisdiction that does not permit the ownership of property by foreigners.

4.3.2 The EIGG

The EIGG was created by Council Regulation (EEC) No 2137/85 of 25 July 1985. Like the GIE (the French '*groupement d'interêt écononomique*' which is widely used for co-operative ventures), the EIGG is a partnership-like entity to which companies, firms, natural persons and other legal entities in different member states may belong for the purpose of certain types of cross-frontier activities. Its object is to facilitate or develop the economic activities of its members, and to improve or increase the results of those activities. It is not designed to make profits for itself. The EIGG is differentiated from most forms of co-operation based upon a contractual relationship in so far as (depending on the member state), it may have its own legal personality and, in any case, it has its own independent capacity. The flexibility of the EIGG, its tax transparency and relative lack of legal restrictions on it, may facilitate its use as a business medium within the Community, especially in relation to joint ventures involving those countries such as France which do not recognise agreements between shareholders about the conduct of a company.

4.4 Contractual problems

Apart from the question of the right of the parties to regulate ownership of IPRs by contract, parties from different jurisdictions may be subject to mandatory provisions of their national laws regulating such things as the language of the agreement, and fairness of terms. These must be complied with. Leaving aside such mandatory rules, the usual way to try to get uniform effect from the agreement or agreements is for the parties to agree on a choice of law and jurisdiction clause, which will either give exclusive jurisdiction to the courts of one or other of the parties, or to the courts of an independent jurisdiction. In general, these clauses will be upheld by the courts.

A particular concern which needs to be addressed in the contract is what happens in cases such as the above to the background and foreground knowledge where one party withdraws. The remaining collaborators will usually want both to continue to be available to those continuing with the project, as well as to new partners brought in to replace the withdrawing party. To cover such a contingency, the contract should contain a licensing provision so that the remaining parties can continue to use the knowledge. The contract should cover the question as to whether such a licence should be free of royalties, and whether any additional payment should be made by the withdrawing party to cover the additional costs which may be incurred by the remaining parties as a result of the withdrawal.

4.5 Problems for technology and knowledge management{tc \l1 "4.5 Problems for technology and knowledge management}

In one sense, all of chapters 2, 3, and 4 constitute a checklist for forming an international collaboration. However, particular attention should be paid to the problems arising in preparing a technology and knowledge management plan in the following areas:

- rules on the attribution and the protection of intellectual property;
- user rights regarding R&D, exploitation and dissemination;
- rights and duties of guest researchers;
- dispute settlement (e.g. by arbitration).

Non-documented, confidential knowledge is dealt with separately and with more precision (confidentiality must be made known to the other party).

More detailed checklists are widely available, for example that provided by the IPR helpdesk[4], "Checklist for a Consortium Agreement". In addition, it is very useful to develop and exploitation plan or strategy, which should be agreed upon by the partners.

Some R&D agreements characterise the technology management plan with more precision than others, e.g. as regards the inclusion of user rights regarding background information (e.g. Canada, South-Africa) or as regards the scope of negotiable terms of licences (reference to the terms of licences in general rather than only to those of exclusive licences, e.g. S&T-Agreement EU-USA).

4.6 Problems where HEIs and PROs are collaborators

The types of entities involved in collaborative ventures can vary considerably: they may be multinational enterprises, SMEs, PROs and HEIs. HEIs and some PROs in particular present problems. As noted above, within the EU there exists in some member states the 'professor's privilege' under which professors are entitled to IPRs resulting from their research projects, in others there will either be a legal or contractual provision vesting the invention in the HEI/PRO employing the persons carrying out the research. A number of people involved in the research may also be research students studying for a degree, and thus not employed at all. How these persons are treated will depend largely on contractual provisions. The research outputs they produce may be required to be assigned to any funding body, to the HEI or PRO where they work, or simply not dealt with at all. We consider that the present situation in HEIs and some PROs is unsatisfactory, and an unnecessary obstacle to collaborative ventures. As noted above, the starting point of this Report is that most modern research outputs are the product of team work, and it is inappropriate to attribute particular IPRs to individuals. Accordingly as we suggested above (4.1.1), harmonisation of the law in this area across the EEA be considered. However, there was no unanimity in the expert group on the question of entitlement to compensation. One possible position is that *ownership* of IPRs resulting from research outputs by employed staff should belong to the HEI or PRO where the research is carried out, this default position being variable by contract. We recognise the problem discussed in the following paragraph that issues of ownership may be *ultra vire*s the Commission's jurisdiction, but it is unclear the extent to which such laws as the 'professor's privilege' are more properly to be regarded as part of national labour laws and thus within the Commission's competence, rather than a part of national property laws.

