

Unclassified

DSTI/STP/TIP(97)15/FINAL



Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

OLIS : 26-Jan-1999
Dist. : 28-Jan-1999

Or. Eng.

DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY

Working Group on Innovation and Technology Policy

PATENT ISSUES IN JOINT INTERNATIONAL RESEARCH

73816

Document complet disponible sur OLIS dans son format d'origine
Complete document available on OLIS in its original format

DSTI/STP/TIP(97)15/FINAL
Unclassified

Or. Eng.

FOREWORD

The attached final version of the report on patent issues relating to joint research and development at the international level primarily involving enterprises has been declassified by the Committee for Scientific and Technological Policy at its 71st Session on 13-14 October 1998.

Copyright OECD, 1999

Applications for permission to reproduce or translate all or part of this material should be made to:
Head of Publications Service, OECD, 2, rue André-Pascal, 75775 Paris Cedex 16, France.

TABLE OF CONTENTS

SUMMARY	5
BACKGROUND	6
Growth of international collaborative research	6
Nature of intellectual property rights	7
Complexity of collaborative research	7
MAJOR PATENT ISSUES	11
Assignment of patent rights	11
Criteria for patentability	12
Disclosure rules	13
Protection of confidential information	14
Costs of patenting	14
Exploitation of research	15
Litigation and enforcement	17
Competition law	18
Tax regimes	19
Contract law	19
CONCLUSIONS	21

SUMMARY

Participation in international collaborative research and development projects is driven by the economic advantages to be derived from the activity; the main results of such projects are in the form of knowledge, patents, designs and other forms of intellectual property. Successful research collaboration at the global level depends partly upon the establishment of frameworks of rights to intellectual property, in all its types and uses. However, many national intellectual property systems exist, each of which presents its own compromise between the rights of innovators to derive value from their activities and the rights of society to benefit from the rapid development and diffusion of new technologies. There has been significant progress in harmonisation through the Trade-Related Intellectual Property Rights (TRIPs) Agreement in the World Trade Organization (WTO) and through the European Patent Convention (EPC) in European countries. Further harmonisation should result from the Patent Law Treaty now being discussed in the World Intellectual Property Organization (WIPO).

Still, some national differences remain which can lead to uncertainties and difficulties for international collaborative research activities. Certain of these issues stem from the design and nature of the **intellectual property rights regimes** themselves, particularly as related to patents. In addition to basic differences concerning filing rules (*first-to-file* or *first-to-invent*), other divergences in national intellectual property right (IPR) approaches can pose problems for international collaborative research. There may be differences in the rules regarding assignment of patent rights and whether these accrue to individual researchers and inventors or to the institutions which employ them. Rules regarding the disclosure of information, particularly when parties are from countries with grace periods, and protection of confidential information tend to complicate joint research, especially that which involves industry-university collaboration. In addition, participation in international joint research can be discouraged at the outset by the high costs of patenting at the international level. These factors can also influence the choice of location for the conduct of international joint research activities.

Other issues pertain to more general legal and **regulatory regimes** that affect the design, location and exploitation of the results of international collaborative research projects. This is due to the fact that these projects pull together partners that operate under different national and institutional settings. Relevant conditions include competition policies, which differ in their treatment of research and development joint ventures and patent pools; tax regimes, which may lead to diverging levels of benefits for different parties to the research; and contract laws, which vary in their recognition of the entities and individuals empowered to commit resources such as previous patents and intellectual property. In summary, international collaborative research is a complex undertaking and the further uncertainties created by diverging intellectual property regimes and related policies may discourage such ventures and call for further international harmonisation.

BACKGROUND

Growth of international collaborative research

The growth in international collaborative research projects and programmes during the past 20 years has been driven by global economic and technological change. Advantages of scale and access to wider expertise have prompted firms to seek alliances in research and development, while governments have encouraged this type of joint venture (**Box 1**) and funded collaboration in response to increasing competitive pressures in world markets and fears of being outpaced by other countries and companies in key technological areas. Though the attractions of public or private funding opportunities for eligible projects is obvious, participants in collaborative research and development work are driven by a broad range of motivations. These may include, for example:

- *achieving a critical mass of research funding by pooling resources;*
- *taking advantage of the complementary expertise of individual participants and enhancing the effectiveness of projects;*
- *avoiding duplication or wasteful competition between competitors in particular areas;*
- *reducing the costs of research, and acting as insurance against the failure of one's own research projects or success of competitors, through "horizontal" collaborations between competitors in particular markets;*
- *improving access to customers and gaining more accurate empirical data on which to base prototypes, etc. through "vertical" collaborations (between, for example, users of results, research/academic institutions, and manufacturers and service suppliers);*
- *observing the behaviour and capabilities of competitor companies for information purposes;*
- *gaining access to academic or other research expertise and creating a pool of specialists trained in specific fields for future recruitment.*

Box 1. R&D joint ventures

There are two forms of joint ventures for research and development: the equity joint venture and the contractual joint venture:

The **equity joint venture** 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 (for example, knowledge) as their contribution to the assets or other capital of that legal entity. The latter is usually established as a limited liability company.

The **contractual joint venture** might be used where the establishment of a separate legal entity is not needed or not possible, for example, when the task is limited or the laws of the country where the planned operation will take place do not recognise the ownership of property by foreigners.

An assignment of the exclusive rights to a patented invention or other intellectual property asset could constitute a portion or the whole of a participant's contribution to the capital of the joint venture. The granting of a license or the supply of know-how might also constitute such a contribution.

Nature of intellectual property rights

Such motivations are important when assessing intellectual property rights issues, as they frame the interests and concerns of participants. Not all these motivations imply an expectation of commercially-exploitable research results, and in some cases, intellectual property considerations may be overlooked at the start of projects; this may subsequently be a source of difficulties and conflicts among partners. Intellectual property generally refers to the rights to the products of the human intellect, including inventions, written works, industrial designs and artistic works. The main accepted varieties of intellectual property rights are: patents, copyright and related rights, designs, trademarks and, more recently accepted, plant varieties. This paper is primarily concerned with patents, where a body of law has developed in the OECD countries with important differences between national systems. These differences may lead to difficulties in the exploitation of research results at the international level and can lead to particular problems in international research and development joint ventures.

A number of complex intellectual property rights issues define the background against which international collaborative efforts in research take place. These issues are of concern in all cases where international patents are sought and may not necessarily prove more serious for partners in collaborative research than for others. However, they may represent an additional parameter they will consider when deciding to embark, or not to embark, in joint research at the international level. Many differences in national intellectual property regimes have been or are being addressed through the TRIPs Agreement in the World Trade Organization, which has achieved considerable harmonisation of IPR approaches. However, some general issues relating to patent systems still remain, including (OECD, 1997):

- *filing rules and the diverging practices of first-to-file and first-to-invent systems;*
- *approaches to recognition of a “grace period”;*
- *different treatment and publication rules for patent applications;*
- *differences between the rules and practices of challenge to granted patents;*
- *insufficient recognition of the special patent requirements of some industrial branches;*
- *differences among government fees for obtaining patents, and*
- *lack of agreed regimes for international patent exhaustion.*

Complexity of collaborative research

The types of outputs, participants and goals sought by partners may be extremely varied in international collaborative research, resulting in a number of different combinations (*see Table 1*). Each collaboration will involve its own configuration of several types of participants with particular objectives. Consideration of these combinations reveals the variety of issues which may be faced by collaborative projects when negotiating intellectual property rights agreements. At present, intellectual property rights provisions are usually negotiated on a project-by-project basis among the participants to the joint research.

Table 1. Diversity of international collaborative R&D projects

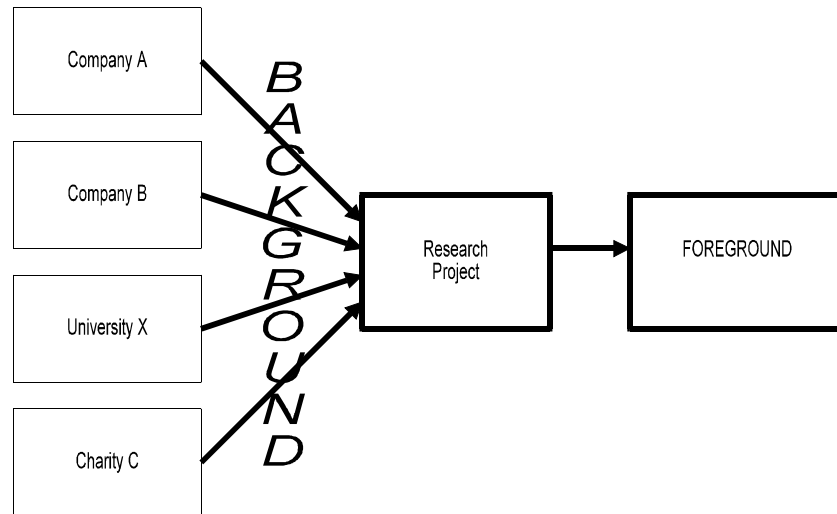
Types of expected outputs	Types of participants	Utilisation of results
IPRs, e.g. patents, copyrights, designs, confidential information, etc.	Commercial enterprises	Incorporation in new commercial products and processes
Commercially valuable information communicated by partners	Research organisations, e.g. research associations	Improvement of, or new usage for, existing products and processes
Relationships with other companies and organisations, e.g. suppliers or clients	Academic institutions, institutes, departments, laboratories, etc.	Use in internal company work, e.g. product development
Private (" <i>de facto</i> ") standards for use in industry or consumer markets	Government research establishments	Input for further research Publication in academic journals Financial asset, use in negotiation in alliances with other firms

Source: Cameron, 1997.

For example, a collaborative project may involve a hardware manufacturer, a software producer, an academic research group and a manufacturing "user". The hardware and software companies may intend to incorporate results in marketed products to sell them to a potential new customer (the user company); the user company gains from the focus on his specific requirements and will gain from the improved products (as well as, possibly, a favourable market price). The academic group receives research funding, training for researchers, academic publications and possibly some royalties or licence fees. It is important that the status and use of intellectual property rights (e.g. patents and copyrights) be specified in clear terms, as early as possible, in order to facilitate successful collaboration. The conditions under which the academic members may publish results should be agreed, and the ways in which research results will be legally protected must be detailed. Most importantly, ownership, access and rights of use to the patents should be set out in an agreement between the parties. Other questions concern the licensing of third parties and the conclusion of marketing agreements.