[4] http://www.ipr-helpdesk.org/

4.7 Competition Policy concerning Research, Technology and Development Collaborations

R&D collaborations generally are looked at favourably by the EU-Treaty as a matter of both industrial policy (Art. 157) and RTD-policy (Art. 163 (2).[a] They may, however, also raise concerns of competition law and policy (Art. 81, 82 of the Treaty), e.g. when competitors co-operate or when the co-operation is aimed at or results in restrictive agreements or concerted practices regarding the exploitation of the jointly obtained or even the individually acquired R&D results. These and related issues, such as the acquisition of market power by the R&D-group and/or its abusive exercise, are not dealt with in this report. The Commission has set up its enforcement policy mainly by Regulation (EEC) No. 418/85 of December 19, 1984 on the application of 81 (3) of the Treaty to categories of research and development agreements,[b] which affords enterprises abiding to its rules full legal security. The regulation has been revised recently, now providing an even more liberal status for R&D-collaborations.[c] This and any remaining issues of competition law are well explained in the Commission's "Guidelines on the application of Article 81 EC-Treaty to agreements on horizontal co-operation".[d]

[a] **Art. 157 (1) reads in relevant parts:**
The Community and the Member States shall ensure that the conditions necessary for the competitiveness of the Community's industry exist. For that purpose, in accordance with a system of open and competitive markets, their action shall be aimed at:
- encouraging an environment favourable to co-operation between undertakings;
- fostering better exploitation of the industrial potential of policies of innovation, research and technological development

Art. 163 reads in relevant parts:
-The Community shall have the objective of strengthening the scientific and technological bases of Community industry and encouraging it to become more competitive at international level, while promoting all the research activities deemed necessary by virtue of other Chapters of this Treaty.
-For this purpose the Community shall, throughout the Community, encourage undertakings, including small and medium-sized undertakings, research centres and universities in their research and technological development activities of high quality; it shall support their efforts to co-operate with one another, aiming, notably, at enabling undertakings to exploit the 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 obstacles to that co-operation.

[b] OJEC 1985 L 53, 5 as amended by Commission Regulation 151/93, OJEC 1993 L 21, 8, and Commission Regulation 2236/93, OJEC 1997 L 306, 12; the regulation expired on December 31, 2000.

[c] Commission Reg. 2659/2000 of November 29, 2000, OJEC 2000 C 118, 4.

[d] OJEC 2000 C 118, 14 ; compare also Commission Regulation (EC) No. 240/96 of January 31, 1996 on the application of Article 81 (3) of the Treaty to categories of technology transfer agreements, OJEC 1996 L 31, 2.

4.8 The international framework

The European Union encourages and participates in international R&D efforts in various ways. In addition to R&D-cooperation that is provided for within the frameworks of broader trade or association agreements, the Union has developed a specific policy of international R&D co-operation on the basis of either bilateral intergovernmental Science and Technology Agreements or, less frequently, of multilateral agreements on cooperation in research and development in specific areas of technology. While in the latter agreements detailed rules on the ownership and exploitation of IPR relating to, or resulting from, the cooperation are

commanded by the very subject and purpose of cooperation, the former, which mostly relate to yet undefined, broad areas of science and technology, have been complemented by IPR rules only subsequently to a specific policy decision of the Council and the Commission. This *"Joint Declaration in respect of negotiations concerning the IPR-aspects of agreements for scientific and technological cooperation between the European Community and third countries"* of June 26, 1992 is both a reaction to increased IPR awareness in general and similar policies of partner States in particular, and a clear signal of the Community's determination to safeguard its IPR interests even in the area of co-operation in science, in particular as regards the risks of undue appropriation of the results of research and technological development by third parties. Therefore, the principles established in the Joint Declaration have been made the baseline for any negotiations of intergovernmental Science and Technology Agreements, and, by and large, they have been incorporated almost fully by way of an annex in all the agreements the Community has entered into in recent years.