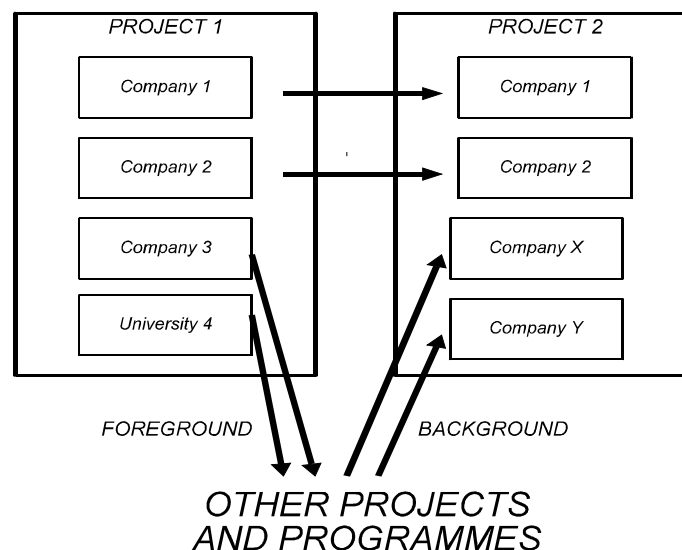
In another example, a group of large companies in an industrial sector may collaborate in order to produce an industry standard, perhaps the specifications of a physical interface between component modules, which could be patentable. This may involve user and supplier companies. The user companies may desire the widest dissemination of the specification in order to generate maximum benefits for themselves, perhaps implying free licenses. The supplier collaborators, however, will prefer to retain control over the standard in order to reap the maximum benefit, perhaps by selling licenses. Compromises must be sought in light of the state of knowledge and expectations at the start of the project, but there is no certainty that all difficulties will be anticipated, due to the uncertainty inherent in any research undertaking and/or to unforeseen changes in market conditions.

Other issues concern the use of *background* and *foreground* intellectual property. Each partner in a collaborative research project will bring to the project a bundle of competencies, knowledge and know-how. Much of this is protected by intellectual property rights of one form or another, often of considerable value. This background intellectual property brought to the project must be available for the use of other participants where appropriate, so this availability becomes one condition of the collaborative agreement. The agreement should also set the rules relating to the foreground intellectual property, namely the results of the R&D project (see **Figure 1**).

Figure 1. Background and foreground intellectual property

Source: Cameron, 1997.

There may be additional difficulties when collaborative research programmes or projects succeed each other, each having slightly different objectives and fields of interest, but somewhat overlapping. Several different sponsors may be involved simultaneously or at different stages. A set of projects may be succeeded by another set in a different programme, with some of the same members, plus some new ones, though they may have been “shuffled” to form new groupings within each project. Each programme may impose different intellectual property rights requirements, and individual projects may be allowed to negotiate additional terms internally. Differences in national intellectual property rights systems may also lead to complications and uncertainty. Under such circumstances, the foreground from one project may become the background for other new projects (**Figure 2**). Previous non-participants may have to negotiate rights to this information. A single company may have several different levels of access to intellectual property produced in various projects.

Figure 2. IPRs in successor collaborative projects

Source: Cameron, 1997.

Many programmes attempt to simplify this by giving rights of access across programmes, so that a participant in one project will have rights of access to certain types of intellectual property across the whole range of the programme. The European Union programmes provide an example of a set of rules designed for the management of intellectual property rights in the context of collaborative research programmes. They impose a standard set of conditions on participants in order to protect the public interest (*see Box 2*). However, the *European Union Model Contract* is usually tailored and modified by participants and may be subject to restrictions by sponsors in the form of a private collaboration or consortium agreement. In principle, the contract's conditions take precedence over the additional agreements, but there may be grey areas in which the intellectual property conditions are interpretable by all sides.

Box 2. The European Union Model Contract

Since 1984, the European Commission has consolidated the collaborative R&D programmes it sponsors into Framework Programmes. Among the conditions to be met by participants, there is increasing insistence upon the effective exploitation of research results, to the extent that exploitation plans must be submitted and agreed prior to funding. Detailed requirements concerning the treatment of intellectual property rights are included in a standard contract - often called the *Model Contract* - that is imposed on most projects and signed by Commission representatives and the full partners (or contractors) involved in the project. A separate contract (complementary contract) will be agreed between associated partners and any of the full partners, which is not subject to Commission scrutiny but must contain certain elements, in particular regarding intellectual property rights. The main aspects are (Cameron, 1997):

- ownership of background knowledge and patents are not affected, but granting of user rights for project purposes may be required;
- contractors involved in generating the foreground knowledge during the execution of the contract must agree on the ownership of foreground knowledge and patents.

The overall approach is to establish a balance between the rights of ownership and exclusivity gained from patents and the diffusion of technologies in the wider community. A number of clauses govern in particular the sharing of background and foreground information for the project R&D with Community and non-Community contractors, with due regard, in the latter case, to the interest of the Community as well as its business interests. Contractors who own foreground information and patents arising from the project must develop, commercialise or exploit these results within a reasonable period of time, in agreement with the parties to the contract. Each contractor is entitled to non-exclusive licenses and user rights, on a royalty-free basis, for the foreground information and patents generated.

MAJOR PATENT ISSUES

Differences in national patent systems, including such features as filing rules (e.g. *first-to-file* vs. *first-to-invent*), may cause difficulties for all research undertaken at the international level (OECD, 1997). However, there are a number of intellectual property-related issues which may have more significant effects on international collaborative research projects than on other types of innovative activities. This is due to the fact that these projects pull together different firms from different countries as well as different types of institutions with different practices in the management of intellectual property. The IPR environment for international collaborative R&D projects may not be geared to this heterogeneity and have difficulties meeting the needs of large firms as well as small firms, industries as well as universities or government research institutions. A distorted framework may result that does not encourage certain types of research and development or yields excessive rewards for some participants at the expense of others.

Intellectual property rights in international collaborative research also take place within a broader legal and regulatory environment, which can pose various barriers to undertaking and conducting joint research. These IPR-related difficulties can result from the broader context of competition laws, tax regimes or contract laws. Problems may arise in these areas due to an uneven recognition of the specific constraints and requirements of research and development joint ventures at both the national and international levels and their economic and political context.

Assignment of patent rights

Differences in the potential claims of employees of the organisations, institutes and companies involved in joint research to the rights resulting from the research may generate a host of complications for collaborative research ventures. This is an area where countries have a range of practices with different types of policies designed to encourage and reward innovators (*see Table 2*). Such laws generally regulate: 1) who owns an invention made by an employee and thus who receives the patent rights, and 2) whether or not the employee should receive a reward over and above their normal salary for making a successful invention for their employer. Under UK law, for example, inventions made in the course of employment belong to the employer – the company or institute. In contrast, under German law, they belong to the employee and, if necessary, have to be claimed by and transferred to the employer.

Rules concerning the assignment of patent rights also differ depending on whether the research in question has been publicly supported (and to what extent) in universities or government research institutes and laboratories. In some countries, such as the United States, government-supported research results from universities accrue to the institution which has the option to license such rights to the most appropriate developer. In other countries, the government holds all patent rights arising from publicly-sponsored research. And in still others, intellectual property rights accrue to the individual researcher or inventor even in the case of publicly-funded research, particularly in the case of universities. In countries such as Canada, policies with respect to the ownership of patent rights by inventor and/or employer as well as the reward systems differ at the institutional level, even within the public sector, where they may vary by

university. Such divergences in the practice of assignment of property rights and the ability to license such rights to developers can only further complicate the development of IPR frameworks for international joint research.

Table 2. National inventor reward schemes

No scheme:	Have such a scheme:
Australia	Austria
Canada	Denmark
Italy	France
New Zealand	Germany
Switzerland	Finland
United Kingdom	Japan
United States	Netherlands
	Norway
	Spain
	Sweden

Source: OECD Secretariat.

In international joint research ventures, the diversity of practices of countries and institutions in this area can also lead to different incentives and costs for participants. The main argument for assigning patent rights to individuals or employees is that they encourage innovation. However, there is no evidence that those countries which reward employee inventors have a higher degree of inventive activity than those which do not. There are other rewards than financial ones, for example in terms of promotion, careers and recognition, which are particularly important for researchers. There have been attempts to diversify the reward system, for example in universities where rewards tend to be based on publications alone, to take into account patents and applications of research results. Different reward systems also impose different costs. Companies may realise significant administrative costs in transferring patent rights from employees. Companies may take these costs into account when determining whether and where to engage in collaborative research.

Criteria for patentability

If an international co-operative venture is intended to lead to exploitation in the differing jurisdictions involved, as opposed simply to joint research with exploitation in only one country or possibly a third country, then the criteria for patentability in the various jurisdictions will be important. In the member states of the European Patent Convention, a reasonable degree of harmony has been achieved with regard to these criteria. Also, Article 27 of the TRIPs Agreement contemplates uniform criteria for patentability, compulsory for all member states of the WTO. Harmonisation through the TRIPs Agreement has been far-reaching and provides that “*patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application.*”

Some differences, however, remain. For example, in the United States, software has become more generally patentable than under the European Patent Convention. However, both in the *Green Paper on the Community Patent and Patent Protection in Europe* and in the debates on the revision of the European Patent Convention, the need for stronger protection of software has been expressed. The same problem exists in relation to other technological fields, notably the developing area of biotechnology where the United States has generally been less restrictive in its approach to patentability than the European Patent

Office. Also, in some developing countries, pharmaceutical products and plant varieties may be unprotected. Here, Article 27 of the TRIPs Agreement and the European directive on the protection of biotechnological inventions should help resolve the situation. In general, patentability criteria questions are being addressed through the TRIPs Agreement and the situation should improve in the foreseeable future at the end of the current transition period towards implementation of the TRIPs recommendations.

Disclosure rules

International research efforts may find it difficult to adjust to diverging national practices with respect to disclosure of invention-related information, in particular, when the research team includes scientists from countries with *grace periods*. In almost all countries, there is a rule that a patentable invention must be novel, and any prior disclosure destroys novelty, and therefore patentability. There can also be problems where publication takes place before a priority date has been secured, because this may be cited as prior art against additional subject matter sought to be added to the original application.

In the United States, where the rule is that entitlement to a patent is based on a *first-to-invent* criterion, rather than *first-to-file*, a grace period is allowed whereby disclosure up to 12 months before application will not destroy patentability. Other countries have adopted similar practices. The main practical objection to a grace period is that it imposes uncertainty. For example, institutions and companies entering into co-operative research ventures normally do background research on the state of the art, including a search of the scientific literature and patent databases. In grace period countries, it will not be known for months whether a patent application is going to ensue from certain journal articles or data. In the case of collaborative ventures, researchers in grace period jurisdictions need to be enjoined from premature disclosure as much as researchers in non-grace period jurisdictions. This is because their employers will be unable to obtain patents in non-grace period jurisdictions if there has been prior disclosure.

The problem of premature disclosure is frequently met in the case of technology being developed in universities, where keeping research results secret is often alien to tradition. The problem is exacerbated by the facility with which information can be exchanged by communications networks such as the Internet. Furthermore, academic advancement is still to a considerable extent based on scholarly reputation, and this is achieved through publication. This can have major implications for collaborative projects because an academic participant may well pursue other lines of research in a purely academic context without being aware of the potential connection with his joint venture commitments. This has prompted some industrial participants to a collaborative effort to request oversight on all publications envisaged by the university department of an academic colleague.