The purpose of these principles is to provide a framework for the IPR-rules that have to be developed with respect to, and in conformity with, the circumstances of the specific R&D-projects carried out by enterprises and/or PROs under a S&T agreement. To this effect, rules on free access to, and broad publication of, scientific literary works are provided for, as well as clear and detailed principles for the safeguard, handling and use of non-disclosed documented (and, by analogy, for non-documented, non-disclosed) knowledge are established. Maintenance of confidentiality of non-disclosed knowledge is indispensable as a basis for acquiring and attributing protection by formal IPRs. In this respect, the Joint Declaration establishes the principles of fair, adequate and effective protection and requires the parties and their successors in title to establish, prior to or at least in parallel with the conclusion of contracts covering specific R&D projects, technology management plans. These technology management plans must consider the relative contributions of the parties and their participants, the benefits of (exclusive) licensing by territory or fields of use, requirements imposed by the parties' domestic laws, and other factors deemed appropriate by the parties. Many S&T Agreements do specify some more details of such technology management plans, such as settlement of disputes by arbitration, but generally they remain vague. It might, therefore, be useful to complement the IPR annex of the Agreements by a more detailed check-list of the matters usefully to be dealt with in a technology management plan. Furthermore, in view of the purpose of S&T co-operation and of the Community's own, recommendable practice, it might be advisable in addition to complement the technology management plan with a mandatory innovation plan at least in the case of projects established in a technology rather than in a narrower science perspective.

4.9 Tax regimes

A frequent result of collaborative ventures is the cross-licensing of patents and other IPRs of the various parties. Where royalties have to be paid by the licensees in such cases, the situation is complicated where the fiscal regimes of one or more of the partners require that tax be deducted before royalties are paid over to the other party. Failure to have regard to such provisions can result in the licensor experiencing cash flow difficulties, as well as causing an additional tax burden for the licensee. Tax regimes can also affect the global flow of information within companies, and between collaborators. National regimes may require intangibles such as R&D outputs and patents be accounted as products, and priced at market rates when they are transferred from one subsidiary to another or from one partner to another. Firms may also be required to provide their national fiscal authorities with information about the project, giving rise to concerns amongst the other collaborators about the confidentiality of this knowledge. There is evidence that undertakings have terminated their collaborative ventures with other undertakings due to concerns about these matters. In addition there is also the problem of differing accounting requirements. Some countries require accounts for all legal entities of which their national undertakings are part. This can lead to tax being levied on the profit of the co-operative venture as well as joint venture company.

Agreement at an international level on these matters should be directed to creating greater simplicity and transparency in this area so that SMEs that cannot afford the expert advice on these matters available to large undertakings, can make strategic choices about collaborative ventures based on *rational economic considerations*, without fear of exposing themselves to unforeseen fiscal disadvantages.

FOR CONCLUSIONS OF THE REPORT, SEE EXECUTIVE SUMMARY.

FOR SECTORIAL INTERNATIONAL COLLABORATIONS, SEE APPENDIX A1.

APPENDIX A1: COLLABORATIVE PROJECT CASE STUDIES

A number of case studies have been prepared to illustrate various aspects of the role of IPR in international research collaboration, as follows, with (cross references) to relevant sections in the main report:

A. Standardisation - The Telecoms Industry (1.3, 1.4c, 1.5.1, 3.3.2)
B. Biotechnology (2.3, 2.4.6)
C. Research Joint Venture (RJV): Automotive Industry (1.3)
D. The Aerospace Industry (1.3)
E. The American Textile Collaborative -AMTEX (2.4)
F. Collaboration in the ICT world (1.3, 1.5.1, 2.4.6, 3.3.5)
G. International Collaboration - Intelligent Manufacturing Systems (3.4.1, 3.4.2)
H. Designs - A Standardised Internet Platform for Design - Covisint (4.1.6)

In addition, the case studies can be also classified in terms of factors (which support the creation of collaboration) and facilitators (which support and drive co-operation), as an aid to putting them in context:

FACTORS AND FACILITATORS DRIVING CO-OPERATION:

Factors -

Reduction of Research Expenses
- Research Joint Venture (RJV): Automotive Industry
- Designs - A Standardised Internet Platform for Design - Covisint
- The Aerospace Industry
- Collaboration in the ICT world

Government Support and Framework Agreements
- International Collaboration - Intelligent Manufacturing Systems
- The American Textile Collaborative -AMTEX

Facilitators -

Modularization
- The Aerospace Industry
- Collaboration in the ICT world

IPRs as currency for consolidating many technologies
- Standardisation - The Telecoms Industry
- The Aerospace Industry
- Biotechnology