However, investment in university research by companies is increasingly important, and in recent years, many academic institutions have also established companies to exploit intellectual property generated by their research. Accordingly, they have taken steps to educate their employees in the need to observe secrecy until after a patent application has been filed. Nevertheless, inadvertent disclosures do occur: for example, an unsuccessful line of research will be outlined in a conference paper, but the researcher will then indicate what he or she expects to be a more successful route, with implications for patentability. Another example relates to “cutting edge” research carried out by universities, where it can be difficult to identify the potential of a new discovery until details are published, but again publication may hinder patentability. This is often referred to as a “*revolving door*” problem.

Protection of confidential information

The related problem of protecting confidential information on the part of all parties to joint research can also inhibit research and development co-operation at the international level. Obviously, it is important to keep information confidential during research leading to a patentable invention. A legal regime may be needed which will prevent employees from disclosing to competitors information they learn in the course of their employment and during the joint research. This regime can be civil or criminal, or both. However, over-protection of such information can have a tendency to detract from the incentive to publicise inventions which is one objective of the patent system. English law has sought to achieve a balance by affording stronger protection while a person is employed and protecting a restricted range of information after the employee ceases to be employed. The principle that the ex-employee must be free to apply the skills acquired whilst working for the ex-employer comes into play.

For present purposes, the existence of provisions which will protect information during joint research and development is significant. As noted above, the problem of premature disclosure may be most acute in the case of universities. Here, the problem is exacerbated by the presence in laboratories and other installations of research students and ordinary students, who are not employees of the university and who may owe no duty of confidence to the university. In consequence, it is essential that those non-employees working on research projects sign confidentiality undertakings and that those undertakings should be enforceable in the particular jurisdiction concerned. Successful management of joint research ventures will also involve a process of designing, staffing and monitoring the collaborative interface to balance the requirements for learning and information-sharing with protection of intellectual capital (Baughn *et al.*, 1997).

On the practical side, if it is possible to keep information completely confidential, then it does not matter what legal regime is in place. Even if there is no protection at all in law, the information will be secure to its possessor. This strategy is of no use where the information can be discovered by an analysis of the product itself. For example, pharmaceutical products are usually easy to analyse, and this confines the use of trade secrets in that industry largely to processes. In general, consideration of confidentiality requirements is important to joint research ventures which are often between larger companies, small firms and universities and where the know-how is often accrued by the larger company which may take the decisions as to patenting.

Costs of patenting

The costs of patenting may discourage prospective participants from embarking on international collaborative research projects. While it is true that co-operative research ventures involve cost-sharing arrangements, these usually relate to the R&D project itself. The cost-sharing element does not necessarily extend to the subsequent steps involved in securing protection of the research results. The responsibility for patent application may in principle fall to one of the partners that owns the decisive background information. The choice might then be whether to cover the large costs involved in patenting (and possible litigation) even though the first income from application and/or licensing might still be many years in the future.

Problems relating to costs are relevant to both large and small firms involved in joint research. However, the rules governing patenting and collaborative projects may call for greater flexibility to ensure more balanced treatment of the smaller partners. The quandary for small firms is that they may neither afford to participate nor not to participate. On the one hand, participation is expensive. On the other, non-participation entails the danger of losing touch with the field and ongoing research. Participation,

however, has a cost in terms of finance, and also in terms of background knowledge to be shared with others. There are examples of smaller firms thus “forced” to become involved in an international collaborative project that found themselves unable to meet the financial conditions required to protect their background information effectively and to cash in on the results. In such a case, the project will have been to the benefit of the partners, and the very existence of the small firm may be threatened. Universities too may not be able to accommodate the costs of obtaining and maintaining patent protection in the absence of private sector partners, which raises issues regarding partnerships with enterprises, establishing start-up companies and treating results from publicly-funded research.

The costs of patenting, including the costs of enforcement, are not only high but also differ widely among jurisdictions. Some of these costs are unavoidable, such as the costs of translating specifications into national languages. The difficulties experienced in implementing the Community Patent Convention since 1977 – partly due to translation requirements – underline that there is no easy solution. Patents confer exclusive rights, and it is argued that it is unfair that the nationals of a particular country should be liable for infringements of patent claims they cannot understand. The European Commission is trying to find a way around the difficulty and has recently published a *Green Paper on the Community Patent and Patent Protection in Europe* which may offer a solution of possibly wider application. Other costs are not so obviously unavoidable; obtaining a patent in most countries remains both slow and expensive.

Exploitation of research

Collaborative research ventures must establish provisions for the exploitation of background and foreground intellectual property, which may be subject to differing rules and practices at the national level. However, it should first be noted that the TRIPs Agreement has gone a long way in generally resolving problems concerning the exploitation of patents in providing that patents “*shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced.*” *Background intellectual property* can be defined as information, patents, designs, software, proprietary information and all other intellectual property (excluding the results of the project itself) which a participant owns or has the right to use, has contributed to or made available to the project, and is necessary to the progress of the work or to exploit the results of the project. In general, the ownership of background will not be affected by use in a project. Products marketed before the project begins would clearly not be affected, though favourable conditions may be negotiated for their use during the project’s activities. Any exploitation of results by one participant may be dependent upon the use of background owned by other participants or even non-participants. However, use agreed only for the purposes of the project *does not* imply use for the purpose of exploitation.