A. Standardisation - The Telecoms Industry

Standardisation and IP have also both become recognised in recent decades as vital elements of business strategy, especially in 'standard intensive' advanced systems technologies and industries, which typically are also R&D- and patent intensive, and subjected to international competition. The telecom sector (composed of service operators and equipment manufacturers) has a long history of international collaborations, of which an important type concerns standardisation of various parts of 'the world's largest machine'. Standardisation also increasingly involves R&D. The sector has undergone dramatic changes in the last few decades due to new technologies and liberalisation subjecting service operators to domestic as well as international competition. The telecom sector provides a good case in illustrating how international R&D collaborations have been affected by an increasingly strategic role of IPRs, patents in particular.

The situation changed drastically in the late 1980s when Motorola, as a newcomer on the European scene, started to use patents aggressively. Motorola claimed that it had a long track record of competing in the electronics industry, for which patenting was an integral part of doing business, and that the "GSM group" recognised too late the serious nature of the pertinent IPR issues and specifically the Motorola patents. All in all, the conduct of Motorola triggered a new era of heightened IPR awareness in telecommunications, leading to an irreversible track of new patenting and competitive behaviour in general, on which service providers also embarked, pushed by privatisation, liberalisation, competition, internationalisation and globalisation in general, and not the least a turn-around in efforts and management attention to IP in Ericsson, as well as in many other telecom companies

The IP clashes in standardisation have continued in the development of the 3rd generation of mobile communication systems ("3G"). Some learning how to handle IP issues in modern standardisation work has taken place among standardisation bodies, but companies have also learnt how to use IPR more strategically in standardisation. There is a regulatory framework in the European telecom standardisation body ETSI, requiring that patents in order to be included in standards should be licensed out on reasonable and non-discriminatory terms. As in the GSM case one or a few companies with very aggressive IP strategies and licensing policies jeopardised the IP vulnerable standardisation process.

In conclusion, the standardisation processes in telecom have undergone a number of essential changes, such as becoming more regionalized and less internationally co-ordinated, more intertwined with recent technological changes at a finer level of technical detail, and more intertwined with IPR issues. As a standard is of great economic value to producers (and users) and each standard becomes covered by an increasing number of patents in particular, dispersed among many competing collaborators, increasingly skilful in strategic use of standard-related IPRs, a previously fairly open and lax IP regime in standardisation has become increasingly complex and closed to actors lacking bargaining power. Moreover, any open IP regime seems unstable after the advent of the pro-patent or pro-IP era and the transition from an open to a closed IP regime seems to be a one-way route, not necessarily towards increasing consumer welfare. Thus, collaborations become vulnerable to IP aggressors and IP based asymmetries in bargaining power. The complexity and vulnerability is likely increased in international collaborations, involving different IP cultures and jurisdictions. The strategic use of IPRs is then not only to use them as "currency" for exchange but to use them for deterrence and credible retaliation threats.

B. Biotechnology

As a result of the increased competition in the global economy and of the ensuing efficiency drive (new techniques, quicker speed to market of new drug discoveries and cost economising), the trends in e.g. pharmaceutical R&D now are (1) a more short-term orientation and (2) more collaboration and outsourcing, e.g. to PRO's and "spin-out" companies created by PRO's. Since innovation requires more and more multidisciplinary knowledge and more privileged and early access to new knowledge, industry is only able to avoid duplication of effort and to shorten the time for the development and commercialisation of the - increasingly complex – products for healthcare by partnering or trading & cross-licensing IP with third parties. In that context, contractual industry-science relationships have become a pillar in this field of the "new economy".

The question is whether IPR's in themselves pose constraints in the daily practice of research collaborations. It is fair to say that by and large, IP issues are in everyday practice not proving to be a specific road block or downward risk in the pursuit of stable and profitable international biotech research collaborations. Maybe this is because there is a school of thought that the economic data do not support the theory that patents are a prime motivator/key tool of biotech innovation. There are, on the contrary, grounds to believe that an equally strong IPR culture across nations would actually offer a substantial upside potential for more biotech research collaboration, as parties would then be able to become true equal partners.

In conclusion, since there is no evidence that IPR's in themselves substantially hamper international biotech research collaborations, it can easily be left to the partners in such collaborations to address sources of IP conflicts, if any. This can be - and invariably is - adequately solved through ad hoc contractual arrangements; no specific EU regulatory assistance is therefore required.