Contractual conditions relating to background intellectual property will normally include, therefore: 1) ensuring that all such background as may be necessary is disclosed and defined at the beginning of a project or as soon as its importance becomes apparent; 2) ensuring that the project has rights to use the background rights for the purposes of the research project; and 3) agreement to maintain the confidentiality of other programme participants’ proprietary information. In addition, participants may have to agree that the company may only use the background donated by other partners for the purposes of the project in question, and will not pass it on for other purposes, even within the company itself. Though usually background is provided by its owner for research use within the project, subsequent use for exploitation may require a licence, and thus payment. Research agreements may thus contain rights to: 1) use of all other partners’ background to the extent that it is necessary to exploiting the results of the immediate project; and 2) the right to obtain a licence on “fair and reasonable terms”.

Foreground intellectual property means the information, patents, designs, software, proprietary information and all other intellectual property which are generated by any member, or sub-contractor, of a collaborative project in the execution of the specific contract. Normally, the foreground will form the basis of the eventual exploitation of the results of a project. Various regimes may be possible to deal with exploitation of foreground intellectual property. Ownership may be allocated on the basis of generation of results or in proportion to the funding by participants. Or, ownership may be pooled for attributability reasons. All participants may have the right to exploit these results (i.e. those owned by other participants as well as their own). This may require the cross-licensing of the foreground results of each partner. However, experience has shown that such cross-licensing may not be appropriate (and therefore the free use of all project foreground by each partner is preferable) because:

- *It can be a very cumbersome and complex task to decide exactly which partner produced a particular result, when in a good collaborative project all the members will have meshed their work together in such a way that attempts to trace the exact origins and contributors to a particular result are not meaningful.*
- *In projects where each participant follows a different route to the solution of a particular problem, it is not appropriate for the one which is successful to gain the rights over the main project results, while the others must pay for licences. This also leads to disagreements over which participant is allocated the most promising route to the solution.*

Several other complications may arise in the exploitation of foreground. Not all participants have the intention, or capability, of exploiting results by means of marketed products, e.g. small companies, or they may not wish to exploit, except insofar as they need to use the results for further research, e.g. academics. Some participants may wish to have (preferential) access to the marketed product. Such partners may be compensated in various ways, such as royalties from licensing, free use for research only purposes or reduced prices for products. Members not directly exploiting research may wish to sub-licence or sub-contract production using the results. However such production may be in direct competition with other members of the project. This may be prevented by the exclusion of sub-licensing, or by a “*major business interests*” clause, which prevents members acting against the interests of other members.

Another concern which must be addressed by the contract is the consequence of the withdrawal of a partner to the joint research. The background donated by the partner, and the foreground produced by the partner, should all remain available to the continuing project. Often the terms upon which such foreground remains available will be less advantageous than would have been the case prior to withdrawal, for example, licence fees may be waived. It will also have to be available to subsequent replacement partners. Also, if the contribution to be expected from the defaulter is sufficiently important to impede the progress of the project, the partner may be required to pay additional penalties, at least until a replacement is found.

In addition, there are inconsistencies among national systems regarding the location of the inventive activity and the location of the patent application. In some countries, nationally registered firms are required to file patents domestically regardless of where they conduct research and development. Some countries require first patent applications when the research and development is conducted within their jurisdiction. The rules in question may be applied generally within a country, or they may be linked to the participation of government sponsors in the project. This is especially relevant to collaborative research and development, in which public funds may be involved, for example, through the funding of university research, through the provision of matching research funds to a firm, or through the participation of a government research facility.

In view of the increasing level of international collaborative research, rigid national rules regarding exploitation of background and foreground knowledge as well as the locale for exploitation of research results must be seen to be increasingly inappropriate and unworkable. In general, a great deal of flexibility is required by firms in collaborative undertakings to free them to file patents, exploit research results and license inventions to the mutual benefit of all parties to the research. It is often useful to appoint a single agent to negotiate on behalf of multiple owners of patent rights resulting from collaborations in order to expedite the exploitation process and resolve any problems, either for joint research within countries or across countries. Excessive government constraints formulated from the outset – when the outcome of the envisaged research is uncertain and the economic and market implications far from clear – will discourage research and development co-operation or affect the choice of location for the research.

Litigation and enforcement

The decision to locate a collaborative research venture, and subsequently the choice of markets for patent applications, may be affected by enforcement rules and practices that will determine which jurisdiction will be competent in the event of litigation by third-parties. The costs of litigation differ significantly by country. In addition, some countries do not have expert patent judges, and there may be an incentive for plaintiffs with dubious cases to sue in those jurisdictions in the hope that the judge will miss weaknesses. This can lead to the practice of “*forum shopping*” which can also affect decisions regarding international collaborative research. The complexities of enforcement practices at the international level possibly play a role in preventing some R&D joint ventures from forming and also in shaping marketing strategies.

In Europe, for example, according to the Brussels Convention, the defendant must be sued in the courts of its domicile; an alternative is that the defendant may be sued in the jurisdiction where the events giving rise to the harm occurred. Because goods circulate around the European Union, this in practice usually gives plaintiffs a choice of jurisdiction, and it is clear that litigants are exercising choice using a variety of criteria to evaluate jurisdictions, of which cost is one. A further important exception to the domicile rule is that provisional relief can be sought in the courts of any member state. Under this provision, the High Court in the Hague has promoted its *korte geding* procedure as an inexpensive and expeditious procedure for litigants from other Contracting States to the Convention. The results of these pressures have perhaps been most marked in the Patents Court in London, which has both formally and informally tightened and expedited its procedures.

The situation is very different in Japan and the United States. In Japan, litigation is considered as an extreme and unwelcome action, entailing a loss in business reputation. Patent infringement suits are rarely considered; negotiated settlements are almost always concluded. In the United States, litigious actions are far more common. In 1990, there were over 1 200 patent infringement suits in the United States, compared with 141 in Japan. Little business risk is involved in bringing an action in the United States, and to outsiders it may even seem that infringement, and litigation, are seen as legitimate and acceptable business strategies. The damages awarded in the two countries also differ considerably. In the United States, triple damages are sometimes awarded, while in Japan the awards are little more than the license fees which would have been payable. However, with the recent revision of the Patent Law, the damage calculation system has been improved. Therefore, the awards are expected to increase considerably in Japan. Companies are often better advised to settle for negotiated license fees rather than pursue litigation – all the more so since the costs of patent litigation in the United States seem to have continued to escalate. It is now by far the most expensive jurisdiction in the world in which to litigate patent suits. And because many actions are tried by juries, it can be one of the most unpredictable in terms of outcomes.

As far as co-operative research ventures are concerned, it is possible to avoid litigation in the United States either by providing for some alternative dispute resolution procedure such as arbitration, or by a choice of law and jurisdiction clause which specifies a country other than the United States. This does not help, however, in related actions against third parties. It would be normal to leave the obligation to sue infringers to the party in the jurisdiction where the infringement has occurred, but if that party is an institution such as a university, it may not have the resources needed to take action. Many of these practices – and in particular jury trials in the United States – have been criticised by participants to collaborative R&D projects because they increase the uncertainty and unpredictability of research activities. Collaborative R&D and patenting is only one of the alternatives open to firms, who may choose to operate alone or with selected partners, and to favour secrecy over patents to minimise the risks.

Competition law

Joint R&D ventures are typically intended to bring together complementary inputs and stimulate innovative activities to introduce new technologies and products. In competition policy language, they tend to be “vertical” in nature. However, it is possible that R&D agreements may extend into using intellectual property to create or strengthen a cartel or to permit participants to jointly restrain actual or potential rivals. The probability of there being such anticompetitive “horizontal” effects is particularly great where an R&D joint venture brings together the leading competitors in a market. From time to time, various competition agencies have issued guidelines to clarify why certain types of collaborative R&D might be prohibited under competition law. Perhaps the earliest of these guidelines was produced in the United States, which set out a general approach showing three types of effects which research joint ventures could theoretically have on market competition (US Department of Justice, 1980):

- *when the association would lessen existing or potential competition between the participating firms;*
- *when the joint venture agreement or related agreements contain restrictions that restrain competition; and*
- *when limitations on participation or access to the results of research create or abuse market power.*

In order to fully appreciate how competition policy affects both national and international collaborative R&D, it is necessary to extend examination to include the more general question of how competition policy treats intellectual property rights. As with competition policies more generally, countries seem to be adopting broadly similar approaches though some interesting differences can be cited. For example, there is variation in the willingness to use compulsory licensing of intellectual property rights to solve competition problems or to allow licences which establish exclusive territories. Less significant differences appear as well in the treatment accorded to grantbacks and price restriction clauses commonly found in patent licences.

However, international differences in competition policy are probably not a significant deterrent to international R&D collaboration, although they will clearly constrain it to what is permitted in the strictest enforcement country. Generally speaking, competition authorities in all countries recognise the power of innovation to create new competition and should appreciate that international collaborative R&D could contribute to such innovation. Moreover, they all pay due respect to statutory intellectual property rights and do not automatically assume that such rights confer dominant positions which could be dangerous for competition. On the other hand, competition authorities everywhere can be expected to be on their guard against the anticompetitive potential mentioned earlier, especially as regards collaboration among close

actual or potential competitors. They will quite naturally be interested in the modalities of co-operation and any agreements concerning how the results are applied.

Tax regimes

Many research joint ventures are intended to result in cross-licensing of patent rights, and if one partner has to deduct tax at the source from royalty payments, but the other does not, there will be differences in the benefits accruing to different parties to the research. Even greater taxation difficulties result from the fact that co-operative ventures may involve setting up a new jointly-owned company, which will have to be formed under a particular national law. Tax law will be a consideration in deciding where to locate such a company and could influence where to undertake the original research. This may be particularly true in the case of start-up firms involved in emerging technologies such as biotechnology and software.

More generally, tax regimes may affect the global flow of information within companies and between partners. National tax authorities may require that intangibles such as R&D results and patents be accounted as products – and thus priced by market standards – when they are transferred from one subsidiary to another or from one firm to another. This practice must be set against a world trend towards rapid growth of royalty rights, which influences estimates made for taxation purposes. Firms may also be required to provide fiscal authorities with large amounts of information; industry may be concerned about ensuring the confidentiality of this knowledge and fear that it will find its way to competitors. There is evidence that firms have terminated their technological co-operation with other firms due to such confidentiality concerns.

Related to this is the problem of differing national (and state/regional) accounting requirements. For example, some countries require worldwide accounts for the legal entities of which the new company is part, which can lead to tax being levied on the profit of the co-operative ventures as well as the joint venture company. More transparent regulation might be required at the international level to clarify such situations and make it easier for prospective research partners – particularly smaller firms which do not have the resources to afford expert advice – to make strategic choices on involvement and exploitation of research results on the basis of economic considerations rather than fiscal technicalities.