There is, however, one area of concern in Europe: there is substantial evidence that the commercialisation of European academic biotech inventions is far from optimal and thus hampers the European international competitiveness. This is caused in part by the varying statuses and attitudes of researchers in European PRO's; and the non-existence of or the varying rules on ownership of IP on inventions from PRO scientists in the European Member States (except for the U.K). This concern requires practical, framework type, EU policy recommendations in order to foster international S&T collaboration. The EU Commission could best stimulate the issuance of a policy statement (Declaration) in order to offer guidance for the fostering of "best practices" (versus a "one size fits all approach") of research commercialisation by European PRO's (e.g. in the framework of its own funding programmes).

C. Research Joint Venture (RJV): Automotive Industry

Origins and Objectives of this Research Joint Venture

The objective of this project was to improve the competitiveness of the European automotive industry, with additional possible impacts upon other manufacturing and supplier sectors including mechanical equipment and fabrication industries. The results may be applicable to all technical areas which need lightweight mouldings with free-form geometry. The aim was to manufacture and assemble a complete specimen car bodyshell and vehicle interior using carbon fibre laminate composite (CFL) materials, for use in rapid prototyping and movement to production. It was intended to reduce the production lead time from about 30 months by 3 months, at the same time increasing the quality of the product by 25%.

Origins and Objectives of the Participant Organisations

The structure of automotive development involves many types of specialist company: primarily the car manufacturer, which subcontracts various elements to specialists including designers and tooling developers and manufacturers, as well as raw materials producers, pattern makers, etc. No single pattern maker could manufacture all the patterns for a given passenger vehicle. The collaborative project structure was therefore well suited to the project participants each of which was given tasks in which it had much expertise.

Organisation of the RJV

A consortium agreement was written by the co-ordinator, using the model of a previous document, and this was immediately accepted by all participants with no problems. The participants considered that the subsequent lack of serious disagreements was due to the assignment of specific, discrete lines of development to respective members of the project. The only minor problems emerged concerning division of the work from the workplan.

Contacts between partners were limited to discussions about their own aspects of the project: no discussions were held concerning other participant's confidential information: no problems of this type or of disclosure of information were identified. However, one factor in the success of the technical aspects of the project was ascribed to the practice of members being able to perform tests on the same parts as performed by others, and to discuss the standards achieved by its counterparts.

The project achieved its aims of developing a series of new techniques for the rapid prototyping of new models, and encouraged collaboration between existing and new combinations of industrial concerns. Behind the clear outputs was also a measure of 'standardisation' in the methods to be used in future for this aspect of vehicle production.

Of, course, the degree of success should be measured against what would have happened in the absence of EU funding. The view of the BMW spokesman was that a similar project would have been carried out even in the absence of Commission funding, but it would have been just with Sollner, its main supplier. Stola, similarly, would have carried out a project in the same field but by itself. The public money therefore caused the project to have a wider, or more immediate, impact on the sector, perhaps ensuring a greater probability of success due to the wider variety of expertise brought to bear, and also assisting in generating a common infrastructure of knowledge for the companies involved in the prototyping and development of new models of car. It could be argued that the project avoided much duplication of research effort, but against this is the possibility that other superior avenues of work were not followed.

D. The Aerospace Industry

The Development of a Civil Aero Engine: The V2500 international consortium

The market for large civil aero engines is dominated by three companies: Pratt & Whitney and General Electric from the USA, and Rolls Royce from the UK. They supply turbojet engines to the small number of large civil aircraft manufacturers. The business is extremely risky, due to the intense competition, very high costs of design and production, and long lead times involved. Research and development are also highly uncertain, and were the cause of the Rolls Royce financial problems 1971. When the scale of the market for a new aircraft or size of aircraft is small or very uncertain, it may not be realistic for one manufacturer to commit its financial and skill resources (including technical and commercial) for the potential rewards. But failing to enter a specific market risks losing sales, allowing a gap to appear in the range of corporate products, lagging in technological development, and allowing other competitors the chance to gain competitive advantage or market entry.

One strategy for coping with these features of the aero engine market is to collaborate with competitors. This can at the same time reduce financial and technological risks, maintain a presence in the market and at the technology's leading edge, and may even gain access to collaborators' expertise, both technological and commercial. The cost is a reduction in the potential payoff in case of success, and also the loss of technological intellectual property, which in this business is the foundation of company value. The main competitive advantage aero engine companies possess are the formidable barriers to entry for new market entrants; it is extremely difficult and expensive to acquire the expertise, physical capital and intellectual property (e.g. negotiating and licensing existing patents from market incumbents), to become an effective manufacturer of large jets.

The proprietary information was not so much about technology itself, but about procedures and know-how. There was not free and easy exchange of information, because of its strategic importance to competition outside the V2500. The V2500 became a successful design, with the best fuel consumption, operating costs and noise characteristics in its class, and was used in several aircraft, including the Airbus A320. Certification was awarded in 1988 (USA) and 1989 (EU). The first commercial flight was in May 1989 by which time orders had reached 253 units, representing eight airlines and two leasing companies, worth over $2.6 billion.

Significant aspects of intellectual property treatment within the V2500 consortium include:

- All the members of the consortium had previously collaborated with some other participants in similar engine design co-operation.
- The members were all competitors with each other to a greater or lesser extent
- Development, licensing and marketing costs were very large and critical to commercial success in the field addressed.
- Protection of background intellectual property was of fundamental importance.
- IP is not only formal (patents, etc.), but also procedures, routines and know how. Engineers understand well the processes of design which evolve designs by trial and error. These procedures, routines and know-how are equally (sometimes more) important than the more obvious 'results' of R&D programmes, and must be protected by designing collaborative projects specifically to cope with their protection.
- The choice of partners, division of the workplan between members, and allocation of rewards, must be consistent overall, giving each participant the incentive to join and contribute fully to the project while being able to protect intellectual property.

The form which this collaboration took was essential to its formation. The modularisation of design programme was essential to enable each partner to ensure protection of its valuable IP.

E. The American Textile Collaborative (AMTEX)

The AMTEX Partnership was set up in 1993 as a 10-year collaborative R&D program between the integrated textile industry — including fibres, textiles, apparel, and fabricated products — the U.S. Department of Energy (DOE), the DOE laboratories, other federal agencies and laboratories, and universities. The goal of AMTEX is to strengthen the competitiveness of the U.S. integrated textile industry us, by enabling U.S. manufacturers to offer higher value-added products and better service than foreign competitors.

DOE laboratories bring expertise in areas such as low-waste chemical processes, sensors, advanced automation, advanced materials, energy efficiency, biotechnology, large-scale data analysis, enterprise simulation, and information technologies. Together with expertise from universities and under the direction of industry, these capabilities are considered useful for tackling a series of technology-based manufacturing problems identified by AMTEX to be necessary for bringing about the projected revolutionary increases in competitiveness. The following initiative areas were designated high priority:

- Demand-activated manufacturing;
- Environmentally sustainable and flexible fiber manufacturing;
- Flexible textile production processes;
- Agile apparel manufacturing;
- Higher value cotton.

The sector consists of a long and complex supply chain, with a history of cooperation and electronic data interchange, which positions it uniquely to implement the paradigm of agile manufacturing depending on new generations of information systems. AMTEX aims at increasing competitiveness through technologies such as:

- An information infrastructure (electronic marketplace) to unite the whole industry and enable companies to discover and respond rapidly to specific customer needs and market trends.
- Flexible manufacturing technologies assisting producers to respond more efficiently to market opportunities.
- Processes to recover, recycle and reuse fibers, dyes and other chemicals, and minimize air emissions in production.

A reported example of the collaboration is DOE's Plasma Physics Laboratory at Princeton, New Jersey, using a laser sensor originally developed to analyse particle behaviour during nuclear fusion reactions to provide real-time information on polymer structure as newly made fibres fly by. Another technology developed by DOE to enable the military to recognise enemy terrain may soon help U.S. textile companies inspect fabrics for flaws as they race through looms, knitting machines and dyeing processes. Other projects, involving biotechnology, are about identifying the genes in cotton regulating strength, fibre uniformity, drought resistance, and insect resistance. Yet other projects, not necessarily less important for the industry, involve the development of inexpensive sensors that help sewing machine operators make seams.

Foreign firms with significant U.S. manufacturing presence can participate under the understanding that they will use resulting innovations in their U.S. based operation for a few (three) years before transferring them abroad.