Contract law

Joint research ventures may involve different types of partners, including small and medium-sized enterprises, corporate headquarters of large multinational firms or their subsidiaries in foreign countries, government research establishments or agencies and members of academic institutions. It is not always easy, in such an international setting, to ascertain the legal nature of the entity, or the identity of the person, who is empowered to commit the resources and information of an institution in conformance with domestic laws. Additional uncertainty relates to the extent to which the entity or person is fully cognisant of all the relevant background knowledge available within, for example, the company. The likelihood that lack of transparency in these respects might subsequently lead to conflict argues for an international attempt to foster greater clarity and more explicit terms of liability to resolve differences when a contract is challenged for such reasons.

Research co-operation involving universities is especially difficult in this respect (Economic and Social Science Research Council, 1996). For example, while inventions made by staff in the course of their employment will belong to the university in many countries, there is the problem that many non-employed persons, such as research students, may have contributed to the invention in a significant way. It cannot

be assumed that the contracting university will be able to require students to comply with the contract in question. Governments and courts in some countries have attempted to deal with such issues based on approaches such as a requirement of good faith, or equity, especially where individual contractors are concerned. These notions remain vague, however, and their introduction into commercial contracting could undermine the predictability which is essential in successful joint ventures.

CONCLUSIONS

Appropriate levels of intellectual property protection can be a powerful instrument for stimulating innovation, economic development and export growth while also promoting the diffusion of new technologies. In order to maximise innovation, industry requires a high level of intellectual property protection, including low-cost acquisition, maintenance and enforcement of intellectual property rights and non-discriminatory regimes conducive to full market access for intellectual property-protected products throughout the world. This, however, must be balanced against the need for maximising the diffusion of new technology through setting appropriate levels of patent protection. The globalisation process also calls for increased attention to the international dimension of intellectual property, and particularly patent, regimes. Increasing demands have been voiced by industry to ensure that (Business and Industry Advisory Council to the OECD, 1997):

- *all countries set high and effective standards of intellectual property protection and enforcement in their national laws;*
- *all countries recognise the special intellectual property needs of industrial sectors whose inventions, because of regulatory requirements, reach the market place with considerable lags after patent grant; and*
- *intellectual property protection is continuously maintained in a context of rapid technological change.*

Collaborative research and development efforts have a central place in these concerns within the context of globalisation. They pull together complementary inputs and thus enhance the effectiveness of research at the international level. They increase the breadth and speed of diffusion of new technologies, in view of their international membership. Encouraging such endeavours has become a high priority for national science and technology policies.

However, these efforts are constrained by a number of differences and discrepancies between national intellectual property rights regimes, ranging from the rules governing disclosure of information to the exploitation of research results. Other legal and regulatory differences also affect international joint ventures in R&D due to the fact that the specific constraints are not recognised (e.g. taxation) or to long-standing differences in legal approaches. Problems arising as a consequence of differences between national approaches may affect the willingness of firms to engage in collaborative international research, the design and effectiveness of the joint ventures, the likelihood that the results will be effectively and rapidly exploited to yield benefits to users and consumers worldwide, and the extent to which these results will serve as stepping stones for further technological advances. The combination of factors stemming from differences in national intellectual property rights regimes may work against the prime goal of these regimes – namely, to foster innovation, encourage its commercial exploitation, stimulate further technological progress and, ultimately, promote economic and social development.

The issues identified above show that international research collaboration is a complex undertaking, and potential participants must make decisions regarding balancing the advantages to be gained with the

difficulties and the uncertainties which are often faced. The commercial uncertainties are substantial (potential leakage of intellectual property, default of other participants, risk of failure, etc.). Yet the advantages of research joint ventures to firms and to the global economy may be substantial in the form of more rapid technological development.

The search for solutions to problems currently encountered by international collaborative research projects should go hand in hand with broader attempts to seek greater harmonisation among national intellectual property rights regimes, and particularly patent systems. Such attempts are being made in the context of the World Intellectual Property Organization and the WTO TRIPs Agreement. However, new internationally recognised norms concerning intellectual property may be needed to reflect increasing trends to globalisation as well as the particular circumstances of industries in rapidly evolving or new technological areas. Efforts are required to develop procedures that will balance the interests of intellectual property owners and users as well as the needs of national and international actors.

BIBLIOGRAPHY

- ADAMS, J. (1997), "From Research Co-operation to Patents: Regulatory and Practical Obstacles", report for the OECD Directorate for Science, Technology and Industry.
- BAUGHN, C. *et al.* (1997), "Protecting Intellectual Capital in International Alliances", *Journal of World Business* 32, p. 2.
- BUSINESS AND INDUSTRY ADVISORY COUNCIL TO THE OECD (BIAC) (1997), *Statement on Intellectual Property Rights and Innovation*.
- CAMERON, H. (1997), "International Collaborative R&D and Intellectual Property Rights", report for the OECD Directorate for Science, Technology and Industry.
- ECONOMIC AND SOCIAL SCIENCE RESEARCH COUNCIL (ESRC) (1996), Socio-Legal Conference on Contract, Co-operation and Competition, London.
- OECD (1996), *Intellectual Property, Technology Transfer and Genetic Resources: An OECD Survey of Current Practices and Policies*, OECD, Paris.
- OECD (1997), *Intellectual Property Rights: Patents and Innovation in an International Context*, OCDE/GD(97)210, OECD, Paris.
- US DEPARTMENT OF JUSTICE (1980), *Anti-Trust Guide Concerning Research Joint Ventures*, Washington, DC.