F. Collaboration in the ICT world

The complexity and costs involved to tackle the enormous challenges in ICT (Information and Communication Technologies) are forcing the top-players in the semiconductor business to form global strategic partnerships on a cost-shared basis and, more and more, on a talent-shared basis. CMOS technology tends to become more uniform and *early insights* in new processing steps and modules, and the way they interact, together with a *costshared approach*, tend to be more important than pure exclusive ownership. The differentiation is gradually shifting more towards the design of functional building blocks, also called IP-blocks, and the way of combining IP (Intellectual Property)-blocks in the most efficient way into attractive new systems and/or products or services.

At the same time, the more vertically integrated companies, where IC-design, development of own EDA-methods and tools for IC design, processing of ICs, packaging of semiconductor components, PCB-based system-integration and testing were all performed within one and the same group, have dramatically changed over the past two decades. Market analysts were talking about the *'atomization'* of the semiconductor market into different, independent players, such as EDA-vendors, 'pure foundries', fab-less design houses, packaging houses and IDMs. As the relationships and the underlying business models were changing strongly, so did the picture of IP and IPR. The notion of *'value chain management'* was born, as many companies worked closely together, in strategic partnerships, complementing each other in the total value chain.

Process technologies (especially the main stream CMOS technology) will further scale down to most probably 25 nm by 2011, may be earlier. Large players will collaborate in strategic partnerships to tackle the large challenges and the extremely high R&D costs. This will become more and more so on a global basis, based on global strategic partnerships. IC manufacturing is increasingly being outsourced to pure foundry companies, although most large IDMs still want to keep involved in process development and keep a minimum level of processing research and know-how to keep in line with the latest evolutions and to boost new systems or application specifications very quickly in line with such latest evolutions. A growing share of IC manufacturing is however being outsourced at present and this will further increase in the future.

Re-usability of functional building blocks (IP-blocks) will become a major driver for fast time-to-market requirements, in combination with increased systems complexity. Especially soft-IP will become important, taking into account scalability requirements. At present the market is still in need to have a better quality labeling of IP-blocks being offered on a commercial basis.

Horizontal integration, combining CMOS logic, with RF, MEMS, smart sensors and actuators, bio-materials,… will become a new driver in the coming decades, along with the further downscaling of the mainstream CMOS technologies into the nano-technology era. This will open up new frontiers and create totally new industrial and/or commercial ventures.

All this will create new players, new business models, ***new IPR-rules*** and quite some technological challenges, forcing different players from different disciplines to combine their forces and intelligence (talent). Such strategic partnerships will increasingly take place in the very early (*embryonic research*) phase of the lifecycle, allowing the partners involved to build a competitive advantage in due time and to grasp the optimum window of opportunity into the market. ***IPR will have to be shared in new ways, as a consequence of such R&D-partnerships.***

G. International Collaboration - Intelligent Manufacturing Systems

Common understanding on the principles of international cooperation on research and development activities in the domain of intelligent manufacturing systems between the European Community and the United States of America, Japan, Australia, Canada and the EFTA countries of Norway and Switzerland (United States of America) - Annex: Terms of reference for a programme of international cooperation in advanced manufacturing:

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1. Objective

Participants will encourage and facilitate cooperation between entities, established within their territories (within the territories of its Member States in the case of the European Community), in the domain of intelligent manufacturing systems. Such cooperation should ensure a balance of benefits and contributions, be of industrial relevance and be based on the principle of mutual interest and understanding.

2. Technical themes for IMS cooperation

The cooperation will initially cover the following five technical themes:

(a) total product life cycle issues;

(b) process issues;

(c) strategy/planning/design tools;

(d) human/organizational/social issues, and,

(e) virtual/extended enterprise issues.

Other themes within the scope of IMS may be envisaged, however, it should be ensured that new technical themes are consistent with government policies and industrial priorities of the participating regions.

3. Forms and means of cooperation

Cooperation will involve participation in projects by entities, in accordance with procedures adopted in common for the creation and operation of international consortia and may include visits, training and exchanges of scientists, engineers and other appropriate personnel for purposes relevant to the successful implementation and completion of the projects.

4. Dissemination and utilisation of information

Intellectual property rights (IPR) resulting from projects carried out within IMS will be subject to the IMS/IPR provisions given in Appendix 2 of the ToR.

H. Designs

Designs are normally related to an individual creator or a number of creators (human beings) producing a new "form" for two- or three- dimensional articles. Designs may be *artistic works* that can be protected under specific design protection laws and/or by *copyright.* The question is: should new protection schemes develop in the one or the other direction, given the *different protection periods* under these two basic approaches? The term "design" is rapidly changing its scope in the digital area, which for example refers to "information design". *Pervasive computing and experience design are accelerating the transformation of what we mean by design.*

Design applications normally are filed with national IP Offices and are examined as to *formalities* only. No substantive examination or examination as to novelty is performed. Although grant and publication should occur within a relatively short time period, there are countries where *secret* deposit is possible which delays grant. Delayed publication of design rights reduces legal certainty for third parties. *Searches* as to prior design rights are difficult, although there are Patent Offices, such as in Romania, that perform searches. Substantial differences exist between the laws of the member states, in particular as concerns the protection period, which typically is 5 years, with renewals possible, up to 15 years in Austria, for example, and 25 years in France or pursuant to the EU Regulation which has now entered into force and will counterbalance the lack of harmonisation of national laws, which affects the movement of goods in the Internal Market.

In the framework of *collaborative R&D* design protection may come up in industries which necessitate design, such as the automobile industry. This industry typically might be considered as governed by the rule *"Capital vs. Protection";* recently it shows some revolutionary aspects as the acceleration of business creates *"Collaboration vs. Competition". A new phenomenon is that formerly competing firms,* which make up about 65% of world wide automobile production, have commenced establishing a *standardised Internet platform ("Covisint")* for their entire automotive business. The *Covisint* venture which comprises co-operation in engineering and product design, for example, to arrive at standardised parts, as well as supply chain management and procurement functions, enables operation in a 24-hour-a-day development cycle. *Covisint* aims at reducing developing times from 36 months to 12-18 months, and the time between order and delivery of a car to 18 days. The Federal Trade Commission has approved Covisint with caution, pending future developments.

Key problems to be considered in collaborations include: What happens in such collaboration environments with *IPs and their protection requirements?* Who would file an application for design protection, and where and when? Who would claim ownership, if for example the Community design as an object of property, shall be dealt with as a national design right? Would protection be needed at all if there basically is no competitor and if for example two-thirds of all cars were equipped with identical parts? Could one identify individual designers (creators)? A problem to which we feel attention should be drawn is the increasing tendency of companies to try to use the trade marks system to protect functional designs in their products. For example applications have been filed, with varying success, for the well-known 'button' configuration of 'Lego' children's play bricks. The effect would be to give Lego a perpetual monopoly on this design, even though it was a principle used by other manufacturers of play bricks during the inter-wars period. We believe that trade marks registries should be alert to this problem, as it is economically undesirable to give any manufacturer a perpetual monopoly in a functional design.

A2 - BIBLIOGRAPHY & REFERENCE DOCUMENTS

Communication of the European Commission "Towards a European Research Area", COM(2000) 6.

Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions - "Making a reality of The European Research Area: Guidelines for EU research activities(2002-2006)", COM (2000) 612.

1992 Joint Council-Commission declaration, "Intellectual Property Aspects of scientific and technological co-operation agreements between the community and third countries" COM(92) 202 final (1992).

OECD international collaboration report, "International Collaborative R&D and Intellectual Property Rights", DSTI/STP/TIP(97)15, (1997).

European Commission funded study, carried out by FIST SA, "Intellectual Property Rights in Publicly funded Research", June 1998.

OECD innovation report, "Patents and Innovation in the International Context", OCDE/GD(97)210, (1997).

ETAN report on "Strategic Dimensions of Intellectual Property Rights in the Context of S&T Policy", EUR 18914, June 1999, and the accompanying October 6, 1999 seminar report of the same title, EUR 19308.

OECD international collaboration report, "International Collaborative R&D and Intellectual Property Rights", DSTI/STP/TIP(97)15, (1997).

European Commission

EUR 20230 – Working Paper: Expert Group Report on Role and Strategic Use of IPR (Intellectual Property Rights) in International Research Collaborations

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2002 — 61 pp. — A4: 21,0 x 29,7 cm

The Expert Working Group 'Role and Strategic Use of Intellectual Property Rights in International Research Collaborations' met five times in 2000-2001 to develop a broad strategic view of the various IPR and International Research Collaboration issues from a Research policy perspective: what are the issues, their importance, and the best approach in addressing them. Experts also submitted individual contributions to be discussed at the meetings. The group then made its own recommendations concerning the objectives, scope and content of appropriate guidelines and policies, and a final report was prepared by the Rapporteur in conjunction with the Chairman. The meetings were attended by Commission staff, who contributed information on EU policies and programmes.

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